SITE INVESTIGATION SUMMARY REPORT

CONSOLIDATED EDISON FORMER KENT AVENUE GENERATING STATION

500 KENT AVENUE
BROOKLYN, NEW YORK

Prepared for

Consolidated Edison Company of New York, Inc.
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Long Island City, New York

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1 INTRODUCTION

1.1 Site Description and Background

The former Con Edison Kent Avenue Generating Station ("Site") is located at 500 Kent Avenue, Brooklyn, New York. The Site is bounded by Division Avenue to the north, the Brooklyn Navy Yard to the south, Kent Avenue to the east, and Wallabout Channel to the west. **Figure 1** provides a site location map. The total area of the Site is approximately 4 acres. Development at the Site consists of an inactive 7-and 9 story structure with a footprint of approximately 2.6 acres that formerly housed portions of the generating station complex located at the Site. The remaining 1.4 acres consist of a vacant lot on the southern portion of the property (where a previously demolished portion of the station complex was located), a concrete walkway in the western portion, and a small concrete/unpaved side yard in the northern portion.

1.1.1 Environmental Setting

The Site is located in Kings County on the northwestern shore of Long Island. The Site is generally flat and lies at an elevation of approximately 15 feet above mean sea level. The geology of Long Island consists of varying thicknesses of glacial till, outwash sediments, and marine deposits, overlying a sloping bedrock surface. Bedrock in the Site area is believed to lie at approximately 50 to 100 feet below ground surface (bgs). According to maps found in technical literature[1], the Site location appears to be one that was land filled sometime between 1844 and 1900. Landfills in New York City during this time period were typically composed of sediments consisting of coal ash, cinders, slag, brick, wood, and cement. This is consistent with the findings of the site investigations of concrete, and brick, as well as sand, silt, gravel, and clay in the upper 20 feet of the soil column. The water table is at an elevation approximately level with the surface water altitude in the adjacent Wallabout Channel, and thus is likely to be influenced by tidal variations. Depth to groundwater was found to be approximately 8 feet below ground

[1] Landfills in New York City: 1844-1994, Walsh, D.C., and LaFleur, R.G., GROUND WATER, V. 33, No.4, 1995.

surface (bgs). Photos illustrating subsurface materials and depth to groundwater are shown in the Photo Log in **Appendix A,** and a detailed lithology log is presented in **Appendix B**.

1.2 Previous Site Investigations

Previous site investigations performed by other consultants are summarized in the following reports:

- Phase I Environmental Site Assessment Report, H2M, September, 1999
- Phase II Site Investigation Report: Kent Avenue Site, Lawler, Matusky & Skelly Engineeers, LLP (LMS), February 6, 2000
- Phase II Site Investigation Report Addendum: Former Kent Avenue Generating Station Facility, LMS, February 16, 2000

The Phase I ESA recognized several potential environmental concerns onsite:

- underground storage tanks (USTs),
- aboveground storage tanks (ASTs),
- an ash pit,
- suspect materials within the buildings,
- placement of fill material, PCBs, oil filled electrical components,
- lead-based paint, and
- asbestos.

Regarding subsurface environmental conditions at the site, the Phase I ESA recommended the collection of shallow-horizon soil samples, and a determination of groundwater quality both upgradient and downgradient of the site be performed. The Phase II investigation of 1999-2000 used these recommendations as a basis for its work scope.

1.3 Purpose of Investigation

Shaw Environmental, Inc. (Shaw) performed a limited Phase II subsurface investigation of the site for Consolidated Edison Company of New York, Inc. (Con Edison) in 2006. The goals of the 2006 site investigation were:

- to perform subsurface delineation of the contaminants detected in soil and groundwater by the 2000 site investigation;
- to determine groundwater flow direction onsite;

- to determine if off-site sources of contamination are present onsite; and
- to determine if contamination is migrating from the Site in a downgradient direction.

The data collected during the investigation is intended to be used in the formulation of a Remedial Action Work Plan, if needed, to facilitate potential future site redevelopment by other parties.

2 FIELD PROGRAM

The field program was conducted at the Con Edison Former Kent Avenue Generating Station between May 2006 and January 2007 in accordance with the Site Investigation Work Plan (SIWP), submitted by Shaw to Con Edison on May 10, 2006. The SIWP proposed a series of soil boring and monitoring well locations; the locations were selected with the goal of delineating the field analytical results of the 2000 LMS subsurface investigation.

A summary of the work performed, including any deviations from the scope of work outlined in the SIWP, is discussed in the following sections.

2.1 Underground Utility Clearance

To identify utilities located within site property boundaries, Shaw reviewed site drawings and electrical plates provided by Con Edison, as well as water and sewer maps provided by the New York City Department of Environmental Protection (NYCDEP). "One-Call" utility markout requests were called in on May 5, 2006 for the Kent Avenue and Division Avenue sidewalks adjacent to the site. A geophysical survey to locate underground utilities was performed on May 1 and 2, 2006 by NAEVA Geophysics, Inc., a subcontractor to Shaw. The survey was performed using ground-penetrating radar, electromagnetic devices, and radio frequency (RF) transmission/reception. All utilities identified by the surveys were marked on the overlying ground surface with spray paint and marking flags. In addition, the investigation area was surveyed by "M-Scope" on May 8, 2006 by the Brooklyn Survey division of the Con Edison Construction Management department. The results of the surveys were reviewed during a May 8, 2006 site walk attended by Con Edison and by Shaw prior to commencement of drilling operations.

2.2 Soil Boring Drilling

The SIWP outlined details for the drilling and installation of soil borings and groundwater monitoring wells. An illustration of all proposed soil borings and groundwater monitoring well locations as of May 2006 is provided as **Figure 2**.

Site activities in chronological order are detailed below. An explanation and summary of these activities is provided in the report sections that follow.

Date	Activities Performed
May 11 to 18, 2006	• Soil boring excavation by vacuum knife to 5 feet below ground surface, borings attempted: PMW-1, 2, 3 and 4, PBL-6, 4, 10, 7, 8, 9, 3, 11, 5
June 15 and 16, 2006	• Unsuccessful attempt at installation of monitoring well PMW-5
July 14 to 27, 2006	• Test pit excavation at all PBL locations and soil sampling. Soil samples collected at: PBL-8, 7, 9, 5, 1, 2 and PMW-2.
August 9 and 10, 2006	• Monitoring well installation at PBL-2 (renamed MW-2) and at PBL-9 (renamed MW-1). • Development of installed wells. • Unsuccessful attempt at installation of monitoring well on the north side of building, development of installed wells.
September 7 and 8, 2006 October 4 and 5, 2006	• Unsuccessful attempts at installation of monitoring well on the sidewalk on Division Avenue.
December 5, 2006	• Geoprobe soil borings and soil sampling (S-1 to S-9) on the Division Avenue side of the property, • Installation of temporary well GW-1 (former soil boring PBL-5) and

	sampling of permanent monitoring wells MW-1 and MW-2. Surveyed well casing elevations and horizontal coordinates of MW-1 and MW-2.
January 3, 2007	• Confirmatory sampling of MW-2 for VOCs, SVOCs, and Chloride

As per Shaw and Con Edison safety protocols, removal of soil from ground surface to a minimum depth of five feet below ground surface (bgs) was attempted by a vacuum-knife apparatus at all proposed soil boring locations. Soil removal to five feet below ground surface (bgs) or deeper was completed at PBL-5, PBL-6, PBL-7, PBL-9, PBL-10, PBL-11, PMW-2, and PMW-4, a total of eight locations. However, considerable building demolition rubble was encountered at many of these locations, and these materials surrounded or lined the boreholes. The rubble is composed mainly of bricks, concrete, and wood. Due to interference from demolition rubble, soil removal to five feet bgs was unsuccessful at locations PBL-1, PBL-2, PBL-3, PBL-4, PBL-8, PMW-1, and PMW-3; these attempts were inhibited by the presence of rubble immediately below ground surface or at various depths to five feet. The unsuccessfully cleared boreholes had termination depths from 0 feet bgs to 4 feet bgs. A Photo Log depicting subsurface conditions at various locations is provided as **Appendix A**. Borehole clearance attempts are posted by location on **Figure 3**.

Although it is permissible to begin hollow-stem auger drilling at the five-foot bgs depth, it was determined that drilling at these locations could pose a risk of rubble concealing the presence of utilities buried at deeper depths, thereby presenting a safety hazard. Con Edison, in verbal communications with Shaw, indicated that the basement of the former power plant building may not have been demolished, and the demolition rubble is resting on top of basement structures, including a floor slab of the former basement.

2.3 Test Pit Excavation

Based on the slower-than anticipated progress of the borehole advancement and the presence of significant amounts of demolition rubble in the boreholes, Shaw re-evaluated the sampling work scope. If a basement floor slab is present onsite, this raises an issue concerning the collection of soil and groundwater samples as outlined in the SIWP. Structural drawings of the remaining portion of the buildings onsite indicates

the presence of a basement floor parallel to Kent Avenue at a depth of approximately 13 feet bgs. At this depth, the floor would be at a depth approximately level with or possibly below the water table. If a similar basement floor remnant was present in the footprint of the demolished portion of the buildings onsite, then the collection of representative samples of soil from the unsaturated zone would not be possible by the methods proposed in the SIWP.

Shaw also reviewed available technical methods of investigation, and proposed an alternate approach of subsurface investigation, consisting of the excavation of test pits using a backhoe. A hydraulic ram attachment was proposed for use in conjunction with the backhoe in order to break up demolition rubble, thereby permitting the exposure of an underlying slab, if present.

The test pit activities were performed between July 14 and July 27, 2006. A rubber-tired backhoe was used to excavate test pits at the soil boring locations proposed in May 2006, break up the rubble, and a “hoe-ram” hammer attachment was used to break up large portions of concrete and to penetrate through the concrete slab at selected locations. At each excavation location, when the rubble had been sufficiently broken up, the debris was removed from the ground, and excavation proceeded to deeper depths. Material that did not display evidence of contamination was returned to the excavation in the reverse order in which it was removed.

Test pits were excavated at 12 locations; the completed depths ranged from 1.5 feet bgs at PBL-3, PBL-6, and PBL-11, where asbestos-containing material was encountered in the excavations, to 14.5 feet bgs at PBL-9. Using the hoe-ram, concrete slabs up to four feet thick were penetrated at locations PBL-2, PBL-5, and PBL-9. Groundwater was present beneath the slabs at the penetrated locations. At location PMW-2, the thickness of the underlying slab exceeded four feet and consisted of an extremely coarse-grained concrete aggregate, and efforts to penetrate the slab at this location were abandoned. **Figure 4** summarizes the pertinent results of the test pit excavations by location.

Stained or discolored soils were encountered at locations PBL-1, PBL-2, PBL-7, and PBL-8. A sheen was observed on the groundwater surface in PBL-1. In accordance with the SIWP, any materials exhibiting visual, olfactory, or photoionization detector (PID) response evidence of contamination were sampled and then staged separately from the remaining excavated soils. Samples of materials displaying evidence of contamination were collected directly from the backhoe bucket, field screened using a PID and were preserved for laboratory analysis. One soil sample from each test pit

exhibiting contamination (PBL-1, PBL-2, and PBL-7) was submitted for laboratory analysis; at location PBL-8, two samples were submitted: PBL-8 from a depth of 8 to 8.5 feet bgs and PBL-8A, from 9 to 9.5 feet bgs. Soil samples were also collected from test pits PBL-5 and PBL-9, in support of the planned installation of monitoring wells GW-1 and MW-1. All samples were analyzed according to the sampling plan included in the SIWP. **Table 1** summarizes the chemical analytes and analytical methods for each of the soil samples.

All suspected contaminated soils were segregated in stockpiled on top of sheet plastic onsite, and then loaded into drums which were shipped to a Con Edison approved disposal facility. Approximately 30 cubic yards of soils exhibiting evidence of contamination were removed by this process, which resulted in an Interim Remedial Measure (IRM).

Based on the evidence of soil contamination observed by Shaw on the first day of test pit excavation, July 14, 2006, Con Edison reported the discovery to the New York State Department of Environmental Conservation (NYSDEC). NYSDEC subsequently assigned Spill identification number 0604169 to the incident. According to the NYSDEC Spill Incidents Database, Spill #0604169 was reported on July 14, 2006. The material spilled was "Waste Oil/Used Oil" in the amount of 2 gallons. The resource affected is listed as "soil", and there are no listed water bodies affected. The spill has not been closed as of this time.

Con Edison has entered this reported spill into its Environmental Management Information System (EMIS) for tracking, as Entry # 201150.

2.4 Monitoring Well Installation

Attempts to clear the upper five feet of soil column for monitoring wells at locations PMW-1, and PMW-3, in May 2006 were unsuccessful due to subsurface obstructions. Locations PMW-2 and PMW-4 were cleared to the five foot depth, however considerable building debris was present at the bottom of each borehole at the termination depth of both borings. During the course of evaluating alternate locations suitable for the installation of monitoring wells, Con Edison advised Shaw of the existence of vaulted rooms within the basement of the existing onsite building. The rooms, in addition to a steel frame support structure, underlie much of the sidewalk underneath Kent Avenue adjacent to the existing building.

On June 15 and 16, 2006 an attempt was made to install monitoring well PMW-5 on the eastern side of the building within the sidewalk on Kent Avenue. This location was selected as the only accessible location within that sidewalk because it was an unpaved tree planter area. The boring was cleared by vacuum knife to seven feet bgs. However, refusal of hollow-stem auger drilling was encountered at approximately 7.5 feet bgs. Due to the boring's close proximity to underground utilities, further drilling at PMW-5 was determined to be hazardous. The driller was unable to relocate within the unpaved area due to presence of a fire hydrant.

The excavations performed during the test pit program provided three locations that appeared to be suitable for the installation of monitoring wells: PBL-5, PBL-1/PBL-2, and PBL-9. Concrete slabs at these locations were penetrated to the depth of groundwater, and the test pits were backfilled in a manner that minimized the possibility of drilling refusal caused by concrete or boulders. Suitable drilling locations were marked at each pit, and measurements from reference points were recorded at each location. The three locations are approximately at the corners of the property, which would allow the determination of water table contours by triangulation.

On August 9, 2006, Shaw mobilized to the site to install monitoring wells. Drilling was performed at locations PBL-2 and PBL-9. Two-inch ID PVC permanent monitoring wells were completed to a depth of 20 feet bgs at each location. Observations of split-spoon soil samples collected during boring advancement were generally unremarkable at both locations, and PID responses from headspace samples were close to background levels. Upon completion of monitoring well installation activities, newly installed wells MW-1 and MW-2 were developed by the drilling subcontractor under the supervision of a Shaw geologist. Development proceeded until a clear discharge of water was observed from each well Approximately 55 gallons of water was pumped from each well and was drummed for disposal by Con Edison.

Numerous attempts were made to install a permanent third monitoring well on the north side of the building and along Division Avenue, so that groundwater elevation determination by triangulation could be accomplished. However, during the test pit activities on that side of the building, large fragments of high grade concrete blocks and a very thick slab were discovered throughout all of the excavations which ultimately prevented successful drilling. On August 10, 2006, the installation of a permanent monitoring well was attempted at PBL-5. Drilling refusal occurred at 15 feet bgs, apparently due to concrete or boulders at this depth. The bore hole was dry at 15 feet. Additional drilling was attempted at six locations in close proximity to the original

attempt, however, each of the six attempts met refusal at four feet bgs due to the presence of an apparent concrete slab. All boreholes were backfilled and no further boring attempts were made at PBL-5.

Drilling under the Division Avenue sidewalk did not prove successful due to very close proximity to underground utilities and a large storm drain tunnel under the surface of the street. Plans to install a monitoring well under the sidewalk were abandoned after unsuccessful borehole clearing attempts occurred on September 7 and 8, 2006, and October 4 and 5, 2006. Significant subsurface obstructions encountered during the 2006 investigation can be seen on **Figure 5**.

2.5 Division Avenue Investigation

Because of the dense distribution of subsurface impediments in the Division Avenue yard and beneath the sidewalk, Shaw proposed in October 2006 a plan to collect soil samples and one subsurface water sample from the Division Avenue yard. The proposed work scope was based on the assumption that, even though some degree of contamination may be present in soils in this portion of the site, such contamination is most likely confined to the shallow subsurface by the presence of one or more concrete slabs that serve as barriers to the downward leaching of contaminants into groundwater. Con Edison approved the plan, and soil sampling activities on December 5, 2006 on the north side of the building were performed using a hand auger at nine locations. Maximum boring depths ranged between 2.5 feet bgs to five feet bgs. A single soil sample was collected from each boring. Samples collected from borings S-1 and S-4 through S-9 were analyzed for Polychlorinated biphenyls (PCBs) by EPA Method 8082 (PCBs) and Total Petroleum Hydrocarbons by EPA Method 8015M (with fingerprint analysis performed on detectable concentrations). The two soil samples adjacent to the underground fuel-oil tank, S-2 and S-3, in addition to the analyses above, were also analyzed for: VOCs by EPA Method 8260B and SVOCs by EPA Method 8270 (PAHs only).

Figure 5 illustrates all final soil sampling locations. **Table 1** details all of the soil sample collection information for this investigation. Soil samples were selected for lab analysis according to the following criteria: the sample exhibiting the highest PID response, or if sample PID responses did not exceed background levels, then the sample immediately above the soil/groundwater interface or above refusal was selected. All soil samples were secured on ice in a cooler for transport under chain-of-custody to Chemtech

Laboratory of Mountainside, New Jersey (New York State Department of Health ELAP #11376) for analysis.

2.6 Groundwater Sampling

On December 5, 2006, a temporary well point (GW-1) was installed using a track-mounted Geoprobe® drill at former soil boring location PBL-5. Perched groundwater overlying the foundation slab was encountered at this location in July 2006; although it is unlikely that this water is hydraulically connected to the shallow aquifer, its chemical quality is in part determined by chemicals leaching from the soil overburden. This temporary well was purged until clarity of water was achieved and sampled prior to abandonment. Details of sampling activities are described below. Locations of wells are provided on **Figure 5**; Monitoring Well Logs with well completion diagrams are provided in **Appendix B**.

Also on December 5, 2006 groundwater sampling of newly installed permanent wells MW-1 and MW-2 was performed by Shaw.

Prior to groundwater purging and sampling, each well was gauged for the presence of free-phase petroleum product and depth to water with an oil interface probe capable of detecting free phase product to a thickness of 0.01 feet. At each well location, low-flow purging was conducted with the use of a bladder pump. Sampling methods adhered to the protocols contained in the SIWP. Copies of purging and sampling logs are provided as **Appendix D**. The sample bottles were secured on ice in a cooler for transport under chain-of-custody to Chemtech. In accordance with the SIWP, the samples were analyzed for VOCs via EPA method 8260B, SVOCs via EPA method 8270 (acid extractables and base neutrals), PCBs via EPA method 8082, Total Petroleum Hydrocarbons by EPA Method 8015M (with fingerprint analysis performed on detectable concentrations), and Target Analyte List (TAL Metals) by EPA Methods 6010B/7471. For quality control purposes a trip blank and field blank samples were submitted to Chemtech for laboratory analysis.

Groundwater samples designated “GW-1” from the temporary well point on the north side of the power house building were also collected on December 5, 2006. The GW-1 samples consisted of a filtered sample to reduce sample turbidity (the temporary well point was not as extensively developed as permanent monitoring wells MW-1 and MW-2), as well as an unfiltered sample. The sample from the temporary well was included with soil samples collected on that day and hand delivered by a Shaw representative to

Chemtech for analysis. The GW-1 samples were analyzed for VOCs via EPA method 8260B, SVOCs via EPA method 8270 (acid extractables and base neutrals), PCBs via EPA method 8082, Total Petroleum Hydrocarbons by EPA Method 8015M (with fingerprint analysis performed on detectable concentrations), and Target Analyte List (TAL Metals) by EPA Methods 6010B/7471 (a filtered and an unfiltered sample was collected for total and dissolved metals analysis). For quality control purposes, a trip blank accompanied the duplicate sample shipped to Chemtech. Analytical Report including chain of custody documents is presented in **Appendix E**.

Using a transit and stadia rod, the locations and casing elevations of MW-1 and MW-2 were surveyed on December 5, 2006. Depth to water gauging was used to determine the groundwater elevations relative to ground surface, as well as elevations in each well relative to the other well, on that day. The elevations, 10.89 feet above datum at MW-1, and 5.52 feet above datum at MW-2, indicate a relative groundwater flow direction from the Kent Avenue portion of the site towards Wallabout Channel.

Based on the analytical results of the December 2006 groundwater sampling, confirmatory sampling of MW-2 was performed on January 3, 2007. Chemicals of concern sampled during the confirmatory sampling included VOCs plus Tentatively Identified Compounds (TICs) by Method 8260, PAHs by Method 8270, and Chlorides by Method 325.3.

2.7 Waste Disposal

Waste materials generated during soil boring/monitoring well installation, well development, and well sampling activities included soil cuttings, construction debris, decontamination rinse water and well development and purge water. Soil cuttings and pavement debris were temporarily staged on 6-mil polyethylene sheeting and then loaded into 55-gallon steel drums. Well development and purge water/decontamination rinse water were pumped directly into 55 gallon drums. Representative samples of waste soil and water were collected and analyzed to determine potential hazardous waste characteristics. Samples were analyzed for TPH, ignitability, corrosivity, reactivity, Toxicity Characteristic Leaching Procedure (TCLP) VOCs and SVOCs, and RCRA metals. No compounds were found to exceed the Toxicity Regulatory Levels in any of the samples taken. Based on these analytical results, the Investigation Derived Waste (IDW) contained in ten (10) drums (8 soil and 2 wastewater) was classified as non-hazardous waste. The drums containing the waste were labeled and rendered to the custody of the Con Edison Hudson Avenue Generating Station. The drums were

removed for disposal by Con Edison in December 2006. A summary of the waste analytical results is provided in **Table 2**. As the data in the table indicates, the waste is non-hazardous IDW. The laboratory analytical data package is provided in **Appendix E**.

3 ANALYTICAL REVIEW

Laboratory analysis was performed on selected soil samples obtained from test pits and soil borings, and on groundwater samples. Analysis was performed by Chemtech.

A summary of all laboratory analytical data is provided on **Tables 2 through 4**; the laboratory analytical data packages are provided in **Appendix E**. Final sampling locations are illustrated on **Figure 5**. Soil analytical results are depicted by location on **Figure 6**, and groundwater analytical results are depicted by location on **Figure 7**.

Soil laboratory analytical data were compared to the Recommended Soil Cleanup Objectives (RSCOs) outlined in the NYSDEC TAGM 4046 "Determination of Soil Cleanup Objectives and Cleanup Levels" (Revised January 1994). Groundwater laboratory analytical data was evaluated using the NYSDEC TOGS 1.1.1 (June 1998 Reissue & April 2000 addendum).

3.1 Soil Analytical Data

Soil analytical data is summarized in **Table 3 and in Figure 6**. A total of sixteen (16) soil samples were submitted for laboratory analysis: PBL-1, PBL-2, PBL-5, PBL-7, PBL-8, PBL-8A, PBL-9 and S-1 through S-9. Analytical compounds for samples included: VOCs via Method 8260B and SVOCs via Method 8270 (PBL-1, 2, 5, 7, 8, 8A, 9, S-2 and S-3), PCBs via Method 8082 (all 16 samples), TPH via method 8015M (all 16 samples), TAL Metals via Method 6010/7471 (PBL-1, 2, 5, 7, 8, 8A, 9 and S-1) and Waste Classification (PBL-2, 5, 8 and 8A).

Analytical results for VOC analyses indicate that six (6) analytes were detected above their respective method detection limits (MDLs) in all of the analyzed samples, however none of the concentrations exceeded their respective RSCOs.

Analytical results for SVOC analyses indicated that twenty three (23) compounds were detected above their respective MDLs in all of the analyzed samples. However, the following parameters were detected above their respective RSCOs in the following seven (7) samples: In PBL-1: benzo(a)anthracene, benzo(a)pyrene,

benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene and pyrene; PBL-2: benzo(a)pyrene; in PBL-5: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene and dibenz(a,h)anthracene; in PBL-8: 2-methylphenol; In PBL-8A: 2-methylphenol, benzo(a)anthracene and benzo(a)pyrene; in S-2: benzo(a)anthracene and benzo(a)pyrene; and in S-3: benzo(a)anthracene, benzo(a)pyrene and chrysene. None of the SVOCs in samples PBL-7 and PBL-9 exceeded any of the RSCOs.

Due to high detected concentrations of certain SVOCs in samples PBL-1, PBL-5, PBL-8, and PBL-8A, the laboratory performed "dilution runs" of these samples in order to better quantify the concentrations within the instrumentation scale of the laboratory equipment. The results of the dilution runs are included in **Table 3**. Total reported SVOCs ranged from 1.998 milligrams per kilogram (mg/kg) in PBL-7 at 7 – 7.5 feet to 822.4 mg/kg in PBL-1.

Analytical results for TAL Metal analyses indicated that twenty four (24) metals were detected above their respective MDLs in the analyzed samples. However, the following metals were detected above their respective RSCOs in eight (8) samples: In PBL-1: zinc; in PBL-2: zinc; in PBL-5: lead and zinc; in PBL-7: arsenic, cadmium, copper, mercury, nickel, selenium and zinc; in PBL-8: arsenic, beryllium, cadmium, chromium, copper, magnesium, mercury, nickel, selenium and zinc; in PBL-8A: arsenic, cadmium, copper, lead, magnesium, mercury, nickel, selenium and zinc; and in PBL-9: arsenic. Only Zinc exceeded the RSCOs in sample S-1. Total reported TAL Metals ranged from 19,565 mg/kg in S-1 to 139,534 mg/kg in PBL-8 at 8 – 8.5 feet. It should be noted that the reported concentrations of metals such as calcium, iron, sodium, and potassium consisted of a significant portion of the total metals in many of the samples.

Regarding PCB analyses, thirteen (13) samples were found to contain detectable concentrations of one PCB: Aroclor-1260, at concentrations ranging from 0.05 mg/kg at 4.5 – 5 feet in S-7 to 3.5 mg/kg in PBL-7 at 7 – 7.5 feet. These concentrations are well below the subsurface soil RSCO of 10 mg/kg for this compound. Samples PBL-1, 2 and 9 did not have any detection of PCBs.

With regards to TPH analyses, the 14 samples with concentration exceeding MDLs exhibited concentrations ranging from 17.9 mg/kg in sample PBL-2 at 6 – 6.5 feet, to 3,420 mg/kg in sample PBL-1 at 5 – 5.5 feet. The NYSDEC has no RSCOs for TPH in soil; therefore, no evaluations can be made for this parameter. Qualitative fingerprint analysis by gas chromatography was requested for samples where TPH was detected. The July 2006 results of fingerprint analysis revealed that contaminants include 50W lubricating oil with some other unknown oil in samples PBL-7, PBL-8 and PBL-8A; and

weathered #6 fuel oil in samples PBL-1, PBL-2 and PBL-5. The December 2006 fingerprint results indicate that no calibrated fuel was detected in any of the analyzed samples except S-6 where 50W lubricating oil was detected.

Total Organic Carbon was reported at the following concentrations in the four samples analyzed for this analyte: >19,488 mg/kg in PBL-1, 3,500 mg/kg in PBL-2, >19,362 mg/kg in PBL-5, and 4,700 mg/kg in PBL-9. The elevated TOC concentration in PBL-1 is likely due to the combination of visibly contaminated soil and possibly organic matter, reported at a shallower depth at this location (see Appendix B). In PBL-5, the elevated concentration may be due to the reported presence of weathered fuel oil. As a point of reference, the RSCOs contained in TAGM Memo #4046 are based on a soil organic carbon content of 1%. The TOC concentrations at PBL-1 and PBL-5 slightly exceed the 1% value, while the concentrations at PBL-2 and PBL-9 are below the 1% value.

3.2 Groundwater Analytical Data

Groundwater analytical data for the newly installed monitoring wells obtained by Shaw on December 5, 2006 and January 3, 2007 is summarized in **Table 4**. Analytical parameters for groundwater samples included VOCs, SVOCs, PCBs, TPH and TAL Metals.

Groundwater sampling performed by Shaw on December 5, 2006 included monitoring wells MW-1 and MW-2 and temporary well GW-1. Analytical results for all VOCs were non-detect for the samples collected from MW-1 and GW-1. VOCs were detected in MW-2 and included VOCs at concentrations exceeding NYSDEC TOGS guidance values as follows: 410 micrograms per liter (ug/l) of benzene, 69 ug/l of ethylbenzene, 14 ug/l of p&m-xylenes and 11 ug/l of o-xylene. The benzene concentration in MW-2 was reported as exceeding the laboratory equipment calibration range, therefore the lab performed a separate dilution run. Benzene was reported at 340 ug/l in the dilution run. Groundwater contaminant concentrations by sampling location are provided in **Figure 7.**

SVOC compounds were detected in all wells but only MW-2 included concentrations exceeding TOGS guidance values as follows: 46 ug/l of acenaphthene.

Analytical results indicate that TAL Metals were detected in all of the groundwater samples (MW-1, MW-2 and GW-1). TAL Metals compounds that were detected above NYSDEC TOGS include: for MW-1: antimony, arsenic, iron and sodium; at MW-2: iron, magnesium, and sodium; and at GW-1 (filtered and unfiltered): antimony, iron, lead and

sodium. The concentration of sodium in the MW-2 sample was reported at 5,568,720 ug/l, thus it may be an indicator of saline groundwater at this location.

Regarding PCB analyses, no detections above MDLs were reported for any of the three groundwater wells sampled during this event. For TPH analyses, concentrations of TPH were reported in GW-1 at a concentration of 177 ug/l. However, there are no TOGS guidance values for TPH in groundwater, therefore, no evaluations can be made regarding TPH. Gasoline Range Organics were reported at 170 ug/l at MW-2, and Diesel Range Organics were reported at 583 ug/l at MW-2. A fingerprint analysis was performed on samples where TPH was detected. The results of the fingerprint analysis revealed that no calibrated fuel type was identified.

Resampling of MW-2 for confirmatory purposes was performed on January 3, 2007. The January 2007 sampling analytes consisted of VOCs + TICs by Method 8260 GC/MS, SVOCs "STARS" list compounds by Method 8270, and Chlorides by Method 325.2 (to confirm salinity).

The January 2007 VOC analysis reported benzene at 390 µg/l, ethylbenzene at 95 µg/l, and naphthalene at 360 µg/l; all three compounds were reported with an "E" qualifier, indicating that the reported concentrations exceeded the calibration range of the analytical instrument. O-xylene was reported at 5.5 µg/l. 10 TICs were reported. The laboratory performed two dilution runs; benzene was reported at 410 "E" µg/l and 520 µg/l in the dilution runs, ethylbenzene at 94 µg/l, and non-detect, and naphthalene at 350 "E" µg/l and 620 µg/l.

The January 2007 SVOC analysis reported three compounds at concentrations exceeding MDLs; of these, the reported concentrations of two compounds, naphthalene and acenaphthene, exceeded TOGS guidance values at 48 µg/l and 35 µg/l, respectively.

Chloride was reported at 5,400 mg/l, above the MDL of 50 mg/l for this analysis.

4 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The soil boring program outlined in the May 2006 SIWP was modified after field conditions necessitated a change from the proposed investigation technique of hollow-stem auger drilling, to the collection of soil samples from test pits excavated in the proposed boring locations. Field evidence of subsurface contamination was noted in test pits PBL-1 and PBL-2, located in the southwestern portion of the site, where stained soils were observed overlying the saturated zone. Stained soils accompanied by an odor were encountered at test pit PBL-8, located in the southeastern portion of the site. In addition to the apparent impact to soils, a sheen was noted on the surface of groundwater present in PBL-1.

Due to difficulty in penetrating concrete slabs underlying the yard on the north side of the site fronting on Division Avenue, an alternate work scope of the collection of shallow soil samples by hand augering was performed at this location. These soil samples were identified as sample numbers S-1 through S-9.

Results of laboratory analyses performed on the soil samples collected from borings PBL-1, 2, 5, 7, 8, 8A, 9 and S-1 through S-9 revealed the presence of residual concentrations of VOCs in all of the analyzed samples, all at concentrations significantly below the TAGM 4046 RSCOs. With respect to SVOC analyses, seven of the samples were found to contain concentrations above the RSCOs, and elevated concentrations of SVOCs were reported for the PBL-1 sample. The PCB analyses reported one PCB (Aroclor-1260) at concentrations above MDLs in most of the subsurface soil samples, however the concentrations were well below the RSCO.

With respect to TAL Metals analyses, eight of the samples contained concentrations above the RSCOs. Concentrations of metals such as calcium, iron, sodium, and potassium consisted of a significant portion of the total metals in many of the samples. Arsenic was reported at elevated concentrations in the sample from PBL-8.

Levels of TPH were detected in all of the samples. Fingerprint analysis of selected soil samples reported the identification of heavy lubricating oil and weathered #6 fuel oil in certain samples.

Groundwater samples were collected from monitoring wells installed in the southeastern and southwestern portion of the site, and from a temporary monitoring well installed in the northern portion of the site. Laboratory analysis of groundwater samples reported an elevated concentration of dissolved-phase benzene, ethybenzene, o-xylene, p & m xylenes, acenaphthene, and naphthalene in MW-2 (southwestern portion), lesser concentrations of other hydrocarbons, as well as elevated concentrations of sodium and chloride in the sample from this well. MW-2 is close to test pit PBL-1, where a groundwater sheen was observed during excavation of the test pit.

Physical evidence, such as soil staining, as well as analytical data confirming elevated concentrations of petroleum-related chemical compounds, suggest that environmental impact to site soils has resulted from facility operations. However, concentrations of most metals in site soils, possibly with the exception of arsenic, may be due to deposition during landfilling operations over 100 years ago (urban fill). Concentrations of other metals, such as iron, calcium, and sodium, may be representative of typical soil concentrations in the northeastern United States.

An Interim Remedial Measure (IRM) was performed at the site in the form of excavation and disposal of contaminated soil encountered during the test pit investigation. Approximately 30 cubic yards of soils displaying physical evidence of contamination were excavated from the subsurface, sampled for laboratory analysis to confirm elevated chemical concentrations, and transported to off-site disposal facilities. This IRM is a form of “source removal” that should complement any potential future site remediation activities. If contaminated soil is encountered during any future demolition and construction activities at the site, it should be excavated and transported to an approved disposal facility.

A potential source of groundwater contamination in the vicinity of MW-2 may be onsite soils in the vicinity of the monitoring well; if so, then the IRM (source removal action) may assist in the attenuation of the contamination. Continued monitoring and sampling of MW-2 is recommended. If dissolved-phase concentrations in groundwater do not attenuate, then an investigation to determine the contamination source should be undertaken.

APPENDIX A

PHOTO LOG

APPENDIX B

BORING LOGS/MONITORING WELL CONSTRUCTION LOGS

APPENDIX C

GROUNDWATER PURGING & SAMPLING LOGS

APPENDIX D

LABORATORY CHAINS OF CUSTODY

LABORATORY ANALYTICAL DATA PACKAGE

FIGURES

TABLES