New York State Department of Environmental Conservation

Division of Environmental Remediation • 625 Broadway, 12th Floor • Albany, New York 12233

Remedial Construction Report

Luzerne Road Site
Warren County
Queensbury, New York
Site No. 5-57-010

January 2010

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Executive Summary

This report documents the activities of construction Contract D006759, the implementation of the Operable Unit (OU) 2 Remedial Design for the Luzerne Road Site (Site No. 5-57-010) in general accordance with the Record of Decision (ROD) for OU-2 and OU-3, as issued by the New York State Department of Environmental Conservation (NYSDEC) in March 2005 and modified by an Explanation of Significant Differences in February 2008.

The Luzerne Road Site is located in the Town of Queensbury, Warren County, New York, as indicated on Figure 1. The Site consists of the following two adjoining land parcels:

- An eight acre parcel at 51 Luzerne Road, which is owned by the State of New York, and, at the beginning of the project, was the locus of the 2.7 acre Containment Cell;
- The 1.2 acre northern portion of the 53 Luzerne Road parcel, which is privately owned.

Through a number of investigations, contaminated media purportedly associated with the Site were identified on areas beyond the historically recognized Site boundaries. The Contract Documents for the Project included a Limit of Work (LOW) for the remedial activities at the Site. This LOW encompassed the Site, as well as the following:

- Portions of 53 Luzerne Road and 55 Luzerne Road, two privately owned parcels to the west and southwest,
- Portions of City of Glens Falls-owned properties to the north, including the Old Glens Falls Landfill, a Class 2 Inactive Hazardous Waste Site (Site No. 5-57-003), and
- The entire 4.3 acre undeveloped property to the east of the Site that is owned by the Greater Glens Falls Development Corporation.

Figure 2 depicts the property boundaries on and adjacent to the Site.

The Site was historically a scrap and salvage yard for automobiles, machinery, and other industrial equipment. Salvaging operations of capacitor equipment performed from the 1950's through the 1970's on the northern portion of the 53 Luzerne Road property resulted in the discharge of Polychlorinated Biphenyls (PCBs) to surface and subsurface soils. As a temporary measure to stop PCB volatilization and prevent direct contact, the United States Environmental Protection Agency (USEPA) granted approval for

construction of the Containment Cell for contaminated materials. In 1979, a clay-lined cell was constructed by the NYSDEC on the northern portion of 51 Luzerne Road. Visibly contaminated soil and other contaminated materials removed from areas of the Site were subsequently placed in the Containment Cell. The Containment Cell reached its capacity before the excavations of contaminated soil were completed. Thus, contaminated soil was left in-place in a two acre area on the north ends of 53 Luzerne Road and 55 Luzerne Road.

In 1995 leachate levels within the Containment Cell decreased unexpectedly, suggesting the possible presence of a leak in the cell liner. A Remedial Investigation (RI) of the Site was conducted by Ecology and Environment Engineering, P.C. (E & E) from July 1999 to March 2001. Supplemental groundwater sampling was performed in 2002 and 2004. A Remedial Investigation (RI) Report for the Site was prepared for the NYSDEC by E & E in August 2002. The following presents a summary of the major RI findings, as presented in the RI Report and the subsequent Feasibility Study (FS) Report, also by E & E:

- Surface Soil. The southern portion of 51 Luzerne Road contained widespread PCB contamination in surface soil.
- Subsurface Soil. PCB-contaminated subsurface soil was identified in the parcels comprising 53 Luzerne Road, 55 Luzerne Road, portions of the City of Glens Falls property immediately north of those parcels and the southern portion of 51 Luzerne Road. PCBs were detected to depths of 24 feet below ground surface on the 53 Luzerne Road and 55 Luzerne Road parcels. The volatile organic compounds (VOCs) xylene and methylene chloride were identified in some subsurface soil at very low concentrations.
- Groundwater. PCBs were found in groundwater beneath the Site ranging from 13 to 24 feet below ground surface (bgs) at upgradient locations and 22 to 35 feet bgs at downgradient on-site locations. PCBs were detected at depths of 40 to 55 feet bgs at off-site locations. However, PCBs were not detected in groundwater collected from the 91 to 96 foot depth interval off-site, which is consistent with on-site groundwater data from similar depths.
- Sediment. Field sediment samples did not contain detectable PCB concentrations based on a PCB screening analytical method having a10 milligrams per kilogram (mg/kg) detection limit.
- Residential Surface and Subsurface Soil. Several events of residential surface and subsurface soil sampling were conducted. Collectively, they indicated PCBs were present at concentrations requiring immediate action. NYSDEC executed an Interim Remedial Measure (IRM) in which PCB-containing soil was removed.
- Site Characteristics. Medium-to-fine sands underlie the Site from grade to a depth of approximately 85 to 95 feet bgs. The sand is underlain by a clay layer of unknown thickness; depth to clay varies across the Site as the clay layer dips southeast.

Bedrock was not encountered during Site drilling activities. Groundwater flow is to the southeast. The geometric mean of hydraulic conductivity values was calculated to be 6.2 x 10-2 centimeters per second (cm/sec) in the shallow saturated zone; 1.43 x 10-2 cm/sec in the intermediate zone; and 1.3 x 10-3 cm/sec in the deep saturated zone. Groundwater velocities are estimated to range between one to six feet/day.

The RI data were compared to the Site Clean-up Goals (SCGs), which were based on the following:

- Soil. NYSDEC's "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Clean-up Objectives and Clean-up Levels." which are 1 mg/kg of total PCBs at the surface (down to one foot below grade) and 10 mg/kg of total PCBs in the subsurface (one foot below grade and lower);
- Water. NYSDEC's "Ambient Water Quality Standards and Guidance Values" and New York State Department of Health's (NYSDOH's) "Part 5 of the New York State Sanitary Code."
- Sediment. NYSDEC's "Technical Guidance for Screening Contaminated Sediments."

Remedial goals for the Site were established through the remedy selection process in 6 NYCRR Part 375-1.10. They included eliminating or reducing to the extent practicable:

- Exposures of persons at or around the Site to PCBs in the surface and subsurface soils,
- Environmental exposures of flora or fauna to PCBs in the surface and subsurface soils,
- The release of contaminants from soil to groundwater that may create exceedances of groundwater quality standards, and (to)
- Reduce further off-site migration of contaminated groundwater to the extent practical.

Based upon the results of the comparisons of data to the SCGs and the identification of potential public health and environmental exposure routes, certain media and areas of the Site were found to require remediation.

An FS was performed by E & E and completed in May 2004. In the ROD for the Site submitted in March 2005, the NYSDEC, in consultation with the NYSDOH, selected a remedy for OU-2 and OU-3. The overall remedy described in the ROD includes:

- Development of a remedial design program of the selected remedy in the ROD.
- Removal of the PCB Containment Cell and excavation of the on-site contaminated surface soil to 1 mg/kg (part-per-million or ppm) and subsurface soil to 10 mg/kg.

- Installation of a demarcation layer over subsurface soils that are residually contaminated above 1 mg/kg.
- On-site treatment of excavated materials using thermal desorption. Treated soil will be used to backfill the excavations.
- Development of a Site Management Plan to address residual contaminated soils that may be excavated from the Site during future redevelopment.
- Institution of a NYSDEC annual certification requirement for institutional controls and engineering controls at the Site, to be completed and submitted by the property owner.
- Imposition of an institutional control in the form of an environmental easement that:
  - requires compliance with the approved Site Management Plan;
  - limits the use and development of the property to commercial, industrial, or recreational activities;
  - restricts the use of groundwater as a source of potable or process water without necessary water quality treatment as determined by the NYSDOH; and
  - requires the property owner to complete and submit the annual certification to the NYSDEC.
- Long-term monitoring of the groundwater to evaluate the effectiveness of the source removal and treatment of the PCB-contaminated soils.

In April 2006, Malcolm Pirnie, Inc. was authorized by the NYSDEC to develop an engineering design for the remedial elements listed in the Record of Decision. During the period June 2006 through January 2008, three separate Remedial Design Studies were completed to provide data to supplement that which had been collected during the RI. These studies included:

- Soil sampling in June 2006 to further characterize the nature and further delineate the extent of PCB contamination in soil located in the South Area and the southern portion of the West Area, including adjacent to the furniture warehouse at 53 Luzerne Road. Also, geotechnical testing of Site soil to determine its physical properties prior to and after thermal treatment;
- Soil sampling in March and April 2007 to further characterize the nature and further delineate the extent of PCB contamination in soil on, in, and under the Containment Cell. Also, supplemental surface soil sampling to further characterize the nature and further delineate the extent of PCB contamination at the southeastern and eastern limits of the South Area. In addition, measuring water levels in on and off-site groundwater monitoring wells and leachate levels in the Containment Cell; and
- Soil sampling in January 2008 to further characterize the nature and further delineate the extent of PCB contamination in soil on, in, and under the Containment Cell.

- The results of the Remedial Design Studies were compiled in a Limited Supplemental Site Investigation Summary which was published by Malcolm Pirnie, Inc. in February 2008.

Contract Documents for the remedial elements were completed in October 2007. Due to the lack of responsive and cost-effective bids, the NYSDEC was precluded from awarding the original Contract. An Explanation of Significant Differences (ESD) to allow off-site disposal of contaminated material at concentrations greater than 50 mg/kg was prepared in February 2008 by the NYSDEC. The Contract Documents were revised to reflect that change and, in February 2008, the revised Project was let for bid. The Contract Documents contained the following summary of the work to be done on the Project:

The Work to be performed under this Contract includes, but is not limited to the following:

1. Provide construction support and health and safety facilities;
2. Clear and grub the areas of Work;
3. Excavate PCB-contaminated soil and materials;
4. Thermally treat contaminated soil determined to contain PCBs at concentrations less than 50 mg/kg (Non-TSCA Soil) to remove PCBs to concentrations less than 1 mg/kg;
5. Backfill successfully-treated Non-TSCA Soil on-site;
6. **a. ALTERNATE A:** Thermally treat contaminated soil determined to contain PCBs at concentrations greater than or equal to 50 mg/kg (TSCA Soil) to remove PCBs to concentrations less than 1 mg/kg and backfill successfully-treated TSCA Soil on-site; or

   b. ALTERNATE B: Dispose contaminated soil determined to contain PCBs at concentrations greater than or equal to 50 mg/kg (TSCA Soil) at an off-site location;
7. Dispose contaminated clay soil, construction debris, and other wastes off-site;
8. Dispose non-contaminated debris off-site;
9. Decommission and install monitoring wells;
10. Provide backfill to restore the Site to finished grades and construct a parking lot;
11. Provide topsoil and seed to restore non-paved surfaces;

Change Order Numbers 1, 2, and 3 contained modifications to the Project scope. The most significant of these included:

1. Provisions to manage PCB contamination associated with up to 15,000 capacitors encountered in and around the Containment Cell during the work of the Project; and

2. Provisions to address soil contamination encountered beyond the Limit of Contaminated Soil Excavation, as depicted in the Contract Documents.

Multiple bids were received on April 8, 2008. The construction Contract was ultimately awarded to D.A. Collins Environmental Services, LLC (DACE) on May 30, 2008.

The work of the Project began on June 23, 2008, when DACE received written Notice to Proceed from the NYSDEC. DACE began mobilizing to the Site on that day. Initially, DAC installed utilities and established services to support remedial activities and implemented programs to monitor the on-site and nearby environmental conditions during the construction. Subsequently, the core of the remedial project was conducted. This generally involved:

- Excavation of Contaminated Soil;
- Thermal Desorption of Contamination from Excavated Soil, and;
- Transport and Off-site Disposal of Soil Not Scheduled for Treatment.

As remedial activities were completed on portions of the Site, the disturbed areas were restored in accordance with the Contract Documents. The final piece of construction equipment was demobilized from the Site by DACE on July 22, 2009.

Excavation of soil at the Luzerne Road Site began on July 29, 2008. The final excavation was completed on July 10, 2009. In general, soil that was specified for removal in the Contract Documents was pre-designated as either Toxic Substances Control Act (TSCA) or Non-TSCA soil, based upon the analytical results of representative samples obtained during the Remedial Investigation or the Remedial Design Studies. In many instances, supplemental soil was excavated from locations beyond the Limit of Contaminated Soil Excavation established in the Contract Documents. This soil was designated based upon the analytical results of investigatory, endpoint, confirmation, pre-construction or post-construction samples which indicated the need for excavation of the supplemental soil. Soil containing PCBs at concentrations equal to or greater than 50 mg/kg was designated as TSCA, while that with less than 50 mg/kg was considered Non-TSCA. DACE generally began excavation in the South Area, and then proceeded to the West Area Phase 1, the Containment Cell, the West Area Phase 2, and the East Area in sequence. The total quantity of TSCA material excavated, based upon the difference between pre-construction and post-excavation survey data obtained throughout the Project, was 45,032 cubic yards. The total quantity of Non-TSCA material excavated, calculated similarly, was 49,479 cubic yards. More than 1000 samples were collected during the

Project to characterize Site soil and determine the ultimate excavation limits. Approximately 794 endpoint confirmation samples were collected and analyzed to document that the soil left in place attained the excavation standard for the Project.

DAC retained ESMI of New York (ESMI) to conduct the thermal desorption work for the Non-TSCA soil at the Luzerne Road Site. On July 7, 2008, DACE began construction of the temporary concrete slab upon which the thermal desorption unit (TDU), its appurtenances, and the Non-TSCA Soil Treatment Area would be developed. That process was completed on July 17, 2008. Erection of the TDU by ESMI was initiated on July 22, 2008. Set-up of the TDU was completed approximately one month later, when testing, or "shakedown" of the equipment commenced. During the period August 22, 2008 through September 10, 2008, ESMI tested the TDU and its ancillary systems to establish equipment settings to facilitate achievement of the treatment objectives, and subsequently, optimize operations. On September 11, 2008, ESMI conducted Proof of Performance testing for the TDU at the Luzerne Road Site. The testing, consisting of three treatment runs on feed soil of varying contaminant concentration, was observed by personnel from the NYSDEC and Malcolm Pirnie. Based upon the continuous emissions monitoring system data collected prior to and during the Proof of Performance (POP) Test, and the real-time source monitoring information from the test, the NYSDEC granted conditional interim approval for continued TDU operations during the period September 12, 2008 through October 12, 2008 using a proposed operating envelope. On October 10, 2008, DACE submitted the Final POP Test Results. Based on these results, the NYSDEC approved the POP Test and established operating parameters for the TDU. Full-scale operation of the TDU began immediately and continued through January 9, 2009, when repeated system curtailments interrupted the natural gas supply of the TDU, resulting in its shut-down. During the Project, a total of 64,222 tons of Non-TSCA soil were successfully treated with the TDU. Of the 482 discrete piles created, 98 percent achieved the soil treatment standard on the initial pass through the TDU. Due to the natural gas curtailment, some residual Non-TSCA soil did remain upon shut-down. It was later transported to an off-site disposal facility.

The Contract Documents for the Project required that a number of materials be transported to appropriate off-site locations for disposal. Bid Alternate B, which was accepted by the NYSDEC, resulted in contaminated soil containing PCBs at concentrations greater than or equal to 50 mg/kg to also be transported off-site for disposal. Upon encountering up to 15,000 capacitors intermixed with the soil at the Site, a mechanism was developed and approval from the USEPA and NYSDEC received for transporting and ultimately thermally destroying them at off-site locations. In addition, curtailments to the natural gas supply to the TDU resulted in the transport and off-site disposal of a significant quantity of Non-TSCA soil. During the execution of the Project, DACE also elected to remove some materials from the Site for disposal elsewhere.

A total of 2,568 truckloads of TSCA soil and other solid TSCA materials were shipped from the Site for off-site disposal during the Project. Of these, 2,529 contained remedial materials, such as contaminated soil, which were the responsibility of the NYSDEC. An additional 35 truckloads contained materials which were generated by DACE during the remedial activities. On four occasions, single trucks were loaded with both NYSDEC and DACE TSCA soil to enable "full loads" to be shipped. TSCA-designated materials were transported to the CWM Chemical Services, LLC facility in Model City, New York for disposal. A total of 90,510 tons of TSCA soil and other TSCA solid materials were transported from the Luzerne Road Site to CWM. Of this quantity, 89,163 tons were materials that were the objective of the remedial Project. Transport and disposal of these materials were paid for by the NYSDEC. Approximately 1,348 tons of TSCA soil and other TSCA solid materials, which were generated by DACE during the remedial activities, were also transported and disposed at CWM.

On September 30, 2008, a Mangiardi Brothers Trucking transport vehicle carrying PCB contaminated soil from the Luzerne Road Site was involved in an accident at the intersection of Truax Road and Chapman Drive in Amsterdam, New York. The 34 tons of soil, designated as TSCA, was spilled down an embankment on the south side of Route 5, when Truck 39 and Trailer AC-96829 overturned. Immediate and follow-up remedial actions and spill site restoration activities were conducted. On November 20, 2008, DACE submitted a Final Spill Report to the NYSDEC documenting the spill and subsequent remedial activities.

On January 23, 2009, ESMI began decontaminating and dismantling the TDU, supporting utilities, appurtenances, and ancillary equipment. On February 4, 2009 and February 5, 2009, approximately 409 tons of contaminated soil designated as Non-TSCA from the Soil Treatment Area was loaded into eleven transport vehicles. Most of this soil was the balance of the Non-TSCA Soil Stockpile which remained at the time TDU operations ceased. Some other material from the TDU decommissioning activities was also added to that pile. This soil was weighed on the TSCA truck scale and transported to the Chemung County Landfill in Elmira, New York for disposal. Additional contaminated soil designated as Non-TSCA was excavated from the East Area and some supplemental soil removal locations during the period April 10, 2009 through July 13, 2009. A total of 319 truckloads of Non-TSCA materials were shipped from the Site for off-site disposal during the Project. Of these, 160 contained remedial materials, such as contaminated soil, which were the responsibility of the NYSDEC. An additional 158 truckloads contained materials which were generated by DACE during the remedial activities. A single truck was loaded with both NYSDEC and DACE Non-TSCA soil to enable a full load to be shipped. Non-TSCA-designated materials were transported to the Chemung County Landfill in Elmira, New York and the Ontario County Landfill in Stanley, New York for disposal. A total of 11,343 tons of Non-TSCA materials were

transported from the Luzerne Road Site to these disposal locations. Of this quantity, 5,792 tons were materials that were the objective of the remedial Project. Transport and disposal of these materials were paid for by the NYSDEC. Approximately 5,551 tons of Non-TSCA materials, which were generated by DACE during the remedial activities, were also transported and disposed.

In mid-September 2008, DACE began excavating the contents of the Containment Cell. This excavation revealed a significant number of capacitors intermixed with contaminated soil. The capacitors required removal and could not be treated on-site. USEPA regulations at 40 CFR Part 761 required that the capacitors be destroyed through incineration following transport in containers meeting the United States Department of Transportation (USDOT) requirements in 49 CFR Parts 171 through 180. DACE, Malcolm Pirnie, and the NYSDEC investigated a variety of on-site management and off-site transport and disposal options. Malcolm Pirnie and the NYSDEC prepared requests to the:

- USDOT Special Permits, Pipeline and Hazardous Materials Safety Administration for a special permit to haul PCB capacitors in lined bulk shipping containers to the incineration facilities, and
- USDOT Hazardous Materials Division, Federal Motor Carrier Safety Administration for emergency and expedited processing of the special permit.

The USDOT ultimately approved the use of alternative bulk containers for shipment of the capacitors to the incinerators. Clean Harbors Environmental Services (CHES) began transporting capacitors from the Site on November 21, 2008. Seventy-six total truckloads, containing approximately 2,173,000 pounds of capacitors and associated packaging materials, were transported from the Luzerne Road Project Site. All but three of the truckloads consisted of capacitors in bulk roll-off containers that were incinerated at the Aragonite, Utah facility. The other three shipments, totaling approximately 66,480 pounds, were in box trucks that transported drums and flexbins to the incinerator in Deer Park, Texas. The final shipment of capacitors left the Site on June 2, 2009.

The Contract Documents for the Luzerne Road Remediation Project required that any disturbed areas within the Limit of Work (LOW) be restored following completion of the remedial activities. Property owned by the State of New York at 51 Luzerne Road would be regraded into a gradually-sloping field, which was to be covered with topsoil and seeded to promote the development of surface vegetation. Areas of parcels owned by others that were disturbed by the work of the Project were generally to be restored to their pre-construction characteristics and conditions. Temporary Project support facilities and site utilities were to be removed to the southern LOW, along the northern edge of Luzerne Road. A network of groundwater wells, suitable for conducting the long-term

environmental monitoring program, were to be installed on and adjacent to the Site. Some existing groundwater monitoring wells were to be refurbished and modified for long-term use.

DACE conducted the core remedial activities of the Project - namely excavation of contaminated soil, followed by treatment and on-site backfill or transport and off-site disposal of that soil – in sequence and in a general geographic progression. The South Area was addressed first, with the West Area, Containment Cell and East Areas following. As the remedial activities were completed in each area, DACE generally began restoration work, resulting in a phased restoration of the overall Project Site. Backfill of the South Area with treated soil began on September 3, 2008, and DACE's final demobilization from the Site occurred on July 22, 2009.

During the period August 22, 2008 through January 9, 2009, DACE's subcontractor, ESMI, successfully treated 64,222 tons of Non-TSCA soil with the on-site TDU. Following treatment, the soil was stockpiled in the Treated Soil Stockpile Area (TSSA) in discrete piles of approximately 100 cubic yards, or 140 tons. Upon receipt of post-treatment analytical results indicating that the treated soil contained less than 1 mg PCB/kg, the pile was cleared for use as on-site backfill by the Resident Engineer. Treated soil was spread in 12 inch lifts and compacted with a roller. Compaction testing on each in-place lift of treated soil was conducted using a nuclear densitometer. The Resident Engineer observed each in-place density test. Field densities obtained were compared to 95 percent of the maximum density from the modified Proctor testing. Moisture adjustment and re-rolling were undertaken, as necessary, until the lift achieved the compaction requirement. Backfill of treated soil continued on a lift-by-lift basis until the backfill subgrade elevation was achieved in each area and in-place test results attained the compaction standard.

After exhausting the supply of treated soil to be used as backfill material, DACE identified and received approval for use of material from the Jointa Galusha, L.L.C. Pattens Mills Quarry in Fort Ann, New York. During the period February 6, 2009 through July 14, 2009, DACE imported 39,850 tons of backfill from that location for use at the Site. It was placed and compacted in a manner similar to that which has been described previously for the treated soil.

Following backfill installation and compaction, DACE imported topsoil that had been removed from property owned by ESMI in Fort Edward, New York. From June 1, 2009 through July 9, 2009, Galusha Trucking delivered 10,271 tons of topsoil to the Site. Topsoil was spread and tracked with a dozer to a depth of approximately four inches. The Greater Glens Falls Development Corporation declined to have topsoil installed on the parcel to the east of 51 Luzerne Road. In lieu of this, Santos Construction, a

subcontractor to DACE, raked that area with a Harley Rake. DACE submitted and received approval for a seed mixture to restore vegetation to disturbed surfaces at the Site. On June 22, 2009, another DACE subcontractor, Donnelly Construction, sprayed hydroseed and hay mulch over portions of the Site. Subsequent seeding and mulching operations by Donnelly on June 24, 2009, July 8, 2009 and July 15, 2009 completed the hydroseeding and mulching of the disturbed areas of the Site.

During the period June 1, 2009 through July 10, 2009, DACE subcontractor, Aztech Technologies, Inc. installed groundwater wells which will be used for long-term monitoring of post-remedial Site conditions. The wells were categorized as either:

- Shallow (S), with approximate depths of 20-33 feet below grade,
- Intermediate (I), with approximate depths of 60-70 feet below grade, or
- Deep (D), with approximate depths of 80-90 feet below grade.

Overall, seven shallow, five intermediate, and six deep wells were constructed and developed.

To record the work of the Project and the Site conditions prior to, during, and after construction activities, a number of documents were collected and created. These documents include Record Drawings, a Photographic Record and Daily Reports of Project progress.

Construction Contract D006759 for the Remedial Construction at Luzerne Road was awarded to D.A. Collins Environmental Services, LLC on May 30, 2008 by the New York State Department of Environmental Conservation. Expenditures for the work were from the NYSDEC's Inactive Hazardous Waste Disposal Site Program (Superfund). A total of $27,677,830.53 was earned by DACE to complete the work of the Project.

1. Introduction

1.1. Purpose of the Remedial Construction Report

The Luzerne Road Site (Site), Site No. 5-57-010, was initially listed by the New York State Department of Environmental Conservation (NYSDEC) in 1987 as a Class 2 Inactive Hazardous Waste Disposal Site. Operable Unit 1 (OU-1) for the Site consists of the initial response action taken by the NYSDEC in 1979 to construct a containment cell (Containment Cell) to hold polychlorinated biphenyl (PCB)-contaminated materials and soils until a suitable remedial technology could be applied. Operable Unit 2 (OU-2) addresses the removal and remediation of the PCB containment cell and the surface and subsurface soils from areas adjacent to it. Operable Unit 3 (OU-3) is the PCB groundwater plume, which is being monitored by the NYSDEC.

The general purpose of this Remedial Construction Report (RCR) is to document the implementation of the remedy for PCB contamination at the Luzerne Road Site, in general accordance with the Record of Decision (ROD) for OU-2 and OU-3, as issued by the NYSDEC in March 2005. More specifically, this report documents the activities of construction Contract D006759, the implementation of the OU-2 Remedial Design for the Luzerne Road Site (Project). It has been prepared by Malcolm Pirnie, Inc., which provided design and construction phase engineering services for the Project.

1.2. Site Location, Topography and Land Use

The Luzerne Road Site is located:

- In the Town of Queensbury, Warren County, New York,
- West of the City of Glens Falls,
- Approximately 1,000 feet east of Interstate 87, and
- Approximately 3,500 feet north of the Hudson River.

The location of the Site is indicated on Figure 1. The Site consists of two adjoining land parcels, 51 Luzerne Road (Tax Map Lot No. 309.10-1-91) and the northern portion of 53 Luzerne Road (Tax Map Lot No. 309.10-1-90). The 8 acre parcel at 51 Luzerne Road is owned by the State of New York, while the 1.2 acre northern portion of the 53 Luzerne Road parcel is owned privately. Figure 2 depicts the property boundaries on and adjacent to the Site. At the beginning of the project, the 2.7 acre Containment Cell was present on the northern portion of the 51 Luzerne Road property, while the balance of that parcel was wooded. At that time, the northern portion of 53 Luzerne Road was undeveloped and covered with grass and brush.

The Site is located among residential, light industrial/commercial and vacant properties. Immediately to the east of the 51 Luzerne Road parcel is a 4.3 acre undeveloped property (Tax Map Lot No. 309.6-3-8) that is owned by the Greater Glens Falls Development Corporation. On the north, it is bounded by undeveloped land owned by the City of Glens Falls (Tax Map Lot No. 309.10-1-93, et al.). To the west and southwest of the Site are two privately owned parcels, which comprise the southern portion of 53 Luzerne Road (Tax Map Lot No. 309.10-1-88.2) and the central portion of 53 Luzerne Road and 55 Luzerne Road (Tax Map Lot No. 309.10-1-88.1). A furniture distribution warehouse and a commercial office occupy a structure on the southern portions of 53 and 55 Luzerne Road. Further to the north and west lies the Old Glens Falls Landfill, a Class 2 Inactive Hazardous Waste Site (Site No. 5-57-003). The Luzerne Road Transfer Station, owned by the City of Glens Falls, is present to the west of the 55 Luzerne Road parcel. Luzerne Road is the southern boundary of the Site. Multi- and single-family residences and the St. Alphonsus Cemetery are present opposite the Site on the south side of Luzerne Road.

The topography of the area is relatively flat with the exception of the Old Glens Falls Landfill, which is mounded up to 50 feet above the surrounding terrain. To the north of the Site is a 15 foot deep stormwater retention basin, which discharges to lower wetland areas, located further to the north. The unlined Old Glens Falls Landfill purportedly primarily contains municipal waste, some industrial wastes, and an unknown quantity of capacitors containing PCBs. A low-permeability cover is to be installed on the Old Glens Falls Landfill, according to a 2003 ROD issued by the NYSDEC. At the time of the Project, the engineering design for this cover was being developed.

Through a number of investigations described herein, contaminated media purportedly associated with the Site were identified on areas beyond the historically recognized Site boundaries. The Contract Documents for the Project included a Limit of Work (LOW) for the remedial activities at the Site. This LOW encompassed the Site, as well as portions of the two privately owned parcels to the west and southwest (53 Luzerne Road and 55 Luzerne Road), portions of the City of Glens Falls properties to the north, and the entire 4.3 acre undeveloped property that is owned by the Greater Glens Falls Development Corporation to the east. Temporary easements were obtained by the NYSDEC to enable implementation of the work of the Project on these various parcels. For the balance of this RCR, the terms “on-site” and “off-site” shall refer to the areas within and outside the LOW, respectively.

1.3. Site History

The Site was historically a scrap and salvage yard for automobiles, machinery, and other industrial equipment. Salvaging operations of capacitor equipment performed from the

1950s through the 1970s on the northern portion of the 53 Luzerne Road property resulted in the discharge of PCBs to surface and subsurface soils. Associated capacitor salvaging operations also contaminated the backyards of private residences in a neighborhood approximately one mile to the west of the Site.

Upon discovery of contamination, an emergency declaration was issued for the Site by the Commissioner of the New York State Department of Health (NYSDOH) to limit human exposure to the PCB contamination. As a temporary measure to stop PCB volatilization and prevent direct contact, the United States Environmental Protection Agency (USEPA) granted approval for construction of the Containment Cell for contaminated materials. In 1979, a clay-lined cell was constructed by the NYSDEC on the northern portion of 51 Luzerne Road. Contaminated soil excavated from the private residences and visibly contaminated soil and other contaminated materials removed from areas of the Site were subsequently placed in the Containment Cell.

The Containment Cell reached its capacity before the excavations of contaminated soil were completed. A Memorandum to the NYSDEC dated 1982 stated that, as a result of the lack of space in the Containment Cell, contaminated soil was left in-place in a 2 acre area on the north ends of 53 Luzerne Road and 55 Luzerne Road. This area was backfilled and capped with 1 foot of a highly organic material to reduce the volatilization and mobility of the remaining PCBs. Subsequently, a 6 inch layer of topsoil was installed and surface vegetation was established. A cover was constructed on the Containment Cell and groundwater monitoring wells (MWs) were installed.

From 1979 through 1985, leachate that collected in the Containment Cell was removed and transported off-site for treatment and disposal. In 1985, an "engineered cover" was installed on the Containment Cell in an effort to reduce leachate production. Subsequently, liquid remained in the Containment Cell and the leachate level was monitored for 10 years.

In 1995, leachate levels within the Containment Cell decreased unexpectedly, suggesting the possible presence of a leak in the cell liner. A potential release of PCBs into the underlying groundwater may have resulted from this event. At that time, the remaining leachate was removed from the Containment Cell. It was transported off-site for treatment and disposal. Periodic monitoring of the Site MWs and the Containment Cell leachate level continued from 1979 through March 2005.

Interim Remedial Measures (IRMs) were undertaken in 2000 and 2003 to remove and dispose of additional PCB-contaminated soils from residential properties associated with the Site.

A Remedial Investigation (RI) of the Site was conducted by Ecology and Environment Engineering, P.C. (E & E) from July 1999 to March 2001. Supplemental groundwater sampling was performed in 2002 and 2004. The purpose of these investigations was to determine the nature, level and extent of contamination resulting from previous activities on the Site. According to the ROD for OU-2 and OU-3, activities performed during this investigation included the following:

- Researching historical information,
- Collecting and analyzing surface soil samples to detect the presence of PCBs,
- Collecting subsurface soil samples from existing grade to the depth of the water table,
- Collecting and analyzing sediment samples from an on-site ditch and a wetland area north of the Site,
- Installing 14 shallow, 5 intermediate, and 3 deep MWs,
- Analyzing soil and groundwater samples collected from the MWs and the soil borings conducted during their installation to determine the character and content of contamination, the physical properties of the soil and the Site's hydrogeologic conditions,
- Sampling 19 new and 5 existing MWs, and a groundwater monitoring point adjacent to the Containment Cell,
- Collecting and analyzing surface soil samples at a dozen private residences,
- Collecting, using a direct push technique, and analyzing subsurface soil samples at a dozen private residences,
- A survey of public and private water supply wells in the area around the Site,
- Collecting and analyzing soil samples from the Containment Cell, and
- Collecting the Containment Cell soil samples and soil samples from the back portion of 53 Luzerne Road and analyzing them to determine their geotechnical characteristics.

An RI Report for the Site was prepared for the NYSDEC by E & E in August 2002. In that report, nomenclature indicating the focus of investigatory activities on and adjacent to the Site was introduced. This included the following descriptors which have been used

since that time to describe the geographic location of activities associated with the Site and its environs:

- **West (Western) Area.** The parcels comprising 53 Luzerne Road, 55 Luzerne Road, and portions of the City of Glens Falls property immediately north of those parcels;
- **South (Southern) Area.** The southern portion of 51 Luzerne Road, including all areas south of the Containment Cell;
- **Containment Cell or TSCA Cell.** The northern portion of 51 Luzerne Road upon which the cell was located;
- **North (Northern) Area.** The portion of the City of Glens Falls property immediately north of the 51 Luzerne Road parcel; and
- **East (Eastern) Area.** The property owned by the Greater Glens Falls Development Corporation located immediately east of the 51 Luzerne Road Parcel.

These terms are used throughout the balance of this report to describe the activities associated with the Site investigations, remedial design studies, and construction activities. Figure 3 depicts these areas.

The following presents a summary of the major RI findings, as presented in the RI Report and the subsequent Feasibility Study (FS) Report, also by E & E:

- **Surface Soil.** The southern portion of the Southern Area contained widespread PCB presence. PCBs are present in surface soils in the Southern Area of the Site; concentrations range from below detection to 2,984 milligrams per kilogram (mg/kg). Access to the area is not restricted; thus PCBs are available for human exposure via foot traffic. Surface soil is the primary exposure medium for wildlife at the Site. PCBs were detected in surface soil samples at concentrations exceeding NYSDEC's ecological criteria. Small mammals, songbirds, and raptors potentially could be exposed to the contamination and adversely affected. A toxic effect analysis is recommended. Since there are no fish in the ditch or wetland area, the Site does not pose an impact to fish.
- **Subsurface Soil.** Subsurface soil PCB presence is limited to the Western and Southern Areas. PCBs were detected to a depth of 12 feet in the middle of the Southern Area, and to a depth of 16 feet in the western flank of the Southern Area. PCBs were also detected to a depth of 24 feet in the Western Area. The greatest subsurface soil total PCB concentration detected was 17,200 mg/kg, found in the 0- to 4 foot depth interval in the parking lot located within the west side of the Site. PCBs were not detected in the Eastern Area. The volatile organic compounds (VOCs) xylene and methylene chloride were identified in western Site soils at very low

concentrations. These findings are consistent with historical data regarding evidence of VOCs in the area. Volatiles detected in landfill (Containment) cell soils are also consistent with historical data, as some western Site soils were placed in the landfill (Containment) cell.

- **Groundwater.** PCBs were found in groundwater beneath the Site ranging from 13 to 24 feet below ground surface (bgs) at upgradient locations and 22 to 35 feet bgs at downgradient on-site locations. PCBs were detected at depths of 40 to 55 feet bgs at off-site locations. However, PCBs were not detected in groundwater collected from the 91 to 96 foot depth interval off-site, which is consistent with on-site groundwater data from similar depths. On-site groundwater PCB concentrations generally ranged from below the detection limit to 49.1 micrograms per liter (µg/l) directly downgradient of the (Old) Glens Falls Landfill. Groundwater PCB concentrations downgradient of the PCB Containment Cell generally ranged from below detection to 2.42 µg/l, although PCBs were detected at a concentration of 151 µg/l in one well immediately adjacent to the cell. However, PCBs were detected in another well 100 feet downgradient of this well at concentrations ranging from1.2 µg/l to 2.42 µg/l. In addition, groundwater samples collected downgradient of the Site in March 2001 contained PCB concentrations ranging up to 5.4 µg/l southeast of the landfill (Containment) cell, although concentrations then decreased considerably downgradient from that point. Samples off-site contain PCB concentrations which are just above the groundwater standard of 0.09 µg/l, but are below the drinking water standard of 0.5 µg/l. The residential properties downgradient of the cell are served by a public water supply. Groundwater underlying the Site generally moves in a southeast direction. The (Old) Glens Falls Landfill is located hydraulically upgradient of the Site. Groundwater data indicate metal-rich leachate and PCB-containing water enters the shallow portion of the aquifer beneath the (Old) Glens Falls Landfill and flows beneath the Luzerne Road PCB (Containment) cell. PCB and metal contribution from the Luzerne Road PCB (Containment) cell to the groundwater is minimal. Shallow groundwater data does not indicate that the PCB (Containment) cell provides significant PCB contribution to the underlying groundwater.

- **Sediment.** Field sediment samples did not contain detectable PCB concentrations based on a PCB screening analytical method having a 10 mg/kg detection limit. A duplicate sediment sample was found to contain 0.08 microgram per kilogram (µg/kg) of PCBs. Sediments north of the Site may receive some minor PCB contamination due to PCB-containing groundwater seeping from the (Old) Glens Falls Landfill into the wetland north of the Site.

- **Residential Surface and Subsurface Soil.** Several events of residential surface and subsurface soil sampling were conducted. Collectively, they indicated PCBs were present at concentrations requiring immediate action. NYSDEC executed an IRM in which PCB-containing soil was removed.

- **Site Characteristics.** Medium-to-fine sands underlie the Site from grade to a depth of approximately 85 to 95 feet bgs. The sand is underlain by a clay layer of unknown thickness; depth to clay varies across the Site as the clay layer dips southeast. Bedrock was not encountered during Site drilling activities, as the maximum depth of on-site groundwater monitoring wells are 110 feet. Groundwater flow is southeast. The horizontal Site hydraulic gradient was calculated by E & E to be approximately 0.0096 ft/ft based on 2001 groundwater elevation data. An upward vertical gradient exists across the Site. Vertical gradients between the intermediate and shallow wells varied from 0.01 ft/ft to 0.1 ft/ft across the Site. Vertical gradients between the intermediate and deep wells varied between 0.065 ft/ft to 0.22 ft/ft across the Site, increasing in the downgradient direction. The geometric mean values of hydraulic conductivity values was calculated to be 6.2×10^{-2} centimeters per second (cm/sec) in the shallow saturated zone; 1.43×10^{-2} cm/sec in the intermediate zone; and 1.3×10^{-3} cm/sec in the deep saturated zone. Groundwater velocities are estimated to range between 1 to 6 ft/day.

The RI data were compared to the Site Clean-up Goals (SCGs), which were based on the following:

- **Soil.** NYSDEC's "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Clean-up Objectives and Clean-up Levels."

- **Water.** NYSDEC's "Ambient Water Quality Standards and Guidance Values" and NYSDOH's "Part 5 of the New York State Sanitary Code."

- **Sediment.** NYSDEC's "Technical Guidance for Screening Contaminated Sediments."

Remedial goals for the Site were established through the remedy selection process in 6 NYCRR Part 375-1.10. They included eliminating, or reducing to the extent practicable:

- Exposures of persons at or around the Site to PCBs in the surface and subsurface soils,

- Environmental exposures of flora or fauna to PCBs in the surface and subsurface soils,

- The release of contaminants from soil to groundwater that may create exceedances of groundwater quality standards, and (to)
- Reduce further off-site migration of contaminated groundwater to the extent practical.

Based upon the results of the comparisons of data to the SCGs and the identification of potential public health and environmental exposure routes, certain media and areas of the Site were found to require remediation.

An FS was performed by E & E and completed in May 2004. The FS was conducted in accordance with the USEPA's Guidance for Conducting Remedial Investigations and Feasibility Studies Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (EPA 540/G-89/004) and NYSDEC's "Technical and Administrative Guidance Memorandum (TAGM) 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites." The purpose of the FS was to determine and evaluate possible approaches to remediation of the contaminants found at the Site during the RI to facilitate achievement of the remedial goals. Five alternatives addressing the remediation of contaminated soil and three alternatives addressing the remediation of contaminated groundwater were developed and evaluated. The findings were documented in a FS Report prepared by E & E.

In the ROD for the Site submitted in March 2005, the NYSDEC, in consultation with the NYSDOH, selected a remedy for OU-2 and OU-3. The overall remedy described in the ROD includes:

- Development of a remedial design program of the selected remedy in the ROD.
- Removal of the PCB Containment Cell and excavation of the on-site contaminated surface soil to 1 mg/kg (part-per-million or ppm) and subsurface soil to 10 mg/kg.
- Installation of a demarcation layer over subsurface soils that are residually contaminated above 1 mg/kg.
- On-site treatment of excavated materials using thermal desorption. Treated soil will be used to backfill the excavations.
- Development of a Site Management Plan to address residual contaminated soils that may be excavated from the Site during future redevelopment.
- Institution of a NYSDEC annual certification requirement for institutional controls and engineering controls at the Site, to be completed and submitted by the property owner.

- Imposition of an institutional control in the form of an environmental easement that:
  - requires compliance with the approved Site Management Plan;
  - limits the use and development of the property to commercial, industrial, or recreational activities;
  - restricts the use of groundwater as a source of potable or process water without necessary water quality treatment as determined by the NYSDOH; and
  - requires the property owner to complete and submit the annual certification to the NYSDEC.
- Long-term monitoring of the groundwater to evaluate the effectiveness of the source removal and treatment of the PCB-contaminated soils.

An Explanation of Significant Differences (ESD) to allow off-site disposal of contaminated material at concentrations greater than 50 mg/kg was prepared in February 2008 by the NYSDEC. The complete ROD and ESD for the Luzerne Road Site are included as Appendix A.

In April 2006, Malcolm Pirnie, Inc. was authorized by the NYSDEC to develop an engineering design for the remedial elements listed in the Record of Decision. During the period June 2006 through January 2008, three separate Remedial Design Studies were completed to provide data to supplement that which had been collected during the RI. These studies included:

- Soil sampling in June 2006 to further characterize the nature and further delineate the extent of PCB contamination in soil located in the South Area and the southern portion of the West Area, including adjacent to the furniture warehouse at 53 Luzerne Road. Also, geotechnical testing of Site soil to determine its physical properties prior to and after thermal treatment;

- Soil sampling in March and April 2007 to further characterize the nature and further delineate the extent of PCB contamination in soil on, in, and under the Containment Cell. Also, supplemental surface soil sampling to further characterize the nature and further delineate the extent of PCB contamination at the southeastern and eastern limits of the South Area. In addition, measuring water levels in on- and off-site groundwater monitoring wells and leachate levels in the Containment Cell; and

- Soil sampling in January 2008 to further characterize the nature and further delineate the extent of PCB contamination in soil on, in, and under the Containment Cell.

The results of the Remedial Design Studies were compiled in a Limited Supplemental Site Investigation Summary which was published by Malcolm Pirnie, Inc. in February 2008.

Contract Documents for the remedial elements were completed in October 2007. A single bid for the work was received on December 11, 2007. Since only one bid was received and it was significantly higher than the engineer's estimate of probable construction cost, the NYSDEC was precluded from awarding the Contract. Interviews with actual and prospective bidders indicated that the use of thermal desorption to treat Site media containing PCBs at concentrations greater than 50 mg/kg would not be economically feasible. In response, a minor modification to allow off-site disposal of such material was made by the NYSDEC to the selected remedy in the ROD. The Contract Documents were revised to reflect that change and, in February 2008, the revised Project was let for bid. Multiple bids were received on April 8, 2008. The construction Contract was ultimately awarded on May 30, 2008.

1.4. Remedial Project Description

The Project described herein is the remedy for PCB contamination at the Luzerne Road Site, as defined by the ROD for OU-2 and OU-3, dated March 2005, and subsequent minor modifications to that ROD. The Contract Documents for that remedy are entitled:

- Luzerne Road Site
- Site Number 5-57-010
- Contract D006759
- Town of Queensbury
- Warren County, New York

The original Contract Documents for the Project are dated February 2008, and include Addenda issued on March 18, 2008 and March 25, 2008. These documents, and the Limited Supplemental Site Investigation Summary, are included as Appendix B. Subsequent to the initiation of remedial construction activities, three Change Orders (COs) were incorporated into the original Contract Documents. Copies of these Change Orders are included as Appendix C.

1.4.1. Remedial Project Scope

The Contract Documents contained the following summary of the work to be done on the Project:

The Work to be performed under this Contract includes, but is not limited to, the following:

1. Provide construction support and health and safety facilities.
2. Clear and grub the areas of Work.
3. Excavate PCB-contaminated soil and materials.
4. Thermally treat contaminated soil determined to contain PCBs at concentrations less than 50 mg/kg (Non-TSCA Soil) to remove PCBs to concentrations less than 1 mg/kg.
5. Backfill successfully-treated Non-TSCA Soil on-site.
6. **a. ALTERNATE A:** Thermally treat contaminated soil determined to contain PCBs at concentrations greater than or equal to 50 mg/kg (TSCA Soil) to remove PCBs to concentrations less than 1 mg/kg and backfill successfully-treated TSCA Soil on-site; or

   b. ALTERNATE B: Dispose contaminated soil determined to contain PCBs at concentrations greater than or equal to 50 mg/kg (TSCA Soil) at an off-site location.
7. Dispose contaminated clay soil, construction debris, and other wastes off-site.
8. Dispose non-contaminated debris off-site.
9. Decommission and install monitoring wells.
10. Provide backfill to restore the Site to finished grades and construct a parking lot.
11. Provide topsoil and seed to restore non-paved surfaces.

The Contract Documents required the excavation of contaminated soil from within the Limit of Contaminated Soil Excavation. This excavation generally included removal to approximately two feet below existing grade in the South Area, the ground water table in the West Area, and one foot into the clay liner under the Containment Cell. Several small excursions to remove contaminated soil "hot spots" from below the ground water table in the West Area were also shown and specified in the Contract Documents. During development of the Remedial Design, a 50 foot by 50 foot horizontal grid was established over the South and West Areas. Soil in each grid matrix box was designated as either TSCA or Non-TSCA based upon the analytical results of representative samples collected during the Remedial investigation and Remedial Design Studies. Soil within layback slopes resulting from the excavation of TSCA grid matrix boxes was conservatively designated as TSCA. Soil from the Containment Cell was also designated as TSCA. The Contract Documents required excavation of contaminated soil from the

West Area in a series of four foot thick lifts, as measured from a horizontal plane approximating the preconstruction ground surface. Excavation in the South Area was similarly specified to be in one two foot lift. Collection and analysis of confirmation samples were required at the horizontal and vertical limits of the overall excavation areas, except for below the ground water table, to verify that the excavation standards of 1mg/kg in the top foot and 10 mg/kg at depths greater than one foot were attained.

Change Order Numbers 1, 2, and 3 contained modifications to the Project scope. The most significant of these included:

1. Provisions to manage PCB contamination associated with up to 15,000 capacitors encountered in and around the Containment Cell during the work of the Project; and
2. Provisions to address soil contamination encountered beyond the Limit of Contaminated Soil Excavation, as depicted in the Contract Documents.

1.4.2. Remedial Project Objectives

The objectives of the remedial construction Project, as stated in the ROD, were established based on the remedial objectives identified during the Remedial Investigation/Feasibility Study (RI/FS) process and through the remedy selection process in 6 NYCRR Part375-1.10. They included eliminating or reducing to the extent practicable:

- Exposures of persons at or around the Site to PCBs in the surface and subsurface soils;
- Environmental exposures of flora or fauna to PCBs in the surface and subsurface soils;
- The release of contaminants from soil to groundwater that may create exceedances of groundwater quality standards; and (to)
- Reduce further off-site migration of contaminated groundwater to the extent practical.

Further, according to the ROD, the remediation goals for the Site included attaining to the extent practicable:

- Soil clean-up goals based on the NYSDEC's "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Clean-up Objectives and Clean-up Levels," which are 1 mg/kg of total PCBs at the surface (down to 1 foot below grade) and 10 mg/kg of total PCBs in the subsurface (1 foot below grade and lower); and

- Ambient groundwater quality standards based on NYSDEC's "Ambient Water Quality Standards and Guidance Values" and NYSDOH's "Part 5 of the New York State Sanitary Code."

1.4.3. Remedial Project Team

1.4.3.1. NYSDEC

The NYSDEC Division of Environmental Remediation (DER) retained the engineer and the remedial contractor to implement the Project. George Harris, P.E. oversaw the Project for the NYSDEC during the Luzerne Road Project. Gerard Burke, P.E. was the NYSDEC's Project Manager for the work. Thomas Koch and Kris Keenan provided on-site inspection on a part-time basis for the NYSDEC during the remedial activities.

1.4.3.2. Engineer

Malcolm Pirnie, Inc. was issued Work Assignment 14 to Contract D004443 to provide construction phase engineering services, including Construction Administration, Resident Engineering, and Reporting during the Project.

1.4.3.3. Remedial Contractor

The Contract was awarded to D.A. Collins Environmental Services (DACE), LLC of Mechanicville, New York on May 30, 2008. John S. Healy, Vice President, was identified as DACE's Authorized Representative with David MacDougall, Director of Remediation serving as the Project Manager. Robert Small and Steven Bullock conducted the Project Superintendent duties. Keith Chadwick and Stony Collins were DACE's Site Safety Officers.

1.4.3.4 Primary Subcontractors

DACE employed a number of subcontractors and firms affiliated with the DACE family of companies to conduct elements of the Project. The primary firms participating in the work (and their roles) included:

- ESMI of New York – (Thermal Desorption & Topsoil Source);
- Kubricky Construction Corporation – (Site Work);
- Galusha Trucking – (Topsoil Hauling);
- CWM Chemical Services, LLC (CWM) Model City, Chemung County Landfill, Ontario County Landfill – (Off-Site Disposal);
- Clean Harbors Aragonite, L.L.C and Clean Harbors Deer Park, L.P. – (Off-Site Disposal and Thermal Treatment of Capacitors);

- Mangiardi Brothers Trucking, Goulet Trucking, Inc., Page E.T.C., Inc., Price Trucking Corporation, U.S. Bulk Transport, Inc., Cedar Hill Trucking, Inc., Clean Harbors Environmental Services – (Off-Site Transport);
- Adirondack Environmental Services, Inc., Con-Test Analytical Laboratory and Mitkem Laboratories – (Environmental Testing Laboratory Services);
- Eric Aynsley & Associates, Inc. – (Source Testing and Stack Sampling – POP Test);
- Maxxam Analytics, Inc., – (Air Testing Laboratory – POP Test);
- Aztech Technologies, Inc. – (Monitoring Well Abandonment & Installation);
- Jointa Galusha, L.L.C. Pattens Mills Quarry – (Stone and Backfill Source, Topsoil Hauling);
- C.T. Male Associates, P.C. – (Stormwater Pollution Prevention Plan)
- Santos Construction – (Site Work and Raking);
- Donnelly Construction – (Seeding and Mulching);
- AFSCO Fence, Inc. – (Fencing);
- Construction Technology – (Geotechnical Testing); and
- Van Dusen and Steves, Land Surveyors – (Land Surveying).

1.4.4. Remedial Project Submittals

During the implementation of the Project, DACE prepared and submitted for review, numerous Contract-required submittals and shop drawings detailing the specific elements of the Project. The submittals, and their status, were tracked on a Submittal Log which was maintained throughout the Project by Malcolm Pirnie. The submittals were subsequently reviewed by Malcolm Pirnie, and returned with the designation "approved," "approved as corrected," "revise and resubmit," or "not approved." Ultimately, a set of the submittals was approved, albeit with some incorporated comments. One copy of each of the submittals and the Final Submittal Log are included in Appendix D.

1.4.5. Remedial Project Chronology

The work of the Project began on June 23, 2008, when DACE received written Notice to Proceed from the NYSDEC. DACE began mobilizing to the Site on that day. The final piece of construction equipment was demobilized from the Site by DACE on

July 22, 2009. A detailed Project Chronology indicating the starting and completion dates for the major elements of the work is included as Appendix E.

2. Remedial Construction

The remedial construction activities for the Luzerne Road Project occurred during the period June 23, 2008 through July 22, 2009. Initially, DACE installed utilities and established services to support remedial activities and implemented programs to monitor the on-site and nearby environmental conditions during the construction. Subsequently, the core of the remedial project was conducted. This generally involved:

- Excavation of Contaminated Soil;
- Thermal Desorption of Contamination from Excavated Soil, and;
- Transport and Off-Site Disposal of Soil Not Scheduled for Treatment.

As remedial activities were completed on portions of the Site, the disturbed areas were restored in accordance with the Contract Documents.

Section 2 of the Remedial Construction Report contains five major subsections describing each of the three previously-identified general construction processes, as well as Site Preparation and Site Restoration. It should be noted that these processes were phased in, and were advanced systematically throughout the Project Site. As shown in the Remedial Project Chronology, significant overlap of these processes occurred during the work. Generally, the contractor initiated each remedial process in the South Area, and then proceeded sequentially to the West Area, the Containment Cell and the East Area.

During the Project, both DACE and Malcolm Pirnie documented the progress of the Work on a daily basis with photographs and daily reports. These project records are discussed further in Section 4.

2.1. Site Preparation

DACE mobilized to the Luzerne Road site on June 23, 2008 and immediately began preparation of the Site for the remedial work. Following establishment of air monitoring and storm water controls at the perimeter, and health and safety zone controls within the LOW, the Site was cleared of trees and surface vegetation. Stumps in areas designated for excavation were left in place to be managed during the subsequent excavation process. Subsurface stumps and roots were grubbed and chipped from areas not

designated for remedial excavation. A Clearing and Grubbing Site Control Work Plan was submitted by DACE and is included in Appendix D.

2.1.1. Monitoring Wells

On July 16, 2008 and July 21, 2008, Aztech Technologies, Inc. of Ballston Spa, New York, abandoned eleven existing ground water monitoring wells using the specified NYSDEC guidance for the methodologies indicated below:

- MW-4S and PCB-E1 – Overdrilled and Tremie Grouted
- PCB-SE1, PCB-N1, PCB-W1, PCB-S1, MW-1S, MW-2S and MW-3S – Pulled Casing and Tremie Grouted
- MW-1I and MW-1D – Tremie Grouted in Place.

A copy of the well abandonment logs is included in Appendix F. Four wells in the East Area, MW-7S, MW-7I, MW-8S, and MW-8I were cut off below grade and fitted with temporary covers. Following completion of remedial activities, the wells were extended to their pre-construction height, and protective casings set in concrete surface collars were installed.

2.1.2. Air Monitoring

Beginning on June 23, 2008, DACE used monitoring devices to monitor air quality at the Project's perimeter and in the work zones. Initially, temporary mobile units were employed to conduct this monitoring. DACE installed an on-site meteorological weather station to monitor and record temperature, wind speed, wind direction and precipitation during the work. On June 26, 2008, DACE set up four fixed perimeter monitoring stations with permanent power connections. These were located as follows:

- East Station – east of the Thermal Desorption Unit (TDU) system and within a fenced enclosure on the Greater Glens Falls Development parcel to the east of the East Area,
- North Station – north of the Containment Cell and within a fenced enclosure on the City of Glens Falls parcel immediately to the north of the Site,
- South Station – south of the work zones and inside the perimeter fence on the north side of Luzerne Road, and
- West Station – west of the work zones and mounted adjacent to the northwest corner of the one story furniture warehouse at 53 Luzerne Road.

Depending upon the daily prevailing wind direction, one of these stations was used for upwind baseline readings, while the other three represented the conditions downwind of the Site. A fifth air monitoring station was used within the LOW in a location selected daily to provide representative monitoring of air conditions in the work zone.

The air monitoring stations each included aerosol/dust meters that monitored 0-10 micron particulates and photo ionization detectors to identify volatile organic compounds. These were operated continuously during intrusive work at the Project Site. Readings were recorded and documented on a daily basis. During the excavation and removal of the contents of the Containment Cell, including the management of PCB capacitors identified therein, DACE operated a supplemental air monitoring station immediately adjacent to, and downwind of the work zone. Monitoring was conducted as described above. This supplemental monitoring was undertaken at the request of the NYSDEC and was a component of Change Order Number 2. DACE prepared and submitted a daily air monitoring report to the NYSDEC's Project Manager during the Project. A copy of each daily air monitoring report is included in Appendix G.

In addition, PVC collection filters with low volume sampling pumps were installed at each perimeter station to collect air samples to detect and document the concentration of PCBs and total nuisance dust at the LOW. Dust samples were collected on a continuous basis, with one day's sample sent to the Con-Test Analytical Laboratory in East Longmeadow, MA for analysis each week. PCB samples were collected on a weekly basis, with the sample sent to the Con-Test Analytical Laboratory for Method TO-10A analysis. DACE's Site Health and Safety Plan (HASP), included with the Project Submittals in Appendix D, contains the Community and Work Area Air Monitoring Plans. The analytical results of samples collected during implementation of the Community Air Monitoring Plan are shown on laboratory reports included in Appendix H.

As part of the implementation of their Site HASP, DACE conducted other monitoring of work zone air, including monitoring the breathing zone of work areas for dust, VOCs, and combustible gases. These efforts were undertaken to comply with the Occupational Safety and Health Administration (OSHA) 1910.120 and 1926.26 requirements.

2.1.3. Construction Water Management

During the Luzerne Road Remedial Project, DACE was required by the Contract Documents to comply with environmental regulations regarding:

- Management of storm water,
- Protection of subsurface and surface waters, and

- Compliance with guidance governing the discharge of treated water.

DACE developed and implemented a Storm Water Pollution Prevention Plan (SWPPP) and Construction Water Management Plan (CWMP) for the Work. A copy of each of these plans is included with the Project Submittals in Appendix D.

2.1.3.1. Storm Water Controls

DACE retained C.T. Male Associates, P.C., to prepare a SWPPP for use during the Project. Upon mobilization to the site, DACE installed perimeter erosion and sediment control fences at the LOW. No surface water bodies or watercourses existed on the Site, nor along the Site boundary prior to, during, or following completion of the Project. The sandy site surface and subsurface soil facilitated the infiltration and percolation of precipitation through the vadose zone and to the ground water. The relatively flat nature of the Site and the adjacent properties precluded runoff from occurring during the execution of the Work. Throughout the Project, SWPPP weekly inspections of the storm water management systems were conducted by the Resident Engineer with the Contractor. A copy of the inspection reports is included in Appendix I.

Precipitated water on Luzerne Road largely ran off the road and infiltrated a vegetated strip located between the north shoulder of the road and areas of excavation and backfill. In the area of the eastern gate, storm water was collected from Luzerne Road in a catch basin. This structure is part of a municipal storm water conveyance system that collects storm water from Luzerne Road and discharges it to a detention basin to the north of the East Area. A 16 inch diameter corrugated HDPE pipe with four on-site manholes conveys collected storm water under the East Area. No surface water from the Site is collected by, or drains into this system.

During the Site Preparation activities, DACE removed the upper rings and covers from three of the concrete manholes and placed steel plates over the openings. This enabled regrading and excavation of contaminated soil in the area of the storm water pipeline. DACE also installed a two inch flexible discharge hose from the area proposed for their on-site Wastewater Treatment Plant (WTP) to a penetration in the top of the pipeline. The penetration was sealed with a butyl rubber compound to prevent infiltration during the work. These modifications were maintained during the work, and restored prior to the close of the Project.

2.1.3.2. Wastewater Treatment Plant

Following approval of the CWMP, DACE constructed an on-site Wastewater Treatment Plant for collected precipitation, contact water, decontamination water and other liquid wastes. On August 21, 2008, the plant was tested to document suitability for use for the Project. Subsequently, it was operated in a semi-continuous mode, with periodic

sampling of discharge water to confirm compliance with the specified discharge standards. Ultimately, DACE operated the WTP in a batch mode, with treated water retained in the Effluent Tank until the results of laboratory analyses on the water indicated that it attained discharge standards. Successfully treated water could be:

1. Used on-site for dust control,
2. Discharged to an on-site infiltration basin constructed in backfilled treated soil at Grid O7 in the South Area, or,
3. Following receipt of written permission from the NYSDEC and the City of Glens Falls discharged through the aforementioned flexible line to the municipal storm water conveyance system.

At the beginning and the end of the Project, some successfully treated water was used for on-site dust control. The treated wastewater throughout the balance of the Project was discharged to the on-site basin. Discharges to the municipal storm sewer were not made.

The initial WTP was configured as depicted in the schematic shown on Figure 4 and was located in Grids H11 and H12. The entire WTP was constructed on 6 inches of crushed stone within a lined area to contain spills that might result during operation. Collected water was mixed with a gel flocculant in a trough inlet to a 21,000 gallon tank divided with a weir and a baffle. Grit and large solids settled out immediately, and the water overflowed to the quelling portion of the tank. Floating materials, including oils were retained by the baffle. Water was then discharged to a second tank of similar size for settling. From the settling tank, the wastewater was pumped successively through bag filters, an organoclay unit, granular activated carbon (GAC) canisters, and another bag filter. Following filtration and adsorption, final settling and storage occurred in a 21,000 gallon Effluent Tank. Treated water was discharged from the Effluent Tank. The WTP system was designed with an operating range of 50-100 gallons per minute.

In November 2008, DACE added four temporary tanks to store collected wastewater prior to treatment. These tanks were located adjacent to the Decontamination Area and were underlain with 40 mil temporary containment liners. In December 2008, supplemental equipment was added to the filtration and adsorption elements of the WTP. One additional organoclay unit was added in parallel to that which existed prior to that time. A supplemental GAC unit was installed in series with the existing filters. Three new bag filters were added and the configuration was revised to create two sets of two polishing filters operating in parallel. A recirculation line was also added to enable wastewater that did not achieve the discharge standards to be sent back to the head of the WTP for re-treatment.

In January 2009, the filtration and adsorption processes were reconfigured once more, resulting in treatment with two sets of two primary bag filters, followed by two organoclay units, four GAC units, four 1 micron bag filters, and two 0.5 micron cartridges, all in series. Portable tanks were added, as necessary, to store untreated water which was collected. Schematics depicting each of these configurations are included as Figures 5, 6 and 7.

A total of 61 samples of water were collected to determine compliance with the specified discharge standards. Water which did not attain the discharge standards was recirculated to the WTP influent and re-treated. Table 1 provides a summary of the analytical results for the WTP effluent. Data dated August 28, 2008 from samples collected on August 21, 2008 are the results of samples collected from the effluent of the WTP system performance test. In June 2009 and July 2009, following the decommissioning of the WTP, two shipments of wastewater were sent to the CWM Model City facility for treatment and disposal. These shipments and the management of the wastewater are discussed further in Section 2.4.

2.1.4. Construction of Support Facilities

Construction of Site support facilities and utilities began on June 23, 2008 and continued through August 22, 2008. Installation was undertaken by DACE, their subcontractors, and some service providers. As systems were completed, they were tested and brought on line to support Site operations. As the work neared completion, utilities and support facilities were removed, as possible. In some cases, temporary utilities were established in alternate locations to allow remedial work to be completed.

2.1.4.1. Installation of Utilities

At Luzerne Road, the site utilities consisted primarily of the following:

- Underground electrical, communications, water and natural gas services from Luzerne Road to the Soil Treatment Area,
- Aboveground electrical and communications services from Luzerne Road to the Scale House,
- Underground electrical and communications services from the Scale House to the Contractor's Trailer, Resident Engineer's Trailer and both truck scales,
- Underground electrical services from the Scale House to the Decontamination Trailer, Wastewater Treatment Plant, and the north and east perimeter air monitoring stations,
- Electrical service from the warehouse at 53 Luzerne Road to the west perimeter air monitoring station,

- Aboveground electrical service from Luzerne Road to the south perimeter air monitoring station,
- Underground sewage disposal for the Contractor's, Resident Engineer's, and Decontamination Trailers in a precast tank in the East Area,
- Underground water service from Luzerne Road to the Decontamination Area, Wastewater Treatment Plant and Contractor's, Resident Engineer's, and Decontamination Trailers, and
- A water service connection in the southeast portion of the East Area; and
- A treated water connection from the Wastewater Treatment Plant to an existing City of Glens Falls storm sewer pipeline under the East Area.

National Grid worked with ESMI and DACE to install the electric and gas services to the Soil Handling Area, Soil Treatment Area and Support Zone of the East Area from the north side of Luzerne Road. National Grid extended the natural gas service along the north side of Luzerne Road to supply the Site. National Grid indicated that upgrades would be needed to their gas delivery infrastructure to maintain continuous uninterrupted service to the Project during peak demand periods. These were not made and the Project was a secondary customer for natural gas service. A four inch natural gas line, capable of supporting an 84 mmbtu/hr demand from the TDU system, was installed from Luzerne Road to the Soil Treatment Area. A 1500 kilovolt-ampere transformer was installed adjacent to the TDU system in the northern portion of the East Area. A three phase, 480 volt, 1,200 amp electrical service was provided to the TDU system. Other power demands on-site were met with a separate line from Luzerne Road to a pole adjacent to the Scale House.

To meet the on-site water demands for the Project, including 80 gallons per minute (gpm) for the TDU system and up to 100 gpm for decontamination and the WTP, DACE installed a wet tap to the City of Glens Falls water main on the north side of Luzerne Road. A subgrade water meter pit and shut-off valve was installed at the LOW in the southeast portion of the East Area. Subsurface water lines were installed from this pit to the TDU system, trailers, Decontamination Area and WTP. Potable water was provided for the use of Site workers through a subcontract bottled water supplier.

Communications connections, consisting of telephone and computer internet services to the TDU Control Room, Scale House, and Resident Engineer's and Contractor's Trailers were provided by DACE for much of the Project. DACE installed connections to these locations from a pole on the south side of Luzerne Road opposite the eastern gate.

Sanitary services were provided through portable facilities and fixed facilities in the Contractor's and Resident Engineer's Trailers. A precast concrete storage tank was installed behind the Resident Engineer's Trailer to accept sanitary wastes. These were periodically removed by a permitted hauler during the Project.

A map indicating the approximate location of site utilities during the primary Work activities is included on Figure 8. At the end of the Project, the utilities were removed as further described in Section 2.5.

2.1.4.2. Access Control and Fencing

Upon mobilization to the Site, DACE contracted with AFSCO Fence, Inc. to install 8 foot high chain link fence at the Project's LOW. Privacy screening was installed on the western, eastern and southern perimeter fencing. Gates were constructed at the northwestern corner of the furniture warehouse at 53 Luzerne Road, the southern boundary of Grids P16 and P17 on the north side of Luzerne Road, and in the northeastern corner of the Site. The latter was installed primarily for TDU facility mobilization and emergency egress purposes. A "western" gate, located immediately east of the furniture warehouse was established by temporarily removing fence sections during June 2009 to facilitate backfilling of the West Area and the western part of the Containment Cell.

Temporary, movable chain link fence panels were rented by DACE to separate the Work from the delivery operations at the loading dock on the north side of the furniture warehouse. This fence, which was part of Change Order 2, was utilized to maintain access to the north side of the furniture warehouse during the remedial activities to the maximum extent possible. This, in addition to conducting the West Area excavation and backfilling in two phases, minimized disruption to the on-site business operations during construction.

DACE retained a private firm to provide Site security services during the Project. Wackenhut Security, Inc. was present on-site 24-hours per day, 7-days per week to control Site access and conduct security inspections for DACE throughout the work.

2.1.4.3. Truck Scales

DACE constructed and operated two portable truck scales at the Site to be used to document the weight of on-site and off-site transport vehicles. The vehicle weights were used to directly and indirectly measure quantities for a number of unit price payment items. The scales were installed during July 2008 and August 2008 and were tested to determine scale accuracy prior to use. Periodic testing of the scales was conducted during the Project to ascertain and document continued scale accuracy. A copy of the scale test records is included in Appendix J.

One of the truck scales was constructed in the northwest portion of the temporary concrete slab to weigh off-road hauling trucks transporting Non-TSCA soil to the Soil Treatment Area. The other truck scale was installed in the central portion of the East Area to weigh over-the-road transport vehicles shipping materials for off-site disposal. Signals from both scales were sent to the Scale House, where DACE's scale operator monitored and documented the results. The Resident Engineer also monitored many of the weighing operations during the work and maintained an up-to-date record of the quantities measured.

Following removal on February 10, 2009 and June 8, 2009, of the Non-TSCA and TSCA truck scales, respectively, DACE used the CAT Scales in Wilton, New York to measure weights of transport vehicles. This process is described further in Section 2.5.

2.1.4.4. Soil Treatment and Staging Pad

During the period July 7, 2008 through July 17, 2008, DACE constructed a temporary Soil Treatment and Staging Pad (temporary concrete slab) to serve as a working surface in the Soil Handling and Treatment Areas. The 200 foot x 340 foot temporary concrete slab was located in the northern portion of the East Area, and was the base of the TSCA and Non-TSCA soil stockpiles, the Non-TSCA truck scale and the TDU system. The slab also provided containment for the remedial activities which occurred on it. The location of the temporary concrete slab is depicted on Figure 8.

Following the collection of pre-construction soil samples to document the presence of soil contamination, if any, prior to the Project, native soil in the area of the temporary concrete slab was graded generally flat. In areas which were to be under the heavy equipment components of the TDU, excavations were made to allow thicker foundations and footings. Excavations were also made in two locations in which sumps for the TSCA and Non-TSCA Soil Stockpiles were to be installed. A 16 ounce geocushion was installed under the entire slab footprint. A 60 mil HDPE liner was then installed on the geocushion. Penetrations for utility pipelines and conduits were seamed and booted above grade. The specified geomembrane quality assurance and quality control (QA/QC) measures were implemented during construction. These are documented in the Project Submittals in Appendix D. Figure 9 depicts the panel layout plan for the geomembrane.

Two precast concrete collection sumps were then set on a bedding of stone on the liner. Steel reinforcing was installed in the excavated areas which were to be foundations and footings. Utility pipelines and conduits for the TDU processing were stubbed above the elevation of the finished surface. The concrete for the slab was poured directly on the geomembrane liner. In general, unreinforced portions of the slab were 6 inches thick. The edges of the temporary concrete slab were sloped upward to construct a 6 inch high perimeter containment berm to minimize run-off from the slab during remedial activities.

During the period July 22, 2008 through August 22, 2008, the TDU system was mobilized to the Site and assembled. The TDU components were connected to the newly-constructed Site utilities, and the ancillary components of the system, including the system controls and monitoring devices were installed. The shakedown and testing of the completed TDU system began on August 22, 2008. Further description of the TDU system is included in Section 2.3.

During the construction of the TDU system, DACE installed barriers constructed from large precast concrete blocks on the temporary concrete slab. The barriers were configured to provide physical separation between the TSCA and Non-TSCA Soil Stockpiles and between the Soil Treatment Area and the Treated Soil Stockpile Area (TSSA). The Non-TSCA truck scale and a ramp to the feed hopper of the TDU were also constructed on the temporary concrete slab during this period.

Throughout the Project, precipitation and decontamination, quench and process waters that were collected in the sumps or accumulated on the temporary concrete slab were pumped to the WTP. Stockpiled TSCA soil and debris were loaded out onto transport vehicles in the Truck Loading Area. Treated Non-TSCA soil was discharged from the TDU over the concrete block barrier to the TSSA with a radial stacker. Figure 8 shows the layout of the temporary facilities and utilities on the temporary concrete slab.

2.1.4.5. Decontamination Facility and Truck Loading Area

DACE constructed a Decontamination Facility and Truck Loading Area immediately south of the temporary concrete slab. Following pre-construction sampling, native soils in these areas were rough graded to slope toward two drainage sumps. A 40 mil HDPE geomembrane liner was then installed and covered with a geotextile. The precast drainage sumps were bedded on, and backfilled with stone. A stone working surface was installed. The Truck Loading Area was occasionally supplemented by other temporary loading areas during the progression of the Work. When this occurred, DACE installed polyethylene sheeting on the ground or stone surface where the transport vehicles were staged during loading. At the end of the loading period, the polyethylene sheeting would be removed and disposed. Further description of the use of temporary loading areas is contained in Section 2.5.

The Decontamination Facility was constructed in a 50 x 20 foot area adjacent to the southwest corner of the temporary concrete slab. This, combined with the adjacent Decontamination Trailer, comprises the Decontamination Area. Ingress and egress of construction equipment between the Exclusion Zone and the Support Zone occurred through the Decontamination Facility. Six inch high stone berms were constructed on the ends of the Decontamination Facility to prevent migration of decontamination wash waters from the facility. Six foot high wood-framed splash walls were erected on the sides of the Decontamination Facility. Liner was installed on the interior surfaces of

these walls to contain overspray. During the Project, decontamination water and precipitation which collected in the sumps of the Decontamination Facility or the Truck Loading Area were pumped to the WTP for treatment. Figure 8 depicts the Decontamination Facility and Truck Loading Areas.

2.1.4.6. Treated Soil Stockpile Area

DACE used the east and southeast portions of the East Area to construct an area for the staging and management of Non-TSCA soil that had been processed in the TDU. Stockpiles of 100 cubic yards or approximately 140 tons of treated soil were moved from the end of the radial stacker to a series of staging bins pending the receipt of post-treatment sampling results. Soil piles for which samples indicated attainment of the soil treatment standard were removed from the TSSA for reuse as on-site backfill. Soil which was shown by the analytical results to not meet the standard was re-treated.

The approximately 20 x 25 foot bins were constructed on a shaped subgrade of native soil. A 16 ounce geocushion was then laid on the soil, followed by a 60 mil geomembrane and a second geocushion. Two precast sumps were installed at low points in the TSSA, and the geomembrane was sloped to promote drainage towards them. A six inch thick stone base constructed of NYSDOT Type 2 material was placed to create a wear surface for the TSSA. Berms dividing the stockpiles were shaped as specified, with NYSDOT Jersey barriers installed on the berms as separation barriers. Figure 8 shows the location of the TSSA.

2.1.4.7. Trailers, Parking and Storage

As required by the Contract Documents, DACE mobilized temporary trailers to the Site to house the offices of the:

1. Contractor and ESMI;
2. Resident Engineer and the NYSDEC; and
3. Scale master and Site security guards.

The trailers were located in the west-central portion of the East Area throughout the majority of the work. The offices were serviced by Site utilities, as identified previously. Personnel vehicle parking areas were generally located adjacent to the trailers and in the southern portion of the East Area. Upon confirmation of the presence of PCB contamination in surface and subsurface soil in the East Area in July 2008, DACE installed a geotextile and 6 inch thick stone barrier in the areas of the field offices and on-site parking to provide physical separation between the Support Zone activities and the contaminated soil.

DACE also provided a Decontamination Trailer which was located immediately south of and adjacent to the Decontamination Facility. Ingress and egress of personnel between

the Exclusion Zone and the Support Zone occurred through the Decontamination Trailer. Site utilities, such as water and power were connected to the trailer. Supplies of personal protective equipment (PPE), personnel showers, lockers and changing facilities were located within the Decontamination Trailer. DACE maintained a log of personnel entering and exiting the Exclusion Zone in the Decontamination Trailer.

On-site storage of equipment, materials and supplies was generally conducted in the southern portion of the East Area. A number of walk-in steel Conex boxes, job boxes and trailers were staged at various times to provide on-site storage. These were located on stoned areas adjacent to Site access roads or parking areas. Some materials which were not adversely affected by weather were stored outside in the southern portion of the East Area.

As the Project neared completion, the trailers, parking areas and storage locations were moved nearer to the eastern gate to allow remediation of the East Area. The activities undertaken to relocate, decontaminate and remove this equipment from the Site are described in Section 2.5.

2.2. Soil Excavation

Excavation of soil at the Luzerne Road Site began on July 29, 2008. The final excavation was completed on July 10, 2009. In general, soil that was specified for removal in the Contract Documents was pre-designated as either TSCA or Non-TSCA soil, based upon the analytical results of representative samples obtained during the Remedial Investigation or the Remedial Design Studies. In many instances, supplemental soil was excavated from locations beyond the Limit of Contaminated Soil Excavation established in the Contract Documents. This soil was designated based upon the analytical results of investigatory, endpoint, confirmation, pre-construction or post-construction samples which indicated the need for excavation of the supplemental soil. Soil containing PCBs at concentrations equal to or greater than 50 mg/kg was designated as TSCA, while that with less than 50 mg/kg was considered Non-TSCA.

Almost exclusively, DACE utilized tracked excavators with standard excavation buckets fitted with grading plates to remove soil from the ground. DACE minimized the potential for spreading highly contaminated soil into areas of lesser contamination by:

- Utilizing separate excavation and hauling equipment for TSCA and Non-TSCA soil, respectively,
- Decontaminating excavation and hauling equipment between handling TSCA and Non-TSCA soil,

- Using separate excavator buckets for TSCA and Non-TSCA soil, or
- Scheduling the excavation activities to allow for sequential excavation of TSCA soil, followed by Non-TSCA soil excavation.

Following excavation, soil was either temporarily stockpiled on polyethylene sheeting or loaded directly into off-road articulating dump trucks. Both directly-loaded trucks and those loaded from stockpiles were routed over dedicated on-site haul roads to either the TSCA or Non-TSCA Stockpiles located in the north portion of the East Area. Excavators and haul trucks were typically kept within the Limit of Contaminated Soil Excavation. If excavation or hauling equipment was needed outside this limit, it was decontaminated prior to exiting.

DACE generally began excavation in South Area, and then proceeded to the West Area Phase 1, the Containment Cell, the West Area Phase 2, and the East Area in sequence. The ultimate horizontal and vertical limits of actual excavation are depicted as a composite surface on a drawing prepared by Van Dusen & Steves, Land Surveyors and included in Appendix K. A table presenting the summary of supplemental excavations is included as Table 2. A table presenting the final confirmation, or endpoint, sample data is included as Table 3. The total quantity of TSCA material excavated, based upon the difference between preconstruction and post-excavation survey data obtained throughout the Project, was 45,032 cubic yards. The total quantity of Non-TSCA material excavated, calculated similarly, was 49,479 cubic yards.

2.2.1. South Area

The South Area was generally characterized during the Remedial Investigation and Remedial Design Studies as having PCB contamination present in surface soil. The Contract Documents generally required the excavation of two feet of surface soil from within the Limit of Contaminated Soil Excavation in the South Area. One exception, in Grid I7 a six foot cut was required to remove a deeper hot spot of contaminated soil, was included in the Contract Documents. During development of the Remedial Design, a 50 foot by 50 foot grid was established over the area, and soil in each grid was designated as either TSCA or Non-TSCA based upon the analytical results of previous samples collected from the grid. Soil within layback slopes resulting from the excavation of TSCA grids was conservatively designated as TSCA. Collection and analysis of confirmation samples were required at the horizontal and vertical limits of the overall area to verify that the excavation standards of 1mg/kg in the top foot and 10 mg/kg at depths greater than one foot were attained.

DACE began excavation of the South Area on July 29, 2008 and completed excavation in that area on September 10, 2008. Initially, grids designated as TSCA were excavated to

full depth. Following complete excavation of the TSCA soil, DACE removed the soil from the grids designated as Non-TSCA.

Confirmation samples were collected from the bottom of the grids and, in some cases, from the resulting side walls of the excavations. If the analytical results of the confirmation samples showed that the excavation standard had not been achieved, the contractor was directed to "overdig," or excavate supplemental soil, from beyond the Limit of Contaminated Soil Excavation in the areas represented by the non-achieving samples. The overdigs were to be of specific dimensions and shape as directed by Malcolm Pirnie and approved by the NYSDEC. Dimensions varied depending upon:

- Sample location,
- Cues from visual inspection of the area,
- Configuration of the non-achieving samples with respect to the overall sampling results,
- Degree of contamination indicated by the sample results, and
- The judgment of the Resident Engineer.

This process was repeated following completion of the overdig, until each of the confirmation sample results attained the excavation standard. The overdigs are referred to as supplemental soil excavation and are summarized on Table 2. The results of the confirmation samples for each South Area location that achieved the excavation standard are depicted on a drawing entitled South Area, contained in Appendix L. The laboratory reports from the confirmation samples collected from the South Area are included in Appendix M.

During this process, capacitors and capacitor fragments were observed on the surface soil in the central portion of the South Area. Some areas which appeared to contain capacitors were beyond the Limit of Contaminated Soil Excavation. Following a visual inspection, the NYSDEC requested that Malcolm Pirnie obtain surface soil samples from Grids L9, L10, K10 and J10. On August 4, 2008, six surface soil samples were collected by Malcolm Pirnie and split with DACE. The analytical results from these samples indicated the presence of PCB contamination at concentrations exceeding TSCA levels in four samples and exceeding the excavation standard in the other two. The contractor was then directed to excavate the top two feet of soil from these grids. A copy of the laboratory report from these analyses is included in Appendix M.

At the same time, the NYSDEC directed Malcolm Pirnie to collect supplemental surface soil samples from another portion of the South Area which was previously beyond the Limit of Contaminated Soil Excavation. Six surface soil samples were collected and split with DACE from the former access road to the Containment Cell. The analytical results from these samples indicated the presence of PCB contamination at concentrations exceeding the excavation standard in Grids J6, K6, and L6. The contractor was then directed to excavate the top two feet of soil from these grids. Samples collected from Grids M6, N6, and O6 had PCB contaminant concentrations below the excavation standard. Surface soil from these grids was left in place. A copy of the laboratory report from these analyses is included in Appendix M.

DACE elected to construct an infiltration basin to receive discharges of treated water during the Project. This basin was built in Grid O7 in the South Area following backfill of the area with treated soil. Treated soil was excavated to a depth of approximately two feet and placed around the west, east and south sides of the grid, forming a low berm. Wastewater Treatment Plant effluent was then discharged to the basin on a semi-continuous or batch mode basis following sampling and laboratory testing to ascertain that the concentration of PCBs in the water was less than the discharge standard. Discharge water was then allowed to infiltrate through the basin into the subsurface.

Samples of surface soil collected on December 9, 2008 and December 11, 2008 from the basin indicated concentrations of PCBs above those of the treated soil that had been used to construct the basin. Approximately one foot of soil from the surface of the basin was excavated and disposed, and the resulting soil surface was tested. Analytical results from those samples indicated compliance with the excavation standard, and the basin was returned to use. As the Project neared completion and the Wastewater Treatment Plant was being decommissioned, confirmation samples from the basin's surface soils were again collected. The analytical results of these samples, dated June 17, 2009, indicated that PCB contamination concentrations in the basin's surface soil were below the excavation standard. On June 18, 2009 the basin was backfilled with the treated soil which had been previously excavated from the area and placed to create the basin's perimeter berms.

During the latter part of the winter, DACE relocated snow and ice which had been removed from surfaces in the East Area to a windrow-shaped stockpile placed on the treated-soil backfill in the southern portion of the South Area. This material was inadvertently mixed with soil, mud and water, which apparently contained PCB contaminants. After the snow and ice had melted, DACE was directed to sample the surface soil in the pile footprint to ascertain whether residual contamination from the stockpiled materials had entered the treated surface soil. Samples collected on April 14, 2009 confirmed the presence of residual contamination. During the period

April 27, 2009 through May 22, 2009, DACE conducted a series of excavations followed by confirmation sampling events to remove the treated soil which had been affected by contamination from the snow and ice pile. Treated soil was designated as either TSCA or Non-TSCA based upon analytical results from representative surface soil samples. Excavated soil was removed to either the TSCA Soil Stockpile or the Non-TSCA Soil Stockpile for subsequent off-site disposal. Following the final excavation event, PCB concentrations in confirmation samples were below the excavation standard. The area was then backfilled with off-site material and restored in accordance with the Contract Documents. A copy of the analytical data from confirmation samples collected during the snow pile remediation process is included in Appendix M.

2.2.2. West Area

The West Area was characterized by repeated sampling during the Remedial Investigation and Remedial Design Studies as having PCB contamination present in surface and subsurface soil to depths of up to 20 feet. The Contract Documents required the excavation of the contaminated soil within the Limit of Contaminated Soil Excavation generally to the groundwater table in the West Area. Several small excursions to remove contaminated soil "hot spots" from below the groundwater table were also shown and specified in the Contract Documents. During development of the Remedial Design, a 50 foot by 50 foot horizontal by four foot vertical grid matrix was established over the entire West Area. Soil in each grid matrix box was designated as either TSCA or Non-TSCA based upon the analytical results of representative samples collected during the Remedial investigation and Remedial Design Studies. Soil within layback slopes resulting from the excavation of TSCA grid matrix boxes was conservatively designated as TSCA. The Contract Documents required excavation of contaminated soil from the West Area in a series of four foot thick lifts, as measured from a horizontal plane approximating the preconstruction ground surface. Collection and analysis of confirmation samples were required at the horizontal and vertical limits of the overall area, except for below the groundwater table, to verify that the excavation standards of 1mg/kg in the top foot and 10 mg/kg at depths greater than one foot were attained.

At the beginning of the Project, DACE requested and received permission to bifurcate the excavation activities in the West Area into phases. This was done to minimize the areal extent of simultaneously-open excavations, and to reduce the time period in which the loading dock and other support facilities from the on-site furniture distribution facility were out of service. Phase 1 of the Work was defined as that which occurred south of the F-G gridline; Phase 2 consists of the Work which occurred north of that same line.

Excavation from Phase 1 and Phase 2 of the West Area was conducted in a similar manner. Initially, grid matrix boxes in the first layer designated as TSCA were dug to full depth. Following complete excavation of the TSCA soil, DACE removed the soil

from the grid matrix boxes designated as Non-TSCA soil. Confirmation samples were collected from the resulting side walls of the overall excavation. If the analytical results of the confirmation samples showed that the excavation standard had not been achieved, the contractor was directed to overdig soil from beyond the Limit of Contaminated Soil Excavation, using an iterative excavation and sampling process similar to that described previously for the South Area. This process was repeated until each of the confirmation sample results for the layer attained the excavation standard. Subsequently, the layer was declared complete, and excavation of soil from the next layer was undertaken.

This process was repeated as many times as necessary to excavate the soil from within the Limit of Contaminated Soil Excavation. Confirmation samples were collected from the bottom of grid matrix boxes at the vertical Limit of Contaminated Soil Excavation in which the bottom elevation of the box was above the groundwater table. In areas where supplemental excavation of the grid matrix box bottom was necessary to achieve the excavation standard, overdigs were conducted and the process was repeated until the results of confirmation samples attained the excavation standard, or the groundwater table was encountered. The overdigs for the West Area are summarized on Table 2. The results of the confirmation samples for each West Area location that achieved the excavation standard are depicted the West Area Drawing in Appendix L. The laboratory reports from the confirmation samples collected from the West Area are included in Appendix M.

While excavating soil from the West Area Phases 1 and 2, numerous capacitors, or portions of capacitors were encountered. The capacitors were removed and managed with other PCB capacitors identified during the Project. Figure 10 indicates the locations in which capacitors were found during the excavation of the West Area.

2.2.2.1. Phase 1 Excavation

DACE initiated excavation of the West Area Phase 1 on September 2, 2008 and completed soil removal activities on October 30, 2008.

In early September 2008, stained soil with a strong odor was encountered in Grids J2 and K2. At the request of the NYSDEC, Malcolm Pirnie and DACE collected split soil samples to characterize the stained material. The laboratory data indicated that the stained soil was highly contaminated with PCBs. Some of this material had been segregated in a stockpile on polyethylene sheeting and some was in-situ. Following receipt of the laboratory data, the stained soil excavated from these grid matrix boxes at this elevation was re-designated as TSCA. It was subsequently managed and disposed off-site with other TSCA soil. A protocol for addressing stained soil from other locations, if necessary, was developed. A copy of the analytical report from the stained soil samples is included in Appendix M.

During removal of soil from within the Limit of Contaminated Soil Excavation to the east and north of the one story structure, the pipelines, distribution box, and infiltration structures from an existing on-site septic system were encountered. As shown and specified in the Contract Documents, the utilities were protected and the soil adjacent to them was removed during the Project. Some components were removed and replaced. Prior to backfilling this area, DACE restored and tested the septic system.

As excavation of soil from the grid matrix boxes along the north wall of the one story structure occurred, the NYSDEC directed Malcolm Pirnie to collect supplemental confirmation samples from the excavation sidewalls beneath the building's foundation. Two samples were collected from the southern sidewall of Grid Matrix Box L3 Elevation 371 and samples were obtained from the southern and western sidewalls of Grid Matrix Box L5 Elevation 375. The laboratory results for the analyses conducted on each of these samples indicated PCB contaminant concentrations at levels less than the subsurface excavation standard. The West Area Drawing in Appendix L depicts the confirmation test results for soil samples which met the excavation standard in these locations. A copy of the laboratory reports for the soil samples is included in Appendix M.

2.2.2.2. Phase 2 Excavation

DACE began excavating the West Area Phase 2 on October 21, 2008. Excavation was completed on January 14, 2009.

The north sidewalls of Grid Matrix Boxes A2 Elevation 375, A3 Elevation 375, A4 Elevation 375 and A5 Elevation 375 were comprised of a mixture of debris, native soil, and other materials which appeared to have been illegally dumped. Eighteen capacitors were encountered in Grid Matrix Boxes A2 Elevation 375 and A3 Elevation 375. On November 4, 2008, six hypodermic needles were encountered in Grid Matrix Box A4 Elevation 375. During excavation of these Grid Matrix Boxes, soil to be treated in the TDU was screened from debris and other materials. The soil was managed with other contaminated site soil, while the debris was collected separately, managed in accordance with regulations governing solid waste, and ultimately disposed as TSCA material. Supplemental removals were conducted in these grid matrix boxes. PCB concentrations in confirmation soil samples were below the excavation standard. Additional debris was apparent in the final north sidewall surface, but removal of those materials was not considered within the scope of this Project. It is intended that the non-PCB debris and other waste materials will be removed and managed during the imminent closure and remediation of the adjacent Old City of Glens Falls Landfill.

Analytical results from two soil samples collected by DACE from the bottom of the Phase 2 excavation indicated the presence of PCBs in underlying soil at concentrations significantly above the excavation standard. These locations are depicted on the West

Area Drawing in Appendix L as sample points B4-SC and F3-SC. Since the elevated contaminant levels in these areas strongly suggested degradation of localized ground water, and supplemental excavation would require removal of soil from below the groundwater table, it was probable that confirmation samples which attained the excavation standard could not be obtained. Thus, the NYSDEC directed that ground water monitoring wells be installed at these locations in lieu of further excavation. Monitoring wells 15S and 16S were installed in these locations on June 4, 2008. The as-built drawing in Appendix K shows the location of these wells.

2.2.2.3. Soil Excavation Below Groundwater Table

Excavation and remediation of contaminated soil from seven "hot spots" located at depths below the historical groundwater table was included in the scope of the Project. DACE conducted these removals on December 17, 2008. Dewatering of the areas prior to soil removal was not required by the Contract Documents. DACE conducted the work by removing soil to the indicated final elevations with a tracked excavator. Each bucket of soil removed was held above the excavation for a short period of time and free water was allowed to drain back into the excavations. Loading occurred into off road dump trucks, which were parked on polyethylene sheeting. Excavated material was pre-designated as TSCA soil. It was blended with other, drier soil in the TSCA soil stockpile prior to transport and off-site disposal.

2.2.2.4. Western Supplemental Surface Soil

During the West Area excavation, debris was identified on the ground surface between the western Limit of Contaminated Soil Excavation and the Limit of Work in the West Area. Some of the debris, including metal fragments and paper, appeared to consist of pieces of capacitors. This debris was removed, managed, transported, and treated as PCB capacitor material. At the direction of the NYSDEC, Malcolm Pirnie obtained representative surface soil samples from locations within and adjacent to the debris field to determine whether the soil was contaminated with PCBs. On November 24, 2008, 20 surface soil samples were collected by Malcolm Pirnie. The analytical results indicated that fourteen of the samples contained PCBs at levels exceeding the excavation standard for surface soil. In response, DACE was directed to remove one foot of soil from the surface of the areas represented by the failing samples for treatment or off-site disposal. That excavation was completed on December 15, 2008. DACE collected 13 confirmation samples from the bottom of the excavations in these areas on December 18, 2008. With the exception of Grid E0, the analytical results of the samples attained the excavation standard for subsurface soil located a minimum of one foot below grade. In Grid E0, another foot of soil was removed on January 13, 2009, and the resulting bottom of the excavation was re-sampled. This sample attained the excavation standard for subsurface soil located a minimum of one foot below grade. The West Area Drawing in

Appendix L depicts the confirmation test results for soil samples which met the excavation standard in the West Area surface and subsurface soil located between the Limit of Contaminated Soil Excavation and the Limit of Work. A copy of the laboratory reports for the supplemental surface and subsurface soil samples is included in Appendix M.

2.2.3. Containment Cell

The Containment Cell was characterized during the Remedial Investigation and Remedial Design Studies as having PCB contamination present in the surface soil above the cell cover. The contents of the cell were found to contain significant levels of PCB contamination, and some debris was apparent in recovered samples. Due to being in physical contact with the cell contents, the upper surface of the cell's clay bottom liner was also assumed to be contaminated with PCBs. Samples collected from native sands under the Containment Cell were generally not contaminated with PCBs. The original Contract Documents designated that the materials within the Limit of PCB Containment Cell Contaminated Soil Excavation be removed and managed as TSCA material. The Contract also required confirmation sampling at the horizontal and vertical excavation limits to document that the excavation standards of 1mg/kg in the top foot and 10 mg/kg at depths greater than one foot below grade were attained. Change Order Number 1 re-designated the two feet of soil above the cell cover as Non-TSCA soil.

DACE began excavation of the Containment Cell on September 12, 2008 and completed excavation of the cell on May 13, 2009. Initially, approximately two feet of Non-TSCA soil was removed with tracked excavators from the surface of the cell, along with the synthetic materials which had been components of the cell cover. These materials were processed through a finger screen located on the cell to separate the surface vegetation and synthetic cover materials from the soil. The screened soil stockpile was then transferred by a rubber-tired loader into off-road haul trucks. This soil was brought to the Non-TSCASoil Treatment Stockpile, blended with other contaminated soil and treated. The other screened materials were loaded into trailers and disposed off-site as TSCA material.

DACE prepared to begin excavating the contents of the Containment Cell in early September 2008. Initially, DACE removed the majority of the East Berm from the cell, and utilized its former footprint as a haul route to the Soil Treatment and Handling Areas. On September 12, 2008, DACE conducted exploratory excavations into the contents of the Containment Cell. These excavations revealed a number of capacitors intermixed with contaminated soil. On September 15, 2008, dozens of capacitors were encountered when full-fledged Containment Cell soil removal activities began. DACE immediately began screening the capacitors from the soil, and soon created separate stockpile areas within the cell for the capacitors. The stockpiles were within the footprint of the cell's

clay bottom liner, and were covered with polyethylene sheeting to prevent precipitation from contacting the capacitors.

The capacitors, although varying in dimension and shape, were generally suitcase-sized and weighed between 80 and 120 pounds. The condition of the capacitors varied greatly; some were fully intact, while others had been flattened. Most of the capacitors had one or more ceramic insulators broken off. Approximately 20 percent of the capacitors had some oil inside or on their exterior surfaces, while 80 percent were dry. The density of capacitors with respect to the cell contents varied somewhat from area to area, but capacitors were generally found throughout the entire Containment Cell footprint. Photographs of the capacitors as encountered during cell excavation and as stockpiled are included in Appendix N.

The soil in the Containment Cell that had been screened from the capacitors was loaded using tracked excavators into off road articulating dump trucks and moved to the TSCA Soil Stockpile. DACE then excavated the cell in two horizontal lifts. The first progressed from east to west until the approximate elevation of the surrounding native ground was reached. Subsequently, excavation to the cell liner was conducted from west to east. Approximately one foot of the cell's clay bottom liner was also excavated, in accordance with the requirements of the Contract Documents. Once the contents of the Containment Cell, including the capacitors, were removed, holes were dug completely through the cell's clay bottom liner in a number of locations to allow future precipitation to drain.

Following development of a methodology for managing the capacitors, and after approval of that protocol by Malcolm Pirnie, the NYSDEC and the USEPA, the stockpiled capacitors were removed from the Containment Cell. This was accomplished by transport to a capacitor stockpile located in the TSCA Soil Handling Area. Loading was accomplished using a grapple mounted to a tracked excavator. Care was taken to conduct the loading within the limit of the cell's bottom liner and to minimize direct worker contact with the capacitors and their contents. Following removal of the capacitors from the Containment Cell, the soil under the former stockpiles was excavated and managed as TSCA contaminated soil. The excavation and management of the capacitors is a major component of Change Order Number 2, and is discussed further in Section 3.

Representative confirmation samples were collected in a spatial array from the bottom of the excavation. If the analytical results of the confirmation sample showed that the excavation standard had not been achieved, the contractor was directed to overdig soil from an area surrounding the failed sample, using an iterative excavation and sampling process similar to that described previously for the South Area. This process was repeated until each of the confirmation sample results attained the excavation standard.

This supplemental soil excavation is summarized on Table 2. The results of the confirmation samples for each Containment Cell location that achieved the excavation standard are depicted on the Containment Cell Drawing in Appendix L. The laboratory reports from the confirmation samples collected from the Containment Cell are included in Appendix M.

The Contract Documents required regrading of the soil berms which comprised the perimeter of the Containment Cell. DACE had proposed to grade the berm material into the hole resulting from the excavation of the contents of the former Containment Cell. Once the berms were exposed, visual inspection of the materials of construction indicated that they were constructed, in part, of non-native fill material and they contained some debris. On April 1, 2009, excavation into the east end of the South Berm uncovered numerous whole capacitors and capacitor parts. Subsequent excavations conducted along the rest of the South Berm also indicated the presence of capacitors. Sampling of material from the West Berm, the remnants of the East Berm, and the east end of the North Berm indicated the presence of PCB contamination in soil at concentrations above the excavation standard. Targeted supplemental soil removals were conducted on the North Berm and the West Berm.

During this process, a number of capacitors and capacitor components were encountered in the southern portion of the West Berm. These were removed and a two foot deep cut was made in that portion of the West Berm. Material comprising the South Berm and that which remained from the East Berm was entirely removed and managed as TSCA soil. After confirmation sampling, an additional cut of one foot was conducted in the area of the South Berm. Following re-sampling, an iterative process of supplemental soil removal and confirmation sampling ensued in the areas beneath the South Berm and the East Berm. This process was repeated until each of the confirmation sample results attained the excavation standard. The supplemental soil excavation is summarized on Table 2. The results of the confirmation samples for each location that achieved the excavation standard are depicted on the Containment Cell Drawing in Appendix L. The laboratory reports from the confirmation samples collected from the berms are included in Appendix M.

Upon receipt of the analytical results of confirmation samples attaining the excavation standard from the North Berm, this material was pushed into the Containment Cell excavation. Samples of the stone and soil from the surface of the North Haul Road, located immediately to the north of the North Berm, indicated that those materials required excavation, transport from the Site, and disposal as TSCA material. The liner under the North Haul Road was also removed and disposed. Subsequent confirmation samples indicated that remaining soil constituting the new surface in the majority of the road footprint attained excavation standards. The balance of the area was overdug, and

the excavated soil was managed as TSCA soil. The results of the confirmation samples for each location that achieved the excavation standard are depicted on the Containment Cell Drawing in Appendix L. The laboratory reports from the confirmation samples are included in Appendix M.

Confirmation samples of surface soil from areas to the south of the South Berm and north of the South Area were collected and analyzed to detect PCBs. It was in these areas that drums of investigation-derived waste (IDW) had been stored prior to construction and upon which DACE had constructed the Wastewater Treatment Plant. The IDW Drums were emptied, crushed and their contents were disposed off-site as TSCA waste. Near the close of the Project, the WTP was decommissioned, decontaminated and its components removed from the Site. The analytical results of the surface soil samples indicated that the excavation standard had been attained in these areas. The results of the confirmation samples for each location that achieved the excavation standard are depicted on the Containment Cell Drawing in Appendix L. The laboratory reports from the confirmation samples are included in Appendix M.

Pre-construction testing of surface soil indicated that PCB concentrations in Grid H13 were above the excavation standard. Two feet of soil was removed from this grid and managed as TSCA soil. The results of post-excavation confirmation samples indicated the need for supplemental soil removal in the southeast portion of the grid. Following this overdig, sampling indicated that the remaining soil met the excavation standard. The supplemental soil excavation is summarized on Table 2. The results of the confirmation samples for each location that achieved the excavation standard are depicted on the Containment Cell Drawing in Appendix L. The laboratory reports from the confirmation samples are included in Appendix M.

2.2.4. East Area

A number of surface soil samples were collected from the East Area during the Remedial Investigation and Remedial Design Studies. None indicated significant PCB contamination present in the surface soil. Thus, during the preparation of the Remedial Design, the East Area was considered a suitable location for the construction of support facilities for the remediation Project. The NYSDEC and the Greater Glens Falls Development Corporation arranged for a temporary easement on the 4.3 acre parcel located east of 51 Luzerne Road to allow its use for that purpose during construction. The Contract Documents were developed based upon this concept.

During site preparation activities, DACE cleared vegetation from the East Area. Surface soil from parts of the area were scraped and stockpiled on the southeast portion of the East parcel. Samples collected by DACE on June 25, 2008 from the stockpiles indicated the presence of PCB contamination. At the direction of the NYSDEC, the stockpiled

surface soil was re-sampled by Malcolm Pirnie, with split samples collected by DACE. The results of this sampling confirmed the presence of PCB contamination at TSCA and Non-TSCA levels. The laboratory reports documenting these sampling events are included in Appendix M. Based upon the test results, the NYSDEC directed that the soil be managed in a manner consistent with other contaminated soil from the site. Malcolm Pirnie's response to Request for Information (RFI) 4.0 directed DACE to manage the stockpiled soil as TSCA material. Between August 25, 2008 and September 8, 2008, 5,452 tons of soil from the stockpile was transported from the Site and disposed at CWM Chemical Service's, L.L.C. (CWM's) Model City, New York facility.

Following the scraping and stockpiling of some surface soil, a 50 foot by 50 foot grid was established and composite preconstruction samples of the surface soil in the East Area were collected. Samples collected on June 25, 2008 from surface soil from areas to be located under the temporary concrete slab indicated the presence of PCB contamination. The analytical results from subsequent sampling of other grids in the East Area indicated TSCA and Non-TSCA-level PCB contamination in surface soils in a number of other grids in the south and west portions of the East Area. A copy of this data is included in Appendix M.

DACE indicated that remediation of the East Area would be much more efficient if conducted at the end of the Project, rather than at the outset. Based upon the test results, and the prospect for significant delay if remediation were to occur immediately, the NYSDEC directed that a physical barrier of geotextile and crushed stone be installed to segregate the areas in question from the other work of the Project until a future time in which remediation of the East Area grids could occur efficiently. DACE installed this barrier throughout the East Area. Malcolm Pirnie's response to RFI 5.0 directed that, during the future remediation of the East Area, DACE manage the contaminated soil from these cells in a manner generally consistent with other contaminated soil from the site encountered beyond the Limit of Contaminated Soil Excavation. In addition, the Contractor was directed to manage soil removed during excavations for utility installation in areas of contamination in a manner consistent with the management of contaminated soil scheduled for remediation. An excavation standard of 1mg/kg in soil at all depths was established by the NYSDEC for the East Area.

During the period December 23, 2008 through July 10, 2009, DACE excavated the contaminated soil from 20 whole grids and six partial grids in the East Area. Grids were remediated on a piecemeal basis, as equipment and personnel were available or, as necessary, to "clear" grids so that the restored surface area could be used for other purposes. Categorization of the soil was generally conducted on a grid-by-grid basis using the preconstruction analytical data to designate each grid. Composite samples collected under the TSSA were aggregated from larger areas, thus resulting in six 75 foot

wide by 125 foot long rectangular grids. Two of these were excavated; one each designated as TSCA and Non-TSCA.

Initially, surface stone and the geotextile barrier were removed from the area of each grid. Polyethylene sheeting was placed on the surface of an adjacent grid to create a loading area. The top two feet of the in-situ contaminated soil was excavated with a tracked excavator and hauled with an articulating dump truck to the appropriate contaminated soil stockpile. Confirmation samples were collected from the bottoms and side walls of each excavation. If the analytical results of the confirmation samples showed that the excavation standard had not been achieved, the contractor was directed to overdig soil using an iterative excavation and sampling process similar to that described previously for the South Area. This process was repeated until each of the confirmation sample results attained the excavation standard.

Following decontamination and removal of the temporary concrete slab from the Soil Treatment and Handling Areas, "post-construction" confirmation samples were collected from the underlying soil to document that the construction processes had not resulted in soil quality degradation. Twenty eight samples, each representing a roughly 50 foot by 50 foot grid were obtained. The analytical results of the samples indicated that soil in Grid F15 contained PCBs at concentrations greater than the excavation standard. On May 19, 2009, DACE excavated one foot of soil from the portion of that grid which had been under the temporary concrete slab. The results of subsequent confirmation sampling and analysis indicated that the remaining soil attained the excavation standard.

As the Project neared its conclusion, DACE systematically removed the surface stone and geotextile barrier from the grids in the East Area from which preconstruction sampling and analysis had not indicated the presence of PCB contamination above the excavation standard. DACE collected post-construction composite confirmation samples from the underlying surface soil in these grids to document that the construction activities had not resulted in soil quality degradation. Most post-construction samples contained PCB contamination at concentrations below the excavation standard. In Grid H14, the standard was exceeded, and a six inch deep overdig was conducted. The results of subsequent confirmation sampling and analysis indicated that the remaining soil attained the excavation standard.

Soil excavation activities in the East Area are summarized on Table 2. The results of the confirmation and post-construction samples for each location that achieved the excavation standard are depicted on the East Area – North and East Area – South Drawings in Appendix L. The laboratory reports from the post-construction and confirmation samples are included in Appendix M.

2.2.4.1. Sampling of Eastern Adjacent Property Surface Soil

Following the confirmation of the presence of PCBs in the East Area, the NYSDEC directed Malcolm Pirnie to determine if the property adjacent to and east of the East Area also had surface soil contamination. On October 2, 2008, Malcolm Pirnie collected four surface soil samples from that property at locations designated by the NYSDEC. The analytical results indicated PCB concentrations ranging from below the detection limit to 0.122 mg/kg. No further investigatory or remedial activity was undertaken on that parcel. The results of this sampling event are depicted on the East Area – North and East Area – South Drawings in Appendix L. The laboratory reports for the samples are included in Appendix M.

2.3. Thermal Desorption of Soil

The Record of Decision for the Luzerne Road Site OU-2 and OU-3 included the following language regarding the selected remedy:

> "On-site treatment of excavated materials using thermal desorption. Treated soil will be used to backfill the excavations."

Contract Documents including these remedial elements were completed in October 2007. Initial bidding, based upon this remedy, proved unsuccessful. Interviews with actual and prospective Bidders indicated that the use of thermal desorption to treat Site media containing PCBs at concentrations greater than 50 mg/kg would not be economically feasible. In response, the Contract Documents were revised to include two options for managing such material:

- **ALTERNATE A:** Thermally treat contaminated soil determined to contain PCBs at concentrations greater than or equal to 50 mg/kg (TSCA soil) to remove PCBs to concentrations less than 1 mg/kg and backfill successfully-treated, TSCA Soil on-site; or

- **ALTERNATE B:** Dispose contaminated soil determined to contain PCBs at concentrations greater than or equal to 50 mg/kg (TSCA soil) at an off-site location.

In April 2008, bids for the revised Project were received. The NYSDEC selected DACE as the construction contractor based upon their bid for Alternate B. The construction Contract, including the Work of Alternate B, was awarded to DACE by the NYSDEC in May 2008.

DACE retained ESMI of New York (ESMI) to conduct the thermal desorption work for the Non-TSCA soil at the Luzerne Road Site. ESMI prepared and submitted for review a Thermal Work Plan detailing their proposed approach to the thermal desorption process, and addressed the following:

- Description of the process;
- List of proposed personnel;
- Requirements of their thermal desorption unit (TDU);
- Permitting and performance testing;
- Proposed schedule of operations;
- Procedures for operation;
- Process safety provisions;
- Equipment configuration;
- Process flow diagram;
- Heated air permit equivalence; and
- Proof of Performance (POP) Plan.

Copies of this Work Plan and the other submittals referenced in this Section are included in Appendix D.

On July 7, 2008, DACE began construction of the temporary concrete slab upon which the TDU, its appurtenances, and the Non-TSCA Soil Treatment Area would be developed. That process was completed on July 17, 2008. Erection of the TDU by ESMI was initiated on July 22, 2008. Set up of the TDU was completed approximately one month later, when testing, or "shakedown" of the equipment commenced. During the period August 22, 2008 through September 10, 2008, ESMI tested the TDU and its ancillary systems to establish equipment settings to facilitate achievement of the treatment objectives, and subsequently, optimize operations. Using Non-TSCA soil excavated from the South and West Areas, ESMI adjusted the settings to enable development of a range of values for each operating parameter which would attain permit equivalency objectives, achieve Project Contract requirements, and be acceptable to the NYSDEC.

2.3.1. Performance Testing and Approval

On September 11, 2008, ESMI conducted Proof of Performance testing for the TDU at the Luzerne Road Site. The testing, consisting of three treatment runs on feed soil of varying contaminant concentration, was observed by personnel from the NYSDEC and Malcolm Pirnie. Samples of treated soil were obtained and sent to Mitkem Laboratories, Warrick, Rhode Island for analysis to detect the presence of PCBs. Eric Aynsley & Associates, Inc. was retained to perform source testing and stack sampling during the POP Test. Air samples were sent to Maxxam Analytics, Inc., Burlington, Ontario laboratory for analysis. Based upon the continuous emissions monitoring system data collected prior to and during the POP Test, and the real-time source monitoring information from the test, the NYSDEC granted conditional interim approval for continued TDU operations during the period September 12, 2008 through October 12, 2008 using a proposed operating envelope.

On October 10, 2008, DACE submitted the Final POP Test Results. Based on these results, the NYSDEC approved the POP Test and established the following operating parameters for the TDU for the Luzerne Road Remedial Project:

Parameter	Feed Rate to Dryer	Discharge Soil Temp	Dryer Draft	Oxidizer Exhaust Temp	Bag House Diff Press	Carbon Monoxide
Units	Ton/hr	degree F	in. W.C.	degree F	in. W.C.	ppm
average time**	5 min	60 min	1 min	instantaneous	5 min	5 min
delay	10 min	10 min	1 min	2 min	2 min	10 min
Value	50	775	0.1	1650	4.0	25

* exclusive of startup ** rolling average

Full-scale operation of the TDU began immediately and continued through January 9, 2009. Copies of the Final POP Test Results are included in the submittals in Appendix D.

2.3.2. Process Description

Soil designated as Non-TSCA, which was excavated at the Site prior to January 9, 2009, was treated using the TDU to remove PCB contamination to below 1mg/kg, the established soil treatment standard for the Project. Some excavated material was processed through a mobile finger screen staged adjacent to each excavation to separate vegetation, rock, and other debris from the soil. The soil was then loaded into off-road articulating dump trucks and transported to the Soil Treatment Area. The haul route followed the North Haul Road to the northwest portion of the temporary concrete slab.

Trucks then entered the Soil Treatment Area over the Non-TSCA truck scale, which was used to weigh each load. After the weight was recorded, the soil was dumped in the Non-TSCA Soil Stockpile. From this stockpile, it was loaded into the contaminated soil feed hopper of the TDU with a rubber tired loader. Upon discharge from the hopper, it passed through a vibratory screen and was spread in a relatively thin layer on the process conveyor. Screenings were consolidated and disposed off-site.

The mobile TDU system used at the Luzerne Road Site used a 42 mm btu., natural gas fueled, direct-fired rotary dryer as the primary treatment unit to desorb PCB contaminants from the soil. Desorbed contaminants were transferred to the gas treatment system, where they were thermally oxidized in the secondary treatment unit. Particulates in the gaseous stream were removed with cyclones and the baghouse filter. Treated soils were discharged to a pugmill for cooling and rehydration. Subsequently, they were moved to stockpile bins which had been constructed in the Treated Soil Stockpile Area (TSSA) of the East Area. Figure 11 is a flow process diagram for the TDU system.

Operation of the TDU was generally conducted by ESMI on a continuous basis from Monday morning through Saturday night. Sundays were generally used for small repairs and system maintenance. ESMI staff was present in the Soil Treatment Area during operations. TDU data was automatically recorded by the electronic monitoring and control system appurtenant to the TDU system. Malcolm Pirnie provided full-time oversight of the process, including inspections of the system and recording an hourly snapshot of system data. The system generally treated soil in the range from 35 tons per hour to 50 tons per hour throughout the Project. During TDU operations, Malcolm Pirnie and ESMI tracked the performance of the system on Daily Operations Logs. Copies of these logs are included in Appendix O.

Each treated soil pile consisted of approximately 100 CY, or 140 tons, of soil. Piles were placed in discrete stockpile bins in the TSSA and assigned unique identifiers. Following cooling, a composite sample was collected from each pile by DACE under the observation of Malcolm Pirnie. The samples were sent to Mitkem Laboratories for analysis using SW846 Method 8082 to detect the presence of PCBs. If the analytical results indicated PCB concentrations below the soil treatment standard, the pile was approved for use as on-site backfill in either the South Area or the West Area. Piles with analytical results above the soil treatment standard were returned to the Soil Treatment Area and re-treated. This process was repeated until subsequent laboratory analysis indicated PCB contaminant levels below the soil treatment standard.

During the Project, a total of 64,222 tons of Non-TSCA soil were successfully treated with the TDU. Of the 482 discrete piles created, 98 percent achieved the soil treatment standard on the initial pass through the TDU. Six of the ten piles requiring re-treatment

were processed during the initial days of the shakedown period. Table 4 provides a summary of the Post-Treatment Analytical Results for the Project. Appendix P contains the laboratory reports for each post-treatment sample. Appendix Q contains a tracking log of the soil piles in the TSSA which was prepared by Malcolm Pirnie during the Project.

2.3.3. Natural Gas Curtailment

When the TDU system was connected to the natural gas supply network, ESMI was established as a secondary customer for the fuel. On December 18, 2008, ESMI was notified that the natural gas supply to the site would be curtailed the following morning. Current and forecasted cold weather conditions exacerbated an existing shortage of natural gas to cause the shut-off. Available gas was directed to primary customers, including hospitals, residences, and other priority users. At 10:00 AM on December 19, 2008, the TDU system was shut down due to the curtailment. It remained shut down through 2:00 PM on January 6, 2009.

Following re-start of on-site soil processing, ESMI was able to operate through 6:00 AM on January 8, 2009, when another curtailment was imposed. Following discussions with their gas supplier, ESMI notified DACE, the NYSDEC and Malcolm Pirnie that operations would re-start on January 9, 2009, and continue until the end of the day. ESMI projected that treatment of the final stockpile of the known Non-TSCA designated soil from the Project, except for that in the East Area, would be completed at that time. Some residual Non-TSCA soil did remain upon shut-down; it was transported to an off-site disposal facility as discussed in Section 2.4.

2.4. Off-Site Transport and Disposal

The Contract Documents for the Project required that a number of materials be transported to appropriate off-site locations for disposal. Bid Alternate B, which was accepted by the NYSDEC, resulted in contaminated soil containing PCBs at concentrations greater than or equal to 50 mg/kg to also be transported off-site for disposal. Upon encountering thousands of capacitors intermixed with the soil at the Site, a proposed mechanism was developed for transporting and, ultimately thermally destroying them at off-site locations. This mechanism was subsequently approved by the USEPA and NYSDEC. In addition, curtailments to the natural gas supply to the TDU resulted in the transport and off-site disposal of a significant quantity of Non-TSCA soil. During the execution of the Project, DACE also elected to remove some materials from the site for disposal elsewhere.

Prior to transport and off-site disposal of any regulated material, DACE was required by the receiving facility to characterize the material being disposed. DACE submitted these

characterization documents and current permits for the proposed transport vehicles and the disposal facilities. Only following review and approval of these submittals by Malcolm Pirnie and the NYSDEC was DACE permitted to load material for off-site transport and disposal. A copy of the characterization documents and permits is included in Appendix D. Appropriate hazardous or non-hazardous waste manifests were prepared for each truckload of regulated material that left the Site. The weight of material leaving the site was recorded. Copies of the completed manifests were submitted to Malcolm Pirnie following transport and disposal. A log of shipments from the Site was maintained, and copies of disposal receipts from each receiving facility were submitted. The quantity of material leaving the Site on each vehicle was compared to that which was disposed at the receiving facility. If significant discrepancies were noted, they were investigated and adjusted, as necessary. Prior to payment for transport and off-site disposal services, the aforementioned records were reviewed and an overall reconciliation of quantities conducted.

2.4.1. TSCA Soil and Other Solid TSCA Materials

Soil that had been excavated during the project from areas designated as TSCA was generally stockpiled in the Soil Handling Area on the temporary concrete slab. The stockpile varied in size throughout the progression of the project. During periods of inactivity, off-hours, weekends and holidays, the pile was covered with heavy-duty construction tarps to prevent airborne dispersion of contaminated materials. Materials classified or otherwise designated as TSCA were mixed into the soil stockpile. These materials included:

- Solid waste, metal and small quantities of debris encountered in TSCA areas,
- IDW, including that which was formerly contained in the 120 drums stored on-site prior to the Project,
- Polyethylene sheeting, geotextile, tarps and liner that had been in contact with TSCA materials or used in TSCA-designated areas,
- Stone, crushed concrete, or waste concrete that had been in contact with TSCA materials or used in TSCA-designated areas,
- Clay excavated from the bottom liner of the Containment Cell,
- Used personal protective equipment (PPE) and sampling supplies, and
- Dewatered or solidified sludge from the WWTP,

PCB-containing capacitors encountered during the Project are not included in this category. They are addressed later in this Section.

Stockpiled materials were loaded into over-the-road end dump trailers, the majority equipped with walking beds, on a lined portion of the East Area located immediately south of the TSCA Soil Stockpile. Following removal of the temporary concrete slab, a temporary lined TSCA stockpile area was constructed in the area of Grids G16, G17, H16, and H17. Loading at either location was generally conducted with rubber-tired loaders equipped with three cubic yard buckets. Other loading equipment used included tracked excavators, and dozers were occasionally used to push material up into the stockpiles.

The entire loading process for each over-the–road transport vehicle was monitored by either the Resident Engineer or the NYSDEC's on-site inspector. Transport vehicles were weighed upon arrival at the site with the TSCA truck scale and the weight was recorded. Following the installation of a liner in the trailer bed and confirmation that the truck and the trailer were permitted for the proposed use, the trailers were loaded with TSCA material. The exterior surfaces of the truck and trailer were then cleaned of residual soil, as necessary, and the trailer was covered. The vehicle was then weighed a second time on the same scale, and the total weight was recorded. The difference of the weights prior to and post-loading was calculated and entered on the Uniform Hazardous Waste Manifest (UHWM) as the weight of the contents. Each UHWM was then completed by DACE's Scale House personnel and provided to the transport vehicle driver and the Resident Engineer for review and signature. A copy of each UHWM for each transport vehicle leaving the Site was given to the Resident Engineer. Daily reconciliation of TSCA material shipments, including the quantity of materials leaving the site was conducted by DACE and Malcolm Pirnie.

Beginning on June 8, 2009, transport vehicle weighing was done at the CAT Scales in Wilton, New York. At that time, the TSCA truck scale was removed from service as DACE began decontamination and demolition of the scale. Hard copy receipts indicating the weight of each transport vehicle were accumulated at the CAT Scale facility until the end of each day, when they were picked up by DACE. Reconciliation of quantities by DACE and the Resident Engineer occurred the following day.

A total of 2,568 truckloads of TSCA soil and other solid TSCA materials were shipped from the Site for off-site disposal during the Project. Of these, 2,529 contained remedial materials, such as contaminated soil, which were the responsibility of the NYSDEC. An additional 35 truckloads contained materials which were generated by DACE during the remedial activities. On four occasions, single trucks were loaded with both NYSDEC and DACE TSCA soil to enable "full loads" to be shipped. In these "split loads," the

trucks were weighed an extra time following loading of the NYSDEC material and prior to loading the DACE material, to allow appropriate allocation of cost for the load. An average truckload from the Luzerne Road Site contained slightly more than 35.2 tons of TSCA material. DACE retained the following six firms to provide transportation services for these materials:

- Mangiardi Brothers Trucking, Castleton, NY
- Goulet Trucking, Inc., South Deerfield, MA,
- U.S. Bulk Transport, Inc., Erie, PA
- Price Trucking Corporation, Buffalo, NY,
- Cedar Hill Trucking, Inc., Selkirk, NY, and,
- Page E.T.C., Inc., Weedsport, NY.

The majority of the TSCA soil and other solid material transport were conducted by Mangiardi Brothers and Goulet Trucking.

TSCA-designated materials were transported to the CWM Chemical Services, LLC facility in Model City, New York for disposal. A total of 90,510 tons of TSCA soil and other TSCA solid materials were transported from the Luzerne Road Site to CWM. Of this quantity, 89,163 tons were materials that were the objective of the remedial Project. Transport and disposal of these materials were paid for by the NYSDEC. Approximately 1,348 tons of TSCA soil and other TSCA solid materials, which were generated by DACE during the remedial activities, were also transported and disposed at CWM. Table 5 is a log of the TSCA soil and other TSCA solid material disposal activities for the Project.

Following disposal, a copy of each completed UHWM, bearing the signature of the designated owner or operator of the receiving facility, was submitted to the Resident Engineer with a receipt for each load received. Subsequently, the Resident Engineer submitted an electronic copy of the completed UHWMs to the NYSDEC. Appendix R contains a copy of each completed UHWM and corresponding disposal receipt for the Project.

2.4.1.1. Surface Soil From The East Area

During Site Preparation activities, DACE scraped surface soil from parts of the East Area. It was stockpiled awaiting potential future use in the southeast portion of the East Area. Laboratory results of samples collected from the stockpile indicated the presence

of PCB contamination at levels precluding its reuse on-site in the future. The material was designated as TSCA soil and DACE was directed to transport it to an off-site disposal facility. Between August 25, 2008 and September 8, 2008, DACE loaded 5,452 tons of this material for transport to the CWM facility for disposal. Loading of the transport vehicles was done directly from the stockpile. Loading was conducted on a polyethylene sheeting barrier laid out adjacent to the pile to minimize contaminant migration into other adjacent soil. Following removal of the stockpile, sampling of the underlying surface soil and remediation of the area, as necessary, were conducted. These activities are described more fully in the Section 2.2.

2.4.1.2. Incident During Transport

On September 30, 2008, a Mangiardi Brothers Trucking transport vehicle carrying PCB contaminated soil from the Luzerne Road Site was involved in an accident at the intersection of Truax Road and Chapman Drive in Amsterdam, New York. The 34 tons of soil, designated as TSCA, was spilled down an embankment on the south side of Route 5, when Truck 39 and Trailer AC-96829 overturned. Following initial emergency responses to provide medical care to the driver and recovery of the vehicle:

- The spilled soil and adjacent surfaces were covered with polyethylene sheeting to minimize the potential for contaminant migration,
- The road surface was swept to remove spilled soil,
- A sorbent material was applied to the road and shoulder to collect diesel fuel that was released from the truck, and
- A hay bale sediment barrier was installed to protect a downgradient culvert.

The NYSDEC was contacted and Spill Number 0807374 was assigned to the incident.

Three subsequent removal actions were undertaken on October 1, 2008, October 10, 2008, and October 20, 2008 to remove spilled soil and soil from the embankment that was contaminated by the spill. Following each, confirmation samples were collected by DACE and/or Malcolm Pirnie. Ultimately, the accident resulted in the following outcomes:

1. The driver sustained significant, but non-life-threatening injuries;
2. After recovery, the trailer was temporarily brought to an off-site location. Subsequently, it was returned to the Luzerne Road Site where residual soil was removed and it was decontaminated. The trailer was then removed from the Site and scrapped;

3. Spilled soil and "native" soil excavated from the embankment which was contaminated by the spill, were loaded directly into transport vehicles and brought to CWM for disposal;

4. The area disturbed by the accident was backfilled and the vegetated surface was restored.

On November 20, 2008, DACE submitted a Final Spill Report to the NYSDEC documenting the spill and subsequent remedial activities. A copy of the Final Spill Report is included in Appendix S.

2.4.2. Non-TSCA Soil

As discussed in previously in this Section, during the period July 29, 2008 through January 9, 2009, soil which was excavated from areas designated as Non-TSCA was hauled to the Non-TSCA Soil Stockpile to undergo treatment in the TDU. Due to repeated curtailments of the natural gas supply to the TDU by the utility during the end of December 2008 and beginning of January 2009, treatment of Non-TSCA soil with the TDU was discontinued by ESMI on January 9, 2009. At that time the overwhelming majority of known Non-TSCA contaminated soil had been processed to achieve the Project treatment standard.

On January 23, 2009, ESMI began decontaminating and dismantling the TDU, supporting utilities, appurtenances, and ancillary equipment. On February 4, 2009 and February 5, 2009, approximately 409 tons of contaminated soil designated as Non-TSCA from the Soil Treatment Area was loaded into eleven transport vehicles. Most of this soil was the balance of the Non-TSCA Soil Stockpile which remained at the time TDU operations ceased. Some other material from the TDU decommissioning activities was also added to that pile. This soil was weighed on the TSCA truck scale and transported to the Chemung County Landfill in Elmira, New York for disposal.

Additional contaminated soil designated as Non-TSCA was excavated from the East Area and some supplemental soil removal locations during the period April 10, 2009 through July 13, 2009. Following removal of the temporary concrete slab, a temporary lined Non-TSCA Soil Stockpile Area was constructed in the area of Grids H16 and H17. The Non-TSCA Soil Stockpile varied in size throughout its existence. During periods of inactivity, off-hours, weekends and holidays, the pile was covered with heavy-duty construction tarps to prevent airborne dispersion of contaminated materials. Most of the material in the stockpile was Non-TSCA soil, but significant quantities of used polyethylene liner was also deposited in the stockpile.

Stockpiled materials were loaded from the Non-TSCA Soil Stockpile into over-the-road end dump trailers, the majority equipped with walking beds, on a lined portion of the East Area located immediately to the west of the stockpile. Loading was generally conducted with rubber-tired loaders equipped with three cubic yard buckets.

The entire loading process for each over-the–road transport vehicle was monitored by the Resident Engineer in a manner similar to that discussed previously for loading of TSCA materials. Transport vehicles were weighed upon arrival at the site with the TSCA truck scale and the weight was recorded. Following the installation of a liner in the trailer bed and confirmation that the truck and the trailer were permitted for the proposed use, the trailers were loaded with Non-TSCA soil. The exterior surfaces of the truck and trailer were then cleaned of residual soil, as necessary, and the trailer was covered. The vehicle was then weighed a second time on the same scale, and the total weight was recorded. The difference of the weights prior to and post- loading was calculated and entered on the Non-Hazardous Waste Manifest (NHWM) as the weight of the contents. Each NHWM was then completed by DACE's Scale House personnel and provided to the transport vehicle driver and the Resident Engineer for review and signature. A copy of each NHWM for each transport vehicle leaving the Site was given to the Resident Engineer. Daily reconciliation of Non-TSCA material shipments, including the quantity of materials leaving the site was conducted by DACE and Malcolm Pirnie.

Beginning on June 8, 2009, transport vehicle weighing was done at the CAT Scales in Wilton, New York. At that time, the TSCA truck scale was removed from service as DACE began decontamination and demolition of the scale. Hard copy receipts indicating the weight of each transport vehicle were accumulated at the CAT Scale facility until the end of each day, when they were picked up by DACE. Reconciliation of quantities by DACE and the Resident Engineer occurred the following day.

A total of 319 truckloads of Non-TSCA materials were shipped from the Site for off-site disposal during the Project. Of these, 160 contained remedial materials, such as contaminated soil, which were the responsibility of the NYSDEC. An additional 158 truckloads contained materials which were generated by DACE during the remedial activities. A single truck was loaded with both NYSDEC and DACE Non-TSCA soil to enable a full load to be shipped. In this split load, the truck was weighed an extra time following loading of the NYSDEC material and prior to loading the DACE material, to allow appropriate allocation of cost for the load. An average truckload from the Luzerne Road Site contained slightly more than 35.5 tons of Non-TSCA material. DACE retained Mangiardi Brothers and Goulet Trucking to provide transportation services for Non-TSCA materials.

Non-TSCA-designated materials were transported to the Chemung County Landfill in Elmira, New York and the Ontario County Landfill in Stanley, New York for disposal. A total of 11,343 tons of Non-TSCA materials were transported from the Luzerne Road Site to these disposal locations. Of this quantity, 5,792 tons were materials that were the objective of the remedial Project. Transport and disposal of these materials were paid for by the NYSDEC. Approximately 5,551 tons of Non-TSCA materials, which were generated by DACE during the remedial activities, were also transported and disposed. Table 6 is a log of the Non-TSCA material disposal activities for the Project.

Following disposal, a copy of each completed NHWM, bearing the signature of the designated owner or operator of the receiving facility, was submitted to the Resident Engineer with a receipt for each load received. Subsequently, the Resident Engineer submitted an electronic copy of the completed NHWMs to the NYSDEC. Appendix R contains a copy of each completed NHWM and corresponding disposal receipt for the Project.

2.4.3. PCB Capacitors

In mid- September 2008, DACE began excavating the contents of the Containment Cell. This excavation revealed a significant number of capacitors intermixed with contaminated soil. The capacitors required removal and could not be treated on-site. DACE immediately began screening the capacitors from the soil, and soon created separate stockpile areas within the footprint of the cell's clay bottom liner. The capacitors, although varying in dimension and shape, were generally suitcase-sized and weighed between 80 and 120 pounds. The condition of the capacitors varied greatly; some were fully intact, while others had been flattened. Most of the capacitors had one or more ceramic insulators broken off. Approximately 20 percent of the capacitors had some oil inside or on their exterior surfaces, while 80 percent were dry. An early estimate of 8,000-10,000 capacitors present in the Containment Cell was made.

The capacitors in the Containment Cell that had been screened from the soil were loaded using tracked excavators fitted with grapples into off road articulating dump trucks and moved to a temporary staging area adjacent to the TSCA Soil Stockpile. Some re-screening was necessary to separate residual soil and large debris from the capacitors. Care was taken to conduct the loading and re-screening within the limit of the cell's bottom liner and to minimize direct worker contact with the capacitors and their contents.

Initially, DACE obtained 55-gallon drums, 85-gallon overpack drums, and one cubic yard lined flexbin containers and conducted a number of trial loading activities to ascertain the optimal loading process and transport container combination for managing the capacitors. The results of these investigations indicated that, in addition to the required sorbent material, approximately six capacitors could fit in a standard 55-gallon drum, 10-11 in an

85-gallon overpack drum used as a primary container, and 20-22 in a flexbin container. Packaging the capacitors was determined to be very labor-intensive, requiring a crew of four to invest 20-30 minutes to prepare and fill one drum, and 15 minutes to prepare and fill one flexbin. The cylindrical drums could not be efficiently filled with the rectangular capacitors, nor efficiently placed in the rectangular transport vehicle, resulting in significant wasted space. The workers had to wear modified Level C personal protective equipment to hand-direct the grapple's placement of each capacitor in each package. This resulted in time inefficiencies and increased the potential for worker injury or exposure to PCB contamination. DACE estimated that approximately one truckload of capacitors could be packaged and loaded into a transport vehicle each day, if the capacitors were packed in drums or flexbins. The NYSDEC directed that DACE begin packing the initial stockpile of capacitors in the drums and flexbins that had been delivered to the site.

Concurrently, DACE, Malcolm Pirnie, and the NYSDEC investigated a variety of on-site management and off-site transport and disposal options. USEPA regulations at 40 CFR Part 761 required that the capacitors be destroyed through incineration following transport in containers meeting the United States Department of Transportation (USDOT) requirements in 49 CFR Parts 171 through 180. Three commercial facilities in the United States were permitted for accepting and incinerating this quantity of capacitors:

- Veolia Environmental Services - Port Arthur, Texas
- Clean Harbors Deer Park, LP - Deer Park, Texas
- Clean Harbors Aragonite, LLC - Aragonite, Utah

The configuration of the unloading facilities at the Deer Park were compatible with receiving non-bulk containerized capacitors, while those at the Aragonite site were set up to handle bulk, or roll-off, shipping containers. At the request of the NYSDEC, DACE obtained price and technical proposals from Clean Harbors Environmental Services (CHES) and Veolia Environmental Services (VES) Technical Solutions, LLC to conduct the transport and incineration of the capacitors.

DACE indicated a strong preference to managing the capacitors in bulk, and outlined the technical components of a system for packaging the capacitors into lined roll-off containers. Malcolm Pirnie and the NYSDEC prepared requests to the:

- USDOT Special Permits, Pipeline and Hazardous Materials Safety Administration for a special permit to haul PCB capacitors in lined bulk shipping containers to the incineration facilities, and

- USDOT Hazardous Materials Division, Federal Motor Carrier Safety Administration for emergency and expedited processing of the special permit.

The USDOT ultimately approved the use of alternative bulk containers for shipment of the capacitors to the incinerators. Correspondence documenting this process is contained in Appendix T.

Following receipt of approval for the use of bulk containers, DACE requested revised price and technical proposals from their potential subcontractors. Following review of the cost proposals and technical information, CHES was selected to provide transport and incineration services for the capacitors. Numerous detailed submittals were prepared by DACE and reviewed and approved by Malcolm Pirnie and the NYSDEC. A copy of each approved submittal is included in Appendix D.

DACE personnel packaged the capacitors into the bulk roll-off containers that had been delivered to the Site by CHES. Each roll-off was sealed and sorbent booms were placed in the bottom of the roll-off and adjacent to the roll-off door. An 18 mil synthetic liner specifically designed for use in this type of container was then installed. Additional sorbent booms and loose corn cob sorbent were then dumped in the bottom of the lined roll-off. A tracked excavator with a standard bucket bearing a sand plate placed capacitors from the stockpile into the roll-off. Once the roll-off was filled, a flap on the liner was pulled across the top and it was secured with "drawstrings." Cover support ribs and the fabric roll-off cover were then installed. The filled roll-offs were staged within portable secondary containment berms constructed on a stone-covered portion of the East Area.

Upon completion of packaging, an inspection of each container was conducted. Permitted CHES transport flatbeds were brought to the Site and weighed on the TSCA truck scale. The roll-off containers were loaded onto the trucks, and the exterior surfaces of the trucks and the roll-offs were decontaminated, as necessary. The vehicle was then weighed a second time on the same scale, and the total weight was recorded. The difference of the weights prior to and post- loading was calculated and entered on the Uniform Hazardous Waste Manifest (UHWM) as the weight of the roll-off and its contents. Each UHWM was then completed by DACE's Scale House personnel and provided to the transport vehicle driver and the Resident Engineer for review and signature. A copy of each UHWM for each transport vehicle leaving the Site was given to the Resident Engineer and is included in Appendix R.

CHES began transporting capacitors from the Site on November 21, 2008. Seventy six total truckloads, containing approximately 2,173,000 pounds of capacitors and associated packaging materials, were transported from the Luzerne Road Project Site. All but three

of the truckloads consisted of capacitors in bulk roll-off containers that were incinerated at the Aragonite, Utah facility. The other three shipments, totaling approximately 66,480 pounds, were in box trucks that transported drums and flexbins to the incinerator in Deer Park, Texas. The final shipment of capacitors left the Site on June2, 2009. Table 7 presents a log of the PCB capacitor disposal activities for the Project.

The excavation and management of the capacitors is a major component of Change Order Number 2, and is discussed further in Section 3.

2.4.4. PCB Contaminated Wastewater

As the remedial Project neared completion, DACE systematically decommissioned the components of the on-site WTP. On July 9, 2009, DACE personnel removed sludge and conducted an internal cleaning of Tank A408, the final remaining component of the WTP. Frank's Vacuum Truck Service, Inc. transferred 8.01 tons of PCB liquid and sludge from the tank and from three 55-gallon drums that had been temporarily staged adjacent to the tank into a permitted tanker truck. These materials were transported to CWM's facility in Model City, New York for treatment of the aqueous phase and disposal of the solid materials.

Following that event, decontamination water, monitoring well development water, and any other water that contacted the remaining on-site contaminated areas were deposited in four 55-gallon drums which had been staged on site. Used PPE, sludge and other PCB contaminated soil was placed in one additional 55-gallon drum. On July 22, 2009, these drums, containing an estimated 1.2 tons of material, were loaded onto a permitted trailer truck from Frank's Vacuum Truck Service. These materials were transported to CWM's facility in Model City, New York for treatment and disposal.

Table 8 is a log of the PCB-Contaminated Wastewater disposal activities for the Project. Following disposal, a copy of the completed UHWM, bearing the signature of the designated owner or operator of the receiving facility, was submitted to the Resident Engineer. Subsequently, the Resident Engineer submitted an electronic copy of the completed UHWMs to the NYSDEC. Appendix R contains a copy of the UHWMs for the PCB-Contaminated Wastewater.

2.5. Site Restoration

The Contract Documents for the Luzerne Road Remediation Project required that any disturbed areas within the LOW be restored following completion of the remedial activities. Property owned by the State of New York at 51 Luzerne Road would be regraded into a gradually-sloping field, which was to be covered with topsoil and seeded to promote the development of surface vegetation. Areas of parcels owned by others that

were disturbed by the work of the Project were generally to be restored to their pre-construction characteristics and conditions. Temporary Project support facilities and site utilities were to be removed to the southern LOW, along the northern edge of Luzerne Road. A network of groundwater wells, suitable for conducting the long-term environmental monitoring program, were to be installed on and adjacent to the Site. Some existing groundwater monitoring wells were to be refurbished and modified for long-term use.

DACE conducted the core remedial activities of the Project - namely excavation of contaminated soil, followed by treatment and on-site backfill or transport and off-site disposal of that soil – in sequence and in a general geographic progression. The South Area was addressed first, with the West Area, Containment Cell and East Areas following. As the remedial activities were completed in each area, DACE generally began restoration work, resulting in a phased restoration of the overall Project Site. Backfill of the South Area with treated soil began on September 3, 2008, and DACE's final demobilization from the Site occurred on July 22, 2009.

2.5.1. Decontamination and Removal of Support Facilities

Decontamination and decontamination confirmation sampling activities were observed and documented by Malcolm Pirnie. Upon the receipt of analytical results from the laboratory, the data were compared to the decontamination standard established for the Project. In general, surface wipe samples of materials and equipment were required to be at or less than 10 micrograms of PCBs/100 cm^2. Surface soil, stone and other similar media were to be less than the 1 mg PCBs/kg excavation standard. Wastewater, including rinse water, was to be less than the 0.065 micrograms of PCBs/liter surface water discharge standard. Media that attained the standards were approved for removal from the Site. Subsequently, these items were loaded onto transport vehicles by DACE and transported off-site. Soil, stone and other similar media that did not achieve the aforementioned standards were disposed off-site with either Non-TSCA or TSCA soil. Equipment and other materials that did not achieve the Project decontamination standards were re-cleaned and re-sampled in an iterative process until the results of the laboratory analyses indicated achievement of the standards. Following approval, these items were then loaded onto transport vehicles for removal from the Site.

2.5.1.1. Thermal Desorption Unit

Following the imposition of curtailments on the natural gas supply to the TDU in late December 2008 and early January 2009, ESMI, with the assistance of DACE, began decommissioning and decontaminating the TDU and its appurtenances. On January 23, 2009, ESMI decontaminated the bag house and began breaking down the process equipment. Concrete blocks and Jersey barriers were washed and representative chip samples were collected from them. Equipment surfaces were washed and wipe

samples obtained from surfaces that had contacted contaminated soil during operations. Remnants of the Non-TSCA Soil Stockpile that had not been treated and residual contaminated soil on the temporary concrete slab and TDU ramp were consolidated and tested. The material comprising the TDU ramp was removed and tested. At this time, utilities for the TDU were generally shut off and disconnected at their interface with the temporary concrete slab. On February 11, 2009, DACE mobilized a crane to the Site to remove the stack from the baghouse. On February 16, 2009, the "towers" of the thermal oxidizer and the cyclones were taken down with a crane, loaded onto trucks and removed from the Site. Two days later, the demobilization of the TDU and its appurtenances was completed. The TDU equipment was returned to ESMI's maintenance and storage facility.

2.5.1.2. North Haul Road

The stone and liner from the North Haul Road was removed by DACE on February 18, 2009. Samples were collected to characterize the stone road base. Liner scraps were accumulated and transported to the Chemung County Landfill for disposal. The stone was found to contain TSCA-level concentrations of PCBs. It was stockpiled temporarily and then transported and disposed at the CWM Model City facility on April 2, 2009. Underlying soil was sampled at a later date and, except for the eastern portion, found to be in general compliance with the Project excavation standards. Further remediation of the eastern portion of the road footprint was conducted. These activities are described in Section 2.2. The analytical results of the samples collected from, and under, the North Haul Road are included in Appendix M.

2.5.1.3. Temporary Concrete Slab

On February 20, 2009, DACE began cleaning the surface of the temporary concrete slab upon which the Soil Handling and Soil Treatment Areas had been located. Following removal of residual soil from the surface of the slab, DACE rinsed the concrete. Repeatedly using pressurized water and Capsur, as a solvent for PCBs, DACE decontaminated the concrete. Subsequently, the slab was subdivided into grids, and chip samples of the concrete were obtained from representative locations within each grid. The analytical results of these samples indicated that some areas attained the 1 mg/kg decontamination standard, while some did not. A copy of the laboratory reports for the samples analyzed during decontamination of the temporary concrete slab is included in Appendix M.

DACE broke up the pad in segments, segregating the concrete which attained the decontamination standard from that which did not. The material which attained the decontamination objectives was crushed with a portable crusher mobilized to the Site. This material was approved for use as backfill, and was placed in the bottom of the Containment Cell. Bulk samples were collected from the material which remained

contaminated to characterize it for disposal. It was ultimately transported to the Chemung County Landfill for disposal. Following removal and disposal of the synthetic liner underlying the temporary concrete slab, post-construction samples of surface soil under the area were collected to identify areas potentially contaminated during the remedial activities. The results of this sampling event and the subsequent remedial activities are discussed in Section 2.2.

2.5.1.4. Non-TSCA and TSCA Soil Stockpile Areas

Upon removal of the temporary concrete slab, DACE constructed temporary stockpile areas for Non-TSCA and TSCA soil. The temporary Non-TSCA Soil Stockpile Area was constructed in the area of Grids H16 and H17 and the temporary TSCA Soil Stockpile area was constructed in Grids G16, G17, H16, and H17. These areas were constructed in the former truck loading area by draping polyethylene sheeting over a line of perimeter hay bales and across the bottom of each stockpile area. Non-TSCA and TSCA soil and other materials that were excavated were placed in these stockpiles until they could be transported from the site. On June 9, 2009, the Non-TSCA and TSCA Soil Stockpile Areas were removed from service. The hay bales and polyethylene sheeting were placed, along with surface stone and underlying liner, into transport vehicles for off-site disposal at the Ontario County Landfill and the CWM Model City facility. Post-construction sampling of surface soil in these areas was conducted and is described in Section 2.2.

2.5.1.5. Treated Soil Stockpile Area

The Treated Soil Stockpile Area which had been constructed in the East Area was removed in May 2009. Surface stone and the underlying geotextile were removed by a tracked excavator fitted with either a grapple or an excavation bucket with a sand plate. The stone from the surface was generally stockpiled in windrows or discrete piles on adjacent areas with surface stone still intact. Geotextile was removed, and the scraps were stockpiled in the East Area. Representative samples of the stone were collected to characterize it for disposal. The precast concrete catch basins were excavated, brought to the Decontamination Facility and pressure washed to remove surface debris. Following stone, catch basin and geotextile removal, soil from two areas of the TSSA was excavated, transported and disposed off-site. These activities are described further in Section 2.2. Ultimately, the geotextile was disposed at the Chemung County Landfill. Stone with PCB concentrations less than 1 mg/kg was transported from the Site as a backhaul in backfill dump trucks to the Jointa Galusha, L.L.C., Pattens Mills Quarry in Fort Ann, New York. Stone with PCB concentrations above 1 mg/kg was transported to the Chemung County Landfill for disposal.

2.5.1.6. Stone

DACE imported and utilized NYSDOT No. 2 and No. 3 stone in a number of locations to create surfaces for driving, storage and other Site operations. Stone used to create the

North Haul Road was removed and disposed in February 2009. These processes are detailed elsewhere in Section 2.5. In general, surface stone from the East Area was removed in a grid-by-grid sequence and stockpiled on polyethylene sheeting on other grids which had yet to be restored. Samples were collected from each pile and the piles were covered with polyethylene sheeting. Following receipt of the analytical results from the laboratory, the stone was disposed either through:

- Backhaul in backfill delivery dump trucks to the Jointa Galusha, L.L.C., Pattens Mills Quarry in Fort Ann, New York, if the concentration of PCBs was less than 1 mg/kg, or

- Loading into over-the-road permitted dump trailers for disposal at either the Chemung County Landfill or the Ontario County Landfill, if the concentration of PCBs was above 1mg/kg.

Table 9 summarizes the analytical data associated with the piles of stone which were removed from the Site. Tables 5 and 6 indicate the truckloads of stone that were transported for disposal at CWM's Model City facility, the Chemung County Landfill or the Ontario County Landfill. A copy of the laboratory reports for the stone is included in Appendix M.

2.5.1.7. Decontamination Facility

DACE began clean up and removal of the aboveground structure from the Decontamination Facility in early June 2009. On June 17, 2009 and June 18, 2009, DACE removed surface stone and liner from the Decontamination Facility. Liner scraps and other debris were disposed at the CWM Model City facility with material designated as TSCA soil. The stone was sampled to detect the presence of PCBs. The analytical results indicated that the stone contained less than 1 mg PCB/kg. The stone was backhauled in backfill delivery dump trucks to the Jointa Galusha, L.L.C., Pattens Mills Quarry. A temporary truck wash that had been constructed on Grids L17 and M17 was removed from service on July 2, 2009. The temporary polyethylene liners and sheeting from this facility were removed and disposed at the Ontario County Landfill. The underlying stone that had been regraded into a berm and basin configuration was sampled to determine the level of PCB contamination in it. The analytical results indicated that a portion of the stone contained more than 1 mg PCB/kg. This material was transported to the Ontario County Landfill for disposal. The balance of the stone had PCB concentrations less than 1 mg/kg. This material was backhauled to the Jointa Galusha, L.L.C. Pattens Mills Quarry. A second temporary truck wash, established on polyethylene sheeting in Grid L17 was used through July 7, 2009. The polyethylene sheeting scraps resulting from the demolition of the truck wash were transported to the Ontario County Landfill on July 7, 2009.

2.5.1.8. Access Control and Fencing

The temporary fence that DACE installed and maintained at the rear of the parking area on the 53 Luzerne Road parcel was removed from the Site by AFSCO Fence, Inc. on July 6, 2009 and July 8, 2009. The perimeter fence was removed from the site by DACE and AFSCO Fence, Inc. during the period July 6, 2009 through July 10, 2009. Fence components, except for gate, line and corner posts that had been set in concrete, were cleaned of any surface debris, to facilitate reuse. The posts that had been set in concrete were broom cleaned and disposed as solid waste.

2.5.1.9. Truck Scales

On February 10, 2009, the Non-TSCA truck scale was decontaminated and wipe samples were collected from three of its surfaces. Following receipt of analytical results indicating that these samples attained the Project decontamination standard, the scale was removed from the Site for reuse at another location. On June 4, 2009, the TSCA truck scale was washed and three wipe samples were collected from its surfaces. The analytical results of these samples indicated that the TSCA truck scale achieved the Project decontamination standard. On June 11, 2009, the TSCA truck scale was removed from the Site for off-site reuse. The precast concrete scale supports were removed, decontaminated and hauled off-site for reuse. The north and south scale ramps were subsequently demolished. Soil, debris and stone from the ramps were sampled. Following receipt of analytical results indicating the presence of PCBs at less than 1 mg/kg, these materials were backhauled to the Jointa Galusha, L.L.C. Pattens Mills Quarry. Load weighing was conducted with an off-site truck scale beginning on June 8, 2009. Table 10 summarizes the analytical data associated with the wipe samples collected from the scales. A copy of the laboratory reports for the wipe sampling is included in Appendix M.

2.5.1.10. Site Utilities

As stated in Section 2.1, at the Luzerne Road Site, the site utilities consisted primarily of the following:

- Underground and aboveground electrical services,
- Underground and aboveground communications services,
- Underground water service,
- Underground natural gas service,
- Underground sewage disposal in a precast tank,

- An underground treated water pipeline from the Wastewater Treatment Plant to an existing City of Glens Falls storm sewer pipeline.

As the work progressed, and as Site utilities became obsolete, they were disconnected. Following removal of the TDU and its appurtenances in February 2009, the services to the Soil Treatment Area were shut-off and disconnected at the temporary concrete slab. During June 2009, these services were removed to the LOW along the north side of Luzerne Road. During the remediation of the East Area, the utilities from areas being remediated were removed during soil excavation. Ultimately, the buried septic tank was emptied, removed from the ground and disposed. On June 11, 2009 and July 10, 2009, power poles installed for the Project were removed with cranes. Water, communications, electrical and natural gas services were removed and disconnected. On June 19, 2009, the tie-in to the municipal storm sewer line was disconnected and, on June 22, 2009, a permanent sleeve was installed on that line. Four storm sewer manholes were restored. On July 14, 2009, the storm sewer line was flow tested to ascertain that it was operational at Project completion.

As necessary, DACE installed temporary utilities to support the work of the Project. Following relocation of the trailers and the Wastewater Treatment Plant to an area adjacent to the gate, temporary connection of utilities supporting those facilities was made. From July 2, 2009 through the end of the Project, the north and east air monitoring stations were powered using generators.

Trenches and excavations from the removal of Site utilities were backfilled with excavated material or imported backfill and compacted. The removed utilities were decontaminated, as necessary, and subsequently transported off-site for either reuse or disposal. Utilities installed during the Project were removed to the LOW on the north side of Luzerne Road. Utility restoration was completed on July 22, 2009.

2.5.1.11. Wastewater Treatment Plant

The Wastewater Treatment Plant constructed for the Project was incrementally removed from the Site as components were no longer needed for treatment. Storage and processing tanks and containers were decontaminated with high pressure water and Capsur. Wipe samples were collected from their interior surfaces to document compliance with the Project decontamination standard. If the analytical results from these samples indicated achievement of the standard, then the tank exterior was pressure washed and it was relocated to a staging area located immediately to the east of the eastern gate. Subsequently, the equipment was removed from the Site. Tanks and containers with samples that did not attain the decontamination standard were re-cleaned and re-tested. This iterative process was repeated until the decontamination standard was met. Table 10 summarizes the analytical data associated with the wipe samples collected

from the Site. A copy of the laboratory reports for the wipe sampling is included in Appendix M.

Upon completion of the Project, the media from other WTP equipment, such as the granular activated carbon and clay from the WTP filters, was removed from its container and disposed with TSCA-designated contaminated soil at the CWM Model City facility. The containers were then decontaminated as discussed previously.

Hoses and fittings used on site were generally color-coded to identify whether they had been used for contaminated or "clean" water. Hoses used for contaminated water were generally discarded at the end of the Project. Others were removed from the Site for reuse.

Following the decommissioning of the WTP discharge basin on June 17, 2009, DACE continued to generate wastewater requiring treatment. Effluent Batches 60 and 61 were sampled and achieved the Project discharge standard with PCB concentrations at or below the detection limits. Permission was granted to use this treated water for dust control on-site.

On July 9, 2009, DACE personnel removed sludge and conducted an internal cleaning of Tank A408, the final remaining component of the WWTP. A wipe sample was collected from the interior of the tank. Laboratory analysis of that sample indicated that the Project decontamination standard had been achieved, and the tank was removed from the Site. Table 10 summarizes the analytical data associated with the wipe samples collected from the Site. A copy of the laboratory reports for the wipe sampling is included in Appendix M.

Following that event, decontamination water, monitoring well development water, and any other water that contacted the remaining on-site contaminated areas were deposited in four 55-gallon drums which had been staged on site. On July 22, 2009, these drums were transported to CWM's Model City facility for treatment and disposal.

2.5.1.12. Construction Equipment

A large amount of construction equipment was mobilized to the Site by DACE and their subcontractors during the progression of the Project. This equipment included, but was not limited to:

- Excavators,
- Loaders,
- Dozers,

- Haul and dump trucks,
- Water trucks,
- Power screens,
- Rollers,
- Generators,
- Cranes, and
- Lifts.

Equipment use during the Project could generally be classified into one of three categories:

1. In contact with TSCA-designated materials;
2. In contact with Non-TSCA-designated materials; and
3. Not in contact with either TSCA or Non-TSCA-designated materials.

Equipment in the initial category was decontaminated prior to removal from the Site or application in either of the other categories. That which was used in the second application was decontaminated before being used outside the exclusion zone or removed from the Site. To be conservative and due to the presence of contamination in a number of initially-unanticipated areas, the equipment in the third category was generally decontaminated prior to removal from the Site. Decontamination was conducted in the Decontamination Facility or one of the temporary truck washes that were established during the Project. Decontamination typically consisted of removing loose soil, pressure washing the exterior surfaces, and using Capsur on surfaces that had come into contact with heavily contaminated material.

Following decontamination and inspection by the Resident Engineer and Site Health and Safety Officer to verify that residual soil and other material had been removed, wipe sampling of multiple surfaces was conducted. Usually, at least one sample was collected from each of the following areas:

- Equipment Body
- Frame, and
- Surface that had repeated direct contact with the Site contaminants, such as the bucket of an excavator or the blade of a dozer.

The results of laboratory analyses on the wipe samples were compared to the Project decontamination standard. If the results attained the standard, the equipment was "released" and could subsequently be transported from the Site. If any of the samples exceeded the standard, the equipment decontamination process was repeated until a compliant analytical result was obtained. Table 10 summarizes the analytical data associated with the wipe samples collected from the equipment. A copy of the laboratory reports for the wipe sampling is included in Appendix M.

2.5.1.13. Construction Trailers and Storage Containers

On May 7, 2009, DACE relocated the Contractor's and Resident Engineer's Trailers to an area west of and immediately inside the eastern gate. The Decontamination Trailer was relocated to immediately west of the Scale House. Following the moves, temporary utilities were reestablished, as necessary, to the trailers. On June 5, 2009, the Scale House was relocated to the same area. On July 6, 2009, power to the trailers was disconnected, the portable furniture and equipment was taken off-site, and the trailers were moved to other East Area locations that had been previously restored. The interiors of the trailers were then hand cleaned. Subsequently, they were removed from the Site by Williams-Scotsman. During the latter part of June 2009 and early July 2009, DACE removed equipment, materials, tools and supplies that had been stored in a number of containers in the East Area. Once emptied, the exterior surfaces of the containers were sprayed and they were transported from the Site.

2.5.2. Backfill of Excavations

The Contract Documents for the Project required that the Site be restored to specific finished grades which were depicted on the Site Restoration Plan in the Contract Drawings. The objectives of the restoration were to:

- Restore the property owned by New York State to a relatively flat field suitable for future development with sufficient grading to promote the runoff or infiltration of precipitation,
- Restore adjacent parcels within the LOW to their pre-construction conditions,
- Utilize successfully treated soil as backfill material, and
- Minimize the amount of off-site backfill to be imported to the Site.

DACE's approved Work Plan for the execution of the Project was consistent with the provisions of the Contract Documents.

2.5.2.1. Treated Soil

During the period August 22, 2008 through January 9, 2009, DACE's subcontractor, ESMI, successfully treated 64,222 tons of Non-TSCA soil with the on-site TDU. Following treatment, the soil was stockpiled in the TSSA in discrete piles of approximately 100 cubic yards, or 140 tons. Upon receipt of post-treatment analytical results indicating that the treated soil contained less than 1 mg PCB/kg, the pile was cleared for use as on-site backfill by the Resident Engineer. DACE used rubber-tired loaders to move the treated soil into off-road articulating dump trucks. The soil was transported to either the South Area or West Area Phase 1, where it was dumped. Initially, the treated soil was spread with dozers in the South Area. Upon reaching the completed backfill subgrade in the South Area, subsequent loads of treated soil were stockpiled temporarily on the surface of the northern portion of the South Area. Following the completion of excavation of contaminated soil from the West Area Phase 1, this temporary stockpile was relocated to the West Area for placement. The final piles of treated soil were hauled directly from the TSSA to the loci of placement in the West Area Phase 1.

Treated soil was spread in 12 inch lifts and compacted with a roller. Samples of the treated soil were collected and tested using ASTM D-1557 (modified Proctor) at Construction Technology's Ballston Lake, New York laboratory in early November, 2008. Compaction testing on each in-place lift of treated soil was conducted by Construction Technology using a nuclear densitometer. The Resident Engineer observed the in-place density testing. Field densities obtained were compared to 95 percent of the maximum density from the modified Proctor testing. Moisture adjustment and re-rolling were undertaken, as necessary, until the lift achieved the compaction requirement. Backfill of treated soil continued on a lift-by-lift basis until the backfill subgrade elevation was achieved in each area and in-place test results attained the compaction standard. A copy of each modified Proctor test result for the treated soil is included in Appendix U. Test reports indicating the results of each in-situ field density test are included in Appendix V.

2.5.2.2. Material Imported to Site

After exhausting the supply of treated soil to be used as backfill material, DACE identified and received approval for use of material from the Jointa Galusha, L.L.C. Pattens Mills Quarry in Fort Ann, New York. During the period February 6, 2009 through July 14, 2009, DACE imported 39,850 tons of backfill from that location for use at the Site. The off-site backfill, categorized as clean sand, was primarily placed in the West Area Phase 2, the Containment Cell, and the East Area. Some of the off-site backfill was used to restore the northern portion of the South Area and the former "snowpile" footprint. Transport of the backfill was accomplished by 30 cubic yard, over-

the-road, tri-axle, dump trucks operated by a variety of subcontracted firms. Material was generally brought directly to the locus of placement and dumped adjacent to the leading edge of the backfill lift being installed. Occasionally material was staged in stockpiles or windrows prior to spreading. Access to the Site was predominantly through the eastern gate in the East Area, although a second gate immediately east of the furniture warehouse at 53 Luzerne Road was used during May 2009 and June 2009 to access the western portion of the Site.

Off-site backfill was spread in 12 inch lifts and compacted with a roller. Samples of the treated soil were periodically collected and tested using ASTM D-698 (standard Proctor) at Construction Technology's laboratory. As with the treated soil, compaction testing on each in-place lift of imported backfill was conducted by Construction Technology using a nuclear densitometer. The Resident Engineer observed the in-place density testing and sample collection for the standard Proctor tests. Field densities obtained were compared to 95 percent of the maximum density from the standard Proctor testing. Moisture adjustment and re-rolling were undertaken, as necessary, until the lift achieved the compaction requirement. Backfill continued on a lift-by-lift basis until the backfill subgrade elevation was achieved in each area and in-place test results attained the compaction standard. Table 11, summarizing the backfill importing activities during the Project, is included herein. A copy of each modified Proctor test result for the imported backfill is included in Appendix W. Test reports indicating the results of each in-situ field density test are included in Appendix X.

2.5.2.3. Other Materials

DACE utilized crushed concrete from the temporary concrete slab as backfill in the bottom of the Containment Cell. Material from the decontaminated temporary concrete slab for which laboratory analysis indicated PCB concentrations of less than 1 mg/kg was crushed on-site during the period March 25, 2009 through March 27, 2009. The material was reduced in size to approximately ten inches or less in any dimension and temporarily staged on polyethylene sheeting at the south end of the TSSA. It was then transported with an off-road articulating dump truck to the Containment Cell, where it was deposited in one lift on the bottom of the cell.

2.5.3. Excavation Limits

DACE retained Van Dusen and Steves, Land Surveyors, to conduct surveys to document the work of the Project. Initially, an overall survey of the Site features and topography was conducted. At the conclusion of each soil removal operation, including overcuts, Van Dusen and Steves surveyed the bottom and sidewalls of the excavation. Also, following backfill, a survey of the restored surface was conducted. This survey data was compiled into a composite drawing depicting the horizontal and vertical extent of the excavations. At the completion of the Project, the restored Site surface was also

surveyed. The Record Drawings created from the surveying during the Project are discussed further in Section 4.

In accordance with the requirements of the ROD and the Contract Documents, DACE installed a geosynthetic fabric on the bottom and sidewalls of each excavation. The fabric separates the material which was addressed during this Project from that which remained undisturbed. In future intrusive work at the Site, it may be used to differentiate between soil handling protocols for remediated and "native" soils. In portions of the West Area, Containment Cell and South Area which were not excavated, this demarcation fabric was installed on the ground surface, and the area was covered with a minimum of eight inches of imported backfill and four inches of topsoil. Thus, a minimum of one foot of soil with PCB concentrations less than 1 mg/kg is present above the fabric in these areas. As described in Section 2.2, confirmation samples collected from the soil immediately beneath the fabric achieved the Project excavation standards. In the East Area, demarcation fabric was installed on the bottom and sidewalls of each excavation.

2.5.4. Surface Restoration

DACE restored the surfaces at the Site in accordance with the general project objectives identified previously. Modifications to the restoration were incorporated based upon specific requests of the NYSDEC and the owners of the other parcels within the LOW.

2.5.4.1. Final Surface Grades

Sheet 13B of 14 from the Contract Drawings depicted the proposed Site Restoration Plan for the Project, including topographic contours for the finished surfaces. This plan was developed to achieve the aforementioned project objectives, including minimizing the quantity of imported backfill required to restore the Site. During the work, a number of modifications to the Project resulted in a significant change in the relative quantities of materials cut from the site during excavation and those available for backfill. These changes included:

- Encountering supplemental contaminated soil beyond the vertical and horizontal limits of excavation in numerous locations,
- Re-designating the top two feet of soil from the Containment Cell cover as Non-TSCA soil,
- Encountering contaminated surface and subsurface soil in the East Area,
- Identifying whole and partial capacitors and their associated soil contamination in areas not originally scheduled for excavation. This resulted in adoption of a more

conservative approach to site restoration, requiring these areas to be covered with supplemental fill,

- Specific restoration requests made by the NYSDEC and the owners of other parcels within the LOW,
- Managing up to 15,000 PCB capacitors intermixed with soil in and around the Containment Cell, and
- Transporting and disposing of 5,792 tons of Non-TSCA Project material and 11,343 tons of overall Non-TSCA material at off-site landfills due to the natural gas curtailments placed on TDU operations in January 2009.

Based upon these changes, new finished grades were developed that were consistent with the original objectives, but based upon the actual conditions encountered. Specifically, the NYSDEC allowed partial filling of the former Containment Cell and grading of the balance of the 51 Luzerne Road property to promote runoff and infiltration of precipitation. That entire parcel was covered with a minimum of eight inches of backfill and four inches of topsoil. The owners of the 53 Luzerne Road parcel did not require the complete backfilling of the area behind the furniture warehouse parking lot and driveway to the pre-construction surface grades. Grades in that area were restored to promote positive drainage. In the East Area, the finished surface was left as flat as possible to facilitate desirability of the parcel for future development. Van Dusen and Steves, Land Surveyors prepared a record drawing indicating the topography of the restored surface which is included in Appendix K.

2.5.4.2. Furniture Warehouse at 53/55 Luzerne Road

DACE backfilled the excavations to the east and north of the furniture warehouse at 53 and 55 Luzerne Road and restored the surfaces in these disturbed areas. SKAPS W315 woven polypropylene stabilization fabric was installed above treated soil in areas indicated as improved roadway or improved parking lot on the Contract Drawings. A driving surface of six inches of crushed stone was placed and compacted above the stabilization fabric.

The improved roadway was extended to the northwest in the rear loading dock area to facilitate the turning and backing of tractor trailers delivering to the furniture warehouse. At the request of the property owner, the western loading dock was left in its modified condition at the end of the Project.

In July 2009, the temporary power connection into the furniture warehouse for the west air monitoring station was disconnected and the station was removed. Concrete pours were made on June 30, 2009 and July 8, 2009 for the replacement wing walls on the

north loading dock and the adjacent man-door pad, respectively. Photographs depicting the restored facilities at the furniture warehouse are included in Appendix N.

2.5.4.3. Topsoil and Seeding

Following backfill installation and compaction, DACE imported topsoil that had been removed from property owned by ESMI in Fort Edward, New York. Representatives of DACE, Malcolm Pirnie and the NYSDEC conducted reconnaissance of the topsoil source. Representative samples of topsoil from five stockpiles at the source were collected, analyzed and determined to be compliant with the requirements of the Contract Documents. Submittals reflecting source and material approvals for the topsoil are included in the Project Submittals in Appendix D.

From June 1, 2009 through July 9, 2009, over-the-road dump trailers operated by Galusha Trucking delivered 10,271 tons of topsoil to the Site. Initially, the topsoil was stockpiled in the center of the South Area. After accumulating approximately 7,000 tons, DACE used a loader, two dozers and multiple dump trucks to relocate topsoil from the pile and spread it in the South Area, West Area and Containment Cell. Topsoil was spread and tracked with a dozer to a depth of approximately four inches. The remaining topsoil was hauled to the site and staged in piles or windrows immediately adjacent to the points of use. The Greater Glens Falls Development Corporation declined to have topsoil installed on their portion of the East Area. In lieu of this, Santos Construction, a subcontractor to DACE, raked the East Area with a Harley Rake. Table 12, summarizing the importation of topsoil during the Project, is included herein.

DACE submitted and received approval for a seed mixture to restore vegetation to disturbed surfaces at the Site. A copy of this submittal is included in the Project Submittals in Appendix D. On June 22, 2009, another DACE subcontractor, Donnelly Construction, sprayed hydroseed and hay mulch over the West Area, Containment Cell and portions of the South and East Areas. Subsequent seeding and mulching operations by Donnelly on June 24, 2009, July 8, 2009 and July 15, 2009 completed the hydroseeding and mulching of the disturbed areas of the Site within the LOW. Photographs indicating the vegetation that had grown on Site surfaces three weeks following Final Completion are included in Appendix N.

2.5.4.4. Installation of Monitoring Wells

During the period June 1, 2009 through July 10, 20009, DACE subcontractor, Aztech Technologies, Inc. installed groundwater wells which will be used for long-term monitoring of post-remedial Site conditions. The wells were categorized as either:

- Shallow (S), with approximate depths of 20-33 feet below grade,

- Intermediate (I), with approximate depths of 60-70 feet below grade, or
- Deep (D), with approximate depths of 80-90 feet below grade.

Overall, seven shallow, five intermediate, and six deep wells were constructed and developed. On July 8, 2009, DACE inadvertently ran into MW-12I, rendering it unusable. The well was subsequently abandoned in place and a new MW-12I was installed adjacent to it. Installation and development logs for these monitoring wells are included in Appendix F. Four wells in the East Area, namely MW-7S, MW-7I, MW-8S, and MW-8I, which had been temporarily cut off below grade during remedial activities were re-extended at the end of the Project. Existing monitoring well MW-5I was damaged during the Project. On July 2, 2009, this well was cut off 30 inches below the ground surface. A slip coupling was used to attach a new riser, and a new protective casing was installed. Van Dusen and Steves, Land Surveyors, surveyed the horizontal locations of the new, modified and pre-existing ground water monitoring wells within the LOW. They also established a vertical measuring point for each well. This information is included on the Record Survey of the Post-Excavation Conditions, which is in Appendix K.

Immediately following the completion of monitoring well installation and development, baseline samples were collected from the Site. The results of this sampling are reported in the Site Management Plan.

3. Deviations from Contract Documents

During the execution of remedial activities at the Luzerne Road Site, a number of modifications to the Project scope or approach were implemented. These changes were deemed necessary due to one of the following three general reasons:

1. Site conditions were encountered which differed from those initially anticipated;
2. The NYSDEC determined that a modification to scope or approach would be expedient; or
3. New information was developed which suggested that revisions to the work would be beneficial.

This Section identifies the salient changes which occurred during construction of the Project.

3.1. Deviations in the Work

On September 15, 2008, the DACE excavation crew removing soil from the Containment Cell encountered PCB capacitors intermixed with the soil. Subsequent excavation in, around and under the Containment Cell and in various other locations inside and beyond the Limit of Contaminated Soil Excavation yielded up to 15,000 PCB capacitors. The capacitors and their contents were:

- Separated from site soil and other materials,
- Stockpiled in contained areas and covered to minimize potential contaminant migration;
- Packaged in bulk containers using state-of-the-art techniques,
- Transported by licensed haulers, and
- Thermally destroyed at permitted off-site locations.

The number of capacitors encountered and the areal extent over which they were found were both beyond that which had been anticipated during the investigation and design phases, and which had been contemplated during the procurement phase of the Luzerne Road Site remediation. The significant investment to accomplish this work was the primary change to the Project during construction.

Another significant change in the Project scope was the identification of soil containing PCB contamination at concentrations in excess of the excavation standards at locations beyond the Limit of Contaminated Soil Excavation, as depicted in the Contract Documents. This supplemental contaminated soil was typically identified through the analytical results from samples collected to characterize and quantify contamination in areas adjacent to, or near, the Limit of Contaminated Soil Excavation. Table 2 provides a summary of the supplemental soil excavation conducted during the Project. Supplemental soil which was excavated was categorized as either TSCA or Non-TSCA soil, depending upon the concentration of PCB s present, as determined through laboratory analysis. Both types of supplemental soil were then managed and treated or transported and disposed with other similar Site soil in accordance with the requirements of the Contract Documents.

Other notable deviations from the Contract Documents during the Project included:

- Addition of an emergency access gate in the perimeter fence at the northeast corner of the Limit of Work,
- Revised configuration of the Soil Treatment and Handling Areas and the Treated Soil Stockpile Area,
- Revised configuration of site utilities to support the soil handling, treatment, stockpiling and loading operations,
- Revised mechanism for temporary protection for storm sewer manholes in the East Area,
- Stone placement to create a larger stone driving area to the west of the structure in the south portion of 53 Luzerne Road,
- Use of a temporary concrete slab underlain by geosynthetic liner in lieu of a lined stone area under the Soil Treatment and Handling Areas,
- Removal of some cleared vegetation for reuse at a local paper mill,
- Submittals for the Wastewater Treatment Plant were generalized, with sufficiency determined by the analytical results of testing on effluent samples,
- Batch-flow operation of the temporary Wastewater Treatment Plant, instead of the semi-continuous flow operation which was originally contemplated,

- Discharge of most treated water to an on-site infiltration basin, which was constructed in the southwest portion of the South Area,
- Conditional operation of TDU while awaiting final Proof of Performance Test approval,
- Included laboratory variance factor during consideration of analytical data,
- Excavation and backfill of the West Area in two distinct phases to minimize disruption to the operations of the on-site business,
- Reuse of crushed concrete from decontaminated areas of the temporary concrete slab as backfill in the Containment Cell,
- Use of temporary staging areas for NYSDEC and DACE TSCA and Non-TSCA soil and other materials following removal of the Soil Treatment and Handling Areas,
- Installation and temporary use of a second access gate from the South Area to Luzerne Road during Site restoration activities,
- Installation of demarcation fabric, eight inches of backfill and four inches of topsoil above areas of the Site located outside the original Limit of Contaminated Soil Excavation,
- Establishment of surface and subsurface excavation standards for the East Area,
- Restoration of surfaces without topsoil in the East Area, at the request of the property owner,
- Many submittals and deliverables accepted in electronic form, rather than hard copy,
- Modified repair, utilizing a corrugated HDPE sleeve, for the temporary penetration into the storm sewer line in the East Area,
- Use of the CAT truck scale on Ballard Road in Wilton, New York (at Exit 16 of Route 87) to track hauling quantities for the final weeks of work following demolition and removal of the on-site weigh scales,
- Retention of the temporary loading dock on the west side of the structure in the south portion of 53 Luzerne Road,
- Increased area of stone surface restoration immediately to the north of the structure in the south portion of 53 Luzerne Road, and

- Restoration to revised finished grades in the South Area, West Area, and Containment Cell.

3.2. Change Orders

Major modifications to the scope or approach of the remedial Project were developed into components of Change Orders to the Contract, in accordance with the procedure included in the General Conditions. These changes were incorporated into one of three Change Orders created to address modifications to the work. The significant changes to the Project scope or approach included in the Change Orders are identified below. The financial ramifications of these Change Orders are discussed in Section 5.

3.2.1. Change Order 1

Change Order Number 1:

1. Directed the Contractor to use environmentally-friendly natural gas in lieu of other fuels to power the TDU;
2. Decreased the time of the Contract by 265 days;
3. Reclassified the surface soil on the Containment Cell from TSCA to Non-TSCA based upon the analytical results from testing samples of the soil; and
4. Allowed screening of the surface soil on the Containment Cell to facilitate treatment in the TDU system.

A copy of Change Order Number 1 is included in Appendix C.

3.2.2. Change Order 2

Change Order Number 2 accomplished the following:

1. Addressed the management, transport and disposal of a large quantity of PCB capacitors which were encountered unexpectedly during Project excavation activities;
2. Supplemented the existing site and community air monitoring programs during periods of capacitor management with a more robust air monitoring regimen;
3. Addressed the transport and off-site disposal of Non-TSCA soil which was encountered following completion of on-site TDU operations; and
4. Required installation of supplemental fencing and monitoring wells, which were deemed to be necessary due to the conditions encountered during the work.

A copy of Change Order Number 2 is included in Appendix C.

3.2.3. Change Order 3

Change Order Number 3 caused the following changes to the Contract:

1. Significantly expanded the capacity of the Contract for furnishing and installing backfill to facilitate restoration of the Site following contaminated soil excavation and treatment or disposal; and
2. Increased the time of the Contract by 81 days, primarily to allow remediation of pre-existing contamination from the East Area after the removal of the TDU and other Project support utilities and facilities.

A copy of Change Order Number 3 is included in Appendix C.

4. Record Documents

To record the work of the Project and the Site conditions prior to, during, and after construction activities, a number of documents were collected and created. These documents include Record Drawings, a Photographic Record and Daily Reports of Project progress.

4.1. Record Drawings

DACE retained Van Dusen and Steves, Land Surveyors, to prepare an as-built survey of the Project Site to document the conditions thereon at the time of Final Completion. A drawing titled "Record Survey – Post Excavation Conditions – Luzerne Road Site" and dated August 28, 2009 was prepared and submitted on September 1, 2009. It bears the seal and signature of State of New York licensed land surveyor Matthew C. Steves. A copy of this drawing is included in Appendix K.

Another drawing, "Record Survey – Excavation Bottom – Luzerne Road Site," prepared by Van Dusen and Steves and depicting the composite topography from the bottom of the excavations (BOE) on the Site was submitted by DACE. The topographic surface shown on this drawing documents both the composite BOE for the excavations dug during the project and the top surface of the native soils left undisturbed by the work. This surface also presents a close approximation to the layer of demarcation fabric that was installed prior to backfilling the excavations. A copy of this drawing is included in Appendix K.

Malcolm Pirnie created a series of drawings to present the analytical data resulting from confirmation soil samples collected from the BOE during the Project. These drawings match the topography of the BOE, as presented in the Van Dusen & Steves drawing referenced previously, with the horizontal and vertical location from which each "end point" sample was obtained. The concentration of PCBs in the soil at each sample location is indicated, thus providing a composite view of the contaminant concentrations in the soil remaining beneath the demarcation fabric. A copy of each of these drawings is included in Appendix L.

4.2. Photographic Record

Photographs were taken of the Site and its environs before, during, and after the construction of the Project.

4.2.1. Contractor's Photographs

Specification Section XI-01324 of the Contract Documents for the Project contained requirements for the Contractor to obtain and submit photographs of the Project:

1. Prior to construction;
2. Periodically during construction; and
3. At Project completion.

Preconstruction photographs of the pre-existing Site conditions, including those of utilities, structures, landscaping and features adjacent to the Project Site, were obtained by DACE. These were collected to document conditions at and near the Site prior to the initiation of construction activities. During the project, DACE obtained photographs on a periodic basis from a variety of locations selected by DACE's personnel and Malcolm Pirnie's Resident Engineer. In addition, DACE photographed many other parts of the work as they occurred. At the completion of the Project, DACE obtained photographs of the restored Site. A collection of these photographs was submitted and is included in Appendix N.

4.2.2. Aerial Photographs

DACE retained Aerial Dimensions to obtain monthly aerial photographs of the Project throughout the construction period. In general, the aerial photos were collected on or around the first day of each calendar month. A number of views from a variety of angles were taken during each aerial photographic event. The aerial photographs were made available in electronic format through a third party website. One copy of an overall view of the Project Site from each aerial photographic event is included in Appendix N.

4.2.3. Engineer's Photographs

Malcolm Pirnie's Resident Engineer also collected photographs to document the work of the Project on a daily basis throughout the construction period. A selection of the daily photographs, with corresponding captions, was included in each of the Engineer's Daily Reports. At the request of the NYSDEC, the Resident Engineer also collected photographic documentation of the discharge from the TDU Stack during periods of soil treatment. Following restoration, Malcolm Pirnie collected photographs of the Site to document the conditions at the time of Final Completion. One copy of the photographs collected by Malcolm Pirnie is included in Appendix N.

4.3. Daily Reports

Significant Work on the Project occurred on 277 calendar days during the period June 19, 2008 through July 10, 2009. DACE and Malcolm Pirnie recorded the progress of the Work on a daily basis during that period by compiling Daily Reports.

4.3.1. Contractor's Daily Construction Quality Control/Health & Safety Reports

DACE prepared Daily Construction Quality Control/Health & Safety Reports documenting their construction activities and those of their subcontractors for the days that they were present on Site during the construction period. Among the elements recorded daily on these reports were the:

1. Work accomplished;
2. Labor, equipment and materials expended; and
3. Health and safety monitoring undertaken.

The reports were prepared and signed by a member of DACE's Project Management Team. Upon completion, they were submitted to the Resident Engineer. A copy of the Contractor's Daily Construction Quality Control/Health & Safety Reports is included in Appendix Y.

During two separate periods during the construction, DACE was asked to create daily records of time and materials invested for potential out of scope work. In both cases, the potential out of scope work was associated with the management of PCB-contaminated capacitors encountered at the site. The Project Superintendent for DACE prepared and signed these daily records and, subsequently, submitted them to the Resident Engineer. Following review of the documentation, the Resident Engineer and the Superintendent obtained concurrence with the levels of investment indicated on the reports and the Resident Engineer countersigned them. The reports were then used as the basis for calculating costs for reimbursement for the work in Change Order Number 2. A copy of these Daily Records of Work Authorized, Not Included In The Contract, is included in Appendix Y.

4.3.2. Engineer's Daily Reports

Malcolm Pirnie's Resident Engineer also prepared Daily Reports throughout the period of construction. These reports included, among other elements, a:

1. Summary of work accomplished;
2. List of labor, equipment and materials employed to conduct the work;
3. Location map identifying the work areas;
4. Sample collection log; and
5. Photographic log.

These reports were electronically submitted on a routine basis to the NYSDEC's Project Manager to provide current and updated information regarding the status of the Project. A copy of each report was kept in the Resident Engineer's Field Office for reference

purposes. A copy of the Engineer's Daily Reports for the Project is included in Appendix Y.

5. Cost Reconciliation

Construction Contract D006759 for the Remedial Construction at Luzerne Road was awarded to D.A. Collins Environmental Services, LLC on May 30, 2008 by the New York State Department of Environmental Conservation. Expenditures for the work were from the NYSDEC's Inactive Hazardous Waste Disposal Site Program (Superfund). A total of $27,677,830.53 was earned by DACE to complete the work of the Project.

5.1. Original Contract Costs

The original Contract costs were based upon DACE's, bid, which was submitted on April 8, 2008 as part of the competitive public procurement process for the Project. This bid was a combination of nine unit prices, five lump sum prices, and one price for Project-specific Pollution Liability Insurance (PLI), which was accepted for this project by the NYSDEC. The capacity of the original Contract, as projected assuming full utilization of all Contract quantities, was $22,392,000.00. A copy of the bid forms submitted by DACE is included in Appendix B.

5.2. Change Order Costs

During the progression of the work, site conditions differing from those which were originally contemplated, and other occurrences, resulted in the requirement to modify the Contract on three separate occasions. The technical descriptions of these changes are provided in Section 3 of this report. The financial modifications resulting from each Change Order are addressed herein:

5.2.1. Cost of Change Order Number 1

Change Order Number 1 was initially drafted in June 2008 and was executed in March 2009. In general, it:

1. Directed the Contractor to use environmentally-friendly natural gas in lieu of other fuels to power the TDU and to establish a guaranteed price for it in response to the extraordinary market fluctuations due to extreme worldwide energy supply and cost variances. It also established a new lump sum payment item to address the fuel issues;
2. Decreased the time of the Contract by 265 days; and
3. Reclassified the surface soil on the TSCA Cell from TSCA to Non-TSCA based upon the analytical results from testing samples of the soil. It also included a

supplemental unit price payment item to address screening of the surface soil to facilitate treatment in the TDU system.

Contract quantities for seven of the nine unit price pay items were adjusted as a result of this Change Order. The savings from the Contract time reduction and the reclassification of TSCA Cell surface soil exceeded the combined Contract cost increase due to the fuel directive and the surface soil screening by $6,968.69. Thus, CO 1 reduced the capacity of the original Contract, as projected assuming full utilization of all Contract quantities by that same amount. The revised Contract capacity following approval of CO 1 was $22,385,031.31. A copy of CO 1 is included in Appendix C.

5.2.2. Cost of Change Order Number 2

Change Order Number 2 was originally drafted in December 2008 and was executed in May 2009. In general, it:

1. Established a new lump sum payment item to address the management, transport and disposal of a large quantity of PCB capacitors which were encountered unexpectedly during Project excavation activities. It also supplemented the existing site and community air monitoring programs during periods of capacitor management with a more robust air monitoring regimen;
2. Established a new unit price payment item to address the transport and off-site disposal of Non-TSCA soil which was encountered following completion of on-site TDU operations;
3. Adjusted the Contract quantities of four pre-existing unit price payment items based on actual site conditions; and
4. Established new lump sum payment items for installation of supplemental fencing and monitoring wells, which were deemed to be necessary due to the conditions encountered during the work.

The net increase to the Contract capacity resulting from the elements of CO 2, as projected assuming full utilization of all Contract quantities, was $3,184,851.20. The revised Contract capacity following approval of CO 2 was $25,569,882.51. A copy of CO 2 is included in Appendix C.

5.2.3. Cost of Change Order Number 3

Change Order Number 3 was originally drafted in June 2009 and was executed in November 2009. In general, it:

1. Significantly expanded the capacity of the Contract for furnishing and installing backfill to facilitate restoration of the Site following contaminated soil excavation and treatment or disposal;

2. Adjusted the Contract quantities for six existing unit price payment items to reflect the actual amounts completed during implementation of the Project; and
3. Increased the time of the Contract by 81 days, primarily to allow remediation of pre-existing contamination from the East Area after the removal of the TDU and other Project support utilities and facilities.

The net increase to the Contract capacity resulting from CO 3, as projected assuming full utilization of all Contract quantities, was $2,183,729.25. The final Contract capacity following approval of CO 3 was $27,753,611.76. A copy of CO 3 is included in Appendix C.

5.3. Contractor's Applications for Payment (CAPs)

Throughout the construction phase, the progress of the Project was continuously tracked by DACE and Malcolm Pirnie, Inc. The quantity of work accomplished was measured and recorded, and the labor, equipment and materials invested to produce acceptable work were documented. On a monthly or semi-monthly basis, an estimated invoice, or Contractor's Application for Payment, was prepared by DACE by allocating project costs into the lump sum and unit price payment items established for the Project in the Contract. Backup information and other documentation to support the included costs were provided as part of each draft CAP. The draft CAP was reviewed by Malcolm Pirnie, and adjustments, as necessary, were made by the Contractor in accordance with the terms of the General Conditions of the Contract. Following finalization of the CAP, a recommendation regarding payment of the CAP was prepared by Malcolm Pirnie and submitted to the NYSDEC. After review and acceptance by the NYSDEC's Project Manager, processing of the CAP to generate progress payments occurred.

In accordance with the terms of the Contract, five percent of the CAP monies were retained pending successful achievement of Substantial Completion of the Work. A total of sixteen CAPs (Numbers 1 through 15 and Number 17) for progress were submitted during the Project. Two CAPs (Numbers 16 and 18), to request the partial release of retained monies were also submitted. Table 13 provides a summary of the CAPs for the Project. Ultimately, DACE was paid a total of $27,677,830.53 for conducting the Work of the Project. Table 14 presents the financial summary of the Project.