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PRE-DESIGN INVESTIGATION REPORT

FORMER KENT AVENUE GENERATING STATION

500 KENT AVENUE
BROOKLYN, NEW YORK

PROJECT NO. 126649

June 2010

Submitted to:

Consolidated Edison Company of New York, Inc.
31-01 20th Avenue
Long Island City, New York

Submitted by:

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1.0 INTRODUCTION

The former Consolidated Edison (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 former 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 in area. It had been developed by a 7-and 9 story structure (demolished in 2009) with a footprint of approximately 2.6 acres which formerly housed the generating station. The remaining 1.4 acres consist of a vacant lot on the southern portion of the property (where a previously demolished portion of the generating station complex was located), a concrete walkway in the western portion, and a small concrete/unpaved side yard in the northern portion.

1.1 Site Topography and Geology

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 (ft). 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 ft. (ft) below ground surface (bgs).

According to maps found in technical literature[1], the Site location appears to be one that was landfilled 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 by previous site investigations of ash, concrete, and brick, as well as sand, silt, gravel, and clay in the upper 15 ft. 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 ft bgs.

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

2.0 SITE INVESTIGATION HISTORY

Site Investigation history has been summarized within the following documents:

- Phase I Environmental Site Assessment Report, H2M, September, 1999;
- Phase II Site Investigation Report: Kent Avenue Site, LMS, February 6, 2000;
- Phase II Site Investigation Report Addendum: Former Kent Avenue Generating Station Facility, LMS, February 16, 2000; and
- Site Investigation Summary Report: Consolidated Edison Former Kent Avenue Generating Station, Shaw, April, 2007.

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, polychlorinated biphenyls (PCBs), oil filled electrical components,
- lead-based paint, and
- asbestos.

The LMS Phase II Site Investigation focused on the applicable areas of concern outlined in the Phase I as a basis for a subsurface investigation. A total of sixteen surface soil samples, fourteen subsurface soil samples and six groundwater samples were collected for laboratory analysis. Laboratory analysis of the surface soil samples reported concentrations of PCBs exceeding cleanup objectives at six locations. The deeper soil horizon (2 to 8 ft bgs) was investigated at 13 locations, where soil borings were advanced to the depth of the water table (approximately eight ft bgs), and soil samples were collected for on-site evaluation and for laboratory analysis. The laboratory analyses of the subsurface soil samples showed concentrations of metals exceeding cleanup objectives at seven locations, concentrations of semi-volatile organic compounds (SVOCs) exceeding cleanup objectives at nine locations, and concentrations of volatile organic compounds (VOCs) exceeding cleanup objectives at one location. Laboratory analysis of the groundwater samples showed exceedances of New York State Department of Environmental Conservation (NYSDEC) Class GA standards by VOCs at two locations, by metals at four locations, and by SVOCs at one location. Groundwater

contamination was most prevalent in the sample collected from the boring at the southwest corner of the property.

During the Phase II Site Investigation field activities, four separate environmental incidents were reported by Con Edison to the NYSDEC:

1. A drum was encountered with several holes, was severely deformed and contained a thick black semi-liquid that resembled heavy fuel oil. Paint thinner and creosote odors were noted. Con Edison prepared an Environmental Management Incident System Report (EMIS Incident ID 129245) and reported the incident to the NYSDEC (Spill #99-10753). The drum contents were tested and identified as oil similar to a light fuel oil. The cleanup was considered complete after the drum and surrounding impacted material were removed (NYSDEC closed this spill on January 9, 2008).
2. A sheen formed on the ash pit water surface during sludge sampling. The sludge was observed to have an oily and dark coloration. Con Edison prepared an EMIS Report (EMIS Incident ID 129308) and reported the incident to the NYSDEC (Spill #99-10993). NYSDEC closed this spill for administrative reasons and consolidated into Spill #99-11014 on January 24, 2008.
3. Oil stained soil with a moth ball type odor was encountered in a boring in the southwest corner of the site. Con Edison prepared an EMIS Report (EMIS Incident ID 129314) and reported the incident to the NYSDEC (Spill #99-11014).
4. Soil saturated with black musty oil and with a fuel oil odor was encountered in a boring in the southeastern portion of the site. Con Edison prepared an EMIS Report (EMIS Incident ID 129323) and reported the incident to the NYSDEC (Spill #99-11046). NYSDEC closed this spill for administrative reasons and consolidated into Spill #99-11014 on January 9, 2008.

The Shaw Environmental Inc. (Shaw) site investigation focused on delineation of subsurface soil contamination and to formulate a Remedial Action Work Plan, if needed, to facilitate potential future site redevelopment. During the Shaw field site investigation activities, one environmental incident was reported by Con Edison to the NYSDEC:

- Approximately two gallons of waste oil/used oil was saturated in the soils at test pit PBL-8. Similar conditions were subsequently encountered at PBL-1, PBL-2, and PBL-7, and a sheen was observed on the groundwater surface in PBL-1. Con Edison prepared an EMIS Report (EMIS Incident ID 201150) and reported these incidents to

the NYSDEC (Spill #0604169). NYSDEC closed this spill for administrative reasons and consolidated into Spill #99-11014 on January 9, 2008.

The Site Investigation Summary Report, prepared in April 2007 by Shaw, provided the following conclusions regarding the site investigation:

- Soil samples collected from borings PBL-1, 2, 5, 7, 8, 8A, 9 and S-1 through S-9 showed SVOCs at concentrations exceeding the NYSDEC Technical and Administrative Guidance Memorandum #4046 (TAGM 4046) Recommended Soil Cleanup Objectives (RSCOs) in seven of the samples. No VOCs were detected above TAGM 4046 RSCOs in any of the soil samples.

- One PCB (Aroclor-1260) was detected in most of the subsurface soil samples; however the concentrations were well below the TAGM 4046 RSCO.

- Eight soil samples contained metal concentrations above the TAGM 4046 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 concentrations were detected in the samples from PBL-8 and PBL-9 above the TAGM RSCO.

- TPH was detected in all of the samples. Fingerprint analysis of selected soil samples showed the identification of heavy lubricating oil and weathered #6 fuel oil in certain samples.

- The laboratory analyses of groundwater samples showed elevated concentrations of benzene, ethybenzene, o-xylene, p & m xylenes, acenaphthene, and naphthalene in the sample from MW-2. Lower concentrations of other hydrocarbons, as well as elevated concentrations of sodium and chloride were detected in the sample from this well. MW-2 is close to test pit PBL-1, where a sheen was observed during excavation of the test pit.

- Visual evidence, 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, or possibly from the adjacent property to the south, which is a former manufactured gas plant site (currently the subject of a Voluntary Cleanup Agreement (VCA) between National Grid and NYSDEC). Concentrations of most metals in site soils may be due to deposition during landfilling operations over 100 years ago (urban fill).

- 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.

Additionally, a geophysical investigation of the site to locate possible buried utilities during Shaw's 2006 investigation delineated an elongated anomaly that coincided with the approximate location of a buried 1,500 gallon fuel oil tank illustrated on a 1961 Insurance Map for the Kent Avenue Generating Station.

3.0 FIELD ACTIVITIES

The field program was conducted at the Con Edison Former Kent Avenue Generating Station between November 18, 2009 and December 15, 2009 in accordance with the Pre-Design Investigation Work Plan (PDIWP), submitted by Con Edison to the NYSDEC on April 28, 2009. The goals of the pre-design investigation field activities were 1.) to confirm the presence and location of a 1,500 gallon underground storage tank (UST) that was used to store fuel oil, and 2.) to approximate the lateral and vertical extents of subsurface contamination in the vicinity of PBL-1, PBL-2, PBL-5, PBL-7, and PBL-8.

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

3.1 Underground Utility Clearance

A utility clearance was made prior to the start of intrusive work. The clearance was performed in accordance with the Utility Clearance Process for Intrusive Activities: EH & S Remediation Program, Revision 1, Con Edison, October 8, 2003. 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 for the Kent Avenue and Division Avenue sidewalks adjacent to the site. A geophysical survey to locate underground utilities was performed on November 18 and 19, 2009 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. NAEVA Geophysics, Inc. developed figures showing the results of the geophysical survey. These figures are presented in **Attachment 1**.

The upper five ft. (at a minimum) of each boring was cleared by vacuum-powered apparatus prior to the use of drilling equipment to continue the boring.

3.2 Soil Borings

Soil sampling was performed in the five onsite areas (PBL-1, PBL-2, PBL-5, PBL-7, and PBL-8), as illustrated in **Figure 2**. Since the purpose of the pre-design investigation was to approximate the lateral extent of the contamination in these five areas, the drilling program called for up to 16 soil borings to be drilled at each of the five locations. A center point for each of the five locations was marked with a steel rod. In a general north-south, and east-west direction (using the east side of Kent Avenue as north-south), four lines were drawn from each steel rod. At each location, marks were made at distances of 5, 10, 20, and 30 ft. from the steel rod along all four lines. The intent of the program was to start near the center of each of the five locations, and move outwards until the contamination was delineated.

In order to easily identify soil borings and associated samples, each soil boring was given a unique number. The boring number started with the location number, followed by a letter (N for north, E for east, etc,) to designate the direction from the steel rod, followed by a number representing the distance, in ft. from the steel rod. As an example, the boring number PBL-1-N-10 represents the boring in the area of PBL-1 that is 10 ft. north of the steel rod. Soil samples collected from a boring were given an identification that included the soil boring number, followed by a number representing the sampling depth in ft. This was used so when two samples were collected from a single boring, they had unique identification numbers.

Hand clearance of soil boring locations utilizing a Vactron and "air knife" began on November 30, 2009. The five and ten foot boring locations were cleared over a two week period. The hand clearing down to five ft. took unexpectedly long due to the large amount of brick, concrete and wood (timber) debris within the site materials. Soil cuttings from the vacuum-clearing process were examined for texture, color, and visual or olfactory evidence of contamination by a Shaw geologist. In addition, the soil cuttings

were screened for the presence of VOCs using a photoionization detector (PID). Soil vacuuming continued to a depth of five ft bgs. Soils from the vacuum clearing process exhibiting evidence of contamination were sampled for laboratory analysis using decontaminated sampling utensils, and inserted directly into laboratory supplied glassware.

Between December 8 and 15, 2009, boreholes were advanced with a Compact Roto Sonic 17-C drill rig under the supervision of a Shaw geologist.

At each boring location soil samples were collected using a core barrel with a dedicated, internal liner. Soil samples were collected continuously from five ft. bgs until refusal was encountered. Test pit logs from the previous Shaw investigation identified a several ft. thick subslab beneath all five locations ranging between 7 and 9.5 ft bgs. Once the core barrel encountered significant resistance at the depth of the subslab identified during the previous investigation, the boring was terminated.

All soil samples were evaluated in the field for visual or olfactory evidence of contamination, screened with a PID, and described in a written log for the following: percent of recovered sample in the internal liner, soil color and soil texture. Soil boring logs are presented in **Attachment 2**. Soil samples from five ft. bgs to the boring termination depth were collected directly from the internal liner and inserted directly into laboratory-supplied glassware. Up to two samples were selected from each boring for laboratory analysis. Selection of samples was biased toward those samples exhibiting evidence of contamination, and was based on the professional judgment of the geologist. Select photographs from the drilling program are presented in **Attachment 3**.

The soil samples were submitted for laboratory analysis of:

- VOCs by EPA Method 8260B (PBL-1 and PBL-2 only);
- SVOCs by EPA Method 8270 (acid extractables and base neutrals); and
- Target Analyte List (TAL Metals) by EPA Methods 6010B/7471.

Samples were picked up daily by the laboratory, Test America, located in Shelton, Connecticut. Samples were analyzed with a 48 hour turn-around-time so results from the early samples could guide the later samples. Since the hand clearing operations took longer than anticipated, the drilling program was shortened. By the time the results for the first two days arrived, there was only one additional day of drilling. That is why

some borings appear to skip some of the intermediate locations, and why some borings were placed as far as 60 ft. from the center location.

3.3 Buried 1,500 Gallon Fuel Oil Tank Location

The geophysical contractor conducted a survey at the north end of the site to verify and mark out the location of the reported buried 1,500-gallon fuel oil tank. The contractor had previously delineated the approximate location in 2006. The survey conducted in December 2009 was hindered by a guard shack that was placed over the eastern portion of the reported tank (see **Figure 2** in **Attachment 1**). The survey was able to delineate and mark the axis of the UST. The survey delineated the east end of the UST axis up to the guard shack. There was no evidence that the UST continued further east of the guard shack. The marked UST axis was approximately seven to eight ft. from the fence along Division Avenue. The Pre-Design Investigation Work Plan (PDIWP) called for a minimum of two hand clearance holes to verify the presence and specific location of the buried tank. Three hand clearance holes were dug in the vicinity of the buried tank. Two hand clearance holes confirmed the presence of the UST, but not the specific outline of the UST.

3.4 Waste Containment and Disposal

Investigation derived waste (IDW) streams generated during the PDI included:

- drill cutting soils or vacuumed soils with visual or olfactory evidence of contamination; or producing high PID responses;
- plastic sheeting placed beneath the drill rig and decontamination pad; and
- decontamination rinse water.

These wastes were containerized in 55-gallon USDOT-approved steel drums. At the end of each work day, all open drums were sealed and were moved to the temporary onsite waste storage location in the southeastern portion of the work area. All drums were labeled with "Investigation Derived Waste: Pending Analysis" labels.

Shaw personnel listed on each drum the soil borings which contributed to the drum contents. All drums were sequentially numbered with indelible ink. Shaw field personnel recorded the drum number and contents for each of the drums, and completed the drum labels using indelible ink. The drums were rendered to Con Edison for

sampling and analysis to determine potential hazardous characteristics and disposal by Con Edison. Con Edison collected a composite sample from the drums on April 20, 2010. The sample was analyzed for polychlorinated biphenyls (PCBs), toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs, Resource Conservation and Recovery Act (RCRA) metals, ignitability of solids, pH, cyanide as HCN (releasable), sulfide as H_2S (releasable), and percent solids. The sample results, presented in **Attachment 4**, show that the drummed material is non hazardous.

4.0 ANALYTICAL REVIEW

Laboratory analysis was performed on all of the soil samples collected from the soil borings. Soil laboratory analytical data were compared to the Part 375-6.8(b) Restricted Use Soil Cleanup Objectives (SCOs) for Residential, Restricted Residential and Industrial Uses to assess remedial options for potential future use scenarios for the Site.

4.1 Regulatory Criteria

NYSDEC issued its Draft CP/Soil Cleanup Guidance document in November 2009. The Guidance document states that NYSDEC's policy is that all environmental remedies be protective of human health and the environment. It also states that it is NYSDEC's preference that environmental remedies be designed such that the implementation of the final remedy results in no future land use restrictions. The Guidance document indicates that NYSDEC recognizes that it is not always feasible to return to a condition where no restrictions are required, and some of the NYSDEC remedial programs are predicated on future site use.

The analytical results from the previous site investigations were compared to the TAGM 4046 RSCOs. Those criteria, based on no future land use restrictions, were very low and restrictive. The above-referenced Guidance document replaces the TAGM 4046 RSCOs. The SCOs found in 6 NYCRR 375-6, Remedial Program Soil Cleanup Objectives, have been incorporated into the Draft CP/Soil Guidance document and are the appropriate guidance levels for use in evaluating the soil sample analytical results of the PDI. Given the historical "making" of land along the New York City waterfront with a wide variety of fill materials, it is not feasible to remediate the Former Kent Avenue Generating Station property without some future land use restrictions. Since the property lies on the waterfront, the Residential, Restricted Residential and Industrial Restricted Use SCOs were chosen as potential future land uses of the property.

4.2 Soil Analytical Data

A total of fifty seven (57) soil samples, including three (3) field duplicates, were submitted for laboratory analysis as follows:

Sample Area	Number of Samples Collected	Sample Analyses
PBL-1	9	VOCs by EPA Method 8260B SVOCs by EPA Method 8270 (acid extractables and base neutrals); Target Analyte List (TAL Metals) by EPA Methods 6010B/7471
PBL-2	10	VOCs by EPA Method 8260B SVOCs by EPA Method 8270 (acid extractables and base neutrals); Target Analyte List (TAL Metals) by EPA Methods 6010B/7471
PBL-5	5	SVOCs by EPA Method 8270 (acid extractables and base neutrals); Target Analyte List (TAL Metals) by EPA Methods 6010B/7471
PBL-7	16	SVOCs by EPA Method 8270 (acid extractables and base neutrals); Target Analyte List (TAL Metals) by EPA Methods 6010B/7471
PBL-8	17	SVOCs by EPA Method 8270 (acid extractables and base neutrals); Target Analyte List (TAL Metals) by EPA Methods 6010B/7471

The analytical results for the VOCs are summarized in **Table 1**. The table presents the sample data in the following sequence:

1. Within each sample area (i.e., PBL-1 then PBL-2);
2. Within each direction from the center of the area (i.e., north, then east, south and west);
3. Closest, then moving further away from area center in one direction; and
4. Shallow then deep when two samples were collected from the same boring.

The analytical results for the SVOCs are summarized in **Table 2**. The table presents the sample data in the same sequence as described for Table 1. The analytical results for the metals are summarized in **Table 3**. The table presents the sample data in the same sequence as described for **Table 1**. The laboratory analytical reports are presented in **Attachment 5.**

4.3 Volatile Organic Compound Findings

A review of the soil sample analytical results on **Table 1** show that fifteen (15) of the forty eight (48) VOCs were detected at very low concentrations within the sixteen soil

samples collected from areas PBL-1 and PBL-2. Each soil sample collected from the PBL-1 area contained between two (2) to eight (8) VOCs. Most of the ten (10) soil samples collected from the PBL-2 area contained only two (2) VOCs (acetone and carbon disulfide), and three (3) of the samples from the PBL-2 area did not contain any detectable VOCs.

Most of the fifteen (15) detected VOCs were petroleum-related VOCs (benzene, methylcyclohexane, toluene, chlorobenzene, ethylbenzene, xylenes, isopropylbenzene, and 1,2-dichlorobenzene), followed by five (5) solvent-related VOCs (acetone, methyl ethyl ketone, trichloroethene, 1,1,2-trichloroethane, and 1,1,2,2-tetrachloroethane). Carbon disulfide and styrene were the other two (2) VOCs detected in the soil samples.

None of the detected VOC concentrations exceeded the corresponding Residential, Restricted Residential or Industrial SCOs.

4.4 Semivolatile Organic Compound Findings

A review of the soil sample analytical results on **Table 2** show that twenty one (21) of the fifty five (55) SVOCs were detected at low to moderate concentrations within the fifty seven (57) soil samples collected from all five (5) areas. With the exception of bis(2-ethylhexyl)phthalate, all of the SVOCs are petroleum-related compounds.

4.4.1 SVOC Residential SCO Exceedances

A total of seven (7) of the twenty one (21) detected SVOCs exceeded the corresponding Residential SCOs as highlighted in **Table 2**, and as shown on **Figure 3**. In the PBL-1 area there was one (1) sample (and corresponding field duplicate), PBL-1-30-E (9), with four (4) Residential SCO exceedances (five [5] Residential SCO exceedances in the field duplicate sample). There were no Residential SCO exceedances in the PBL-2 area. There were Residential SCO exceedances in three (3) of the five (5) samples collected from the PBL-5 area. There were five (5) SVOC exceedances in the samples collected to the south and west of the area center, and six (6) SVOC exceedances in the sample collected east of the area center. There were three (3) Residential SCO exceedances in one sample collected in the PBL-7 area and no Residential SCO exceedances in the PBL-8 area.

4.4.2 SVOC Restricted Residential SCO Exceedances

A total of six (6) of the twenty one (21) detected SVOCs exceeded the corresponding Restricted Residential SCOs as highlighted in **Table 2**, and as shown on **Figure 4**. In the PBL-1 area there was one sample (and corresponding field duplicate), PBL-1-30-E (9), with three (3) Restricted Residential SCO exceedances (five [5] Restricted Residential

SCO exceedances in the field duplicate sample). There were no Restricted Residential SCO exceedances in the PBL-2 area. There were Restricted Residential SCO exceedances in three (3) of the five (5) samples collected from the PBL-5 area. There were four (4) SVOC exceedances in the samples collected to the south and west of the area center, and five (5) SVOC exceedances in the sample collected east of the area center. There were two (2) Restricted Residential SCO exceedances in one sample collected in the PBL-7 area and no Restricted Residential SCO exceedances in the PBL-8 area.

4.4.3 SVOC Industrial SCO Exceedances

One (1) of the twenty one (21) detected SVOCs exceeded the corresponding Industrial SCOs as highlighted in **Table 2**, and as shown on **Figure 5**. There were no Industrial SCO exceedances in the PBL-1, PBL-2, PBL-7 and PBL-8 areas. There was one (1) Industrial SCO exceedances (benzo(a)pyrene) in three (3) of the five (5) samples collected from the PBL-5 area.

4.5 Metals Findings

A review of the soil sample analytical results on **Table 3** show that all twenty three (23) metals were detected at low to high concentrations within the fifty seven (57) soil samples collected from all five (5) areas. Iron was detected at concentrations above the Residential SCO of 2,000 milligrams per kilogram (mg/Kg) in all fifty seven (57) samples. The range of Eastern USA Background iron concentrations, provided in the NYSDEC TAGM 4046 RSCOs, are between 2,000 and 550,000 mg/Kg. Since iron is such a prominent metal in the soils and rock of New York, and given that the range of background concentrations is so large, iron concentrations will not be used to delineate the extent of soil remediation and will not be included in the discussions regarding SCO exceedances.

4.5.1 Metals Residential SCO Exceedances

A total of nine (9) of the detected metals exceeded the corresponding Residential SCOs as highlighted in **Table 3**, and as shown on **Figure 6**. In the PBL-1 area there were two (2) samples with Residential SCO exceedances of copper and lead (PBL-1-20-E (8)) and nickel (PBL-1-5-W (9)). There were three (3) Residential SCO metal exceedances in two (2) samples (plus a field duplicate) in the PBL-2 area. In the PBL-5 area there were two (2) samples with Residential SCO exceedances of chromium and lead (PBL-5-10-S (2)) and mercury (PBL-5-2-W (7). There were up to seven (7) Residential SCO metal exceedances in fourteen (14) of the sixteen (16) samples collected from the PBL-7 area.

All of the fourteen (14) samples with Residential SCO exceedances had, as a minimum, an arsenic exceedance. The two samples from the PBL-7 area without any Residential SCO exceedances were both the shallower of two samples collected from the same boring. There were up to nine (9) Residential SCO metal exceedances in sixteen (16) of the seventeen (17) samples collected from the PBL-8 area. All of the sixteen (16) samples with Residential SCO exceedances had, as a minimum, an arsenic exceedance.

4.5.2 Metals Restricted Residential SCO Exceedances

A total of six (6) of the detected metals exceeded the corresponding Residential SCOs as highlighted in **Table 3**, and as shown on **Figure 7**. The concentrations of cadmium, chromium and selenium that exceeded the Residential SCOs were less than the Restricted Residential SCOs. In the PBL-1 area there were two (2) samples with Restricted Residential SCO exceedances of lead and copper (PBL-1-20-E (8)) and nickel (PBL-1-5-W (9). There were two (2) Restricted Residential SCO exceedances in two (2) samples (plus a field duplicate) in the PBL-2 area. In the PBL-5 area there were two (2) samples with Restricted Residential SCO exceedances of lead (PBL-5-10-S (2)) and mercury (PBL-5-2-W (7). There were up to four (4) Restricted Residential SCO exceedances in fourteen (14) of the sixteen (16) samples collected from the PBL-7 area. All fourteen (14) samples had, as a minimum, an arsenic Restricted Residential SCO exceedance. There were up to six (6) Restricted Residential SCO exceedances in sixteen (16) of the seventeen (17) samples collected from the PBL-8 area. All sixteen (16) samples had, as a minimum, an arsenic Restricted Residential SCO exceedance.

4.5.3 Metals Industrial SCO Exceedances

One (1) of the metals, arsenic, exceeded the corresponding Industrial SCOs as highlighted in **Table 3**, and as shown on **Figure 8**. There were no Industrial SCO exceedances in the PBL-1 and PBL-5 areas. There was one (1) arsenic Industrial SCO exceedance in one sample (PBL-2-60-E (4), plus the field duplicate) in the PBL-2 area. There were fourteen (14) arsenic Industrial SCO exceedances in the sixteen (16) samples collected from the PBL-7 area. There were sixteen (16) arsenic Industrial SCO exceedances in the seventeen (17) samples collected from the PBL-8 area.

5.0 DELINEATION ASSESSMENT

A primary objective of the PDI was to delineate the lateral and vertical extents of subsurface contamination in the vicinity of the PBL-1, PBL-2, PBL-5, PBL-7, and PBL-8 areas for the purpose of remediation. For this program, the limit of remediation is established when none of the tested parameters exceed the Part 375 Soil Cleanup Objectives. As discussed in Section 4.3 above, none of the detected VOC concentrations exceeded the corresponding Residential, Restricted Residential or Industrial SCOs. Therefore, VOCs do not affect the delineation of the soil contamination.

5.1 Residential SCO Delineation

Residential SCO exceedances of both SVOCs and metals were observed in several of the sample locations as shown on Figure 3 and Figure 6. In the PBL-1 area, there was one sample with four (4) Residential SVOC exceedances, and two (2) sample locations with a maximum of two Residential metal exceedances. No additional delineation is necessary toward the north, south or west of the PBL-1 area. The location of the Residential SVOC exceedances (PBL-1-30-E) is furthest to the east of the area. Further delineation to the east is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-2 area, there were only two (2) sample locations with a maximum of two (2) Residential metal exceedances. No additional delineation is necessary toward the north, south (PBL-1 area to the south) or west of the PBL-2 area. The locations of the Residential metal exceedances (PBL-2-30-E and PBL-2-60-E) are furthest to the east of the area. Further delineation to the east is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-5 area, there were three (3) sample locations with either five (5) or six (6) Residential SVOC exceedances, and two (2) sample locations with a maximum of two (2) Residential metal exceedances. No additional delineation is necessary toward the north. Further delineation to the west is not possible due to the presence of the Ash Pit. The location with both Residential metal and SVOC exceedances (PBL-5-10-S) is furthest to the south of the area, and the location of Residential SVOC exceedances (PBL-5-10-E) is furthest to the east of the area. Further delineation to the south and east is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-7 area, there was one (1) sample location with three (3) Residential SVOC exceedances, and all of the sample locations had a minimum of one (1) Residential metal (arsenic) exceedance. Further delineation to the north, east, south and west is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-8 area, there were no Residential SVOC exceedances, and all of the sample locations had a minimum of one (1) Residential metal (arsenic) exceedance. Further delineation to the north, south east, and west is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

5.2 Restricted Residential SCO Delineation

Restricted Residential SCO exceedances of both SVOCs and metals were observed in several of the sample locations as shown on Figure 4 and Figure 7. In the PBL-1 area, there was one sample with three (3) Restricted Residential SVOC exceedances, and two (2) sample locations with a maximum of two Restricted Residential metal exceedances. No additional delineation is necessary toward the north, south or west of the PBL-1 area. The location of the Restricted Residential SVOC exceedances (PBL-1-30-E) is furthest to the east of the area. Further delineation to the east is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-2 area, there were only two (2) sample locations with a maximum of two (2) Restricted Residential metal exceedances. No additional delineation is necessary toward the north, south (PBL-1 area to the south) or west of the PBL-2 area. The locations of the Restricted Residential metal exceedances (PBL-2-30-E and PBL-2-60-E) are furthest to the east of the area. Further delineation to the east is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-5 area, there were three (3) sample locations with either four (4) or five (5) Restricted Residential SVOC exceedances, and two (2) sample locations with one (1) Restricted Residential metal exceedance. No additional delineation is necessary toward the north. Further delineation to the west is not possible due to the presence of the Ash Pit. The location with both Restricted Residential metal and SVOC exceedances (PBL-5-10-S) is furthest to the south of the area, and the location of Restricted Residential SVOC exceedances (PBL-5-10-E) is furthest to the east of the area. Further delineation to the south and east is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-7 area, there was one (1) sample location with two (2) Restricted Residential SVOC exceedances, and all of the sample locations had a minimum of one (1) Restricted Residential metal (arsenic) exceedance. Because all of the furthest sampling locations had metal exceedances, further delineation to the north south, east, and west is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-8 area, there were no Restricted Residential SVOC exceedances, and all of the sample locations had a minimum of one (1) Residential metal (arsenic) exceedance. Because all of the furthest sampling locations had Restricted Residential metal exceedances, further delineation to the north south, east and west is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

5.3 Industrial SCO Delineation

Industrial SCO exceedances of both SVOCs and metals were observed in some of the sample locations as shown on Figure 5 and Figure 8. In the PBL-1 area, there were no Industrial SVOC or metal exceedances. Therefore, no further delineation is required.

In the PBL-2 area, there was only one (1) sample location with one (1) Industrial metal (arsenic) exceedance. The location of the Industrial metal exceedance (PBL-2-60-E) is furthest to the east of the area. Further delineation to the east is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-5 area, there were three (3) sample locations with one (1) Industrial SVOC (benzo(a)pyrene) exceedances, and no Industrial metal exceedances. No additional delineation is necessary toward the north. Further delineation to the west is not possible due to the presence of the Ash Pit. The two (2) locations with the Industrial SVOC exceedance are furthest to the south of the area (PBL-5-10-S), and furthest to the east of the area (PBL-5-10-E). Further delineation to the south and east is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-7 area, there were no Industrial SVOC exceedances, and all of the sample locations had only one (1) Industrial metal (arsenic) exceedance. Because all of the furthest sampling locations had metal exceedances, further delineation to the north, south, east, and west is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

In the PBL-8 area, there were no Industrial SVOC exceedances, and all of the sample locations had only one (1) Industrial metal (arsenic) exceedance. Because all of the furthest sampling locations had metal exceedances, further delineation to the north, south

east and west is discussed in Section 5.4, and will incorporate historical analytical and qualitative data.

5.4 Historical Data

As discussed above in Section 2.0, two previous investigations had been completed at the site. In 2000, a total of fourteen (14) subsurface soil samples were collected from thirteen (13) soil borings. In 2006, sixteen (16) subsurface soil samples were collected from eleven (11) soil borings/test pits and nine (9) shallow soil borings. The locations of the soil borings/test pits are shown on Figure 9. As discussed above, analytical results from these two (2) investigations were compared to the TAGM 4046 RSCOs, and a large number of exceedances were noted. To assist in the delineation of contaminated soil at the site, the analytical results from the previous investigations were compared to the Part 375 Residential SCOs. The Residential SCOs were chosen for comparison because 1.) the Residential SCOs would require the least amount of future land use restrictions; and 2.) key SVOC and metal compounds have little to no change in SCO levels between Residential and Industrial SCOs. At this site, the two significant compounds are 1.) benzo(a)pyrene, a SVOC, with a Residential SCO of 1.0 mg/Kg and an industrial SCO of 1.1 mg/Kg; and 2.) arsenic, a metal, with a Residential and Industrial SCO both at 16 mg/Kg. Remedial actions to meet Industrial SCOs would require the same level of effort as remedial actions to meet Residential SCOs.

With one exception, none of the reported VOCs concentrations presented in the previous site investigation reports exceeded the corresponding Residential SCO. The one exception was a reported naphthalene concentration of 103 mg/Kg in sample S-07C (8-12 ft. deep) which was in excess of the Residential SCO of 100 mg/Kg. Naphthalene is one of a few compounds that are sometimes reported as both a VOC and a SVOC. The naphthalene concentration in sample S-07C, reported as a SVOC, was 840 mg/Kg. The naphthalene concentration used for this review was the SVOC result of 840 mg/Kg.

A total of seven (7) samples from the previous investigations had SVOC concentrations above the corresponding Residential SCOs. The location and compounds of the seven (7) samples are shown on Figure 9, along with the five (5) samples from the PDI. Sample S-07 (8-12 ft. deep) had thirteen (13) SVOCs with concentrations greater than the corresponding Residential SCOs (there was not enough room on the figure to list all thirteen (13) compounds). Four (4) of the samples from the previous investigations (PBL-1, S-06, S-08, and S-12) had between six (6) and seven (7) SVOCs with concentrations greater than the corresponding Residential SCOs. The remaining

historical sample, S-01 (4-8 ft. deep), located near the Ash Pit, had three (3) SVOCs which exceeded the corresponding Residential SCOs.

A total of eleven (11) samples from the previous investigations had metal concentrations above the corresponding Residential SCOs. The location and metals of the eleven (11) samples are shown on Figure 10, along with the thirty four (34) samples from the PDI. All ten (10) samples from the previous investigations that were located south of the recently demolished building had, as a minimum, a Residential SCO exceedance for arsenic. Most of the eleven (11) samples had between one (1) and three (3) metals with concentrations which exceeded the corresponding Residential SCO. Sample PBL-8 (8-8.5 ft. deep) contained eight (8) metals with concentrations greater than the corresponding Residential SCOs.

5.5 Areas of Insufficient Data

During the previous investigations, several soil borings/test pits (PBL-3, PBL-4, PBL-6, PBL-10 and PBL-11) were advanced into the subsurface where no sample was collected for laboratory analysis. These locations, for the most part were located in the central area south of the recently demolished building. The test pits at PBL-3, PBL-6 and PBL-11 were terminated at 1.5 ft. bgs because asbestos containing material (ACM) was encountered. PBL-4 was terminated at 4.5 ft. bgs due to steel and concrete obstructions. There was no physical evidence of the potential for chemical contamination of subsurface soils at these locations. PBL-10 was advanced to 7 ft. bgs and encountered predominantly brick and fire brick. This description is nearly identical to the description of subsurface conditions reported in the boring log for PBL-7-20-S. PBL-7-20-S is approximately 40 ft. north of PBL-10 and the sample from PBL-7-20-S had a Part 375 SCO exceedance for arsenic. Based on the nearly identical subsurface conditions at both locations, it is reasonable to expect that the material in the vicinity of PBL-10 would also exceed the arsenic SCO.

In the area immediately north of the recently demolished building there were nine (9) shallow soil borings that were sampled down to 4.5 ft.. Samples from two of the soil borings (S-02 and S-03) were analyzed for SVOCs. The samples had concentrations of benzo(a)pyrene at 0.52 mg/Kg (S-02) and 0.84 mg/Kg (S-03) which are just below the Residential and Industrial SCOs of 1.0 and 1.1 mg/Kg, respectively. Given that most of the PDI samples from this northern area had exceedances of benzo(a)pyrene ranging from 1.3 to 2.5 mg/Kg, and both of the historical samples from this northern area had concentrations just below the Part 375 SCOs, it is reasonable to expect that the material in the northern area will typically exceed the benzo(a)pyrene SCOs.

To assess what areas have insufficient data to complete the delineation of the soil remediation, a distance of approximately fifteen (15) beyond sample locations of Residential SCO exceedances was used. This distance was chosen to reflect the relatively large area to be assessed, and the heterogeneity of the fill material at the site. Based on this information, two (2) areas where there is insufficient data to complete the remediation were identified. These two (2) areas are both shown on **Figure 9** (SVOC exceedances) and **Figure 10** (metal exceedances). The first is a small rectangular area located adjacent to the southwestern corner of the recently demolished building footprint. The second is in the central area south of the recently demolished building.

6.0 SUMMARY PERSPECTIVE DRAWINGS

Figures 11 through 12 were prepared so that the reader can better visualize the extent of soil contamination in both the horizontal and vertical (areal and depth) dimensions. **Figure 11** presents the metal and SVOC Residential SCO exceedances at the Site in a three-dimensional layout to better depict the extent of the contamination. **Figure 11A** focuses on the north end of the Site, and **Figure 11B** focuses on the south end of the Site. **Figure 12** presents the metal and SVOC Industrial SCO exceedances at the Site in a three-dimensional layout to better depict the extent of the contamination. **Figure 12A** focuses on the north end of the Site, and **Figure 12B** focuses on the south end of the Site.

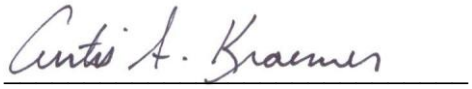
7.0 CONCLUSIONS AND RECOMMENDATIONS

A review of the data from the PDI shows that SVOC exceedances of the Part 375 Residential, Restricted Residential and Industrial SCOs are driving the delineation of the soil remediation in the PBL-1 area and the southern portion of the PBL-2 area. A combination of SVOC and metal exceedances of the Part 375 Residential, Restricted Residential and Industrial SCOs are driving the delineation of the soil remediation in the northern and eastern portions of the PBL-2 area and the PBL-5 area. Metal (in particular, arsenic) exceedances of the Part 375 Residential, Restricted Residential and Industrial SCOs are driving the delineation of the soil remediation in the PBL-7 and PBL-8 areas (nearly the eastern half of the area south of the recently demolished building).

The PDI confirmed the presence of the reported buried 1,500 gallon fuel oil tank at the north end of the site, but not the specific outline of the UST.

A review of the combined results of the PDI and historical investigations indicates that nearly every location sampled had either a SVOC or metal exceedance. This areal pervasiveness of the SCO exceedances is principally attributable to two (2) chemical constituents detected in the subsurface soils, benzo(a)pyrene, and arsenic. Shaw recommends that no further delineation be attempted, and that onsite soil/fill material located to the north and south of the recently demolished building be removed to a depth of the structural slab of the former generating station or to groundwater (whichever is encountered first).

PREPARED BY:



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TABLES

FIGURES

ATTACHMENT 1

FIGURES FROM GEOPHYSICAL CONTRACTOR

ATTACHMENT 2

BORING LOGS

ATTACHMENT 3

PHOTOGRAPHS

ATTACHMENT 4

WASTE CHARACTERIZATION RESULTS

ATTACHMENT 5

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