FOSTER WHEELER ENVIRONMENTAL CORPORATION

BSMC/RV7/98
October 26, 1998

Mr. Karel Konrad
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4 Irving Place, Room 1340S
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**RE: Con Edison, Ravenswood Phase II
Draft Site Investigation Report**

Dear Mr. Konrad:

Enclosed please find four (4) copies of the Con Edison, Ravenswood Phase II draft report for your review and comments. Once you have had an opportunity to review the report, I will be pleased to address your comments and will be happy to assist you with any additional presentation of this Phase II information that you may require.

Please feel free to call me at 973-597-7032 at your convenience.

Very truly yours,

Bruce S. McClellan
Project Director

Enclosures

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Draft
Phase II Site Investigation Report
Ravenswood Generating Station
Long Island City, New York

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EXECUTIVE SUMMARY

Ravenswood is located at 38-54 Vernon Boulevard, in Long Island City, Queens County, New York. Ravenswood is situated on the eastern bank of the East River and is bordered by Con Edison's Ravenswood Gas Turbine Facility to the north, Vernon Boulevard to the east, Con Edison's Vernon Central Substation to the south, and the East River to the west.

The Generating Station at Ravenswood consists of three units that are housed in the main building on the property. Oil is the primary fuel used in the winter months, and natural gas is the primary fuel used in the summer months. Coal operations ceased at Ravenswood by 1974; however, remnants of the coal operations still remain on-site along the East River, including three ash settling ponds, two ash silos, and the coal conveyor system. In addition, coal feeders, crushers, and hoppers remain inside the Generating Station building.

In addition to the three steam-electric generating units, Con Edison operates a Steam Plant at Ravenswood, located in "Boiler House A." Steam is delivered to Manhattan via a pipeline that passes through a Con Edison tunnel under the East River. The Steam Plant utilizes a freshwater reservoir located to the north of the main Generating Station building and east of the Steam Plant. Water stored in this reservoir is used in the boilers to produce steam. The reservoir is a base of a former gas holder - a part of the MGP.

Fuel oil is supplied to Ravenswood from three tanks. The first tank is a mounded, completely covered, No. 6 fuel oil storage tank located east of the main Generating Station building, adjacent to Vernon Boulevard. The remaining two tanks are located at the Rainey Tank Farm on the Rainey site located north of Ravenswood across 36th Ave.

Con Edison also maintains a marine transfer facility adjacent to the Steam Plant. This facility provides a berth for one semi-permanently berthed oil storage barge used for emergency storage only, and can currently store up to 60,000 barrels of oil. The fuel oil can be pumped from the marine transfer facility to the Rainey Tank Farm, via piping that is primarily aboveground.

Additional facilities located on Ravenswood include the Vernon Substation and the Tunnel Headhouse building. The area in the northern portion of Ravenswood was initially an MGP facility, as early as 1898. In the late 1950s, most of the MGP facility structures were demolished, and the current Generating Station buildings were constructed by the early 1960s.

The surface topography of the site is relatively flat with a gentle slope from east to west across the site. Surface elevations range from approximately +20 feet to +10 feet above mean sea level (MSL). Aside from the existing building/structures at the facility, the land cover at Ravenswood consists primarily of paved roads and a two- to six-inch layer of crushed bluestone. As a result, there are no exposed soil areas and the site is devoid of vegetation. Immediately adjacent to the facility is the East River, which is tidal, and the western boundary of the. The area surrounding the site is heavily industrialized. Lower elevations are along the western property boundary, adjacent to the East River. Surface water runoff is generally from east to west towards the East River except where obstructed generating buildings. The generating buildings represent an obstruction to this general east west flow direction. In areas with stone cover, surface water is able to percolate to the groundwater. Some portions of the Ravenswood site contain a storm drainage system that conveys surface runoff directly to the East River.

This Phase II Site Investigation Report has been prepared by Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) on behalf of Consolidated Edison Company of New York, Inc.(Con Edison). This Report describes the results of investigation activities undertaken at Ravenswood. Con Edison undertook this investigation and evaluation of subsurface environmental conditions at Ravenswood to provide information to potential buyers on the environmental conditions and to be consistent with the terms of the November 4, 1994 New York State Department of Environmental Conservation (NYSDEC) Order on Consent (OC).

The Phase II investigation at Ravenswood included the collection and chemical analysis of soil and groundwater samples, evaluation of previous remedial studies, and preparation of this Site Investigation Report. The subsurface environmental conditions that were investigated included the site of a former manufactured gas plant (MGP), four or the seven identified oil spills listed in Appendix B of the OC, and areas of suspected soil contamination in the vicinity of generator transformers located on-site.

The Phase II objectives are to provide information sufficient for Con Edison and potential buyers to fully understand the existing subsurface environmental conditions at Ravenswood and to be able to assess the level of effort required to achieve a No Further Action decision for the site; and respond to the requirements of the OC to investigate impacted areas associated with past oil spills identified in Appendix B of the OC that occurred at Ravenswood.

The Phase II field investigation at the Ravenswood Generating Station was conducted August 26 through October 12, 1998. The site investigation activities were performed in accordance with the Field Sampling Plan (FSP), Appendix A of the Work Plan, the Quality Assurance Project Plan (QAPP), Appendix B of the Work Plan, and the site-specific Environmental Health and Safety Plan (EHS Plan), Appendix C of the Work Plan. The FSP defines and specifies sample collection and data gathering techniques. The QAPP describes the protocols and procedures used to verify that all project work was performed according to the established analytical and engineering procedures.

Sixty-seven subsurface soil samples were collected for chemical analysis from selected depth intervals in each test pit/trench/soil boring. Quality assurance/quality control (QA/QC) subsurface soil samples were also collected including duplicate, field rinsate, and matrix spike/matrix spike duplicate (MS/MSD) samples. The depth interval for analysis was selected based on visual observations, PID screening results, and the site history of each boring location. The planned intention of this sampling plan was to analyze soil samples with apparent contamination where encountered or from areas likely to have contamination, e.g., the top of groundwater.

The chemical fractions analyzed in each soil sample was based on the site history of each sample location. Subsurface soil samples collected from locations near active transformers were analyzed for total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs). Subsurface soil samples collected from locations near former MGP operations were analyzed for TPH; polycyclic aromatic hydrocarbons (PAHs); benzene, ethylbenzene, toluene, and xylene (BTEX); and cyanide. Other subsurface soil samples were analyzed for TPH only. NYSDEC Analytical Service Protocols were followed for analysis of all soil samples.

Eight new monitoring wells were installed during the Phase II field investigation at Ravenswood. Five 2-inch diameter wells (MWRV-1 through MWRV-5) were installed surrounding the former MGP operations area on the northern portion of the site, and three 4-inch monitoring wells (RMW-2 through RMW-4) were installed surrounding the No. 6 fuel oil tank and pumps located in the southeastern portion of the site. Groundwater samples were collected from the eight newly installed monitoring wells during the Phase II field investigation. Groundwater samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and cyanide.

The near surface soils beneath the two- to six-inch thick layer of asphalt or crushed bluestone at the facility consist of dense and compact fill material ranging in thickness from 5 to 15 feet bgs that typically contain large boulders, cobbles, concrete rubble, brick, wood, cinders, and metal debris. Soil in this fill material consists predominantly of low plasticity silt, sandy silt, and sand. The near surface fill soil generally appeared to be clean, except for several locations, where black, oily staining is present. The fill appears to be thicker on the western portion of the site toward the East River and may extend to the natural underlying deposits in these areas.

Beneath the fill material the soil consists predominantly of low plasticity silts and clays, with the silts also containing fine sands and occasional gravel. The clay within this zone consists of mottled orange and gray stiff clays that are generally free of organic matter. The presence and thickness of this zone is variable, typically it is 10 to 12 feet thick, but is absent at locations on the western side of the site.

The deepest soil zone at the site, when present, consists of primarily medium to fine grained sands and silty sands. This unit is absent at many locations, where present, the lowest few inches is characterized by an increase in grain size immediately adjacent to the underlying bedrock This sandy zone is saturated, and black staining or an oily sheen with a distinct petroleum odor were typically noted, especially at or just above the saturated zone.

Bedrock consists of the Ravenswood Gneiss with a trend in slope toward the East River. However, the surface of the bedrock is highly variable with very localized moderate to deep depressions occurring at five distinct areas of the site (see Section 2.0). The USGS reports that the bedrock beneath the site consists of a low hydraulic conductivity unit. This will inhibit vertical migration, confining groundwater flow to the overlying soil units.

Groundwater occurs in the unconsolidated soil/fill deposits overlying bedrock under unconfined water table conditions. This overburden saturated zone is recharged on-site via rainwater percolating through the stone covered areas, seepage from the Fresh Water Reservoir, and from regional groundwater flow from off-site areas toward the east. Based on the general limited saturated zone thickness and anticipated low to moderate hydraulic conductivites, this saturated zone would not be capable of yielding significant quantities of water to wells, except in areas adjacent to the river where infiltration from the river will likely be significant. Groundwater flow directions on site have been interpreted using water level measurement, obtained from the monitoring wells installed. The groundwater level data obtained indicates an east to west flow direction on the northern portion f the site with discharge to the East River, and a potential for west to east flow in the area around the No. 6 Fuel Oil Tank.

Based on the field observation and results of the laboratory analyses the site can be characterized as exhibiting residual impacts from historical release of petroleum related fuels and oils. In general, the soil contamination observed in the field with a few exceptions, appeared to be related to petroleum type products and not MGP wastes. The exceptions to this were the tar-like material observed in SB-3 and the oily stain present at the bottom of MWRV-3.

The surficial fills that overlie most of the site are dense and compact and generally free of visible contamination. The dense condition of these materials has likely aided in preventing contemporary release at the surface from penetrating to the deeper soils and water table. Contamination is generally more apparent at depths in the soil column and is typically more apparent at the top of the water table. This appears to be a wide spread site condition most likely associated with historical site wide use of petroleum related material and the former MGP operations and typically not specific source areas. Soil encountered on the northern portion of the site generally exhibited higher levels of contamination. The site soil contamination consists perdominantly of elevated levels of BTEX and PAH constituents that range from the ppb to ppm levels, and TPHs were detected site-wide in the ppm range. PCBs were detected in only one shallow soil sample of the eight samples analyzed.

No LNAPL was observed during soil sample collection or in the monitoring wells. This is significant in that it indicates the detected soil contamination is associated with residuals absorbed to the soil matrix and not a separate free phase layer. Likewise, the deeper borings in the northwest corner of the site (SB-4, MWRV-3 and MWRV-4) exposed soils at the bottom of the soil column, but have not exhibited any free DNAPL.

Groundwater at the site exhibits relatively low ppb levels of BTEX and PAH constituents. The groundwater impact is generally greater in the northern portion of the site. On the northern portion of the site groundwater flows east to west across the site and is discharged to the East River.

The sheet piling used in the bulkhead construction will likely impede but not prevent the flow to the river.

In the area of the No. 6 Fuel Oil Tank groundwater flow is to the east from the generator building to Vernon Boulevard. Beyond the eastern site limits this groundwater may become entrained in the structural features beneath Vernon Boulevard and conveyed to the south around the site. The soil with the saturated zone in this area are relatively low hydraulic conductivity and the volume of water actually transmitted in this area is anticipated to be minimal.

Contaminant migration from a source occurs via a variety of mechanisms. The importance of a given mechanism is controlled by the specific physical, geochemical, climatic and hydrologic conditions at a given site as well as by the physicochemical characteristics of the contaminated media. The migration of contaminants to and through underlying soils and groundwater by gravity and the percolation of rainwater and groundwater through contaminated soils and/or contaminated buried fill material within specific site areas is expected to be the major environmental fate and transport mechanism at Ravenswood.

Migration of contaminants into biota due to bioaccumulation effects was not considered as a significant potential pathway because: 1) the site is devoid of terrestrial biota; 2) transport of contaminants to the East River is assessed to be minimal and only via recharging groundwater; 3) immediately upon entering the East River, contaminants are expected to dissipate rapidly over a relatively short distance due to the tremendous dilution occurring from the substantial volume of water flowing within the river, and/or volatilization from the water to the atmosphere; and, 4) the contaminants transported to the East River are not substantially bioaccumulated. As a consequence of these characteristics, there is anticipated to be a negligible impact to edible fish species within the adjacent surface water body (i.e., the East River). The migration of contaminants within stormwater surface runoff also was not considered to be a principal environmental fate and transport mechanism at Ravenswood since the surface of the site is covered with buildings/structures, crushed stone or bituminous pavement.

Among the contaminants of potential concern associated with Ravenswood, the PCBs will exhibit the greatest persistence in soil/buried fill matrices, due to their physicochemical characteristics. Exhibiting moderate persistence would be the PAHs, based upon their physicochemical properties. In contrast, the highly mobile volatile organic aromatic compounds and cyanides, would exhibit the least persistence in contaminated matrices. As a direct result of the contaminant fate characteristics and transport mechanisms, contaminant concentrations in environmental media are expected to gradually diminish over time as long as no additional sources (i.e., future spills) introduce contaminants in the future.

1.0 INTRODUCTION

This Phase II Site Investigation Report has been prepared by Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) on behalf of Consolidated Edison Company of New York, Inc. (Con Edison). This Report describes the results of investigation activities undertaken at the Ravenswood Power Generating Station (Ravenswood). Con Edison undertook this investigation and evaluation of subsurface environmental conditions at Ravenswood to provide information to potential buyers on the environmental conditions and to be consistent with the terms of the November 4, 1994 New York State Department of Environmental Conservation (NYSDEC) Order on Consent (OC). Ravenswood is located at 38-54 Vernon Boulevard in Long Island City, New York. Figure 1-1 presents a site location map.

The Phase II investigation at Ravenswood included the collection and chemical analysis of soil and groundwater samples, evaluation of previous remedial studies, and preparation of this Site Investigation Report. The subsurface environmental conditions that were investigated included the site of a former manufactured gas plant (MGP), four of the seven identified oil spills listed in Appendix B of the OC, and areas of suspected soil contamination in the vicinity of generator transformers located on-site. Implementation of this investigation has met the spirit and intent of the New York State Environmental Conservation Law (NYSECL), the OC, NYSDEC requirements, protocols and guidance, and United States Environmental Protection Agency (USEPA) guidelines where appropriate.

1.1 PHASE II PURPOSE AND OBJECTIVES

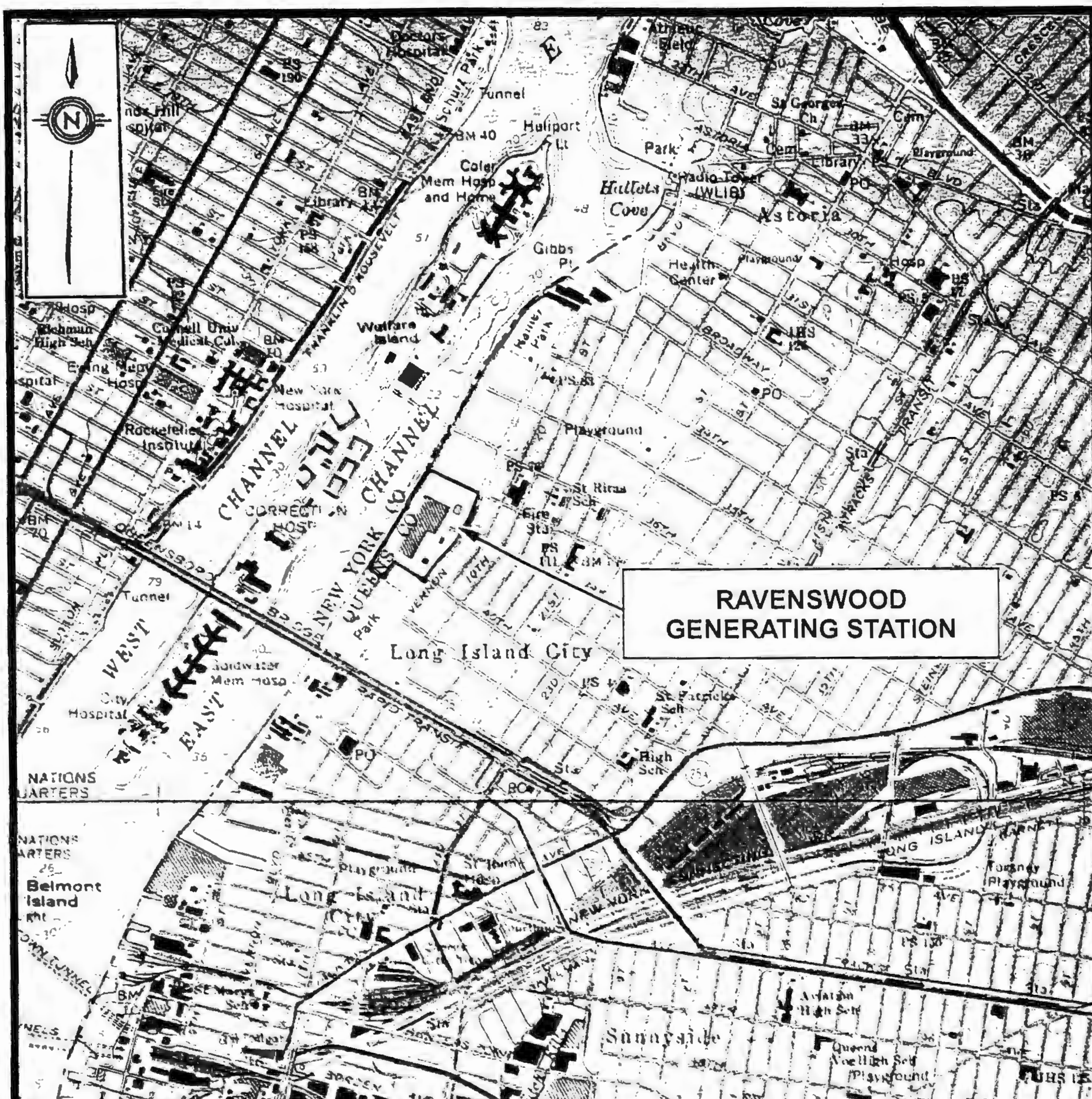
The purpose of the Site Investigation is to undertake a programmatic approach to defining site condition to permit an assessment of the efforts required to obtain a No Further Action decision for Ravenswood. Foster Wheeler Environmental's programmatic approach was to:

- Rapidly assess the impact of reported releases and the effectiveness of the remedial actions conducted to date at the site through the review of existing environmental information that is available;
- Incorporate the results of the 1998 Phase I Environmental Assessment Report for the Ravenswood site;
- Implement a field investigation to obtain data sufficient to determine the degree and extent of contamination.

The Phase II objectives are to:

1) Provide information sufficient for Con Edison and potential buyers to fully understand the existing subsurface environmental conditions at Ravenswood and to be able to assess the level of effort required to achieve a No Further Action decision for the site; and

2) Respond to the requirements of the OC to investigate impacted areas associated with past oil spills identified in Appendix B of the OC that occurred at Ravenswood.



Source: US Geological Survey 7.5-minute topographic map quadrangles for Central Park, NY-NJ (1966, photorevised 1979) and Brooklyn, NY (1967, photorevised 1979).

Scale: 1:24000

FOSTER WHEELER FOSTER WHEELER ENVIRONMENTAL CORPORATION	**Consolidated Edison Company of New York, Inc.**
	Ravenswood Generating Station
	Figure 1 **Site Location Map**

1.2 SITE LOCATION, DESCRIPTION AND HISTORY

This section provides a summary of the comprehensive site description and history discussion presented in the Phase I Report (June 1998). Ravenswood is located at 38-54 Vernon Boulevard, in Long Island City, Queens County, New York. Ravenswood is situated on the eastern bank of the East River and is bordered by Con Edison's Ravenswood Gas Turbine Facility to the north, Vernon Boulevard to the east, Con Edison's Vernon Central Substation to the south, and the East River to the west. Figure 2 shows the Ravenswood site and identifies significant features to be investigated.

Ravenswood as an operating power generating station is a secure, fenced complex that is continuously patrolled by security guards. The Generating Station at Ravenswood consists of three units that are housed in the main building on the property. Generating Unit 1 was installed in 1961, and Generating Unit 2 was installed in 1962. Generating Units 1 and 2 are rated at 400 megawatts (MW) and are designed to burn oil or natural gas. Generating Unit 3 installed in 1965 is rated at 1,000 MW, and is equipped with two boilers, designated as Boilers 30 north and south, which are designed to burn oil, natural gas, or coal. Oil is the primary fuel used in the winter months, and natural gas is the primary fuel used in the summer months.

Coal operations ceased at Ravenswood by 1974; however, remnants of the coal operations still remain on-site along the East River, including three ash settling ponds, two ash silos, and the coal conveyor system. In addition, coal feeders, crushers, and hoppers remain inside the Generating Station building.

In addition to the three steam-electric generating units, Con Edison operates a Steam Plant at Ravenswood. It is located in, so called, "Boiler House A", which is located adjacent to the East River, northwest of Generating Unit 3. The Boiler House A building was constructed in the late 1940s as a part of the former MGP (Figure 2). The Steam Plant utilizes four boilers to generate steam for the distribution to Con Edison's customers in Manhattan. Steam is delivered to Manhattan via a pipeline that passes through a Con Edison tunnel under the East River. The Steam Plant's boilers are designed to primarily burn No. 6 Fuel Oil but have a natural gas startup and limited burning capability as well. The Steam Plant utilizes a freshwater reservoir located to the north of the main Generating Station building and east of the Steam Plant. Water stored in this reservoir is used in the boilers to produce steam. The reservoir is a base of a former gas holder - a part of the MGP.

Fuel oil is supplied to Ravenswood from three tanks. The first tank is a mounded, completely covered, No. 6 fuel oil storage tank located east of the main Generating Station building, adjacent to Vernon Boulevard. The remaining two tanks are located at the Rainey Tank Farm on the Rainey Site located north of Ravenswood across 36th Ave.

Con Edison also maintains a marine transfer facility adjacent to the Steam Plant. This facility provides a berth for one semi-permanently berthed oil storage barge, the "Lemon Creek," which is leased by Con Edison, and two separate berths for fuel oil delivery by barges. The "Lemon Creek" barge is used for emergency storage only, and can currently store up to 60,000 barrels of oil. The fuel oil can be pumped from the marine transfer facility to the Rainey Tank Farm, via piping that is primarily aboveground.

Additional facilities located on Ravenswood include the Vernon Substation and the Tunnel Headhouse buildings. The Vernon Central Substation, located in the southern portion, is supplied by Generating Units 1 and 2. The Tunnel Headhouse buildings were originally part of the MGP operations located on site. The tunnels connect Ravenswood to Manhattan and are used for the transmission of steam and power. One satellite gas turbine is located to the southeastern corner of the main Generating Station building and is used for the "black" startup capability of the Ravenswood Generating Station.

The area in the northern portion of Ravenswood was initially an MGP facility, as early as 1898. In the late 1950s, most of the MGP facility structures were demolished, and the current Generating Station buildings were constructed by the early 1960s. Figure 2 indicates the location of former MGP structures of potential environmental significance.

1.3 SITE SETTING

1.3.1 Surface Conditions

The surface topography of the site is relatively flat with a gentle slope from east to west across the site. Surface elevations range from approximately +20 feet to +10 feet above mean sea level (MSL). Lower elevations are along the western property boundary, adjacent to the East River. Surface water runoff is generally from east to west towards the East River except where obstructed by the generating buildings. The generating buildings represent an obstruction to this general east west flow direction. In areas with stone cover, surface water is able to percolate to the ground. Some portions of Ravenswood contain a storm drainage system that conveys surface runoff directly to the East River.

The ground surface cover over the trafficked portion of the site is concrete and/or asphalt; however, a significant portion of the site is covered with crushed stone (bluestone). In areas that contain electrical transmission equipment, the ground surface is covered with a layer of bluestone. In some areas, the bluestone surface layer has been observed to be as much as 2 to 3 feet thick before encountering the soil fill material that blankets the site.

1.3.2 Subsurface Conditions

Generally, the soil profile consists of soil fill forming the upper-most stratum which is underlain generally by a fine to medium, brown to gray sand with various amounts of silt to the top of bedrock. The surficial fill material is reported to consist of coarse to fine sand with various amounts of gravel and silt. Beneath the northern portion of the site a layer of silt and clayey silt were encountered just above the bedrock. The unconsolidated deposits are reported on historical site borings to range in thickness from approximately 6 to 27 feet along the eastern site limits to as much as 35 feet along the western site limit adjacent to the East River.

Hydrogeologic information from test borings and monitoring wells in the vicinity of "Boiler House A", indicate the water table is located at an elevation of approximately 8 to 9 feet below ground surface (bgs). Groundwater elevations from borings and monitoring well locations around the mounded No. 6 tank located in the southeastern portion of the property ranged from 7 to 10 feet below grade. These elevations correspond to a water table in the overburden. The overall site groundwater flow direction is generally from the west towards the East River. Actual localized flow paths can be influenced by the bedrock surface and subsurface structures such as the station generating building foundations, which extend to the top of the bedrock surface. Historical drawings indicate that the area beneath Generating Unit Nos. 1, 2, and 3 were planned to be excavated to the top of the bedrock prior to construction. Groundwater in the overburden has the potential to discharge to the East River.

The Geologic Map of New York, Lower Hudson Sheet indicates a ridge is formed beneath the site area by the Ravenswood Gneiss, which is a biotite-hornblende-quartz-plagioclase gneiss with accessory garnet and sphene. This unit strikes northeastward and also outcrops near Long Island Sound in Westchester County, New York and Connecticut where it is known as the Harrison Gneiss and the Brookfield Diorite Gneiss. According to the Ravenswood Generating Station Groundwater Contingency Plan, dated April 1997, Ravenswood is underlain by the Harrison Gneiss Formation. This formation parallels the East River, extending from the lower east side of Manhattan to Hunters Point, Queens, south of Ravenswood, to Pot Cove, north of Ravenswood. The bedrock surface varies significantly across the site with high elevation at eastern site limits and lower elevation typically along the western limit. However, elevations of the bedrock at positions on the interior of the site can vary significantly from the general trend.

The United States Geological Survey (USGS) Publication (File Report 81-1186) characterizes the underlying bedrock at the property as a low hydraulic conductivity formation that does not yield more than a few gallons per minute of water. This is typical and expected for the type of bedrock identified at the site. Under these conditions the quantity of water that can flow vertically downward across the bedrock boundary will be insignificant and groundwater will preferentially flow horizontally in the overlying unconsolidated deposits. The USGS publication further characterizes the bedrock surface as representing the bottom hydrologic boundary for the groundwater flow system in the area of the site.

2.0 SITE INVESTIGATION SCOPE OF WORK

2.1 INTRODUCTION

This section of the report provides an overview of the field activities performed as part of the Phase II Site Investigation at Ravenswood. The site investigation activities were performed in accordance with the Field Sampling Plan (FSP), Appendix A of the Work Plan, the Quality Assurance Project Plan (QAPP), Appendix B of the Work Plan, and the site-specific Environmental Health and Safety Plan (EHS Plan), Appendix C of the Work Plan. The FSP defines and specifies sample collection and data gathering techniques. The QAPP describes the protocols and procedures used to verify that all project work was performed according to the established analytical and engineering procedures. The site-specific EHS Plan was prepared in accordance with 29 CFR 1910.120, Electrical Maintenance Standards, and local New York City applicable standards, such that the health and safety of persons on or in the vicinity of the project site during implementation of field activities were protected. The EHS Plan addresses those concerns and risks identified in the hazard analysis and outlines mitigative measures to be implemented. The hazard analysis was performed as part of the pre-planning process conducted during the preparation of the Work Plan. In addition, daily health and safety briefings outlining the field activities scheduled for the day and risk/mitigative measures to be employed were performed.

2.2 FIELD INVESTIGATION

The Phase II field investigation at the Ravenswood Generating Station was conducted August 26 through October 12, 1998. The field investigation included field mobilization, vacuum excavation/hand digging and downhole clearance with a magnetometer, collection of hand samples, soil boring, trenching, subsurface soil sampling, monitoring well installation and development, groundwater level measurement, surveying, and waste management. The location of all soil boring, monitoring wells, trenches and hand sample locations are shown on Figure 2.

2.2.1 Field Mobilization

Mobilization activities conducted to support the Phase II field investigation at Ravenswood included two site reconnaissance visits prior to initiation of invasive activities at the site, procurement and coordination of subcontractors, and mobilization of all personnel and supplies to the site.

Proposed sampling locations were marked during an initial site reconnaissance visit conducted on July 30, 1998. The soil boring and monitoring well locations were selected to avoid obvious overhead or known underground obstructions/conduits and marked with white paint on the ground surface. The locations were selected based on existing site engineering drawings made available by Con Edison. A 25-foot radius surrounding the selected locations was later M-scoped by Con Edison to identify potential subsurface utilities.

A site visit was conducted on August 20, 1998. This visit was attended by representatives of Con Edison, Foster Wheeler Environmental, and the two on-site subcontractors (Allstate Power Vac, and Aquifer Drilling and Testing). Locations for decontamination pads, equipment storage, and solid and liquid waste disposal and storage were also identified during the site visit. Final sample locations were also selected based on the results of the M-scoping of the originally proposed sample locations.

Subcontractors selected to perform the vacuum excavation and soil boring/monitoring well drilling were mobilized to the site. Prior to arrival on-site, subcontractors were presented with copies of the site-specific EHS Plan for review by all personnel being mobilized to the site. Upon arrival on-site, a site-specific health and safety briefing was conducted for all subcontractor personnel by the Foster Wheeler Environmental health and safety officer. The site-specific health and safety briefing included a review of the emergency phone numbers, site history, potential contaminants of concern, hazards analysis, personal protective equipment, air monitoring, emergency procedures, decontamination procedures, and site evacuation routes. Also included in the site-specific briefing was a review of the Occupational Health and Safety Administration (OSHA) and medical certifications of all subcontractor personnel. All Foster Wheeler Environmental and subcontractor personnel also viewed the Ravenswood health and safety video that outlined Con Edisons's site-specific health and safety policies.

2.2.2 Borehole Clearing

All soil boring and monitoring well locations at Ravenswood were cleared to a depth of 5 feet below ground surface to expose potential underground utilities. This clearing was accomplished by excavating a 24-inch diameter test pit to a depth of 5-feet depth at each location utilizing either vacuum excavation or hand digging. Vacuum excavation involved the use of a vacuum truck to remove material loosened with a fiberglass-handled pry bar. At several locations that could not be accessed by the vacuum truck, hand dug test pits were excavated with a post-hole digger. After excavation of all test pits at Ravenswood to a depth of 5 feet below ground surface, potential subsurface utilities below the bottom of the 5-foot test pit were cleared with a Schonstedt® magnetic locator. The Schonstedt® magnetic locator, capable of detecting ferrous material to a depth of 4 feet below the measuring location, was lowered to the base of each test pit and readings collected to identify potential utilities that would be encountered during drilling/boring operations. Once the test pits were cleared with a magnetic locator, they were backfilled with the excavated material. In areas where bluestone gravel was present at the surface, the test pit location was marked with a 2-foot by 2-foot wooden frame. Steel plates were placed over the backfilled test pits until soil boring or monitoring well drilling activities were initiated.

The near surface soils at the site were observed to be very dense, compact, and typically contained cobble size or greater rocks, masonry, or other debris. These conditions coupled with the limitations of fiberglass handled tools caused the clearing process to be time intense. The average clearance rate was one hole per day per vacuum crew.

2.2.3 Soil Boring

Twenty-nine soil borings were drilled and sampled during the Phase II field investigation at Ravenswood. Soil borings were advanced below the base of the test pits using hollow-stem auger drilling techniques. Soil borings were drilled until bedrock or an obstruction was encountered. Two-inch diameter split spoons were hammered ahead of the 4-inch diameter hollow-stem augers to collect continuous soil samples from each soil boring. Soil samples from each split spoon were collected in zip-lock bags, screened with a photoionization detector (PID), and described in the field logbook. Soil samples were logged and classified according to the Unified Soil Classification System (USCS). The soil description, classification, PID screening results, and visual and olfactory observations made by the field geologist, were recorded in the field logbook and provided the bases for selecting samples for laboratory analyses. Boring logs are presented in Appendix A.

2.2.4 Trenching

Three trenches were excavated during the Phase II field investigation at Ravenswood. The trenches, approximately 10 to 12 feet long, were excavated to delineate the extent of the holding tanks used during former MGP operations at the site. The trenches were excavated to a depth of 3 to 5 feet using vacuum excavation as described in Section 2.2.2. Once the extent of the former holding tanks was determined, a test pit was excavated adjacent to the tank wall to a depth of 5 feet using vacuum excavation, the hole was cleared using the magnetic locator (see Section 2.2.2), and a soil boring was advanced (see Section 2.2.3). Cross sections of each of the three trenches are presented in Appendix A.

2.2.5 Subsurface Soil Sampling and Analysis

Sixty-seven subsurface soil samples were collected for chemical analysis from selected depth intervals in each test pit/trench/soil boring. Quality assurance/quality control (QA/QC) subsurface soil samples were also collected including duplicate, field rinsate, and matrix spike/matrix spike duplicate (MS/MSD) samples. The depth interval for analysis was selected based on visual observations, PID screening results, and the site history of each boring location. The planned intention of this sampling plan was to analyze soil samples with apparent contamination where encountered or from areas likely to have contamination, e.g., the top of groundwater. Soil samples collected from split spoons were placed in laboratory supplied jars, placed on ice, and forwarded to an off-site subcontractor laboratory for chemical analysis.

The chemical fractions analyzed in each soil sample was based on the site history of each sample location. Table 1 lists all subsurface soil samples collected and the analytical analyses for each sample. Subsurface soil samples collected from locations near active transformers (SB-1, SB-2, SB-16, and SB-17) were analyzed for total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs). Subsurface soil samples collected from locations near former MGP operations were analyzed for TPH; polycyclic aromatic hydrocarbons (PAHs); benzene, ethylbenzene, toluene, and xylene (BTEX); and cyanide. Other subsurface soil samples were analyzed for TPH only. NYSDEC Analytical Service Protocols were followed for analysis of all soil samples. Analytical results for subsurface soil samples are discussed in Section 4.

2.2.6 Monitoring Well Installation and Development

Eight new monitoring wells were installed during the Phase II field investigation at Ravenswood. Five 2-inch diameter wells (MWRV1 through MWRV5) were installed surrounding the former MGP operations area on the northern end of the site, and three 4-inch monitoring wells (RMW2 through RMW4) were installed surrounding the No. 6 fuel oil tank and pumps located in the southeastern portion of the site. Each monitoring well location was excavated to a depth of five feet and cleared with a magnetic locator as described in Sections 2.2.2 and 2.2.3. The monitoring well was then drilled using a 4-inch hollow-stem auger for the 2-inch monitoring wells, and a 6-inch diameter hollow stem auger for the 4-inch monitoring wells. Subsurface soil samples were collected ahead of the augers using 2-inch diameter split spoons as described in Section 2.2.4 (subsurface soil samples for laboratory analysis were collected from monitoring wells MWRV1 through MWRV5 only).

Monitoring well installation involved placement of 2- or 4-inch diameter, polyvinyl chloride (PVC) casing, with a 10 foot section of 0.02-inch slot size well screen and a 6-inch sump into the borehole. The well screen was placed to straddle the water table. Sufficient riser pipe was attached to the top of the screen to bring the top of the well to a depth 3-inches below ground surface. The borehole below the base of the sump was backfilled with bentonite The annular space surrounding the well screen was filled with clean, quartz filter sand from the base of the borehole to a point 2 feet above the top of the screen. Two feet of bentonite pellets were then placed above the filter sand to create a seal. The bentonite pellets were allowed to hydrate for a period of at least two hours, then the remaining portion of the borehole was filled with a bentonite-portland cement grout. The monitoring well was than capped with a locking expansion wellcap, and secured with a forged steel, flush-mount surface vault, which was placed in a 2-foot square, 6-inch thick concrete pad. Monitoring well construction data are presented in Table 2. Monitoring well construction drawings appear in Appendix B.

Monitoring well development was initiated after a waiting period of at least two days following well installation. Well development consisted of alternately pumping and surging the wells to remove sediment from the well screen, and to increase the hydraulic contact between the sand-pack and the natural formation material. Well development continued until a turbid-free discharge was observed in each monitoring well.

2.7 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples were collected from the eight newly installed monitoring wells during the Phase II field investigation at Ravenswood. Appropriate QA/QC groundwater soil samples were also collected including duplicate, field rinsate, and MS/MSD samples. Table 3 lists the groundwater samples collected at Ravenswood and analyses for each sample. Analytical results for groundwater samples are presented in Section 4. Prior to sampling the monitoring wells were purged to a minimum of three well volumes using a disposable polyethylene bailer for wells MWRV-1A through MWRV-5 and a low flow submersible pump for wells RMW-2 through RMW-4. Well purge data and water quality field measurements are presented in Table 4 and well purge field data sheets are presented in Appendix B. In general, wells MWRV-1 through 5 recovered quickly and wells RMW-2 through 4 were slow to recover. Groundwater samples were then collected using dedicated polyethylene bailers in laboratory supplied bottles, preserved, placed on ice, and forwarded to an off-site subcontractor laboratory for chemical analysis. Sample preservation, shipment and documentation were completed according to NYSDEC guidelines.

Water quality readings including temperature, pH, salinity, conductivity, and turbidity were recorded during monitoring well purging (Table 4). Groundwater samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and cyanide.

2.8 WATER LEVEL READINGS

Depth to groundwater readings were obtained from the new monitoring wells during the Phase II field investigation at Ravenswood. Depth to groundwater readings were taken by lowering an oil/water interface probe into the well and recording the water depth from a scribed point on top of the riser pipe. The elevation of the scribed point on the riser pipe was surveyed as described in Section 2.9. The oil water interface probe also detected the presence or absence of light petroleum products floating on top the water table, and DNAPL petroleum products which sink to the bottom of the water column. The recorded depths to groundwater readings are presented in Table 5 and are discussed in Section 4.0.

2.9 SITE SURVEYING

All soil boring and monitoring well locations were surveyed by a New York State certified professional surveyor during the Phase II field investigation at Ravenswood. The horizontal ground surface location of each soil boring and monitoring well was surveyed to the nearest 0.01 foot. The vertical location of a scribed point on top of the well riser pipe was also surveyed to the nearest 0.01 foot. Survey data from the Phase II investigation at Ravenswood are presented in Appendix B.

2.10 WASTE MANAGEMENT

All investigation derived wastes (IDW) generated during the Phase II field investigation at Ravenswood were segregated and containerized for future disposal by Con Edison. Purge water, development water, and decontamination water were placed in a 500-gallon tank located next to the decontamination area. Potentially contaminated soils, decontamination solids, and plastic were placed in a tarp-covered, roll-off box. Much of the IDW soil was generated from the vacuum excavation test pits. PPE and miscellaneous sampling waste was placed in a Department of Transportation (DOT)-approved 55-gallon drum. All non-hazardous solid waste (boxes and other packaging materials) were placed in a trash dumpster provided by Con Edison.

Samples of the solid and liquid IDW generated during the Phase II field investigation at Ravenswood were collected for chemical analysis following the completion of field activities. A composite sample of the solid waste was collected from five discrete locations equally distributed within the roll-off box and a sample of the liquid waste was collected from the 500-gallon tank. Both samples were analyzed for Toxicity Characteristic Leaching Potential (TCLP), PCBs, TPH and Resource Conservation and Recovery Act (RCRA) characteristics (ignitibility, corrosivity, and reactivity). Results of these analyses were provided to Con Edison under separate cover on October 19,1998.

3.0 SITE INVESTIGATION RESULTS

3.1 SITE SUBSURFACE CONDITIONS

3.1.1 Soil and Bedrock

This discussion of soil and bedrock is based primarily upon the subsurface materials encountered during the Ravenswood Phase II field investigation; however, the results and knowledge gained from previous subsurface investigations has also been incorporated into the discussion. This section provides a general discussion of soil and groundwater conditions observed in the soil borings, monitoring wells, and trenches performed for this Phase II investigation. The location for all exploration performed as part of this Phase II are shown on Figure 2 and detailed descriptions of encountered conditions are presented in boring and well logs in Appendix A. The information presented concerning bedrock condition is from previously existing published information.

To aid in visualizing the subsurface condition, three geologic cross sections have been prepared based on the boring logs generated during the Phase II investigation. Cross sections A-A', B-B', and C-C'; presented in Figure 3. Cross Section A-A' runs primarily south to north along the west side of Ravenswood, paralleling the East River. Cross section B-B" also runs primarily south to north, paralleling Vernon Street. Cross section C-C" runs primarily west to east, paralleling 37th Avenue. The transect of each cross-section is depicted in Figure 3.

Ground cover at the site consists of a two- to six-inch thick layer of asphalt or bluestone, a chunked stone. Below this veneer is a layer of fill soil material ranging in thickness from 5 to 15 feet bgs. The fill material consists of large boulders, cobbles, concrete rubble, brick, wood, cinders, and metal debris in a soil matrix of predominantly low plasticity silt, sandy silt, and sand. Thin lenses of fill sand are present within the fill material. Black oily staining was observed in the fill material at several locations. The fill soil is generally dense and compact making vacuum and hand excavation very difficult.

Below the fill material is a soil zone dominated by low plasticity silts and clays. The silts also contain fine sands and occasional gravel. The clays are generally free of foreign matter and consist of mottled orange and gray stiff clays. Occasionally in borings on the western portion of the site toward the East River fill and debris is also encountered in this zone indicating the fill to be thicker in areas on the western portion of the site or that it may have penetrated into the natural deposits in these areas. This zone is 10 to 12 feet thick at some locations, and absent at many other locations. Based on the fine grained nature of these soils in this unit, it is anticipated to have a low hydraulic conductivity and not to be very transmissive.

The lowest soil zone encountered at the site consists primarily of medium to fine grained sands and silty sands. This unit varies dramatically in thickness and is absent at locations on the western site border and in the area around the No. 6. Fuel Oil Tank. Where present, the lower couple of inches is characterized by a noticeable coarsening in grain size adjacent to the underlying bedrock. Based on the sandy nature of this unit it is anticipated to be moderately transmissive. The upper portions of this sand zone are generally moist and the lower portion saturated. Black staining, an oily sheen, and a petroleum odor were common in the sand zone. This was particularly noted in samples at or just above where water saturated samples were encountered.

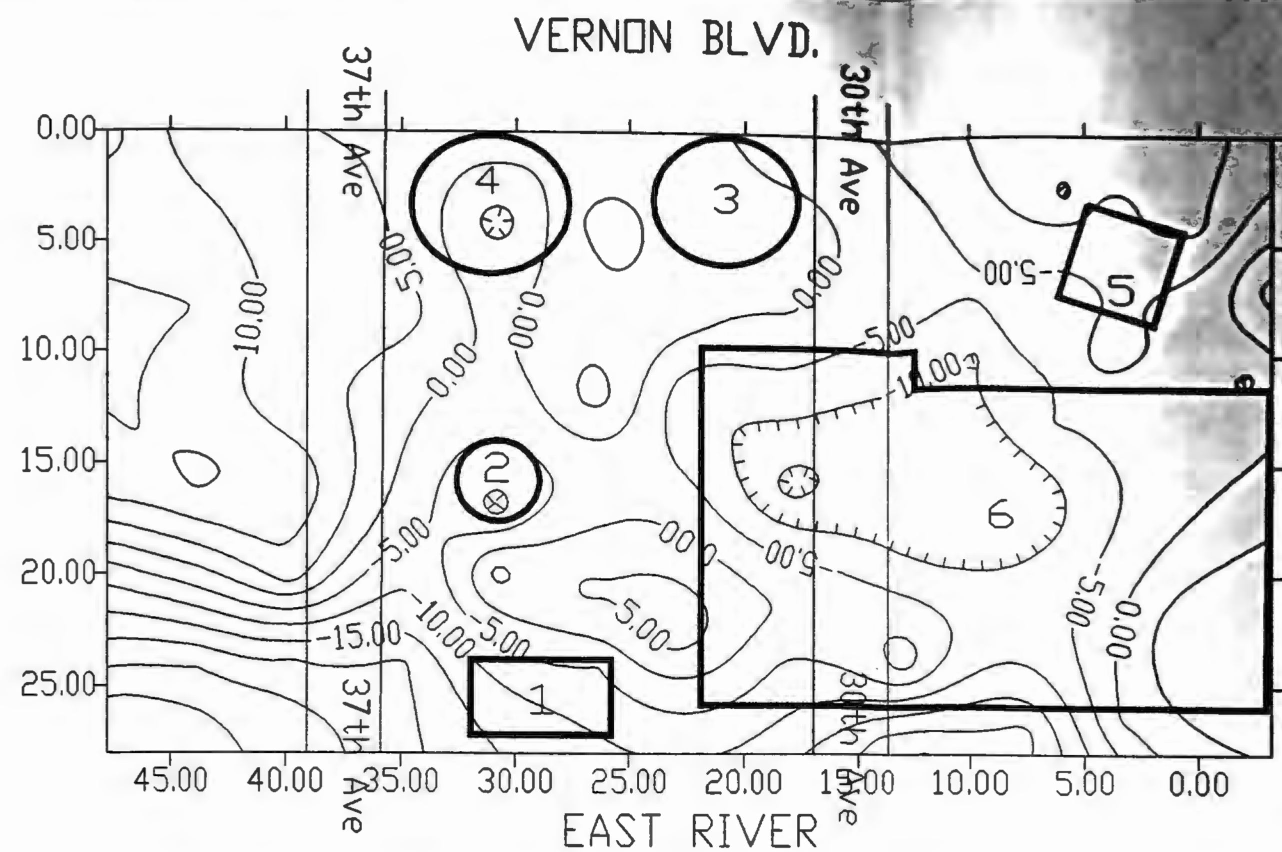
Bedrock below the site is the Ravenswood Gneiss, a biotite-horneblend-quartz-plagioclaise gneiss with accessory garnet and sphene (Fisher et al, 1970). The overall trend in the top of bedrock at the site is a slope from east to west towards the East River; however, the depth to bedrock is variable across the site and several depressed areas were encountered during this investigation.

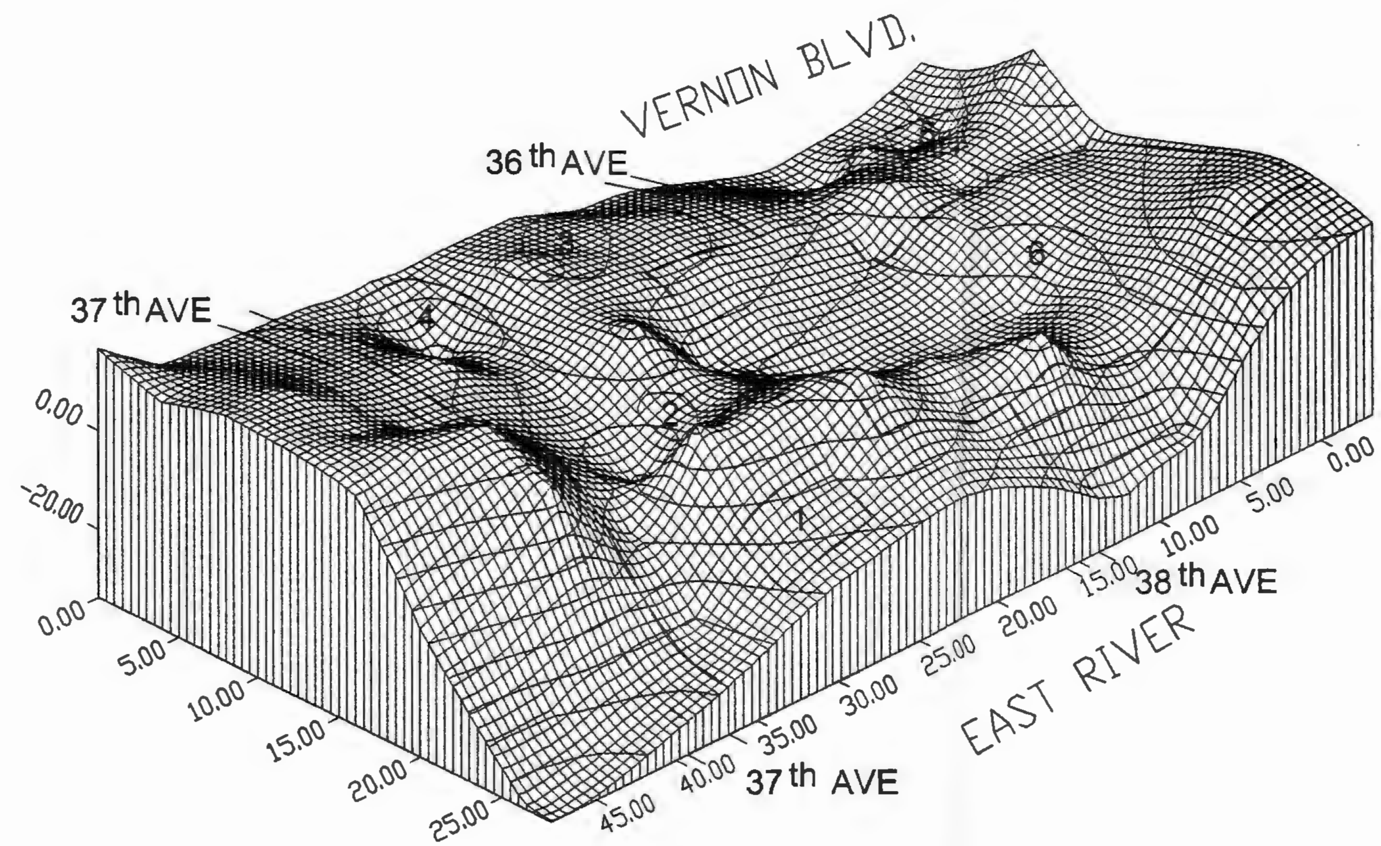
Using historical soil boring data a 3D bedrock surface structural map was created and is presented as Figure 4. The map covers the area from the southern limit of power generating Unit 1 to the northern edge of the Con Edison Ravenswood Generating Station property. Figure 4 presents a view looking southwest from the northwest corner of the property, south of the mounded No. 6 tank. Figure 4 also presents a plan view of bedrock surface. Two views were provided because the top of the bedrock surface has several depressions within the site that can not be fully viewed in the 3-D image. Also illustrated on Figure 4 are some of the identifying site features including 37 and 38 Avenues, the Ravenswood generating units, and the Freshwater Reservoir, the former gas holder 3 and 4 and the No. 6 fuel oil tank. Figure 4 was prepared as part of the Work Plan and was intended to provide a general representation of the bedrock surface indicating areas of higher and lower bedrock elevation relative to features within the site. This figure indicates that the top of bedrock elevations vary across the site with local highs and depressions The general overall slope appear to be to the west.

Several distinct lows can be observed on Figure 4. The bedrock low near the No. 6 fuel oil tank (item 5 on the map). A broader bedrock low under Power Generation Units 1, 2, and 3 (item 6). A third bedrock low is located left (north) of the Fresh Water Reservoir (item 2). A very deep, distinct bedrock low is also apparent north of Boiler House A (item 1) in the northwest corner of the site near the junction of the East River and 37th Avenue. The bedrock surface elevation was determined to range from approximately –24 feet at SB-4 to about +4 feet at SB-12. The depressed areas shown on Figure 4 in the northwestern site corner, north of the fresh water reservoir and northeast of the No. 6 fuel oil tank were investigated during this Phase II. These depressed areas are also shown on the cross sections (Figure 4). The broad bedrock low west of Power Generation Units 1, 2, and 3 is shown in the northern half of cross section A-A'. The bedrock low near the No. 6 Fuel Oil Tank is depicted in cross section B-B' under RMW4. The deep bedrock low north of Boiler House A is visible on the west side of cross section C-C' and the low near the Freshwater Reservoir can be seen in the central portion of the same cross section below MWRV2.

3.1.2 Groundwater Flow

Groundwater occurs at the site under unconfined water table conditions. The saturated zone investigated during the Phase II is situated in the unconsolidated soil deposits which overlie bed





LEGEND
1 - Boiler House 'A'
2 - Fresh Water Reservoir
3 - No. 3 Gas Holder
4 - No. 4 Gas Holder
5 - No. 6 Fuel Oil Tank
6 - Power Generation Units 1, 2, and 3

DRAFT

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CON EDISON

RAVENSWOOD GENERATING STATION

FIGURE 4
BEDROCK SURFACE STRUCTURAL MAP

FOSTER WHEELER ENVIRONMENTAL CORPORATION
LIVINGSTON, NEW JERSEY

CAD FILE NAME: RA102698.DWG DATE: 10/26/98
PLOT SCALE: 1=1 TIME: 9:00 AM

FWB3R12.DWG

rock. Bedrock beneath the site is reported by the USGS to consist of a low hydraulic conductivity zone that represents the bottom hydrologic boundary for groundwater flow in the site area. What this means is that the low hydraulic conductivity of the bedrock will inhibit downward vertical flow, confining groundwater flow and contaminant migration to the overlying soils.

The overburden saturated zone is recharged on-site by the percolation of precipitation through the stoned covered areas, and on the northern portion additionally by seepage from the Fresh Water Reservoir and on flow from area east of the site. The overburden saturated zone generally is on the order of 3 to 6 feet thick across the site. Exceptions to this are where the bedrock surface is depressed and the groundwater mound adjacent to the Fresh Water Reservoir. In these areas the saturated zone is from 10 to 18 feet thick.

The soil immediately above the bedrock consists of sand and silty sands. This sand unit is typically fully saturated and is expected, based on the soil types described, to be a unit of low to moderate hydraulic conductivity. Throughout most of the site area investigated, the saturated zone extends above the sand unit into the overlying silts and clays. The silt and clay unit likely possesses relatively low hydraulic conductivity and generally will be less transmissive than the underlying sands. It is expected that most of the groundwater movement, in terms of volume, will occur in the lower sand unit. The sand unit is present in all areas investigated and except in the No. 6 Fuel Oil tanks area where the saturated zone is predominantly in the silt and clay unit, and the volume of ground flow will be very low.

Based on the general limited saturated zone thickness and anticipated low to moderate hydraulic conductivites, this saturated zone would not be capable of yielding significant quantities of water to wells, except in areas adjacent to the river where infiltration from the river will likely be significant.

Groundwater flow directions on site have been interpreted using water level measurement, obtained from the monitoring wells installed. The groundwater level measurements are presented in Table 5. Using the water level data for October 12, 1998, the Estimated Groundwater Flow Map presented in Figure 5 was prepared. It is very important to understand that the groundwater flow map presented in Figure 5 is an interpretive presentation of the available data. With exception of the northwestern portion of the area investigated, too few groundwater measuring points are available for good groundwater surface elevation control. The site also contains numerous man-made structures and various past excavations, all of which can influence and complicate the flow conditions in a specific area. The groundwater level data obtained for the Phase II investigation indicates an east to west flow direction on the northern portion of the site and a potential for west to east flow in the area around the No. 6 Fuel Oil Tank. These two areas are discussed separately.

NORTHERN SITE AREA

As indicated by the potentiometric surface contours in Figure 5, groundwater flow on the northern portion of the site is generally from east to west with the potential for discharge to the East River. A significant feature observed in this area is the apparent groundwater mound indicated to be associated with the Fresh Water Reservoir by water level reading in MWRV-2. The mound is anticipated to be of limited horizontal extent based on water levels in MWRV-5 and the depth to saturated samples noted for borings SB-12, SB-15 and T-3. The water level in the Fresh Water Reservoir was noted to vary during the investigation activities but typically was close to or just below the surrounding ground surface, providing a very localized, but significant hydraulic head to the underlying silty sand unit. The reservoir is estimated to be 15+ feet deep. The mound impacts groundwater only in that it appears to increase the general hydraulic gradient on its down-gradient side to the west towards the river, and groundwater flowing on-site from the east is diverted around the mound on its way to the river. Discharge of groundwater to the river may be inhibited somewhat by the sheet piling used to construct the bulkhead. The high groundwater level observed in MWRV-3 versus that observed in MWRV-4 indicates any damming effect provided by the sheet piling may be more significant around MWRV-3, but discharge to the river is still anticipated in this area as well.

NO. 6 FUEL OIL TANK AREA

The three wells installed in the site area around the No. 6 Fuel Oil Tank indicate the potential from easterly groundwater flow direction. This is illustrated on Figure 5. The groundwater levels indicate an elevated groundwater area adjacent to the east side of the generator building for Generator Unit 2. Any specific unnatural source for recharge to this area is unknown and the only natural recharge will be by localized percolation through the stone cover. Because of the fine grained nature of saturated zone soils in this area, very little groundwater movement is expected to occur in this area. The potentiometric surface shown on Figure 5 indicates that groundwater flows beyond the eastern site boundary in the area east of the No. 6 Oil Storage Tank. With the potential for easterly flow observed in this area, discharge of groundwater to utility trenches and any storm sewer system along Vernon Boulevard must be considered a possibility. The actual volume of flow beyond the eastern site boundary is expected to be very small, because of the fine grained soils encountered.

Immediately north of this area and east of the building for Generator Unit 3 the groundwater flow conditions remain undefined, because of a lack of monitoring points. As presented on Figure 5, this area represent a broad flat divide between the eastern flow observed in the No. 6 Fuel Oil Tank area and the western flow in the northern portion of the site.

3.2 ANALYTICAL RESULTS BY AREA

The following sections present a discussion of the analytical results for each media sampled during the Phase II Site Investigation at Ravenswood.

The soil investigation at Ravenswood was directed to evaluate three categories of subsurface environmental conditions present at the site. These three categories are:1) Soil contamination in the vicinity of transformers for generator Units 1 and 3; 2) Oil spill areas identified in Appendix B of the 1994 NYSDEC Order on Consent; and 3) Contamination related to the former MGP operations. This presentation of the soil sampling results is divided into separate discussions which assess the findings in each of these three categories. The discussion for each category will include a background discussion of the activities which resulted in the environmental condition, a review of field activities conducted at each location to evaluate the environmental condition, observations made during those field activities, and a discussion of the soil sampling analytical results at each location. It is important to recognize when considering the analytical results that selection of soil samples for laboratory analysis was biased toward field observations indicating the presence of contamination or locations likely to have contamination, e.g., the top of the water table.

3.2.1 Bluestone and Soil Contamination in Vicinity of Generator Transformers

Background

During removal and replacement of Transformer 1E, located immediately south of Unit 1, oily soil containing PCBs was found beneath the transformers. A replacement for Transformer 1W is currently on order, and Con Edison intends to investigate and remediate both transformer areas once Transformer 1 West has been replaced. The extent of oil/PCB contamination in this area is not currently known. The vaults under the transformer are reported to extend to approximately 20 feet bgs. Staining of the bluestone underneath Transformer 1E was noted during the Phase I site reconnaissance. According to the Ravenswood Generating Station's Major Oil Storage Facility (MOSF) Report System, Oil Spills Database, dated December 31, 1997, the bushing on Generator Transformer 3S faulted on October 10, 1997, causing a fire. Pieces of the failed bushing damaged one of the transformer's fins, resulting in an approximately 200 gallon leak of non-PCB transformer oil onto the bluestone area beneath the transformer. According to the Spill Database, the oil has been documented to have less than 10 ppm PCBs, and the oil leak was isolated to the transformer bay. Samples of the oil were collected from the failed bushing, and tested to be non-PCB oil. Staining of the bluestone underneath the transformer was noted during the Phase I site reconnaissance. The extent of oil contamination resulting from this leak is not known.

Investigative Activities

Four soil borings were drilled and samples adjacent to the generator transformers. Two borings (SB-16 and SB-17) were drilled adjacent to transformers 3N and 3S, and two borings were drilled adjacent to transformers 1E and 1W (SB-1 and SB-2). Two soil samples were collected from each soil boring. The borings were located to be just outside of the concrete vaults that underlie the transformers. Samples selected for laboratory analysis from these locations included the 3-3.5 feet and 12-14 feet depth intervals in SB-1, the 1-1.5 feet and 12-14 feet depth intervals in SB-2, the 5-5.5 feet and 16-18 feet depth intervals in SB-16, and the 5-5.5 feet and 14-16 feet depth intervals in SB-17. Figure 2 shows the location of the borings in this area. The depth interval for the first sample in each soil boring corresponds to the vertical limit of visible soil contamination where contamination was observed, or was based on PID readings where visible contamination was not observed. The second sample in each soil boring was collected at the top of the water table or the base of the boring based on PID readings and visual and olfactory observations. The soil samples were analyzed for PCBs and TPH.

Field Observations

Soils encountered during drilling/boring operations at these locations appeared generally clean. Minor black staining was encountered below a depth of 10 feet just above the water table in SB-1. An oily sheen was visible on the groundwater in SB-17. Maximum PID readings off of soil samples was 20 ppm in SB-1, 128 ppm in SB-2, and less than 20 ppm in SB-16 and SB-17.

Soil Analytical Results

Selected soil samples from this area were analyzed for PCBs and TPH. The results of these analyses are presented in Table 6. The analytical results for constituents above NYSDEC cleanup objectives are shown on Figure 6. The analytical results indicate that petroleum hydrocarbons are present at low levels throughout the area investigated. TPH levels exceeding the NYSDEC soil clean-up objectives were only encountered in three of the eight samples collected, and only in samples collected below a depth of 10 feet. These samples also correspond to the top of the saturated zone. These findings are consistent with general observations that an oily staining was frequently observed at the water table.

Detection of PCB was limited to Aroclor 1260. In contrast to TPH the PCB detections above the NYSDEC soil clean-up objectives were only encountered in shallow samples of the samples collected. These findings indicate that the elevated PCB is residual contamination from past transformer oil release to the surface. The residual PCB appears to be of limited extent because it was only detected in one shallow soil sample in the areas adjacent to the transformers.

3.2.2 Consent Order Appendix B Oil Spills

Background

Appendix B of the 1994 Consent Order identified seven oil spill incidents. These incidents included the following :

- *Item 1: DEC Spill No. 9311706*

On January 1, 1994, an open-ended 1/2-inch fuel oil heater discharged an unknown volume of No. 6 fuel oil onto a soil area near the "06" Fuel Oil Tank. The spill covered an area approximately 50 feet by 50 feet in size. The released oil congealed and was recovered. No sewer or waterway was affected by this spill.

- *Item 2: DEC Spill No. 9414394*

On July 12, 1994, an internal leak on a fuel oil heater caused a spill of approximately 100 gallons of No. 6 fuel oil onto a concrete floor in the Station's basement. The released product did not reach soil, sewer, or waterway structures, the present Steam Plant building in the northeastern portion, or parking lots.

- *Item 3: DEC Spill No. 9406019*

On August 2, 1994, the United States Coast Guard (USCG) personnel discovered an oil sheen of unknown origin and type in the East River at a common outfall from the Station. It was not possible to determine the source or amount of the spill. The oil sheen, which was removed by a Con Edison cleanup contractor, caused no environmental damage.

- *Item 4: DEC Spill No. 9407884*

On September 13, 1994, test borings conducted near the Boiler House "A" indicated the presence of oil-contaminated soil. The source of this contamination was not determined at that time, however, it should be noted that oil and coal tar storage facilities associated with the former MGP operations were located in the vicinity of Boiler House "A."

According to the soil boring logs prepared by Jersey Boring & Drilling Co. Inc., three soil borings were drilled. Split-spoon samples were collected at 5-foot intervals. The soil descriptions indicate "sand soaked in fuel oil" at depths ranging from 10 to 35 feet bgs.

- *Item 5: DEC Spill No. 9300948*

On April 20, 1993, approximately 110 gallons of dielectric fluid (cable oil) was released from a blown pot head onto bluestone within the Vernon Central Substation located south of the Generating Station at Ravenswood. The released oil was first contained by the Substation personnel, and the entire spill was then cleaned by an outside Con Edison contractor.

- *Item 6: DEC Spill No. 9411975*

On December 7, 1994, an underground pipeline carrying No. 6 Fuel Oil ruptured approximately 10 feet below grade in the Station parking lot south of the 37th Avenue entrance. The release was due to a failure of an insulating joint on the fuel oil pipeline. The NYSDEC Spill Report Form indicates that 39,580 gallons of No. 6 fuel oil were spilled and no fuel oil was recovered. The form also indicated that Con Edison personnel contained the release. Con Edison retained MEG to perform and document in a report cleanup of the spill. According to MEG's report, an estimated 39,000 gallons of free product were released during this incident. From the initial release point, the No. 6 fuel oil flowed in two separate directions: west, towards the East River, into an area covered with bluestone gravel, and south into an adjacent area also covered with bluestone gravel. The oil was contained at all times within the boundaries of the Ravenswood property, and was prevented from reaching the East River by absorbent material. No release of oil into sewers occurred. Approximately 19,560 gallons of free product were recovered, 69,320 gallons of an oil/water mixture were removed and disposed of, and a total of 1,690 cubic yards of contaminated soil and other solids were also removed and disposed of.

According to MEG's report, 34 soil borings were advanced in the area of the spill while the cleanup operations for this spill were in progress, to determine if oil was present under the asphalt of the parking lot. Each soil boring was completed to a maximum depth of two feet bgs, and fuel oil was not observed in any of the 34 soil borings. Based on the subsurface investigation and observations of oil seeping from cracks in the asphalt, a decision was made to remove asphalt in the areas where oil had seeped. An area measuring approximately 100 feet by 120 feet of asphalt-covered parking lot was removed.

Once the asphalt was removed, a sampling grid with 20-foot intervals was established in the immediate vicinity of the fuel line rupture, and a total of 22 sampling locations were selected. The samples were collected at the ground surface and directly below any loose gravel/blend material which may have been present. The soil samples were analyzed for total petroleum hydrocarbons (TPH), and the results ranged from 3.5 parts per million (ppm) to 295,000 ppm. In addition, an area located southwest of the fuel line rupture, where fuel oil had pooled during the spill, also was sampled. A limited amount of asphalt was removed from this area, and oil-soaked soil was removed to a depth of approximately 3 feet bgs. Five soil samples were collected and analyzed for TPH, and the results ranged from 12.9 to 55.3 ppm.

- *Item 7: DEC Spill No. (Not Available)*

On seven occasions, February 20 and 27, 1996; March 5, 13, 15, and 26, 1996; and April 10, 1996, the Station personnel observed and reported an oil sheen in the East River. On April 18, 1996, Con Edison submitted a letter to the United States Environmental Protection Agency (USEPA) regarding seven oil sheens that were reported in the East River during a 60-day period. The source of the sheen was unknown, and no spills or leaks from Station equipment occurred. In all of these incidents, the sheen was contained within a permanent containment boom that is deployed at the Station. In each case, the oil sheen was removed using oil absorbent materials. There were no known oil leaks or spills within the Station, and the source of the reoccurring sheen was undetermined. For this reason, the Station conducted dye testing and discovered that an oil-water separator located in Boiler House "A," which was believed to discharge to the New York City sewer system, in fact was actually discharging to the East River. After that discovery, Con Edison had the effluent from this oil-water separator rerouted into the sewer, and the pipe through which the separator effluent used to discharge to the East River was cleaned and video-inspected. The pipe was found to be in deteriorated condition; it was concluded that debris in the pipe and/or ground leakage into the pipe was potential sources of the oil sheen observed in 1996.

Investigative Activities

No soil sampling was conducted during the Phase II field investigation at Ravenswood for four of the seven cited incidents (Items 2, 3, 5, and 7). Item 2 consisted of a 100-gallon release of No. 6 oil to the concrete floor in the generator building basement. This area of the basement was inspected during Phase II and because the integrity of the concrete floor has not been compromised no sampling was conducted during the Phase II investigation. Items 3 and 7 consisted of historical releases to the East River with no potential to impact the site soils and no samples were collected. Item 5 will be sampled as part of the ongoing investigation at the adjoining Rainey Substation, because it involves soil sampling and analyses for dielectric fluid. The remaining four incidents were investigated during the Phase II investigation. Investigative activities at each location were as follows:

- *Item 1: DEC Spill No. 9311706*

Initially two sample locations were sampled to evaluate this spill, soil boring SB-3 and a shallow hand sample HS-3. Two soil samples were collected, one from the 6 to 8 feet depth interval in SB-3, the second from the 1 to 1.5 feet depth interval in HS-3. After drilling and sampling SB-3, three additional soil borings (SB-21, SB-22, and SB-23) were added after consultation with Con Edison. Two soil samples were collected from each boring for analyses. The samples for analysis included the 5 to 5.5 feet and 6 to 8 feet depth intervals in SB-21, the 2 to 3 feet and 8 to 10 feet depth intervals in SB-22, and the 2 to 3 feet and 8 to 10 feet depth intervals in SB-23. The depth interval for the first sample in each soil boring was selected to correspond to the vertical limit of visible soil contamination where contamination was observed, or was based on PID readings where visible contamination was not observed. The second sample in each soil boring was collected at the top of the water table or the base of the boring based on PID readings and visual or olfactory observations. The soil samples from SB-3 and HS-3 were analyzed for TPH. The soil samples from SB-21, SB-22 and SB-23 were analyzed for TPH, PAH, BTEX, and cyanide.

- *Item 4: DEC Spill No. 9407884*

Two soil borings (SB-4 and MWRV3) were drilled and sampled to evaluate this spill. Soil boring MWRV3 was later completed as a monitoring well. Soil samples selected for laboratory analyses collected from these locations included the 1.5-2 feet and 24-26 feet depth intervals in SB-4, and the 3-3.5 feet, 12-14 feet and 24-26 feet depth intervals in MWRV3. The depth interval for the first analytical sample at each boring was based on visual and olfactory observations, and on screening of soil samples with a PID within the first 10 feet of the soil boring. The second sample from each boring corresponds to the top of the water table. The third sample from each boring was at the bottom of the borehole. All laboratory samples from this area were analyzed for TPH, PAH, BTEX, and cyanide.

- *Item 6: DEC Spill No. 9411975*

Initially, six sample locations (SB-5 through SB-9, and MWRV1) were selected for sampling to evaluate this spill. After attempting to drill MWRV1, the hole was abandoned due to the presence of shallow groundwater with an oily sheen. The location of MWRV1 was relocated approximately 45 feet north and the new location was labeled MWRV1A. Three additional offset soil borings (SB-18, SB-19A, and SB-20A) were also added to the field investigation. The offset locations were approximately 15 feet north, west, and south of MWRV1. Soil boring MWRV1A was later completed as a monitoring well. Three additional borings (SB-24, SB-25, and SB-26) were also added to offset SB-8 after a potential underground storage tank (UST) and visibly apparent contamination was encountered in this boring. The offset locations were approximately 15 feet north, west, and east of SB-8.

Two of the soil borings (SB-5 and MWRV1A) were planned for the sole purpose of evaluating the No. 6 oil spill. The remaining soil borings had a dual purpose, to evaluate the No. 6 oil spill and to evaluate the MGP related contamination. The dual purpose borings are marked with an asterisk below.

The soil sampling intervals selected for laboratory analyses for each boring are as follows:

- SB-5 5-5.5 feet and 10-11 feet
- SB-6* 1.5-2 feet and 6-7 feet
- SB-7* 1-2 feet (a second sample was not collected due to an obstruction at 5 feet)
- SB-8* 5-5.5 feet and 6-8 feet
- SB-9* 5-5.5 feet and 10-12 feet
- SB-18* 5-5.5 feet and 12-14 feet
- SB-19A* 2-3 feet and 10-12 feet
- SB-20A* 1-2 feet and 12-14 feet
- SB-24 5-5.5 feet and 6-9 feet
- SB-25 5-5.5 feet and 8-10 feet
- SB-26 5-5.5 feet and 10-12 feet
- MWRV1A 5-5.5 feet and 16-18 feet

The depth interval for the first sample in each soil boring selected for laboratory analysis corresponds to the vertical limit of visible soil contamination where contamination was observed, or on PID readings where visible contamination was not observed. The second sample in each soil boring was collected at the top of the water table or the base of the boring based on PID readings and visual or olfactory observations. The samples from SB-05 were analyzed for TPH, all other samples were analyzed for TPH, PAHs, BTEX and cyanide.

Item 1: DEC Spill No. 9311706

Field Observations

A black tarlike substance was encountered in SB-3 at depths of 3 to 6 feet bgs. The presence of this tarlike substance in SB-3 resulted in the addition of the three additional borings (SB-21, SB-22, and SB-23) which were offset of the original boring by approximately 15 feet. The tarlike substance was not encountered during the drilling and sampling of the three additional borings or in HS-3 and the soils at these locations generally appeared clean. Odors were also present in boring SB-3 as well as in hand sample HS-3. The odor was not present in the three offset borings. PID readings were low and drager tube sampling for benzene registered no reading indicating the source of the odor was not organic in nature.

Soil Sample Analytical Results

Selected soil samples from this area were analyzed for TPH, BTEX, PAHs, and cyanides. The results of these analyses are presented in Table 7. TPH concentrations above the NYSDEC clean-up objectives were detected in six of the eight samples analyzed. BTEX were not detected above the NYSDEC clean-up objectives in any of the samples analyzed. Several of the PAH constituents were detected above the clean-up objectives in five of the six samples analyzed for PAHs. Cyanide was detected in two samples. The analytical results above the NYSDEC clean-up objectives are shown on Figure 6.

The elevated detections were present in both shallow deeper samples in this area. The elevated TPH and PAH detections appear to be consistent with possible residuals from past No. 6 oil releases reported in this area. The detected contamination also seem consistent with the historical use of this area for oil storage and handling. The analytical results indicate that residual oil contamination is generally present in this area, below the depth of 2 feet.

Item 4: DEC Spill No. 9300948

Field Observations

Petroleum odors, black staining and an oily sheen on the groundwater were encountered during the drilling and sampling of both soil borings. PID readings off the soil samples ranged up to 336 ppm in MWRV3 and 105 ppm in SB-4. The surficial soils appeared generally clean from 0 to 6 feet in SB-4 and from 0 to 12 feet in MWRV-3. Visible soil contamination occurred at greater depths.

Soil Sample Analysis

Selected soil samples from this area were analyzed for TPH, PAHs, BTEX and cyanide. The results of laboratory analyses for this area are presented in Table 8. TPH was detected above the NYSDEC clean-up objectives in only one of the five samples analyzed, which corresponded to the top of groundwater in MWRV-3. The BTEX constituents were detected above the NYSDEC clean-up objectives in two of the soil samples analyzed and these were also at or below the zone of saturation. Detections above the NYSDEC clean-up objectives are presented in Figure 6. PAH constituents were detected above the NYSDEC clean-up objectives in all of the samples analyzed. PAH constituent detections were notably more numerous and at higher concentration in samples obtained at or below the zone of saturation. In particular, the sample from 24 to 26 feet obtained in MWRV-3 contained elevated levels of both BTEX and PAH constituents, indicating a contaminant source that may have previously migrated downward to the lower part of the saturated zone. The observed contamination appears consistent with the past use of this area for the storage of oil and coal tar during the MGP site operations.

Item 6: DEC Spill No. 9411975

Field Observations

An oily sheen was encountered at a depth of approximately 2 feet in soil boring MWRV1 which resulted in the hole being abandoned and an alternate location (MWRV1A) chosen for this soil boring and monitoring well. Three offset soil borings(SB-18, SB-19A, and SB-20A) were also added to the field investigation. Soils encountered the drilling and sampling of the alternate location soil boring and the three offset soil borings were generally clean and free of odors, staining and oil sheens. One exception to this was a thin gravel zone at a depth of 2-2.3 feet in MW19A which appeared to be oily. PID readings from soil samples collected in these boring were all less than 20 ppm.

Black oily staining was encountered in SB-8 from 7-9 feet and a possible UST was also encountered at a depth of 9 feet. During the drilling and sampling of the three offset borings (SB24, SB-25, and SB-26) petroleum odors were present in SB-25 at depths of 6-10 feet bgs, and petroleum odors and black staining were observed in SB-26 from 6 to 7 feet bgs. PID readings ranged up to 228 ppm in SB-8, 106 ppm in SB-25, and were less than 20 ppm in SB-24 and SB-26. In general, the soil above 6 feet appeared clean with little or no indication of contamination.

Black staining and a petroleum odor were also encountered in SB-9 at a depth comparable to the top of the water table at 8.5 feet. Soils encountered during drilling and sampling of the remaining borings (SB-5, SB-6 and SB-7) appeared generally clean. PID readings ranged up to 68 ppm in SB-9, and were less than 20 ppm in SB-5, SB-6 and SB-7.

Soil Analytical Results

Selected soil samples from borings in this area were analyzed for TPH, BTEX, PAHs and cyanide. Because this area overlaps with the MGP area the analytical results for Item 6 are presented in Table 9 along with the MGP area sample results. The discussion of analytical results for Item 6 are also addressed in the discussion presented for the MGP area, Section 3.2.3.

3.2.3 MGP Related Contamination

Background

Before 1898 to the late 1950s, buildings and structures relating to MGP operations existed on the northern portion of the Ravenswood Generating Station. These former buildings and structures included the No. 2 Gas Holder (100 ft. diameter), No. 3 Gas Holder (190 ft. diameter), No. 4 Gas Holder (190 ft. diameter), the present Fresh Water Reservoir which was formerly a gas holder, a Purifier House and boxes (24), two tar separators, Generator Houses "A" and "B", Boiler Houses "A" and "B", an Engine House, Wash House and Exhaust House, tar and oil tanks, condensers and other miscellaneous structures. Types of MGP operations which may have existed include Coal (Retort) Carbonization and Carburetted Water Gas Production. During the Coal (Retort)

Carbonization process, coal was carbonized in ovens (retorts). The Former MGP related structures are shown on Figure 2.

The present Steam Plant building was built in the late 1940s, based on a review of the available Sanborn maps, and was originally denoted as Boiler House "A". As shown in the historic map of the MGP plant generator buildings were located southeast of Boiler House "A." To the east of Boiler House "A" and north of the generators was the tar separator. A water reservoir (which is still present on the Facility site) and the purifier house were located further to the east on the site. The water reservoir was originally built to be a gas holder and was converted to its present use between 1915 and 1936, based on a review of the available Sanborn fire insurance maps. Based on a review of the available Sanborn maps, holders No. 2 and 3 were built before 1898, and holder No. 4 was built before 1915. Presently, the area where the former holders were located is a large parking lot.

Former MGP structures on the eastern portion of the property included nine aboveground storage tanks for tar, fuel oil and transformer oil (Former Tar Tanks), an aboveground storage tank for gas oil, (No. 56 storage tanks) and a mounded storage tank for fuel oil (Tank F06-3). The mounded fuel oil tank still exists at the site. Tar separator tanks were located in the central portion of this area, to the west of the fuel tanks, across 38th Avenue from the Purifier House.

A majority of the former MGP buildings and structures have been demolished and therefore are not currently visible on-site. The Fresh Water Reservoir, the Boiler House "A" and the mounded fuel oil tank are intact and visible at the site. The area of a number of the former MGP buildings and structures, including portions of the Purifier House and boxes, a tar tank, a tar separator, Generator Building "B", Engine House, and Boiler House "B", is now occupied by Generating Unit #3, Boiler #30. Existing information indicates that the area of the existing generating station was excavated to and below bedrock surface. Therefore the former MGP structures and associated materials in this area were removed as part of the generator and structures in 1960.

Based on existing information the gas holders and associated piping were constructed below grade and sit below the top of the bedrock surface. The base of the holders consisted of a concrete foundation with inlet and outlet pipes which measured approximately 36 inches in diameter and were located below the concrete foundation. Other areas investigated as part of the former MGP site include tar wells and tanks, tar separators and condensers, and oil tanks. These structures were used to store tars generated from the process and oil to be used in the manufacturing process.

Investigative Activities

Thirteen soil borings (SB-6 through SB-15, MWRV2, MWRV3, and MWRV5) were drilled and sampled to investigate MGP-related contamination at Ravenswood during the Phase II field investigation As noted above, several of these borings had a dual purpose of evaluating the No. 6 oil spill (these are denoted with a * on the list below). The soil boring locations and former MGP structures investigated are shown on Figure 2. Soil borings MWRV2, MWRV3, and

MWRV5 were completed as monitoring wells. An obstacle was encountered in SB-14 at 5 feet, and the hole was offset approximately 10 feet where a second boring labeled SB-14A was performed. Soil samples collected to evaluate MGP-related contamination are listed below:

- SB-6* 1.5-2 feet and 6-7 feet
- SB-7* 1-2 feet (a second sample was not collected due to an obstruction at 5 feet)
- SB-8* 5-5.5 feet and 6-8 feet
- SB-9* 5-5.5 feet and 10-12 feet
- SB-10 5-5.5 feet and 6-9 feet
- SB-11 5-5.5 feet and 16-18 feet
- SB-12 4.5-5 feet and 10-12 feet
- SB-13 5-5.5 feet and 10-12 feet
- SB-14/14A 5-6 feet and 14-16 feet
- SB-15 5-5.5 feet and 10-12 feet
- MWRV2 5-5.5 feet and 14-16 feet
- MWRV3 3-3.5 feet and 12-14 feet
- MWRV5 2-2.5 feet and 18-20 feet

Three trenches (T1, T2, and T3) were also planned to evaluate MGP-related soil contamination associated with these former gas holders to see if residual contamination was present adjacent to the former holder walls. Trenches could not be excavated beyond a depth of 5 feet, so soil borings were used to investigate soils below 5 feet at one location in each trench. The borings were located within the trench adjacent to the observed or suspected former holder wall. One soil sample was collected from each trench boring. These samples were collected from the following depths:

- T1 6-8.5 feet
- T2 8-10 feet
- T3 10-12 feet

The depth interval for both samples collected from each soil boring and trench was based on visual and olfactory observations, and on screening of soil samples with a PID. All samples were analyzed for TPH, PAHs, BTEX and cyanide.

Field Observations

In addition to the observations noted for the dual purpose borings (SB-6, SB-7, SB-8, and SB-9) in the Item 6 oil spill above, the following observations were made during the field investigations. Perched water was encountered at two feet bgs in monitoring well MWRV-2, possibly leakage from the Fresh Water Reservoir located approximately 15 feet to the east. Soils from the surface to 12 feet bgs in MWVR-2 appeared clean. This was also the case in monitoring wells MWRV-3 and MWRV-4, where soils from the surface to 12 feet bgs appeared to be clean. An oily sheen was encountered at 12 feet bgs in the three monitoring well borings, and a petroleum odors were present from this depth to the base of both holes (16.25 feet bgs in MWRV2, 26 feet bgs in MWRV-3 and 24 feet bgs in MWRV-4). The soils in monitoring well MWRV-5 appeared clean from the surface to total depth (22.5 feet bgs). Maximum PID readings from soils encountered in each monitoring well are 20 ppm at 14 feet bgs in MWRV2, 304 ppm at 22 feet in MWRV3, and 13 ppm at 18 feet bgs in MWRV5.

Soils encountered in soil borings SB-10 and SB-12 appeared to be clean from the surface to total depth (9 feet bgs in SB-10 and 11.75 feet bgs in SB-12). Soils in borings SB-11 and SB-14/14A were clean in the upper four feet. Black staining was observed in soils from 4 to 18.1 feet bgs in SB-11, and an oily sheen and staining were observed in SB-14/14A from 4 feet 10 inches bgs to 18.75 feet. An oily sheen was also encountered at 10.5 feet bgs in SB-15, and at 6 feet bgs in SB-13. Soils above these depths in both boring appeared to be clean. Maximum PID readings from soils encountered in each borings are as follows:

SB-10	628 ppm at 6 feet bgs
SB-11	16 ppm at 16 feet bgs
SB-12	32 ppm at 8 feet bgs
SB-13	431 ppm at 10 feet bgs
SB-14/14A	1,145 ppm at 14 feet bgs
SB-15	252 ppm at 10 feet bgs

Considerable amounts of rubble and debris were encountered during the trenching at T1, T2 and T3. The rubble consisted of large boulders, brick, and concrete. Material encountered in T1 appeared clean from the surface to total depth (8.5 feet bgs). Soils in T2 appeared clean from the surface to 9.5 feet were an oily sheen was encountered. Similarly, an oily sheen was encountered at 8.5 feet in T3. Material above this depth in T3 appeared clean, however a petroleum odor was observed at 3.5 feet in this trench. Maximum PID readings from soils encountered in each trench are 8 ppm at 6 feet bgs in T1, 98 ppm at 8 feet bgs in T2, and 338 ppm at 10 feet bgs in T3.

An observation of what appears to be a general condition for most of the area investigated, is the tendency of visible signs of contamination to be more apparent in deeper samples. Also the soil at or above the zone of saturation tended to exhibit visible signs of contamination such as staining and an oily sheen. The field observations appeared to indicate contamination consisting of a petroleum material or oil as opposed to a MGP-tar.

Analytical Results

Soil samples from the MGP area and the Item 6 oil spill area are discussed together in this section because of the significant overlap of these areas. Selected soil samples were analyzed for TPH, BTEX, PAHs and cyanide. The results of the laboratory analysis are presented in Table 9. The detections above the NYSDEC clean-up objectives are shown in Figure 6. TPHs were detected generally at low levels throughout these areas and in only 11 of 50 samples analyzed did the levels detected exceeded the NYSDEC clean-up objectives. Typically the higher levels were detected in the deeper samples, many at or just above the water table. This is consistent with field observations which indicated the soil above 5 feet generally appeared clean. BTEX constituents were detected above the NYSDEC cleanup objectives in 15 of the samples analyzed. In most cases the elevated BTEX levels were encountered in deeper samples, many situated at or near the top of the saturated zone. PAH constituents were detected above the NYSDEC cleanup objectives in 40 of the 50 samples analyzed. For the PAH, deeper samples tended to have high levels and more numerous detections. One notable exception to the trend for higher level in deeper samples is SB-10, where the sample at 5 feet had elevated PAH and BTEX. This boring was performed in an area used for former coal tar storage and is also close to the existing No. 6 oil transmission lines.

3.2.4 Groundwater Analytical Results

Groundwater from each of the eight newly installed wells was sampled and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and cyanide. The groundwater analytical results are presented in Table 10 and the distribution of detections above the NYSDEC water quality standards are shown in Figure 7.

Analytical results from the two groundwater flow areas, the Northern Site Area and the No. 6 Fuel Oil Tank Area are discussed separately. The results for the Northern Site Area includes samples from wells MWRV-1 through MWRV-5. The results for the No. 6 Fuel Oil Tank area includes samples from wells RMW-2 through RMW-5.

<u>Northern Site Area</u>

The groundwater in the Northern Site Area had BTEX constituents detected above the NYSDEC Water Quality Standards in the VOC fraction for all wells except the upgradient well MWRV-1A. The only VOC detected in MWRV-1A was 1,1,1-trichloroethene which based on the groundwater flow conditions is likely from an off-site source. The BTEX constituents detected in the mid- and downgradient wells is consistent with general soil contamination in this area. Groundwater concentrations for benzene above the water quality standards range from 0.94 to 12.8 parts per billion (ppb). Ethylbenzene and toluene were detected at levels ranging from 6.3 to 104 ppb. Other VOCs detected included chloroform in MWRV-2 at 11.7 ppb and styrene in MWRV-4 and 5 at 0.57 ppb and 1.4 ppb, respectively.

SVOCs were detected above the water quality standards in wells MWRV-2 through MWRV-5. The SVOCs detected in these wells were all PAH constituents and are consistent with the residual soil contamination detected in the area of these wells. The PAH constituents detected were all detected at relatively low ppb levels with the exception of naphthalene in MWRV-2 which was detected at 3.3 to 2.64 ppm. The upgradient well MWRV-1A had no SVOC detections.

No. 6 Fuel Oil Tank Area

Groundwater samples from the wells in the No. 6 Fuel Oil Tank Area had BTEX constituents detected above the NYSDEC water quality standards. Two detections of benzene were 1.6 and 26.6 ppb in well RMW-2 and RMW-4 respectively, both above the water quality standards. Toulene was also detected in RMW-2 above the water quality standard at 11.3 ppb. The only non-BTEX VOC detected was chloroform. Chloroform was above the water quality standards in RMW-2 at 11.7 ppb. Semi-volatile organic compounds were not detected in groundwater samples from this portion of the site.

The overall groundwater impact detected at the site are consistent with impacts associated with the known reported petroleum fuel releases and with the historical site uses. In particular, in the northern portion of the site the level of BTEX and PAH constituents detected in the groundwater appear relative low considering the levels of BTEX and PAHs detected in soil samples at or below the water table. It is also significant that no free product has been observed on the water table surface or accumulation in the bottom of the wells. This suggests the source of groundwater contamination is residual soil contamination from historical activities as opposed to more recent releases or existing nonaqueous phase liquids (NAPL).

3.3 SITE CHARACTERIZATION

Based on the field observation and results of the laboratory analyses the site can be characterized as exhibiting residual impacts from historical release of petroleum related fuels and oils. In general, the soil contamination observed in the field with a few exceptions, appeared to be related to petroleum type products and not MGP wastes. The exceptions to this were the tar-like material observed in SB-3 and the oily stain present at the bottom of MWRV-3.

The surficial fills that overlie most of the site are dense and compact and generally free of visible contamination. The dense condition of these materials has likely aided in preventing contemporary release at the surface from penetrating to the deeper soils and water table. Contamination is generally more apparent at depths in the soil column and is typically more apparent at the top of the water table. This appears to be a wide spread site condition most likely associated with historical site wide use of petroleum related material and the former MGP operations and not specific source areas. Exception to this are the apparent source area around boring SB-8 where a possible UST was encountered and the PCB detections in SB-2 which is associated with the adjacent transformers.

Although in general the soils appear contaminated at the water table based on field observation and the laboratory results, no LNAPL was observed during soil sample collection or in the monitoring wells. This is significant in that it indicates the detected soil contamination is associated with residuals absorbed to the soil matrix and not a separate free phase layer. Likewise, the deeper borings in the northwest corner of the site (SB-4, MWRV-3 and MWRV-4) encountered soils at the bottom of the soil column which exhibited apparent high concentrations of contaminants, but have not exhibited any free DNAPL.

Based on information published by the U.S. Geologic Survey, bedrock beneath the site represents the lower hydrogeologic boundary to groundwater flow; therefore, for all practicable purposes, groundwater flow beneath the site will be confined to the overlying soils. Groundwater at the site exhibits relatively low levels of BTEX and PAH contamination considering the levels of these materials detected in the saturated portion of the soil column. The groundwater impact is generally greater in the northern portion of the site (Figure 7). On the northern portion of the site groundwater flows east to west across the site and is discharged to the East River (Figure 5). Based on information published by the U.S. Geological survey, bedrock beneath the site represents a lower hydrologic boundary to groundwater flow; therefore, for all practical purposes, groundwater flow at the site will be confined to the overlying soils. The sheet piling used in the bulkhead construction will likely impede but not prevent the flow to the river. This is apparent by the water level fluctuations in wells MWRV-3 and MWRV-4 adjacent to the river, suggesting a direct hydraulic connection to the tide cycle. The upgradient well MWRV-1A is relatively free of contamination, while the mid site well MWRV-2 and the downgradient wells MWRV-3, MWRV-4 and MWRV-5 are impacted with site related contaminants BTEX and PAHs. The hydraulic gradient in the Northern Site Area is impacted by the seepage from the Fresh Water Reservoir. This has the effect of increasing the hydraulic driving force on the downgradient side or west of the Fresh Water Reservoir. The groundwater conditions in the northern area are relevant to areas of concern, Item 4, Item 6 and the Former MGP facilities.

In the area of the No. 6 Fuel Oil Tank groundwater flow is to the east from the generator building to Vernon Boulevard. Beyond the eastern site limits this groundwater may become entrained in the structural features beneath Vernon Boulevard and conveyed to the south around the site. Groundwater contamination in this area consists of relative low ppb level of BTEX constituents with very minor SVOC detection. The soil types with the saturated zone in this area typically exhibit relatively very low hydraulic conductivity values and the volume of water actually transmitted in this area is anticipated to be minimal. The groundwater conditions in this area are relevant to identified areas of concern, Item 1 and the Former MGP facility on the southeastern portion of the area investigated.

4.0 CONTAMINANT FATE AND TRANSPORT

An understanding of the environmental fate and the potential transport mechanisms of the contaminants present at Ravenswood is necessary to determine the potential for continued on-site and off-site migration and to assess the potential for exposure to the contaminants.

4.1 FACTORS AFFECTING ENVIRONMENTAL FATE AND TRANSPORT PROCESS

Two major characteristics affecting the fate and transport of a chemical are the mobility and the persistence of the chemical in environmental media.

Mobility is the tendency of a chemical to migrate through the environment. Mobility is controlled by both the physicochemical environment at the site and the behavioral characteristics of individual chemicals. Important factors controlling the physicochemical environment of the site include the local climate, the configuration of surface water and groundwater bodies, and the nature of underlying soils and bedrock. Factors that control the behavior of individual compounds include aqueous solubility, the susceptibility of a chemical to sorption, and volatility.

Persistence is the tendency of a chemical to remain in the environment. Persistence is influenced by many of the factors affecting chemical mobility (including solubility, sorption, and volatility), but is also a function of oxidation rates, hydrolytic and photolytic reactions, and biochemical processes (such as biodegradation and bioaccumulation).

Major factors affecting environmental fate and transport of chemicals are briefly defined below:

Solubility is the measure of a chemical's ability to dissolve in a solvent and is expressed in units of chemical mass per unit volume of solvent (e.g., ug/l or mg/l). Aqueous solubility is an important determinant of chemical concentration and residence time in water. Highly soluble chemicals readily dissolve in water and remain in solution whereas chemicals having low solubility tend to be unstable in solution. In addition, solubility often predicts the ease with which chemicals are leached from wastes and soils.

Volatilization describes the movement of a chemical from the surface of a liquid or solid matrix to a gas or vapor phase. Only the neutral (uncharged) form of the compounds can volatilize. Therefore, the fraction of the compound in the uncharged form should be calculated using pKa (acids) or pKb (bases) under the site pH conditions. Volatilization is calculated from the equilibrium vapor pressure which is a measure of chemical solubility in air (when the initial chemical concentration is in the liquid phase). Volatilization losses to air are correlated with chemical concentration, molecular weight, solubility and ambient temperature. Volatilization is a particularly important environmental fate process for nonpolar chemicals having low aqueous solubility. Volatilization from the liquid phase is measured by the Henry's Law Constant, which can be expressed as the quotient of the chemical's vapor pressure to its solubility at a specific temperature. Lyman et al. (1982) described compounds as readily, significantly or limitedly volatilized based on the values of their Henry's Law constants. These values in atm-m^3/mol are $\geq 10^{-3}$, 10^{-3} to 10^{-5} and $< 10^{-5}$, respectively.

Sorption (adsorption/desorption) is the reversible binding of a chemical to a solid matrix. Both soluble nonpolar and insoluble chemicals usually adsorb strongly to sediments, suspended solids and soils. Adsorption of these compounds to a solid phase limits the fraction available for other fate processes such as volatilization and hydrolysis. Although adsorption is generally modeled as a fully reversible process, there is evidence in published literature that there is a partially irreversible component related to the length of time that the material has been adsorbed. Generally, the less polar and less soluble the chemical, the greater the adsorption to the solid phase (i.e., soils, sediments, and suspended solids). Partition coefficients, which are important measures of sorptive characteristics, define the relative concentration of a given chemical in two phases or matrices.

Partition coefficients are expressed as concentration ratios; higher values indicate a greater tendency to associate with the non-aqueous phase. Partition coefficients useful in describing the environmental behavior of a compound include K_{ow}, K_d and K_{oc} and are defined:

K_{ow}: The octanol-water partition coefficient is the ratio of chemical concentration in octanol (organic solvent) to that in water at steady-state conditions. Octanol serves as a surrogate for lipids or other organic phases.

K_d: The soil-water partition coefficient is the ratio of chemical concentration in aqueous and solid phases at steady-state conditions (usually applied to inorganic species). Small K_d values indicate the chemicals are highly leachable and are not likely to be bound to soil particles. High K_d values indicate a propensity to sorb onto soil particles.

K_{oc}: The organic carbon partition coefficient is the K_d normalized to the concentration of organic carbon of the soil, since in many surface soils, the soil organic carbon is the dominant sorbent for hydrophobic organic compounds. High K_{oc} values usually indicate a high tendency of a compound to sorb to organic matter in soils or sediments.

Bioconcentration is the accumulation of a chemical directly from the exposure medium or source material into an organism. For example, plants or animals associated with exposures to ambient water, soil, air or sediment may bioconcentrate chemicals from these media via ingestion and/or direct absorption through the organisms exposed surfaces. After entering the organism, contaminants may become concentrated within specific tissues as the result of metabolic pathways that yield the same chemical for storage within the organism, or via direct deposition of the contaminant in certain tissues without being metabolized and/or excreted.

Bioaccumulation is the accumulation and transport of a chemical from a specific media through both the food chain and bioconcentration. The potential for bioaccumulation may be quantified by equilibrium bioconcentration factors (BCFs), which define the ratio of a chemical concentration in animal or plant tissue to the concentrations of the same chemical in the environmental media of contact. Organic chemicals with high BCFs (such as pesticides, PCBs, etc.) are typically insoluble and lipophilic (nonpolar) and, thus, tend to reside in animal fat tissue. Some heavy metals may also bioaccumulate. Literature values of BCFs most commonly pertain to fish species.

Biotransformation/biodegradation is the metabolic transformation of complex molecules into other compounds by microorganisms. Products of biotransformation/biodegradation may or may not be toxic to other organisms and these products may undergo further biotransformation/biodegradation. Biological transformation includes a variety of enzyme-catalyzed reactions such as oxidation and reduction.

Hydrolysis is the reaction of a chemical with water or with hydrogen (H+) or hydroxyl (OH^-) ions. These components of water interact with or attack sites of a chemical resulting in subsequent breakdown or modification in the environment. The extent of chemical hydrolytic reactivity depends on both pH (acidity/alkalinity) and the molecular structure of the specific chemical.

Photolysis is a chemical decomposition process induced by radiant energy (sunlight). The rate of loss of a chemical from photochemical reactions depends on both its molecular structure and the proximity and character (i.e., wavelength) of the light source, and the presence of other reactive compounds.

Oxidation is a chemical reaction which involves the removal of electrons from an element or compound. Conversely, electrons are added to chemical substrates in reduction reactions. Both oxidation and reduction reactions are environmentally significant in that they influence the mobility and fate of chemicals in environmental matrices. Oxidized and reduced forms of the same element or compound may also have totally different chemical, ecological and toxicological properties. For example, hexavalent chromium (i.e. Cr(+6)) is an oxidized valence state of chromium that is generally highly toxic whereas trivalent chromium (i.e., Cr(+3)) is a reduced form of chromium that is generally less toxic. Oxidation-reduction reactions are commonly referred to as "redox" reactions.

This section of the Phase II Site Investigation Report is focused on fate and transport processes that may affect contaminants of concern associated with Ravenswood. The large number of chemical contaminants detected (>20 parameters) precluded a detailed evaluation of each chemical present. Therefore, for the purposes of discussion, the contaminants detected were grouped into five generalized classes sharing similar physicochemical and behavioral characteristics. These classes are: 1) volatile organics, 2) semivolatile organics, 3) PCBs, and 4) cyanides, and each will be discussed in the subsections that follow. The semi-volatile organics discussion addresses polycyclic aromatic hydrocarbons (PAHs) compounds as a class since these compounds generally have similar environmental behavioral characteristics.

This section of the report is focused on fate and transport processes that may affect contaminants at Ravenswood and is organized into four main subsections. In Section 4.1, site environmental characteristics that influence contaminant fate and transport are summarized. Section 4.2 contains information about the environmental behavioral characteristics of the contaminant classes discussed previously, with special attention given to contaminants of potential concern (i.e., identified as having concentrations greater than NYSDEC standards, guidance values, and/or cleanup objectives). Characteristics of specific compounds are elaborated upon where available and particularly relevant; however, the discussions that follow are primarily focused on the general characteristics of the classes of chemical compounds associated with Ravenswood. In each discussion, a summary of the anticipated fate for the chemical classes is given. Since the bioaccumulation of chemicals of concern detected at Ravenswood may be occurring in biota indigenous to the East River due to contaminated groundwater recharging the East River, the bioaccumulation potential of chemicals detected on-site is discussed in the following sections to complete the fate and transport profiles for those chemicals detected. In Section 4.3, specific transport and migration pathways that may affect the contaminants are discussed in light of both the data collected from the site and relevant environmental characteristics of the contaminants. Finally, Section 4.4 summarizes the contaminant fate and transport analysis findings.

4.2 SITE CHARACTERISTICS

The fate and transport of contaminants at Ravenswood are affected by site-specific environmental characteristics, specifically the geology and soil type, geochemistry, hydrology and climate. The general environmental characteristics of the site are described in detail in Sections 1.0 and 3.0. The following paragraphs summarize the attributes of the site that affect the fate and transport of the contaminants of potential concern.

Aside from the existing building/structures at the facility, the land cover at Ravenswood consists primarily of paved roads and a two- to six-inch layer of crushed bluestone. As a result, there are no exposed soil areas and the site is devoid of vegetation. Immediately adjacent to the facility is the East River, which is tidal, and the western boundary of the site has a sheet pile bulkhead. The area surrounding the site is heavily industrialized.

The near surface soils beneath the two- to six-inch thick layer of asphalt or crushed bluestone at the facility consist of dense and compact fill material ranging in thickness from 5 to 15 feet bgs that typically contain large boulders, cobbles, concrete rubble, brick, wood, cinders, and metal debris. Soil in this fill material consists predominantly of low plasticity silt, sandy silt, and sand. At several locations, black, oily staining is present. The fill appears to be thicker on the western portion of the site toward the East River and may extend to the natural underlying deposits in these areas.

Beneath the fill material is a zone of soil that is predominantly low plasticity silts and clays, with the silts also containing fine sands and occasional gravel. The clay within this zone consists of mottled orange and gray stiff clays that are generally free of organic matter. The presence and thickness of this zone is highly variable with it being absent or 10 to 12 feet thick in some locations. As discussed previously, fill occasionally extends into this zone, particularly in the western portions of the site adjacent to the East River.

The deepest soil zone at the site, when present, consists of primarily medium to fine grained sands and silty sands. This unit is absent at many locations, and where present, the lowest few inches is characterized by an increase in grain size immediately adjacent to the underlying bedrock. The lower portions of this sandy zone are saturated, and black staining or an oily sheen plus a distinct petroleum odor were typically noted, especially at or just above the saturated sands.

Bedrock consists of the Ravenswood Gneiss with a trend in slope toward the East River. However, the surface of the bedrock is highly variable with very localized moderate to deep depressions occurring at five distinct areas of the site (see Section 2.0). The USGS reports that the bedrock beneath the site consists of a low hydraulic conductivity unit that will inhibit vertical migration and confine groundwater flow to the overlying soil units.

Groundwater occurs in the unconsolidated soil/fill deposits overlying bedrock under unconfined water table conditions. This overburden saturated zone is recharged on-site via rainwater percolating through the stone covered areas, seepage from the fresh water reservoir, and from regional groundwater flow from off-site areas toward the east. Data obtained during this investigation indicates a general east to west flow on the northern portion of the site with a potential for discharge to the East River, and a significant, very localized, groundwater mound apparently associated with the fresh water reservoir. This groundwater mound appears to only affect the local groundwater by increasing the flow on its downgradient side toward the river to the west, and diverting groundwater flow from the east to either side of the reservoir as it moves toward the East River. These regional/localized groundwater flow directions may facilitate the transport of site contaminants to other site areas and/or the East River. However, groundwater to the east of the generating station building near the No. 6 fuel tank appears to be flowing in an easterly direction to areas beyond the eastern site limit at Vernon Boulevard. The exact cause of this reversal in expected groundwater flow patterns is currently unknown, but is important since it may facilitate the transport of contaminants to off-site locations east of the facility. It is important to note that the site also contains numerous underground utilities and other manmade structures and areas that were excavated/disturbed in the past which can influence and cause very localized variations in groundwater recharge conditions and/or groundwater velocity/flow patterns. Additionally, the sheet piling used to construct the bulkhead on the East River may impede groundwater recharge to the East River.

4.3 FATE AND TRANSPORT DATA

In this section, the chemical characteristics and available fate and transport data for organic and inorganic contaminants of potential concern at Ravenswood are summarized. Each generalized contaminant class is discussed along with a summary of the anticipated environmental fate characteristics. Chemical parameters of specific organic compounds and metals are given in

Table 11, and fate and transport tendencies of the classes of organic compounds and of cyanide are outlined in Table 12. Much of the information presented in this section is from EPA (1979; 1982; 1986d) and Clement Associates (1985), in addition to other sources, to which the reader is referred for more detailed discussions of the chemical characteristics affecting the fate and transport of the on-site contaminants of concern.

4.3.1 Organic Chemicals

4.3.1.1 Volatile Organic Compounds

The volatile organic compounds of potential concern detected in various matrices associated with Ravenswood (see Table 11) are non-halogenated aromatic compounds. This class of organic compounds will be discussed in the subsection that follows.

Non-halogented Aromatic Volatiles - Four non-halogenated VOCs (benzene, ethylbenzene, toluene and xylenes) have been identified as contaminants of potential concern at Ravenswood. Specific physicochemical characteristics of these non-halogenated VOCs are listed in Table 11. These non-halogenated VOCs are widely used as industrial solvents, and benzene, toluene, ethylbenzene and xylenes may also occur in MGP wastes, petroleum products and petroleum combustion exhaust fumes.

Summary of Environmental Tendencies - Environmental fate and transport characteristics of non-halogenated VOCs are summarized in Table 12. Compounds of this subclass generally are mobile and not very persistent in the environment due to their high volatility, low adsorptive affinity to soils, low bioaccumulation potential and relatively high aqueous solubility. Because of these characteristics, the primary fate and transport mechanisms affecting VOCs are volatilization into the air and migration in groundwater. However, under certain conditions which restrict or eliminate these compounds' contact with the surface atmosphere (i.e., presence in deep soil strata or deep groundwater, overlying dense packed soil or clay without interstitial voids, paved surfaces/roads, buildings/structures, etc.), volatilization into the air may be of minor importance. The high volatility of VOCs limits, somewhat, the extent to which surface water and/or groundwater transport will be a major transport process, because the VOCs may volatilize out of unconfined or partially confined waterbodies. Due to the high mobility of non-halogenated aromatic VOCs, a decrease in their concentrations is anticipated with time, as long as there is no additional input of these compounds. The halogenated VOCs also tend to undergo degradation reactions in aerobic soil systems. These aerobic degradation reactions involve the opening of aromatic ring followed by an opening of the double bond structure(s) and/or a progressive loss of carbon atoms or splitting of the molecule into smaller fragments. These degradation reactions involving the opening of the double bond structure and/or progressive loss of carbon atoms/fragmentation generally results in a sequential increase in the mobility of the resulting compounds within environmental media. Additionally, the non-halogenated compounds are susceptible to microbial biodegradation/ biotransformation processes that further contribute to a low persistence in the environment.

4.3.1.2 Semivolatile Organic Compounds

Numerous semivolatile organic compounds that can be grouped into a single class (polycyclic aromatic hydrocarbons) have been identified as contaminants of potential concern in environmental media at Ravenswood. This class will be discussed in the subsection that follows with emphasis placed upon the contaminants of potential concern.

Polycyclic Aromatic Hydrocarbons (PAHs)

Sixteen PAHs (acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)-anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene) are identified as potential compounds of concern. Relevant data describing the physicochemical characteristics that affect the fate and transport of PAHs are shown in Table 11 and summarized in Table 12. PAHs are typical components of MGP wastes, asphalt, fuels, oils and greases.

Summary of Environmental Tendencies - PAHs are persistent and generally immobile in soil matrices under normal environmental conditions. This is primarily due to their low aqueous solubility and resistance to photolytic, oxidative and hydrolytic degradation, and their high affinity for adsorption to organic matter and soil particles. However, in the presence of highly mobile organic compounds (i.e., aromatic VOCs) which can act as co-solvents, the mobility of PAHs in soils and/or aqueous matrices can be greatly enhanced which would facilitate the transport of PAHs to groundwater. These highly mobile organic compounds acting as cosolvents can also greatly enhance the transport of PAHs within groundwater and/or surface water. PAHs can be degraded by microbial populations; however, this is generally a slow process in the environment. Among PAHs, naphthalene is relatively mobile in the environment due to its lower adsorptive affinity and higher aqueous solubility in comparison to most PAHs. The carcinogenic PAHs tend to be high molecular weight compounds which are less mobile in the environment and more likely to bind to soil particles. Some of the PAHs may exhibit substantial bioaccumulation (i.e., phenanthrene); however, this is usually a transitory effect (i.e., depuration typically occurs within several weeks or months) since most organisms have the ability to metabolize these compounds.

4.3.1.3 PCBs

Only one PCB (Aroclor-1260) was detected and identified as a potential compound of concern. Physicochemical data for Aroclor-1260 is listed in Table 11 and its environmental behavioral tendencies are summarized in Table 12. The principal use of PCBs was as dielectric fluids in electrical transformers and capacitors.

Summary of Environmental Tendencies - PCBs are generally persistent in the environment, primarily due to their resistance to degradation, low aqueous solubility and volatility, ability to substantially bioaccumulate in aquatic organisms, and very high adsorptive affinity for soils and organic matter. They are typically highly resistant to biodegradation and when it does occur, it is a very slow process. Primarily as a result of their very high adsorption to soils, PCBs are essentially immobile in soil matrices under normal environmental conditions. However, in the presence of highly mobile organic co-solvents (i.e., volatile organic aromatic compounds), the mobility of PCBs can be greatly enhanced.

4.3.2 Inorganics (Cyanide)

Cyanides were detected in the soils and groundwater sampled at Ravenswood. It is important to note that cyanides consist of a diverse group of compounds such as free hydrogen cyanide or cyanogen, metallo-cyanides/cyanates/isocyanates/thiocyanates, nitriles and/or cyanohydrins. However, the exact species of cyanide present is not determined by the analytical method. Relevant data for cyanides are presented in Table 11 and summarized in Table 12. A brief synopsis of the important characteristics affecting the environmental fate of cyanides was compiled from USEPA (1979), Clement Associates (1985), and other sources, and is presented in subsequent discussion.

The cyanide functional group (-CN) can exist in a diverse group of organic or inorganic compounds whose fate and transport in the environment can vary greatly. The most common and toxic of the cyanides, free hydrogen cyanide (HCN), is extremely volatile, soluble in water, and reactive. Due to these characteristics, it rarely occurs in the environment. Cyanide ion typically forms complexes with a variety of metals, especially transition series metals, with ferricyanides and ferrocyanides being the most prominent form typically encountered in the environment. Iron cyanides are very stable in the absence of light, yet rapidly undergo photolytic decomposition reactions to release hydrogen cyanide upon exposure to sunlight or ultraviolet radiation. Complex metallo-cyanides (i.e., ferricyanides, ferrocyanides, etc.) are quite soluble and can be readily transported in aqueous solution. Cyanogen [$(CN)_2$] is a highly toxic, flammable, gaseous form that undergoes slow hydrolytic reactions in water to produce hydrogen cyanide, cyanic acid, and other compounds. In contrast, metallo-cyanates (-OCN) readily hydrolyze in water to form ammonia and bicarbonate ion as decomposition products. Organocyanates, if sufficiently concentrated, may also readily trimerize to generate cyanurates. Organoisocyanates (-NCO) can be formed from cyanates and they too are rapidly hydrolyzed. Thiocyanates (-SCN) can be produced from cyanates and sulfur containing compounds under anaerobic conditions and are more stable than cyanates; however, in acidic media, thiocyanates can decompose to form free hydrogen cyanide. Nitriles also contain the cyanide functional group, are generally much less toxic than the metal cyanides or free hydrogen cyanide, and exhibit similar environmental fate characteristics as that for hydrogen cyanide. Cyanohydrins [$R_2C(OH)CN$] can also decompose with the release of HCN or CN under normal environmental conditions.

In general, cyanides typically occur in water as: 1) free hydrocyanic acid (HCN); 2) simple cyanides (alkali and alkaline earth cyanides); 3) easily decomposable complex cyanides such as $Zn(CN)_2$; and, relatively stable complex cyanides such as $[Fe(CN)_6]^{-3}$, $[Fe(CN)_6]^{-4}$ and $Co(CN)_4$. Complex nickel and copper cyanides exhibit intermediate stability when compared to the easily decomposable and relatively stable cyanide containing compounds.

Cyanides are adsorbed to a variety of materials, including clays, biological solids and sediments; however, sorption is typically not a significant immobilizing process due to the relatively high volatility, solubility and/or reactivity of most cyanide containing compounds. Thus, cyanides are fairly mobile in soils with mobility being greatest at high pH, high concentrations of free $CaCO_3$ (i.e., high negative charge) and low clay content.

Hydrogen cyanide, metallo-cyanide complexes and nitriles are all subject to aerobic and anaerobic microbial degradation, and the importance of this process varies according to such factors as cyanide concentrations, pH, temperature, concentration of microbes, availability of nutrients, and whether the microbes are acclimated to cyanide. Additionally, all organisms have the ability to rapidly metabolize low concentrations (i.e., below lethal doses) of cyanide containing compounds. This, combined with the high toxicity of some of the cyanide compounds, results in an extremely low potential for organisms to bioaccumulate these compounds.

Summary of Environmental Tendencies - In general, most cyanide compounds are typically mobile and not very persistent in the environment due to their high volatility (hydrogen cyanide, nitriles), high reactivity (principally hydrogen cyanide), high aqueous solubility (except for insoluble simple metal cyanides), low adsorption to soil, low bioaccumulation potential, and susceptibility to microbial, metabolic, photolytic (primarily iron cyanides) and hydrolytic degradation. However, since many of these compounds can be converted to other cyanide containing compounds during various degradation/decomposition reactions, various forms may exist for some time in the environment, particularly if insoluble and/or stable cyanide containing compounds are produced.

4.4 TRANSPORT AND MECHANISMS OF MIGRATION

Contaminants may migrate from a source area via a variety of mechanisms. The importance of a given mechanism is controlled by the specific physical, geochemical, climatic and hydrologic conditions at a given site as well as by the physicochemical characteristics of the contaminated media. In this section of the report, the following potential pathways for the fate and transport of contaminants of concern identified within the various matrices at Ravenswood will be considered:

- Migration of contaminants from potential source areas to environmental media.
- Percolation and migration of contaminants into groundwater.
- Migration of contaminants within groundwater to adjacent off-site areas and/or surface water bodies.
- Migration of contaminants in air.

Migration of contaminants into biota due to bioaccumulation effects was not considered as a significant potential pathway because: 1) the site is devoid of terrestrial biota; 2) transport of contaminants to the East River is assessed to minimal and only via recharging groundwater; 3) immediately upon entering the East River, contaminants are expected to dissipate rapidly over a relatively short distance due to the tremendous dilution occurring from the substantial volume of water flowing within the river, and/or volatilization from the water to the atmosphere; and, 4) the contaminants transported to the East River are not substantially bioaccumulated. As a consequence of these characteristics, there is anticipated to be a negligible impact to edible fish species within the adjacent surface water body (i.e., the East River). The migration of contaminants within stormwater surface runoff also was not considered to be a principal environmental fate and transport mechanism at Ravenswood since the surface of the site is covered with buildings/structures, crushed stone or bituminous pavement. The importance of the pathways mentioned above to the classes of contaminants found within Ravenswood will be discussed in the sections that follow.

4.4.1 Migration of Contaminants from Potential Source Areas to Environmental Media

Contamination of matrices within and/or surrounding Ravenswood has occurred in the past as a result of prior spills and/or operational/disposal practices employed during the use of the site. As a consequence of these events/activities, areas of contaminated soil and/or contaminated buried material (i.e., MGP waste) within specific areas of Ravenswood still remain. Chemicals from these potential sources of contamination may migrate within and/or into the surrounding environment in several ways. Potential sources that are contaminated soil areas and/or contaminated buried material within the site contain contaminants that may be transported into underlying soils and groundwater by the percolation of rain and/or gravity. Contaminated soil areas that are saturated (i.e., below the water table) may also leach contaminants directly into the surrounding groundwater. Upon entering groundwater, contaminants will migrate with the groundwater flow and may enter the East River adjacent to the facility via groundwater recharge, or be transported to off-site areas situated to the east of the generating station building and across Vernon Boulevard. Finally, volatile contaminants may volatilize from contaminated matrices (i.e., vadose zone soil and/or East River surface water) and be emitted into the atmosphere and subsequently transported by prevailing winds.

It is likely that each of the above processes has occurred to some degree at Ravenswood and is continuing to occur; however, the extent to which contamination observed in individual environmental media samples can be attributed to a specific given point source or an areal concentration of contamination is highly speculative. For example, it is not possible to conclude that contaminants in subsurface soil within the former MGP site were the only (or even primary) source of contaminants in subsurface soils within the northwestern corner of the site, because of the wide variety of ways (e.g., transport of similar contaminants from other sources (i.e., fuel spills, etc.) or areas along subsurface utilities, etc.) that contaminants may have been introduced into or transported to the subsoils in these areas.

4.4.2 Percolation and Migration into Groundwater

Contaminants of concern present in soils and/or buried material within Ravenswood may migrate into groundwater by leaching directly into groundwater from contaminated saturated subsurface soils and/or by the percolation of rainwater through contaminated soils or buried material. Incorporation of contaminants within percolating groundwater may be through direct dissolution of contaminants from soil or contaminated buried material into the percolating water or by dissolution into more water soluble organic compounds already entrained within the percolating rainwater (i.e., cosolvent effects). This transport of contaminants into groundwater is a function of the solubility (and related leachability) of a given contaminant in a specific water mass (or more mobile entrained cosolvent) under specific conditions. Additionally, the transport of contaminants into groundwater may also occur, to a limited extent, with particulate phases to which the contaminants are adsorbed. In water-bearing zones, transport of particulates is principally limited to colloid-size (i.e., extremely small, generally defined as less than 0.7 mm in diameter) particles, or particles smaller than the available pore space. Larger particles cannot pass through water-bearing zones because of their size (generally larger than pore space) and because the energy of the water that is slowly percolating through the ground is usually insufficient to carry particles larger than colloids in suspension. Considering that the saturated site soils overlying the bedrock in which groundwater occurs are medium to fine grained sand, silt and silty sands with small pore spaces between individual soil particles, some particulate transport may occur for a limited distance. Therefore, migration into the underlying groundwater by contaminants, either dissolved and/or associated with entrained colloids, is speculated to be an important transport and migration mechanism for on-site soil contaminants of potential concern.

Irrespective of the partitioning among dissolved and particulate fractions, contaminant groundwater concentrations were typically higher in wells within or immediately adjacent to and hydrologically downgradient of elevated soil contaminant areas when compared to wells situated upgradient or farther away from these areas within Ravenswood (see Section 3.0). All of these contaminants exhibiting elevated levels in on-site groundwater were also present in the overlying and/or saturated on-site soils/waste (in some instances at very elevated concentrations), with the greatest groundwater contaminant concentrations typically occurring within the wells immediately within or adjacent and downgradient of the elevated soil contaminant areas. This implies that contaminants are migrating from soils/waste within these areas to groundwater via percolating rainwater and/or direct dissolution from subsurface saturated contaminated soils. Principal contaminant classes present on-site that may migrate via these potential pathways are discussed in the paragraphs that follow.

The volatile organic aromatic compounds and cyanides are characterized by high aqueous solubilities and low adsorptive affinities for soils. Due to the permeable nature of the site soils (particularly within the coarser fill material) in conjunction with these characteristics, incorporation into percolating rainwater with their eventual dissolution and transport in groundwater and/or direct dissolution into surrounding groundwater from contaminated saturated subsurface soils is expected to be a major environmental fate mechanism for these organic compounds and cyanides. This is substantiated by the groundwater data, which indicated benzene, ethylbenzene, toluene and xylenes , and to a lesser extent, polyaromatic hydrocarbon compounds and cyanides in groundwater, some of which were also present at high concentrations (i.e., up to 3,000 ppm for VOCs and percent levels for PAHs) in overlying and/or saturated on-site soils (see Section 3.0). Although PAHs and PCBs are typically not readily transported through soil or within groundwater due to their generally low aqueous solubilities and high adsorptive affinities, cosolvent effects mediated by the more mobile volatile organic aromatic compounds present may enhance PAH and PCB downward migration in soils and the eventual incorporation of some of these compounds into the underlying groundwater. This is substantiated by the groundwater data, which noted several PAHs occurring in association with the more mobile volatile organic compounds and cyanides. However, this enhanced transport scenario may not be as important for PCBs due to their higher adsorptive affinities for soil particles. Additionally, transport of PAHs may also occur, to some degree, with particulate phases to which these compounds are adsorbed during the rapid percolation of turbid waters that may result during intense storm events, upwelling and/or other disturbance activities (i.e., construction or earth moving activities, utility repair work, etc.).

Although this type of transport is anticipated to occur only for a limited distance until these suspended particulates in the percolating water become trapped within the subsurface soil matrix (see previous discussion), it may be an important mechanism at these sites considering that the aquifer is very close to elevated concentrations of soil contaminants in some areas, and in some of the study areas, these elevated contaminants are below the water table. In general, adsorption is anticipated to be the primary fate mechanism for most PAHs, and PCBs in on-site soils, with limited enhanced migration due to cosolvent effects exerted by volatile organic aromatic compounds for several PAHs, and/or limited migration for these chemical constituents adsorbed to suspended particulates within turbid water percolating downward. As shown by the groundwater data, the enhanced migration due to cosolvent effects and/or transport mediated on suspended particulates for PAHs via direct dissolution and/or percolating rainwater into groundwater is of major importance, whereas for PCBs, migration into groundwater due to cosolvent effects is expected to be insignificant.

4.4.3 Migration of Contaminated Groundwater Off-Site

Groundwater that becomes contaminated beneath Ravenswood as a result of residual contaminated soil will migrate through the subsurface aquifer, thereby spreading and dispersing the contaminants. Migration of dissolved contaminants in groundwater is controlled by two processes: advection and dispersion. Advection is the process by which dissolved contaminants are transported by the bulk motion of groundwater flow. Dispersion is the spreading of dissolved contaminants as they move with groundwater and results from two basic processes: molecular diffusion and mechanical mixing. Both advection and dispersion act on contaminants in solution. Contaminants associated with large soil particles generally are not transported by groundwater, however some transport of very fine particles (i.e., very fine clay particles, colloids) may occur.

As presented in Section 3.0, groundwater beneath Ravenswood flows across the site toward the East River west of the fresh water reservoir, and in an easterly direction just east of the generating station toward Vernon Boulevard in the shallow, unconfined aquifer. Contaminants present in on-site soils that may enter groundwater beneath the site will migrate to off-site areas following these local groundwater flow directions. Vertically, contamination extends to and within groundwater present just above the underlying bedrock. However, the precise lateral extent of this shallow groundwater contamination is currently unknown due to: 1) the difficulty in predicting groundwater flow direction and/or velocities within the subsurface soils across the entire site; 2) the extensive subsurface utilities/structures buried beneath the site that can act as conduits facilitating localized groundwater flow in numerous directions; and, 3) the paucity of monitoring wells in many on-site and adjacent off-site areas. Irrespective of this, in general, the local groundwater flow direction for groundwater contaminants in the northern site area and in particular, west of the fresh water reservoir, is westerly toward the eastern shore of the East River. In contrast, the groundwater east of the generating station (Unit No. 2) around the No. 6 fuel oil tank area flows easterly, and thus, contaminants present in groundwater in this area may migrate off-site toward the east and Vernon Boulevard. Additionally, groundwater recharge to the East River situated immediately adjacent to Ravenswood may also transport contaminants to the river and this, along with the groundwater flow directions previously discussed, will be major transport mechanisms for contaminants at Ravenswood.

Based upon physicochemical characteristics, the volatile organic aromatic compounds and cyanides would be expected to migrate the farthest in groundwater, primarily due to their high aqueous solubilities and low adsorptive affinities. However, for the PAHs, their relatively high adsorptive affinities and lower aqueous solubilities (except for naphthalene) would restrict their transport within groundwater over any great distance by their adsorption to surrounding soil particulates, except where cosolvent effects mediated by more mobile, water soluble organic compounds in the VOC plume areas enhance their migration in groundwater. Organic compounds with high adsorptive affinities, may also be transported with very fine suspended particulates and/or colloidal matter to which they are adsorbed. However, any groundwater transport via suspended particulates would be anticipated to occur only for a limited distance until these fine particulates become trapped within the subsurface matrix, unless this transport occurs within fractured bedrock. Any migration of contaminants in groundwater will be controlled principally by groundwater flow and dilution effects, and contaminant removal mechanisms such as adsorption, equilibrium dissolution-precipitation conditions, biodegradation, and for some constituents, limited volatilization from groundwater into interstitial voids within the overlying vadose zone soils.

While considering the scenarios and speculations presented above, it is important to note that while groundwater is migrating through natural granular soil deposits and it may also be moving within more highly permeable material (i.e., crushed stone, etc.) surrounding subsurface utilities/structures. Hence, contaminant transport will differ in each of these media with typical contaminant reduction mechanisms such as adsorption, dilution, filtration of suspended particulates and volatilization, etc., either not occurring or being significantly minimized during transport through or coarser, more permeable material as compared to transport through fine granular soils.

4.4.4 Migration of Contaminants in Air

Contaminants may migrate into air via two distinct emission mechanisms: volatilization, primarily of organic compounds from contaminated subsurface soils; and, entrainment of contaminated soil particles by the wind (i.e., fugitive dust emissions). At Ravenswood, the entrainment of contaminated soil particles is not a viable transport mechanism since the entire exposed surface of the site is either paved or covered with gravel. Hence, only the volatilization emission mechanism is important at the facility. Volatile organic compounds can migrate into air from shallow subsurface soils by passing through the more permeable coarse fill material and highly permeable surficial gravel areas at certain on-site locations. Volatilization from these subsurface materials, particularly if compounds must also pass must through a surficial gravel covering, is extremely complex and factors such as soil moisture and permeability must be taken into account.

Although no air monitoring data are available, the emission of volatile organic compounds from subsurface soils is expected, since high concentrations (i.e., up to 3,000 ppm) of volatile contaminants were present in some areas of Ravenswood's vadose zone soils. The appreciable paved areas and buildings over most of Ravenswood would impede emissions from the soil except in the gravel covered areas. As discussed previously, volatile compounds may also be emitted from the East River after volatile organic compounds have entered this waterbody from recharging groundwater. Once emitted, the volatile organic compounds would be transported with the prevailing winds. Therefore, volatile emissions, with their concomitant migration via the prevailing wind, would be a viable transport mechanism for several areas of Ravenswood. Considering the high concentrations of volatile organic compounds (i.e., up to 3,000 ppm) present within the contaminated subsurface soil at several Ravenswood areas and the fact that volatile organic compounds were detected within the groundwater, this scenario is an important transport mechanism. It is also important to note that the East River only receives site-related contaminants from discharging groundwater, with no input from overland runoff containing contaminants. Immediately upon entering the East River, volatile compounds are expected to dissipate rapidly from the river's surface water over a relatively short distance with the principal mechanism for this being the tremendous dilution occurring due to the substantial volume of water flowing within the river, and volatilization from the water to the atmosphere.

4.5 CONTAMINANT FATE AND TRANSPORT ANALYSIS SUMMARY

In Section 4.0, physicochemical data and environmental behavioral tendencies of the organic compounds and metals, with emphasis placed upon the contaminants of potential concern (i.e., contaminants with concentrations above NYSDEC standards, guidance values or cleanup values) associated with Ravenswood, are presented and discussed. This information has been utilized in conjunction with analytical results of site samples and general site characteristics to describe the importance of potential fate and transport pathways for the contaminants of potential concern.

The migration of contaminants to underlying soils and groundwater by gravity and the percolation of rainwater through contaminated soils and/or contaminated buried fill material within specific site areas is expected to be a major environmental fate and transport mechanism at Ravenswood. The groundwater data show that migration through contaminated soil/material via percolating rainwater and/or direct dissolution from contaminated saturated soils into groundwater is especially important for volatile organic compounds, naphthalene, and to a limited extent, other PAH compounds and cyanide. In contrast, for PCBs, this pathway is not significant, and therefore the PCBs present are likely to persist at their current locations within the on-site soil.

Upon entering groundwater, contaminants will migrate with the local groundwater flow until dilution and removal mechanisms such as adsorption, degradation, precipitation and limited volatilization result in their eventual non-detection or until the contaminated groundwater discharges to the East River, particularly if this migration occurs within or along more permeable material (i.e., crushed stone) surrounding subsurface utilities/structures. Based upon the local groundwater flow directions and groundwater quality data, contaminants in groundwater originating from the on-site contaminated areas will migrate predominantly to the west and enter the East River due to recharging groundwater on the northern portion of the site, and to a lesser extent, toward the east of the generating station Unit No. 2 to Vernon Boulevard. Vertically, contaminants have migrated to and within groundwater just above the underlying bedrock. Laterally, contaminants are speculated to be migrating from Ravenswood to off-site areas following the local groundwater flow (Figure 5); however, the actual extent of the contaminant plume is difficult to establish due to a lack of wells in both off-site and several on-site areas.

Based upon physicochemical characteristics, dissolved volatile organic aromatic compounds, and cyanides would be expected to migrate the farthest in groundwater, while PAHs associated with fine particulates are expected to migrate with the groundwater flow for only a limited distance. However, cosolvent effects exerted by more mobile organic contaminants present in groundwater may enhance the migration of PAHs for greater distances. In contrast, PCBs present in on-site soil are not expected to migrate to or within groundwater and are anticipated to remain at their present locations.

The migration of contaminants within stormwater surface runoff will not be a principal environmental fate and transport mechanism at Ravenswood unless the surficial stone layer is removed. However, if the surficial stone layer is removed and the underlying soils are disturbed, this migration pathway could become important for volatile organic compounds, PAHs, cyanides, and to a limited extent, PCBs.

The emission of volatile organic compounds into the atmosphere from contaminated on-site soils and the East River, and their concomitant migration via the prevailing wind, would be a viable transport mechanism. Considering the high concentrations of volatile organic compounds present on-site, volatile emissions are assessed to be a significant transport process, particularly from the gravel covered subsurface BTEX contaminated soils areas, and to a lesser extent, surface water in the East River immediately adjacent to the facility. The airborne entrainment of contaminated surficial soil particulates, would not be an important contaminant transport mechanism, unless the surficial gravel layer is removed and the underlying contaminated soils are disturbed and remain exposed during dry, windy periods.

Among the contaminants of potential concern associated with Ravenswood, the PCBs will exhibit the greatest persistence in soil/buried fill matrices, due to their physicochemical characteristics. Exhibiting moderate persistence would be the PAHs, based upon their physicochemical properties. In contrast, the highly mobile volatile organic aromatic compounds and cyanides, would exhibit the least persistence in contaminated matrices. However, these compounds and elements may persist in groundwater under certain hydrologic conditions. As a direct result of the aforementioned contaminant fate characteristics and transport mechanisms, contaminant concentrations in environmental media are expected to gradually diminish over time as long as no additional sources (i.e., future spills) introduce contaminants in the future.

5.0 CONCLUSIONS

Based on the results of this Phase II investigation the following conclusions can be reached regarding the existing subsurface environmental conditions:

- The near surface soils beneath asphalt or crushed bluestone cover at the facility consist of dense and compact fill material ranging in thickness from 5 to 15 feet bgs that typically contain large boulders, cobbles, concrete rubble, brick, wood, cinders, and metal debris. Soil in this fill material consists predominantly of low plasticity silt, sandy silt, and sand.
- The fill material is underlain predominantly by low plasticity silts and clays, consisting of mottled orange and gray still clays that are generally free of organic matter containing fine sands and occasional gravel.
- The deepest soil zone at the site consists primarily of medium to fine grained sands and silty sands. This unit is absent at many locations, and where present, the lowest few inches is characterized by an increase in grain size immediately adjacent to the underlying bedrock
- The surficial fills that overlie most of the site are dense and compact and generally free of visible contamination. The dense condition of these materials has likely aided in preventing contemporary release at the surface from penetrating to the deeper soils and water table.
- Contamination is generally more apparent at depth in the soil column and is typically most apparent at the top of the water table. This appears to be a widespread site condition associated with historical site-wide use of petroleum materials and the former MGP operations and not specific source areas.
- Site soils contain contamination above the NYSDEC Soil Clean-Up Objectives (TAGM 4046) consisting of BTEX and PAH constituents at concentrations ranging from ppb to high ppm levels, TPHs in the ppm range and PCBs in the shallow soils adjacent to the Unit 1 transformer.
- Soil contamination at the site can be characterized as residual from historical release of petroleum fuels and oils. The soil contamination observed in the field with a few exceptions, appeared to be related to petroleum products and not MGP wastes.
- The lack of free product on the water table surface or as an accumulation in the bottom of the wells, indicates the source of groundwater contamination is the residual soil contamination from historical activities as opposed to more recent releases or existing nonaqueous phase liquids.
- The bedrock beneath the site consists of a low hydraulic conductivity unit that will inhibit vertical migration and confine groundwater flow to the overlying soil units.

- Groundwater occurs in the unconsolidated deposits overlying bedrock under unconfined water table conditions and is recharged via rainwater percolating through the stone covered areas, seepage from the Fresh Water Reservoir, and from regional groundwater flow from off-site areas toward the east.

- Based on the limited saturated zone thickness and anticipated low to moderate hydraulic conductivities, this saturated zone will not be capable of yielding significant quantities of water to wells, except in areas adjacent to the river where infiltration from the river will likely be significant.

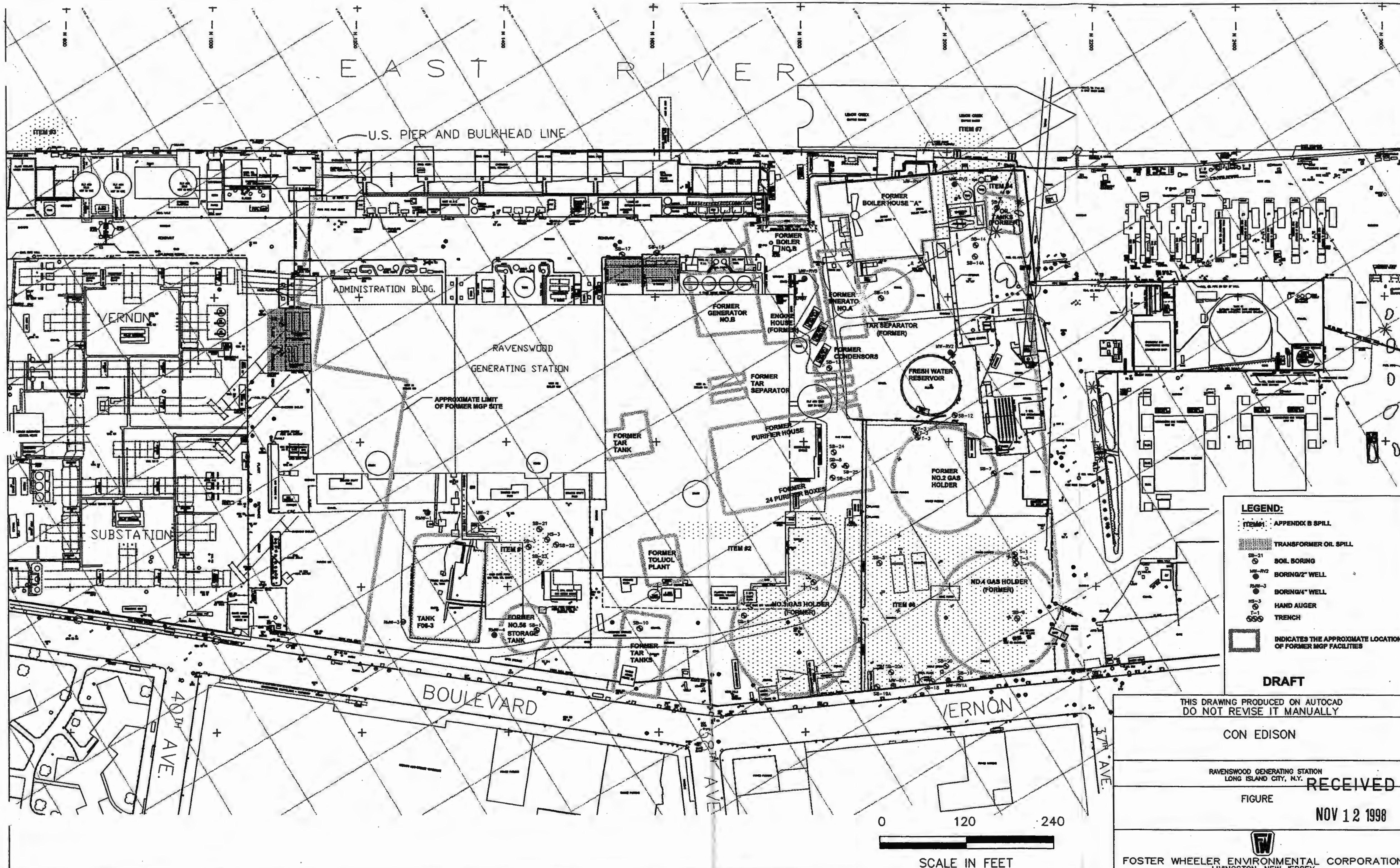
- An east to west groundwater flow direction is present on the northern portion of the site with discharge to the East River and a west to east flow in the area around the No. 6 Fuel Oil Tank with discharge beyond the eastern site boundary.

- Groundwater contamination at the site consists of relatively low ppb levels of BTEX and PAH. Constituents with several individual constituents above the NYSDEC, Class GA, Water Quality Standards/Guidance Values. The groundwater impact is generally greater in the northern portion of the site.

- Contaminated groundwater on the site represents the principal areas for contaminant migration beyond the site. Based upon physiochemical characteristics, dissolved volatile organic aromatic compounds, and cyanides are expected to migrate the farthest in groundwater, while PAHs associated with fine particulates are expected to migrate with the groundwater flow for only a limited distance.

- Migration of contaminants into biota due to bioaccumulation effects is not considered a significant potential pathway because: 1) the site is devoid of terrestrial biota; 2) transport of contaminants to the East River is assessed to minimal and only via recharging groundwater; 3) immediately upon entering the East River, contaminants are expected to dissipate rapidly over a relatively short distance due to the tremendous dilution occurring from the substantial volume of water flowing within the river, and/or volatilization from the water to the atmosphere; and, 4) the contaminants transported to the East River are not substantially bioaccumulated. As a consequence of these characteristics, there is anticipated to be a negligible impact to edible fish species within the adjacent East River.

- As a direct result of the contaminant fate characteristics and transport mechanisms, contaminant concentrations in environmental media are expected to gradually diminish over time as long as no additional sources (i.e., future spills) introduce contaminants in the future.



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CON EDISON RAVENSWOOD PHASE II INVESTIGATION
ABBREVIATIONS AND QUALIFIERS UTILIZED IN SOIL AND GROUNDWATER ANALYTICAL RESULTS TABLES

Abbreviation	Definition
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes.
FB	Field Blank.
mg/kg	milligrams per kilogram.
mg/L	milligrams per liter.
MW	Monitoring Well Location.
NC	No criteria and/or guidance value available.
ND	Non-detectable concentration by an approved analytical method.
NYSDEC	New York State Department of Environmental Conservation.
PAHs	Polycyclic Aromatic Hydrocarbons.
ppb	parts per billion (ug/kg or ug/L).
ppm	parts per million (mg/kg or mg/L).
SB	Soil Boring Location.
SS	Shallow Soil Location.
TAL	Target Analyte List.
TCL	Target Compound List.
TICs	Tentatively Identified Compounds.
ug/kg	micrograms per kilogram.
ug/L	micrograms per liter.
$\boxed{\quad}$	Compound concentration is above the criteria and/or guidance value provided on the table. To be used for comparison and reference purposes only.

Qualifier	Definition
U	Compound not detected at detection limits.
--	No Tentatively Identified Compounds (TICs) identified in sample.
J	Compound value is estimated.
R	Compound value is rejected and deemed unusable.
B (organics)	Compound was also present in an associated blank sample.
B (inorganics)	Analyte value is less than the required method detection limit but greater than the instrument detection limit.
E	Compound concentration exceeds the calibration range.
D	Compound value reported is from a dilution analysis.

D	Included in Sample Number indicates a duplicate sample
N	Presumptive evidence exists for the presence of compound.
NA	Not analyzed/not available.

TABLE 1
SUBSURFACE SOIL SAMPLES ANALYSES
CON EDISON, RAVENSWOOD PHASE II INVESTIGATION

Sample ID	Date Collected	Time	Analysis	Comments
RW-MWRV1(1.5-2)	8/27/98	1010	TPH	
RW-MWRV5(2-2.5)	8/27/98	1500	BTEX,TPH,PAH,Cyanide	
RW-MWRV3(3-3.5)	8/28/98	1015	BTEX,TPH,PAH,Cyanide	
RW-SB4(1.5-2)	8/31/98	1030	BTEX,TPH,PAH,Cyanide	
RW-MWRV4(2-2.5)	9/1/98	1010	BTEX,TPH,PAH,Cyanide	
RW-HS3(1-1.5)	9/1/98	1310	TPH	
RW-SB2(1-1.5)	9/2/98	1145	TPH,PCBs	
RW-SB2(1-1.5)D	9/2/98	1145	TPH,PCBs	Duplicate Sample
RW-SB4(12-14)	9/3/98	940	BTEX,TPH,PAH,Cyanide	
RW-SB4(24-26)	9/3/98	1030	BTEX,TPH,PAH,Cyanide	
RW-MWRV4(14-16)	9/3/98	1430	BTEX,TPH,PAH,Cyanide	
RW-MWRV3(12-14)	9/4/98	920	BTEX,TPH,PAH,Cyanide	
RW-MWRV3(24-26)	9/4/98	955	BTEX,TPH,PAH,Cyanide	
RW-SB15(5-5.5)	9/4/98	1020	BTEX,TPH,PAH,Cyanide	
RW-SB15(5-5.5)D	9/4/98	1020	BTEX,TPH,PAH,Cyanide	Duplicate Sample
RW-SB2(12-14.5)	9/4/98	1320	TPH,PCBs	
RW-SB1(3-3.5)	9/8/98	930	TPH,PCBs	
RW-SB1(3-3.5)M	9/8/98	930	TPH,PCBs	Matrix Spike Sample
RW-SB1(3-3.5)MD	9/8/98	930	TPH,PCBs	Matrix Spike Duplicate Sample
RW-MWRV5(18-20)	9/8/98	950	BTEX,TPH,PAH,Cyanide	
RW-MWRV5(18-20)M	9/8/98	950	BTEX,TPH,PAH,Cyanide	Matrix Spike Sample
RW-MWRV5(18-20)MD	9/8/98	950	BTEX,TPH,PAH,Cyanide	Matrix Spike Duplicate Sample
RW-SB1(12-14)	9/8/98	1305	TPH,PCBs	
RW-MWRV2(5-5.5)	9/8/98	1325	BTEX,TPH,PAH,Cyanide	
RW-MWRV2(5-5.5)D	9/8/98	1325	BTEX,TPH,PAH,Cyanide	Duplicate Sample
RW-SB15(10-12)	9/8/98	1515	BTEX,TPH,PAH,Cyanide	
RW-FB1	9/9/98	800	BTEX,TPH,PAH,PCBs,Cyanide	Field Blank
RW-MWRV2(14-16)	9/9/98	1050	BTEX,TPH,PAH,Cyanide	
RW-SB18(5-5.5)	9/9/98	1310	BTEX,TPH,PAH,Cyanide	
RW-SB18(5-5.5)M	9/9/98	1310	BTEX,TPH,PAH,Cyanide	Matrix Spike Sample
RW-SB18(5-5.5)MD	9/9/98	1310	BTEX,TPH,PAH,Cyanide	Matrix Spike Duplicate Sample
RW-SB14(5-6)	9/9/98	1425	BTEX,TPH,PAH,Cyanide	
RW-MWRV1A(5-5.5)	9/10/98	820	BTEX,TPH,PAH,Cyanide	
RW-SB18(12-14)	9/10/98	1020	BTEX,TPH,PAH,Cyanide	
RW-MWRV1A(16-18)	9/10/98	1130	BTEX,TPH,PAH,Cyanide	
RW-SB6(1.5-2)	9/11/98	1100	BTEX,TPH,PAH,Cyanide	
RW-SB6(6-7)	9/14/98	1325	BTEX,TPH,PAH,Cyanide	
RW-SB11(5-5.5)	9/14/98	900	BTEX,TPH,PAH,Cyanide	
RW-SB3(6-8)	9/14/98	1500	TPH	
RW-SB10(5-5.5)	9/16/98	930	BTEX,TPH,PAH,Cyanide	
RW-SB9(5-5.5)	9/17/98	1000	BTEX,TPH,PAH,Cyanide	
RW-SB11(16-18)	9/17/98	1230	BTEX,TPH,PAH,Cyanide	
RW-SB10(6-9)	9/17/98	1415	BTEX,TPH,PAH,Cyanide	
RW-SB12(4.5-5)	9/17/98	1500	BTEX,TPH,PAH,Cyanide	
RW-SB9(10-12)	9/18/98	930	BTEX,TPH,PAH,Cyanide	
RW-SB8(5-5.5)	9/18/98	1030	BTEX,TPH,PAH,Cyanide	

TABLE 1
SUBSURFACE SOIL SAMPLES ANALYSES
CON EDISON, RAVENSWOOD PHASE II INVESTIGATION

Sample ID	Date Collected	Time	Analysis	Comments
RW-SB12(10-12)	9/18/98	1130	BTEX,TPH,PAH,Cyanide	
RW-SB8(6-9)	9/18/98	1330	BTEX,TPH,PAH,Cyanide	
RW-SB7(1-2)	9/22/98	800	BTEX,TPH,PAH,Cyanide	
RW-SB20A(1-2)	9/22/98	1030	BTEX,TPH,PAH,Cyanide	
RW-SB19A(2-3)	9/22/98	1500	BTEX,TPH,PAH,Cyanide	
RW-SB5(5-5.5)	9/23/98	950	TPH	
RW-SB13(5-5.5)	9/23/98	1505	BTEX,TPH,PAH,Cyanide	
RW-SB20A(12-14)	9/24/98	1020	BTEX,TPH,PAH,Cyanide	
RW-SB16(5-5.5)	9/24/98	1025	TPH,PCBs	
RW-SB19A(10-12)	9/24/98	1115	BTEX,TPH,PAH,Cyanide	
RW-SB5(10-11)	9/24/98	1205	BTEX,TPH,PAH,Cyanide	
RW-SB26(5-5.5)	9/24/98	1450	BTEX,TPH,PAH,Cyanide	
RW-SB17(5-5.5)	9/25/98	925	TPH,PCBs	
RW-SB26(10-12)	9/28/98	945	BTEX,TPH,PAH,Cyanide	
RW-SB26(10-12)M	9/28/98	945	BTEX,TPH,PAH,Cyanide	Matrix Spike Sample
RW-SB26(10-12)MD	9/28/98	945	BTEX,TPH,PAH,Cyanide	Matrix Spike Duplicate Sample
RW-SB24(5-5.5)	9/28/98	1035	BTEX,TPH,PAH,Cyanide	
RW-SB24(5-5.5)D	9/28/98	1035	BTEX,TPH,PAH,Cyanide	Duplicate Sample
RW-SB13(10-12)	9/28/98	1100	BTEX,TPH,PAH,Cyanide	
RW-SB24(8-9)	9/28/98	1205	BTEX,TPH,PAH,Cyanide	
RW-SB21(5-5.5)	9/29/98	925	BTEX,TPH,PAH,Cyanide	
RW-SB22(2-3)	9/29/98	1030	BTEX,TPH,PAH,Cyanide	
RW-SB23(2-3)	9/29/98	1350	BTEX,TPH,PAH,Cyanide	
RW-SB23(8-10)	10/1/98	930	BTEX,TPH,PAH,Cyanide	
RW-SB22(8-10)	10/1/98	1010	BTEX,TPH,PAH,Cyanide	
RW-SB25(5-5.5)	10/1/98	1005	BTEX,TPH,PAH,Cyanide	
RW-SB21(6-8)	10/1/98	1115	BTEX,TPH,PAH,Cyanide	
RW-SB25(8-10)	10/1/98	1245	BTEX,TPH,PAH,Cyanide	
RW-T3(10-12)	10/2/98	1325	BTEX,TPH,PAH,Cyanide	
RW-T1(6-8.5)	10/2/98	1215	BTEX,TPH,PAH,Cyanide	
RW-SB14A(14-16)	10/3/98	955	BTEX,TPH,PAH,Cyanide	
RW-SB16(16-18)	10/3/98	1105	TPH,PCBs	
RW-SB17(14-16)	10/3/98	1155	TPH,PCBs	
RW-T2(8-10)	10/3/98	1250	BTEX,TPH,PAH,Cyanide	

TABLE 2
MONITORING WELL CONSTRUCTION DATA
CON EDISON, RAVENSWOOD PHASE II INVESTIGATION

Monitoring Well	Installation Date	Total Depth (feet bgs)	Screened Interval (feet bgs)
MWRV1	9/10/98	19	9-19
MWRV2	9/9/98	16.25	6-16
MWRV3	9/4/98	26	10-20
MWRV4	9/3/98	25	10-20
MWRV5	9/8/98	22.5	9-19
RMW2	9/30/98	13	3-13
RMW3	9/14/98	17	6.5-16.5
RMW4	9/11/98	23.75	13-23

TABLE 3
GROUNDWATER SAMPLE ANALYSIS
CON EDISON, RAVENSWOOD PHASE II INVESTIGATION

Sample ID	Date Collected	Time	Analysis	Comments
RW-MWRV1A-1	9/30/98	950	VOCs,SVOCs,Cyanide	
RW-MWRV2-1	9/30/98	1300	VOCs,SVOCs,Cyanide	
PW-MWRV3-1	9/30/98	1445	VOCs,SVOCs,Cyanide	
RW-MWRV4-1	9/30/98	1540	VOCs,SVOCs,Cyanide	
RW-MWRV5-1	9/30/98	1215	VOCs,SVOCs,Cyanide	
RW-MWRV1-1D	9/30/98	1300	VOCs,SVOCs,Cyanide	Duplicate sample of MWRV1A
RW-MWRV2-1M	9/30/98	1445	VOCs,SVOCs,Cyanide	Matrix Spike/Matrix Spike Duplicate Sample
RW-MWRB-1	9/30/98	900	VOCs,SVOCs,Cyanide	Field Blank
RW-MWTB-1	9/30/98		VOCs	Trip Blank
RMW2	10/9/98	1410	VOCs,SVOCs,Cyanide	
RMW3	10/9/98	1500	VOCs,SVOCs,Cyanide	
RMW4	10/9/98	1230	VOCs,SVOCs,Cyanide	
RMW4(MS/MSD)	10/9/98	1230	VOCs,SVOCs,Cyanide	Matrix Spike/Matrix Spike Duplicate Sample
RMW5	10/9/98	1505	VOCs,SVOCs,Cyanide	Duplicate sample of RMW4
FB01	10/9/98	1425	VOCs,SVOCs,Cyanide	Field Blank
TB01	10/9/98		VOCs	Trip Blank

TABLE 4
WELL PURGE DATA AND WATER QUALITY FIELD MEASUREMENTS
CON EDISON, RAVENSWOOD PHASE II INVESTIGATION

Date	Well I.D.	Total Water Purged (Gallons)	pH	Conductivity (wmhos/cm)	Temperature (oC)	Dissolved Oxygen (ppm)	Tubidity
9/30/98	MW-RV1A	3.0	6.5	1.03	21.7	2.86	999
9/30/98	MW-RV2	5	7.25	0.312	21.4	1.37	1000
9/30/98	MW-RV3	7.5	7.11	49.7	22.8	0.44	>1000
9/30/98	MW-RV4	5.5	7.31	5732	23.8	0.72	93
9/30/98	MW-RV5	5	7.15	22.1	25.6	1.55	>1000
10/9/98	RMW2	4.5	9.67	1.00	20.7	0.43	>1000
10/9/98	RMW3	5.0	5.2	0.94	24.5	1.43	979
10/9/98	RMW4	21.0	6.96	1.05	21.9	0.08	>1000

TABLE 5
DEPTH TO GROUNDWATER AND GROUNDWATER ELEVATIONS
CONSOLIDATED EDISON, RAVENSWOOD PHASE II INVESTIGATION

Monitoring Well ID	Total Depth	Well Casing Elevation	9/29/98 Depth to Water	9/29/98 Water Elevation	9/30/98 Depth to Water	9/30/98 Water Elevation	10/2/98 Depth to Water	10/2/98 Water Elevation	10/8/98 Depth to Water	10/8/98 Water Elevation	10/9/98 Depth to Water	10/9/98 Water Elevation	10/12/98 Depth to Water	10/12/98 Water Elevation
RMW-2	13.05'	15.32	NM	**NM**	NM	**NM**	NM	**NM**	NM	**NM**	7.43	**7.89**	7.14	**8.18**
RMW-3	14.49'	16.51	9.61	**6.9**	NM	**NM**	9.73	**6.78**	9.84	**6.67**	9.76	**6.75**	9.82	**6.69**
RMW-4	22.25'	16.17	9.75	**6.42**	NM	**NM**	9.81	**6.36**	9.92	**6.25**	9.84	**6.33**	10.04	**6.13**
MWRV-1A	16.97'	19.1	11.79	**7.31**	11.81	**7.29**	11.88	**7.22**	11.93	**7.17**	NM	**NM**	11.86	**7.24**
MWRV2	14.09'	13.14	4.8	**8.34**	4.77	**8.37**	NM	**NM**	3.55	**9.59**	NM	**NM**	3.47	**9.67**
MWRV3	19.85'	10.67	8.52	**2.15**	7.99	**2.68**	9.93	**0.74**	NM	**NM**	NM	**NM**	8.84	**1.83**
MWRV4	20.45'	7.23	8.98	**-1.75**	8.67	**-1.44**	10.54	**-3.31**	NM	**NM**	NM	**NM**	9.49	**-2.26**
MWRV5	19.55'	15.35	12.38	**2.97**	13.15	**2.2**	13.35	**2**	11.19	**4.16**	NM	**NM**	13.43	**1.92**

TABLE 6
TRANSFORMERS 1E, 1W, 3S, 3N
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. **Lab ID No.** **Matrix** **Date**	**NYSDEC** **Soil Clean-up** **Objectives** **(TAGM 4046)**	RW-SB1 (3-3.5) E39189-6 Soil 09/05/98	RW-SB1 (12-14) E39189-8 Soil 09/08/98	RW-SB2 (1-1.5) E39081-3 Soil 09/02/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	30 U	8040	207
Polychlorinated Biphenyls [ug/kg]				
Aroclor 1016	1,000 (surface) / 10,000 (subsurface)	20 U	38 U	37 U
Aroclor 1221	1,000 (surface) / 10,000 (subsurface)	20 U	76 U	55 U
Aroclor 1232	1,000 (surface) / 10,000 (subsurface)	20 U	38 U	37 U
Aroclor 1242	1,000 (surface) / 10,000 (subsurface)	20 U	38 U	37 U
Aroclor 1248	1,000 (surface) / 10,000 (subsurface)	20 U	38 U	37 U
Aroclor 1254	1,000 (surface) / 10,000 (subsurface)	20 U	38 U	37 U
Aroclor 1260	1,000 (surface) / 10,000 (subsurface)	20 U	38 U	4370

TABLE 6
TRANSFORMERS 1E, 1W, 3S, 3N
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB2D (1-1.5) E39081-4 Soil 09/02/98	RW-SB2 (12-14.5) E39189-5 Soil 09/04/98	RW-SB16 (5-5.5) E39959-2 Soil 09/24/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	251	7280	30.6
Polychlorinated Biphenyls [ug/kg]				
Aroclor 1016	1,000 (surface) / 10,000 (subsurface)	47 U	21 U	34 U
Aroclor 1221	1,000 (surface) / 10,000 (subsurface)	95 U	21 U	69 U
Aroclor 1232	1,000 (surface) / 10,000 (subsurface)	47 U	21 U	34 U
Aroclor 1242	1,000 (surface) / 10,000 (subsurface)	47 U	21 U	34 U
Aroclor 1248	1,000 (surface) / 10,000 (subsurface)	47 U	21 U	34 U
Aroclor 1254	1,000 (surface) / 10,000 (subsurface)	47 U	21 U	34 U
Aroclor 1260	1,000 (surface) / 10,000 (subsurface)	3380	179	72.3

TABLE 6
TRANSFORMERS 1E, 1W, 3S, 3N
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB16 (16-18) E40278-10 Soil 10/03/98	RW-SB17 (5-5.5) E39959-6 Soil 09/25/98	RW-SB17 (14-16) E40278-11 Soil 10/03/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	236	259	817
Polychlorinated Biphenyls [ug/kg]				
Aroclor 1016	1,000 (surface) / 10,000 (subsurface)	38 U	36 U	39 U
Aroclor 1221	1,000 (surface) / 10,000 (subsurface)	76 U	73 U	78 U
Aroclor 1232	1,000 (surface) / 10,000 (subsurface)	38 U	36 U	39 U
Aroclor 1242	1,000 (surface) / 10,000 (subsurface)	38 U	36 U	39 U
Aroclor 1248	1,000 (surface) / 10,000 (subsurface)	38 U	36 U	39 U
Aroclor 1254	1,000 (surface) / 10,000 (subsurface)	38 U	36 U	39 U
Aroclor 1260	1,000 (surface) / 10,000 (subsurface)	38 U	52.2	89.5

TABLE 7
SPILL ITEM #1
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB3 (6-8) E39651-4 Soil 09/16/98	RW-SB21 (5-5.5) E40158-6 Soil 09/28/98	RW-SB21 (6-8) E40278-4 Soil 10/01/98	RW-SB22 (2-3) E40158-8 Soil 09/29/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	9300	620	79.6	668
BTEX Constituents [ug/kg]					
Benzene	60	NA	0.6 U	0.58 U	2.7
Ethylbenzene	5,500	NA	0.6 U	0.58 U	18
Toluene	1,500	NA	0.6 U	0.58 U	4.6
Xylenes (total)	1,200	NA	0.6 U	0.58 U	11.7
PAH Constituents [ug/kg]					
Acenaphthene	50,000	NA	400 U	390 U	474 J
Acenaphthylene	41,000	NA	400 U	170 J	1490 J
Anthracene	50,000	NA	400 U	215 J	1210 J
Benzo(a)anthracene	224	NA	400 U	386 J	3300
Benzo(a)pyrene	61	NA	400 U	254 J	1600 J
Benzo(b)fluoranthene	1,100	NA	25.3 J	255 J	1680 J
Benzo(g,h,i)perylene	50,000	NA	400 U	86.7 J	1020 J
Benzo(k)fluoranthene	1,100	NA	400 U	244 J	2110 J
Chrysene	400	NA	400 U	529	4540
Dibenzo(a,h)anthracene	14	NA	400 U	390 U	558 J
Fluoranthene	50,000	NA	400 U	571	4440
Fluorene	50,000	NA	400 U	239 J	1980 J
Indeno(1,2,3-cd)pyrene	3,200	NA	400 U	71.9 J	870 J
Naphthalene	13,000	NA	400 U	58.9 J	606 J
Phenanthrene	50,000	NA	400 U	1050	7340
Pyrene	50,000	NA	400 U	757	7980
Cyanide [mg/kg]	NC	NA	1.9	1.2 U	27.4

TABLE 7
SPILL ITEM #1
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB22 (8-10) E40278-2 Soil 10/01/98	RW-SB23 (2-3) E40158-9 Soil 09/29/98	RW-SB23 (8-10) E40278-1 Soil 10/01/98	RW-H53 (1-1.5) E39081-2 Soil 09/01/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	6090	7000	17600	129
BTEX Constituents [ug/kg]					
Benzene	60	5.5 U	0.58 U	140 U	NA
Ethylbenzene	5,500	5.5 U	0.58 U	246	NA
Toluene	1,500	5.5 U	0.76	140 U	NA
Xylenes (total)	1,200	5.5 U	0.65	445	NA
PAH Constituents [ug/kg]					
Acenaphthene	50,000	160 J	1900 U	1970 J	NA
Acenaphthylene	41,000	246 J	170 J	2300 U	NA
Anthracene	50,000	300 J	669 J	2020 J	NA
Benzo(a)anthracene	224	494	1910	2470	NA
Benzo(a)pyrene	61	247 J	1680 J	1390 J	NA
Benzo(b)fluoranthene	1,100	273 J	1310 J	1260 J	NA
Benzo(g,h,i)perylene	50,000	104 J	906 J	2300 U	NA
Benzo(k)fluoranthene	1,100	384	1500 J	1110 J	NA
Chrysene	400	771	1860 J	3520	NA
Dibenzo(a,h)anthracene	14	360 U	426 J	2300 U	NA
Fluoranthene	50,000	1070	3210	4650	NA
Fluorene	50,000	535	1900 U	2400	NA
Indeno(1,2,3-cd)pyrene	3,200	99 J	785 J	2300 U	NA
Naphthalene	13,000	131 J	1900	4520	NA
Phenanthrene	50,000	1460	1870 J	3380	NA
Pyrene	50,000	1520	2960	4610	NA
Cyanide [mg/kg]	NC	6.3	1.2 U	1.2 U	NA

TABLE 8
SPILL ITEM #4
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB4 (1.5-2) E38803-4 Soil 08/31/98	RW-SB4 (12-14) E39081-5 Soil 09/03/98	RW-SB4 (24-26) E39081-6 Soil 09/03/98	RW-MWRV4 (2-2.5) E39081-1 Soil 09/01/98	RW-MWRV4 (14-16) E39081-7 Soil 09/03/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	86.1	255	78.6	139	141
BTEX Constituents [ug/kg]						
Benzene	60	0.58 U	770 U	6.2	0.5 U	0.72 U
Ethylbenzene	5,500	0.58 U	2890	46.7	0.5 U	0.91
Toluene	1,500	0.58 U	770 U	1.6	0.5 U	0.72 U
Xylenes (total)	1,200	0.96	5050	28.4	0.65	2.2
PAH Constituents [ug/kg]						
Acenaphthene	50,000	93.7 J	26400	4400	178 J	1320 J
Acenaphthylene	41,000	24 J	24900	2180	300 J	13800
Anthracene	50,000	194 J	62900	3790	390 J	5200
Benzo(a)anthracene	224	422	54000	3710	1000 J	31600
Benzo(a)pyrene	61	358 J	51700	2700	1140 J	35600
Benzo(b)fluoranthene	1,100	378 J	28800	1780	1300 J	23200
Benzo(g,h,i)perylene	50,000	111 J	4600	425	304 J	8170
Benzo(k)fluoranthene	1,100	380	12500	1740	946 J	10400
Chrysene	400	420	52100	3470	1070 J	34300
Dibenzo(a,h)anthracene	14	72 J	2920	241 J	179 J	5980
Fluoranthene	50,000	1080	93800	6990	2310 J	34800
Fluorene	50,000	94.5 J	14400	3750	202 J	4040
Indeno(1,2,3-cd)pyrene	3,200	114 J	4770	365 J	304 J	7810
Naphthalene	13,000	380 U	24200	9740	143 J	964 J
Phenanthrene	50,000	754	53700	10200	1460 J	1710 J
Pyrene	50,000	734	120000	9450	2090 J	57700
Cyanide [mg/kg]	NC	1.2 U	1.2	1.1 U	1.1 U	1.4 U

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB4 (1.5-2) E38803-4 Soil 08/31/98	RW-SB4 (12-14) E39081-5 Soil 09/03/98	RW-SB4 (24-26) E39081-6 Soil 09/03/98	RW-MWRV2 (5-5.5) E39189-9 Soil 09/08/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	86.1	255	78.6	29 U
BTEX Constituents [ug/kg]					
Benzene	60	0.58 U	770 U	6.2	0.84
Ethylbenzene	5,500	0.58 U	2890	46.7	0.58 U
Toluene	1,500	0.58 U	770 U	1.6	0.58 U
Xylenes (total)	1,200	0.96	5050	28.4	0.58 U
PAH Constituents [ug/kg]					
Acenaphthene	50,000	93.7 J	26400	4400	390 U
Acenaphthylene	41,000	24 J	24900	2180	390 U
Anthracene	50,000	194 J	62900	3790	390 U
Benzo(a)anthracene	224	422	54000	3710	390 U
Benzo(a)pyrene	61	358 J	51700	2700	390 U
Benzo(b)fluoranthene	1,100	378 J	28800	1780	390 U
Benzo(g,h,i)perylene	50,000	111 J	4600	425	390 U
Benzo(k)fluoranthene	1,100	380	12500	1740	390 U
Chrysene	400	420	52100	3470	390 U
Dibenzo(a,h)anthracene	14	72 J	2920	241 J	390 U
Fluoranthene	50,000	1080	93800	6990	390 U
Fluorene	50,000	94.5 J	14400	3750	390 U
Indeno(1,2,3-cd)pyrene	3,200	114 J	4770	365 J	390 U
Naphthalene	13,000	380 U	24200	9740	390 U
Phenanthrene	50,000	754	53700	10200	390 U
Pyrene	50,000	734	120000	9450	61 J
Cyanide [mg/kg]	NC	1.2 U	1.2	1.1 U	1.2 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-MWRV2D (5-5.5) E39189-10 Soil 09/08/98	RW-MWRV2 (14-16) E39336-2 Soil 09/09/98	RW-MWRV3 (3-3.5) E38803-3 Soil 08/28/98	RW-MWRV3 (12-14) E39189-1 Soil 09/04/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	30 U	37.9	105	9920
BTEX Constituents [ug/kg]					
Benzene	60	1.1	0.57 U	0.59 U	6.2 U
Ethylbenzene	5,500	0.6 U	1.6	0.59 U	470
Toluene	1,500	0.6 U	0.57 U	0.59 U	18.8
Xylenes (total)	1,200	0.6 U	3.4	0.59 U	189
PAH Constituents [ug/kg]					
Acenaphthene	50,000	600	1230	94.4 J	10000
Acenaphthylene	41,000	400 U	135 J	523	31700
Anthracene	50,000	106 J	2290	368 J	43700
Benzo(a)anthracene	224	43.2 J	2680	1770	37400
Benzo(a)pyrene	61	400 U	2640	2280	36900
Benzo(b)fluoranthene	1,100	400 U	2810	2720	25200
Benzo(g,h,i)perylene	50,000	400 U	685	788	5830
Benzo(k)fluoranthene	1,100	400 U	1350	1320	13600
Chrysene	400	39.6 J	2560	1920	33200
Dibenzo(a,h)anthracene	14	400 U	507	408	4450
Fluoranthene	50,000	291 J	6030	2980	63100
Fluorene	50,000	322 J	1510	202 J	2550
Indeno(1,2,3-cd)pyrene	3,200	400 U	812	731	6210
Naphthalene	13,000	77.3 J	2200	94 J	1600 J
Phenanthrene	50,000	82.9 J	6900	1190	114000
Pyrene	50,000	416	4610	2390	75500
Cyanide [mg/kg]	NC	1.2 U	1.1 U	1.2 U	1.2 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-MWRV3 (24-26) E39189-2 Soil 09/04/98	RW-MWRV4 (2-2.5) E39081-1 Soil 09/01/98	RW-MWRV4 (14-16) E39081-7 Soil 09/03/98	RW-MWRV5 (2-2.5) E38803-2 Soil 08/27/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	258	139	141	122
BTEX Constituents [ug/kg]					
Benzene	60	15700	0.5 U	0.72 U	0.55 U
Ethylbenzene	5,500	74900	0.5 U	0.91	0.55 U
Toluene	1,500	750 U	0.5 U	0.72 U	0.55 U
Xylenes (total)	1,200	95300	0.65	2.2	0.55 U
PAH Constituents [ug/kg]					
Acenaphthene	50,000	82200	178 J	1320 J	370 U
Acenaphthylene	41,000	15900	300 J	13800	57 J
Anthracene	50,000	48100	390 J	5200	53.6 J
Benzo(a)anthracene	224	28200	1000 J	31600	201 J
Benzo(a)pyrene	61	22700	1140 J	35600	238 J
Benzo(b)fluoranthene	1,100	12800	1300 J	23200	383
Benzo(g,h,i)perylene	50,000	5030	304 J	8170	102 J
Benzo(k)fluoranthene	1,100	8600	946 J	10400	370 U
Chrysene	400	27800	1070 J	34300	224 J
Dibenzo(a,h)anthracene	14	3250	179 J	5980	56.6 J
Fluoranthene	50,000	51300	2310 J	34800	396
Fluorene	50,000	61600	202 J	4040	370 U
Indeno(1,2,3-cd)pyrene	3,200	4910	304 J	7810	92.7 J
Naphthalene	13,000	286000	143 J	964 J	370 U
Phenanthrene	50,000	137000	1460 J	1710 J	178 J
Pyrene	50,000	71000	2090 J	57700	324 J
Cyanide [mg/kg]	NC	1.2 U	1.1 U	1.4 U	1.1 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-MWRV5 (18-20) E39189-7 Soil 09/05/98	RW-SB14 (5-6) E39336-4 Soil 09/09/98	RW-SB14A (14-16) E40278-9 Soil 10/03/98	RW-SB15 (5-5.5) E39189-3 Soil 09/04/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	32.6	1520	496	33.5
BTEX Constituents [ug/kg]					
Benzene	60	0.62 U	0.82	140 U	0.64 U
Ethylbenzene	5,500	0.62 U	17.5	865	0.64 U
Toluene	1,500	0.62 U	1.8	140 U	0.64 U
Xylenes (total)	1,200	0.62 U	19.3	140 U	2.2
PAH Constituents [ug/kg]					
Acenaphthene	50,000	264 J	2520	15300 D	904 J
Acenaphthylene	41,000	167 J	898	1260	11800
Anthracene	50,000	296 J	2210	7830 D	7850
Benzo(a)anthracene	224	616	1930	4070	20500
Benzo(a)pyrene	61	599	1900	2850	16500
Benzo(b)fluoranthene	1,100	549	1230	1430	11600
Benzo(g,h,i)perylene	50,000	279 J	467 J	1030	4160
Benzo(k)fluoranthene	1,100	375 J	1600	1480	10500
Chrysene	400	751	1910	3850	22700
Dibenzo(a,h)anthracene	14	167 J	296 J	380 U	2900
Fluoranthene	50,000	1100	3910	8010 D	22500
Fluorene	50,000	348 J	2500	5680	2300
Indeno(1,2,3-cd)pyrene	3,200	280 J	476 J	866	4130
Naphthalene	13,000	97500	3840	47400 D	721 J
Phenanthrene	50,000	1210	8180	23300 D	7510
Pyrene	50,000	1250	4680	9110 D	42700
Cyanide [mg/kg]	NC	1.3	1.1 U	2.9	1.3 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB15D (5-5.5) E39189-4 Soil 09/04/98	RW-SB15 (10-12) E39189-11 Soil 09/08/98	RW-SB05 (5-5.5)* E39810-4 Soil 09/23/98	RW-SB05 (10-11)* E39959-4 Soil 09/24/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	37.9	79.5	106	239
BTEX Constituents [ug/kg]					
Benzene	60	0.62 U	150 U	NA	0.58 U
Ethylbenzene	5,500	0.62 U	1150	NA	19.7
Toluene	1,500	0.62 U	150 U	NA	1
Xylenes (total)	1,200	1	2340	NA	18.4
PAH Constituents [ug/kg]					
Acenaphthene	50,000	1030 J	27000	NA	75.2 J
Acenaphthylene	41,000	12400	7230	NA	191 J
Anthracene	50,000	9360	10500	NA	209 J
Benzo(a)anthracene	224	24500	11100	NA	264 J
Benzo(a)pyrene	61	17800	9530	NA	222 J
Benzo(b)fluoranthene	1,100	12800	6630	NA	181 J
Benzo(g,h,i)perylene	50,000	4850	1860	NA	78.2 J
Benzo(k)fluoranthene	1,100	10900	4130	NA	157 J
Chrysene	400	26800	11300	NA	281 J
Dibenzo(a,h)anthracene	14	3450	1270	NA	38.9 J
Fluoranthene	50,000	27000	17800	NA	390
Fluorene	50,000	1890 J	24300	NA	319 J
Indeno(1,2,3-cd)pyrene	3,200	4760	1890	NA	74.2 J
Naphthalene	13,000	632 J	91100	NA	122 J
Phenanthrene	50,000	9130	49400	NA	871
Pyrene	50,000	48200	29800	NA	576
Cyanide [mg/kg]	NC	1.2 U	1.2 U	NA	9

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB6 (1.5-2)* E39651-2 Soil 09/11/98	RW-SB6 (6-7)* E39651-3 Soil 09/14/98	RW-T1 (6-8.5) E40278-8 Soil 10/02/98	RW-SB07 (1-2) E39810-1 Soil 09/22/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	86.6	9520	549	53.6
BTEX Constituents [ug/kg]					
Benzene	60	0.52 U	0.52	5.7 U	0.6 U
Ethylbenzene	5,500	0.52 U	0.98	5.7 U	0.6 U
Toluene	1,500	1.5	1.6	5.7 U	0.6 U
Xylenes (total)	1,200	2	2.4	5.7 U	0.6 U
PAH Constituents [ug/kg]					
Acenaphthene	50,000	75.5 J	258 J	2300	56.4 J
Acenaphthylene	41,000	64.3 J	167 J	338 J	551
Anthracene	50,000	240 J	432 J	4750	233 J
Benzo(a)anthracene	224	766	958 J	5650	1090
Benzo(a)pyrene	61	708	975 J	5410	1500
Benzo(b)fluoranthene	1,100	613	903 J	6680	1055
Benzo(g,h,i)perylene	50,000	498	661 J	1090	596
Benzo(k)fluoranthene	1,100	450	621 J	4590	1845
Chrysene	400	781	1090 J	5560	1490
Dibenzo(a,h)anthracene	14	244 J	308 J	760 U	400 U
Fluoranthene	50,000	1420	2070	14200 D	1610
Fluorene	50,000	92 J	458 J	2750	400
Indeno(1,2,3-cd)pyrene	3,200	437	565 J	1100	550
Naphthalene	13,000	24 J	140 J	2500	400
Phenanthrene	50,000	912	1940	15300 D	1200
Pyrene	50,000	1350	2180	9030	2230
Cyanide [mg/kg]	NC	1.2 U	1 U	1.1	1.2 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-T3 (10-12) / E40278-6 / Soil / 10/01/98	RW-SB9 (5-5.5)* / E39651-7 / Soil / 09/17/98	RW-SB9 (10-12)* / E39651-11 / Soil / 09/18/98	RW-T2 (8-10) / E40278-12 / Soil / 10/03/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	191	28 U	6400	8690
BTEX Constituents [ug/kg]					
Benzene	60	1500 U	0.56 U	150 U	360 U
Ethylbenzene	5,500	9590	0.56 U	408	360 U
Toluene	1,500	1500 U	0.56 U	150 U	360 U
Xylenes (total)	1,200	11100	0.56 U	446	607
PAH Constituents [ug/kg]					
Acenaphthene	50,000	55500 D	370 U	1040 J	569 J
Acenaphthylene	41,000	6580	370 U	210 J	2300 U
Anthracene	50,000	19000	370 U	1130 J	1050 J
Benzo(a)anthracene	224	11800	370 U	2810 J	1250 J
Benzo(a)pyrene	61	9450	370 U	2190 J	650 J
Benzo(b)fluoranthene	1,100	5020	370 U	1910 J	827 J
Benzo(g,h,i)perylene	50,000	1190 J	370 U	1040 J	327 J
Benzo(k)fluoranthene	1,100	7140	370 U	2010 J	469 J
Chrysene	400	12000	370 U	3240 J	1920 J
Dibenzo(a,h)anthracene	14	2000 U	370 U	624 J	2300 U
Fluoranthene	50,000	19500	370 U	5840	2500
Fluorene	50,000	22200	370 U	651 J	947 J
Indeno(1,2,3-cd)pyrene	3,200	1180 J	370 U	1090 J	288 J
Naphthalene	13,000	280000 D	28.8 J	7780	46600 D
Phenanthrene	50,000	79000 D	370 U	3180 J	4710
Pyrene	50,000	23400	370 U	4640	2880
Cyanide [mg/kg]	NC	1.2 U	1.1 U	1.2 U	1.2 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB10 (5-5.5) E39651-6 Soil 09/17/98	RW-SB10 (6-9) E39651-9 Soil 09/17/98	RW-SB11 (5-5.5) E39651-5 Soil 09/16/98	RW-SB11 (16-18) E39651-8 Soil 09/17/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	19400	268	39 U	1500
BTEX Constituents [ug/kg]					
Benzene	60	254000	95900	0.78 U	0.7 U
Ethylbenzene	5,500	948000	400000	0.78 U	0.7 U
Toluene	1,500	624000	249000	0.78 U	0.7 U
Xylenes (total)	1,200	1220000	534000	0.78 U	0.7 U
PAH Constituents [ug/kg]					
Acenaphthene	50,000	2640000	193000 J	520 U	170 J
Acenaphthylene	41,000	806000 J	417000	520 U	166 J
Anthracene	50,000	1250000 J	223000 J	520 U	161 J
Benzo(a)anthracene	224	627000 J	127000	520 U	165 J
Benzo(a)pyrene	61	498000 J	103000	520 U	148 J
Benzo(b)fluoranthene	1,100	328000	54600	520 U	73.7 J
Benzo(g,h,i)perylene	50,000	136000	26100	520 U	61.1 J
Benzo(k)fluoranthene	1,100	236000	47400	520 U	122 J
Chrysene	400	612000 J	119000	520 U	172 J
Dibenzo(a,h)anthracene	14	89600	15100	520 U	30.8 J
Fluoranthene	50,000	1220000 J	230000 J	520 U	274 J
Fluorene	50,000	2110000	413000	520 U	296 J
Indeno(1,2,3-cd)pyrene	3,200	127000	23400	520 U	62.6 J
Naphthalene	13,000	18000000	3050000	30.5 J	268 J
Phenanthrene	50,000	4580000	882000	520 U	664
Pyrene	50,000	1990000	390000	520 U	348 J
Cyanide [mg/kg]	NC	25.5	1.2 U	1.6 U	1.4 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB8 (5-5.5)* E39651-12 Soil 09/18/98	RW-SB8 (6-9)* E39651-14 Soil 09/11/98	RW-SB24 (5-5.5)* E40158-2 Soil 09/28/98	RW-SB24D (5-5.5)* E40158-3 Soil 09/28/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	240	433	30 U	155
BTEX Constituents [ug/kg]					
Benzene	60	350 U	9270	1950	2990
Ethylbenzene	5,500	350 U	17300	9160	9240
Toluene	1,500	350 U	56700	740 U	750 U
Xylenes (total)	1,200	350 U	136000	1360	1460
PAH Constituents [ug/kg]					
Acenaphthene	50,000	204 J	386 J	3900 U	4000 U
Acenaphthylene	41,000	832 J	498 J	2840 J	4220
Anthracene	50,000	387 J	718 J	521 J	976 J
Benzo(a)anthracene	224	1620 J	1330 J	2680 J	3850 J
Benzo(a)pyrene	61	1010 J	1020 J	3670 J	5080
Benzo(b)fluoranthene	1,100	936 J	601 J	3510 J	4580
Benzo(g,h,i)perylene	50,000	500 J	327 J	2120 J	2560 J
Benzo(k)fluoranthene	1,100	1130 J	802 J	2340 J	4080
Chrysene	400	1860	1420 J	3480 J	4740
Dibenzo(a,h)anthracene	14	322 J	191 J	1140 J	1450 J
Fluoranthene	50,000	1700 J	1880 J	1060 J	1820 J
Fluorene	50,000	527 J	931 J	1370 J	1120 J
Indeno(1,2,3-cd)pyrene	3,200	465 J	314 J	1860 J	2250 J
Naphthalene	13,000	2470	127000	1470 J	2430 J
Phenanthrene	50,000	1240 J	3160	1060 J	1990 J
Pyrene	50,000	2510	2760	3010 J	4860
Cyanide [mg/kg]	NC	10.2	37.7	1.2 U	22.6

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB24 (8-9)* E40158-5 Soil 09/28/98	RW-SB25 (5-5.5)* E40278-3 Soil 10/01/98	RW-SB25 (8-10)* E40278-5 Soil 10/01/98	RW-SB26 (5-5.5)* E39959-5 Soil 09/24/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	30 U	115	295	46.1
BTEX Constituents [ug/kg]					
Benzene	60	1700	150 U	14 U	0.55 U
Ethylbenzene	5,500	11600	1050	14 U	3.4
Toluene	1,500	774	324	14 U	0.98
Xylenes (total)	1,200	3420	7610	122	3
PAH Constituents [ug/kg]					
Acenaphthene	50,000	866 J	390 U	463 J	95.3 J
Acenaphthylene	41,000	1620 J	1200	1170	843
Anthracene	50,000	2910 J	451	807	2360
Benzo(a)anthracene	224	3570 J	601	1020	9400
Benzo(a)pyrene	61	2790 J	1400	986	8920
Benzo(b)fluoranthene	1,100	1990 J	1070	1000	10400
Benzo(g,h,i)perylene	50,000	1070 J	237 J	195 J	2530
Benzo(k)fluoranthene	1,100	1830 J	1010	943	5400
Chrysene	400	3450 J	872	1180	8870
Dibenzo(a,h)anthracene	14	10000 U	390 U	760 U	1440
Fluoranthene	50,000	4370 J	843	1990	17400 D
Fluorene	50,000	2450 J	168 J	734 J	522 J
Indeno(1,2,3-cd)pyrene	3,200	802 J	247 J	199 J	2780
Naphthalene	13,000	19300	6180	46400 D	3870
Phenanthrene	50,000	8430 J	937	2600	9830
Pyrene	50,000	7930 J	1320	2280	13800
Cyanide [mg/kg]	NC	39.4	15.6	3.4	4

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB26 (10-12)* E40158-1 Soil 09/28/98	RW-SB12 (4.5-5) E39651-10 Soil 09/18/98	RW-SB12 (10-12) E39651-13 Soil 09/18/98	RW-SB13 (5-5.5) E39810-5 Soil 09/23/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	30 U	27 U	57.4	629
BTEX Constituents [ug/kg]					
Benzene	60	0.59 U	0.54 U	760 U	5700 U
Ethylbenzene	5,500	0.59 U	0.54 U	15100	51100
Toluene	1,500	0.59 U	0.54 U	760 U	5700 U
Xylenes (total)	1,200	0.59 U	0.54 U	17400	54400
PAH Constituents [ug/kg]					
Acenaphthene	50,000	390 U	360 U	140 J	42000
Acenaphthylene	41,000	36.2 J	121 J	247 J	490000 D
Anthracene	50,000	48.5 J	32.7 J	164 J	141000
Benzo(a)anthracene	224	119 J	163 J	126 J	87200
Benzo(a)pyrene	61	106 J	238 J	125 J	93500
Benzo(b)fluoranthene	1,100	73.6 J	129 J	48.7 J	43400
Benzo(g,h,i)perylene	50,000	74 J	113 J	39.9 J	20100
Benzo(k)fluoranthene	1,100	67.4 J	136 J	85.8 J	82300
Chrysene	400	140 J	187 J	123 J	98600
Dibenzo(a,h)anthracene	14	30.4 J	51.2 J	400 U	9400 U
Fluoranthene	50,000	159 J	131 J	190 J	144000
Fluorene	50,000	59.4 J	360 U	276 J	341000 D
Indeno(1,2,3-cd)pyrene	3,200	58.2 J	89 J	30.7 J	20400
Naphthalene	13,000	305 J	118 J	948	1480000 D
Phenanthrene	50,000	217 J	75 J	636	736000 D
Pyrene	50,000	306 J	283 J	329 J	322000 D
Cyanide [mg/kg]	NC	2.2	1.1 U	1.2 U	1.1 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB13 (10-12) E40158-4 Soil 09/28/98	RW-SB18 (5-5.5)* E39336-3 Soil 09/09/98	RW-SB18 (12-14)* E39336-7 Soil 09/10/98	RW-SB19A (2-3)* E39810-3 Soil 09/22/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	1130	30 U	72.7	24600
BTEX Constituents [ug/kg]					
Benzene	60	710 U	0.6 U	0.58 U	140 U
Ethylbenzene	5,500	12800	0.6 U	0.58 U	140 U
Toluene	1,500	710 U	0.6 U	0.58 U	140 U
Xylenes (total)	1,200	14000	0.6 U	0.58 U	295
PAH Constituents [ug/kg]					
Acenaphthene	50,000	17300	400 U	380 U	3700 U
Acenaphthylene	41,000	14400	30.8 J	380 U	3700 U
Anthracene	50,000	24700	75.6 J	380 U	3700 U
Benzo(a)anthracene	224	30600	183 J	380 U	3700 U
Benzo(a)pyrene	61	23000	219 J	380 U	3700 U
Benzo(b)fluoranthene	1,100	9130 J	132 J	380 U	3700 U
Benzo(g,h,i)perylene	50,000	6890 J	141 J	380 U	3700 U
Benzo(k)fluoranthene	1,100	14200	198 J	380 U	3700 U
Chrysene	400	31400	228 J	380 U	1880 J
Dibenzo(a,h)anthracene	14	3620 J	67.3 J	380 U	3700 U
Fluoranthene	50,000	52200	447	380 U	3700 U
Fluorene	50,000	60600	400 U	380 U	3700 U
Indeno(1,2,3-cd)pyrene	3,200	5390 J	117 J	380 U	3700 U
Naphthalene	13,000	209000 D	27.4 J	380 U	3700 U
Phenanthrene	50,000	182000 D	406	380 U	3700 U
Pyrene	50,000	92300	433	380 U	2320 J
Cyanide [mg/kg]	NC	1.1 U	1.2 U	1.1 U	1.1 U

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-SB19A (10-12)*	RW-SB20A (1-2)*	RW-SB20A (12-14)*	RW-MWRV1 (1.5-2)*
Lab ID No.		E39959-3	E39810-2	E39959-1	E38803-1
Matrix		Soil	Soil	Soil	Soil
Date		09/24/98	09/22/98	09/24/98	08/27/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	157	31 U	29 U	1750
BTEX Constituents [ug/kg]					
Benzene	60	0.59 U	0.63 U	0.58 U	NA
Ethylbenzene	5,500	0.59 U	0.63 U	0.58 U	NA
Toluene	1,500	0.59 U	0.63 U	0.58 U	NA
Xylenes (total)	1,200	0.95	0.63 U	0.58 U	NA
PAH Constituents [ug/kg]					
Acenaphthene	50,000	460 U	179 J	390 U	NA
Acenaphthylene	41,000	460 U	620	390 U	NA
Anthracene	50,000	460 U	785	390 U	NA
Benzo(a)anthracene	224	460 U	3260	390 U	NA
Benzo(a)pyrene	61	460 U	3480	390 U	NA
Benzo(b)fluoranthene	1,100	460 U	3230	390 U	NA
Benzo(g,h,i)perylene	50,000	460 U	1080	390 U	NA
Benzo(k)fluoranthene	1,100	460 U	3940	390 U	NA
Chrysene	400	460 U	4040	390 U	NA
Dibenzo(a,h)anthracene	14	460 U	420 U	390 U	NA
Fluoranthene	50,000	32.5 J	5080	390 U	NA
Fluorene	50,000	460 U	373 J	390 U	NA
Indeno(1,2,3-cd)pyrene	3,200	460 U	1100	390 U	NA
Naphthalene	13,000	460 U	140 J	390 U	NA
Phenanthrene	50,000	460 U	4010	390 U	NA
Pyrene	50,000	32.2 J	5890	390 U	NA
Cyanide [mg/kg]	NC	1.2 U	2	1.2 U	NA

* Indicates location also used for Spill Item #6.

TABLE 9
SPILL ITEM #6 AND FORMER MGP SITE
SOIL ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Soil Clean-up Objectives (TAGM 4046)	RW-MWRV1A (5-5.5)* E39336-5 Soil 09/10/98	RW-MWRV1A (16-18)* E39336-8 Soil 09/10/98
Total Petroleum Hydrocarbons (TPH) [mg/kg]	500	69.9	237
BTEX Constituents [ug/kg]			
Benzene	60	0.58 U	0.59 U
Ethylbenzene	5,500	0.58 U	0.59 U
Toluene	1,500	1	1.1
Xylenes (total)	1,200	0.58 U	0.59 U
PAH Constituents [ug/kg]			
Acenaphthene	50,000	390 U	181 J
Acenaphthylene	41,000	119 J	390 U
Anthracene	50,000	57.5 J	923
Benzo(a)anthracene	224	468	1690
Benzo(a)pyrene	61	495	1410
Benzo(b)fluoranthene	1,100	446	1590
Benzo(g,h,i)perylene	50,000	151 J	267 J
Benzo(k)fluoranthene	1,100	559	1300
Chrysene	400	535	1670
Dibenzo(a,h)anthracene	14	106 J	197 J
Fluoranthene	50,000	677	3740
Fluorene	50,000	390 U	227 J
Indeno(1,2,3-cd)pyrene	3,200	175 J	307 J
Naphthalene	13,000	390 U	390 U
Phenanthrene	50,000	108 J	2560
Pyrene	50,000	591	2620
Cyanide [mg/kg]	NC	1.6	1.2 U

* Indicates location also used for Spill Item #6.

TABLE 10
GROUNDWATER ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Water Quality Standards/ Guidance Values (Class GA)	RW-MWRV1A E40158-10 Groundwater 09/30/98	RW-MWRV2 E40158-11 Groundwater 09/30/98	RW-MWRV2D E40158-15 Groundwater 09/30/98	RW-MWRV3 E40158-12 Groundwater 09/30/98	RW-MWRV3D E40158-16 Groundwater 09/30/98
Volatile Organics [ug/L]						
Acetone	50	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Acrolein	5	NA	NA	NA	NA	NA
Acrylonitrile	5	NA	NA	NA	NA	NA
Benzene	0.7	0.5 U	12.2	12.8	0.94	0.94
2-Butanone (MEK)	50	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Bromochloromethane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Bromodichloromethane	50	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Bromoform	50	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Bromomethane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Carbon disulfide	NC	0.5 U	2.5 U	2.5 U	1.9	2.2
Carbon tetrachloride	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Chlorobenzene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Dibromochloromethane	50	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Chloroethane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
2-Chloroethyl vinyl ether	NC	NA	NA	NA	NA	NA
Chloroform	7	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Chloromethane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
1,2-Dibromoethane	NC	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	4.7	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	4.7	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	5	NA	NA	NA	NA	NA
1,1-Dichloroethane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
1,2-Dichloroethane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
1,1-Dichloroethene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U

TABLE 10
GROUNDWATER ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Water Quality Standards/ Guidance Values (Class GA)	RW-MWRV1A E40158-10 Groundwater 09/30/98	RW-MWRV2 E40158-11 Groundwater 09/30/98	RW-MWRV2D E40158-15 Groundwater 09/30/98	RW-MWRV3 E40158-12 Groundwater 09/30/98	RW-MWRV3D E40158-16 Groundwater 09/30/98
1,2-Dichloropropane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Ethylbenzene	5	0.5 U	84.1	98.7	3.9	4.2
2-Hexanone	50	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Methylene chloride	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone (MIBK)	NC	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Styrene	5	0.5 U	2.5 U	2.5 U	0.52	0.69
1,1,2,2-Tetrachloroethane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Tetrachloroethene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Toluene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	5	1	2.5 U	2.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Trichloroethene	5	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Trichlorofluoromethane	5	NA	NA	NA	NA	NA
Vinyl acetate	NC	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Vinyl chloride	2	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U
Xylene (total)	5	0.5 U	86.2	104	1.9	2.8
Semi-Volatile Organics [ug/L]						
2-Chlorophenol	1	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methyl phenol	1	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	1	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	1	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	1	26 U	25 U	25 U	26 U	25 U
4,6-Dinitro-o-cresol	1	26 U	25 U	25 U	26 U	25 U
2-Methylphenol	1	10 U	10 U	10 U	10 U	10 U
3&4-Methylphenol	1	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	1	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	1	26 U	25 U	25 U	26 U	25 U

TABLE 10
GROUNDWATER ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Water Quality Standards/ Guidance Values (Class GA)	RW-MWRV1A E40158-10 Groundwater 09/30/98	RW-MWRV2 E40158-11 Groundwater 09/30/98	RW-MWRV2D E40158-15 Groundwater 09/30/98	RW-MWRV3 E40158-12 Groundwater 09/30/98	RW-MWRV3D E40158-16 Groundwater 09/30/98
Pentachlorophenol	1	26 U	25 U	25 U	26 U	25 U
Phenol	1	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	1	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	1	10 U	10 U	10 U	10 U	10 U
Acenaphthene	20	10 U	146	143	10	15.2
Acenaphthylene	NC	10 U	7.7 J	5.4 J	10.1	14.9
Anthracene	50	10 U	16.4	12.8	6.1 J	10.8
Benzidine	5	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.002	10 U	3.1 J	1.2 J	12.8	21.8
Benzo(a)pyrene	ND	10 U	1.9 J	10 U	12.4	19.5
Benzo(b)fluoranthene	0.002	10 U	0.98 J	10 U	6.5 J	9.3 J
Benzo(g,h,i)perylene	NC	10 U	0.7 J	10 U	7.6 J	9.9 J
Benzo(k)fluoranthene	0.002	10 U	0.94 J	10 U	6.2 J	10.2
4-Bromophenyl phenyl ether	1	10 U	10 U	10 U	10 U	10 U
Butyl benzyl phthalate	50	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	5	10 U	10 U	10 U	10 U	10 U
Carbazole	NC	10 U	5.7 J	4.9 J	10 U	10 U
Chrysene	0.002	10 U	3.2 J	1.2 J	13.8	22.9
bis(2-Chloroethoxy)methane	5	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	1	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)ether	5	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl phenyl ether	1	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	4.7	10 U	10 U	10 U	10 U	10 U
1,2-Diphenylhydrazine	ND	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	5	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	4.7	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	5	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	5	10 U	10 U	10 U	10 U	10 U

TABLE 10
GROUNDWATER ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Water Quality Standards/ Guidance Values (Class GA)	RW-MWRV1A E40158-10 Groundwater 09/30/98	RW-MWRV2 E40158-11 Groundwater 09/30/98	RW-MWRV2D E40158-15 Groundwater 09/30/98	RW-MWRV3 E40158-12 Groundwater 09/30/98	RW-MWRV3D E40158-16 Groundwater 09/30/98
3,3'-Dichlorobenzidine	5	20 U	20 U	20 U	20 U	20 U
Dibenzo(a,h)anthracene	NC	10 U	10 U	10 U	10 U	10 U
Dibenzofuran	NC	10 U	8.6 J	7.4 J	10 U	10 U
Di-n-butyl phthalate	50	10 U	10 U	10 U	10 U	10 U
Di-n-octyl phthalate	50	10 U	10 U	10 U	10 U	10 U
Diethyl phthalate	50	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate	50	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	50	10 U	10 U	10 U	10 U	10 U
Fluoranthene	50	10 U	8.7 J	5.7 J	21	38.8
Fluorene	50	10 U	62	58.4	1.4 J	2.6 J
Hexachlorobenzene	0.35	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	5	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	5	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	5	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	0.002	10 U	0.52 J	10 U	5.1 J	6.4 J
Isophorone	50	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	NC	10 U	936 D	752 D	1.1 J	1.7 J
2-Nitroaniline	5	26 U	25 U	25 U	26 U	25 U
3-Nitroaniline	5	26 U	25 U	25 U	26 U	25 U
4-Nitroaniline	5	26 U	25 U	25 U	26 U	25 U
Naphthalene	10	10 U	3300 D	2640 D	2.9 J	3.6 J
Nitrobenzene	5	10 U	10 U	10 U	10 U	10 U
N-Nitrosodimethylamine	NC	NA	NA	NA	NA	NA
N-Nitroso-di-n-propylamine	NC	10 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	50	10 U	10 U	10 U	10 U	10 U
Phenanthrene	50	10 U	63.8	55.2	15.6	26
Pyrene	50	10 U	11.4	6.6 J	32.3	58.9
1,2,4-Trichlorobenzene	5	10 U	10 U	10 U	10 U	10 U
Cyanide [mg/L]	0.10	0.12	0.01 U	0.01 U	0.012	0.01 U

TABLE 10
GROUNDWATER ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. Lab ID No. Matrix Date	NYSDEC Water Quality Standards/ Guidance Values (Class GA)	RW-MWRV4 E40158-13 Groundwater 09/30/98	RW-MWRV5 E40158-14 Groundwater 09/30/98	RMW2 E40577-4 Groundwater 10/09/98	RMW3 E40577-3 Groundwater 10/09/98	RMW4 E40577-1 Groundwater 10/09/98	RMW5 E40577-2 Groundwater 10/09/98
Volatile Organics [ug/L]							
Acetone	50	0.5 U	0.5 U	NA	NA	NA	NA
Acrolein	5	NA	NA	2.2 U	2.2 U	2.2 U	2.2 U
Acrylonitrile	5	NA	NA	2.4 U	2.4 U	2.4 U	2.4 U
Benzene	0.7	2.2	4	1.6	0.28 U	26.6	0.28 U
2-Butanone (MEK)	50	0.5 U	0.5 U	NA	NA	NA	NA
Bromochloromethane	5	0.5 U	0.5 U	NA	NA	NA	NA
Bromodichloromethane	50	0.5 U	0.5 U	0.27 U	0.27 U	0.27 U	0.27 U
Bromoform	50	0.5 U	0.5 U	0.21 U	0.21 U	0.21 U	0.21 U
Bromomethane	5	0.5 U	0.5 U	0.54 U	0.54 U	0.54 U	0.54 U
Carbon disulfide	NC	0.5 U	0.5 U	NA	NA	NA	NA
Carbon tetrachloride	5	0.5 U	0.5 U	0.12 U	0.12 U	0.12 U	0.12 U
Chlorobenzene	5	0.5 U	0.5 U	0.71 U	0.71 U	0.71 U	0.71 U
Dibromochloromethane	50	0.5 U	0.5 U	0.32 U	0.32 U	0.32 U	0.32 U
Chloroethane	5	0.5 U	0.5 U	0.71 U	0.71 U	0.71 U	0.71 U
2-Chloroethyl vinyl ether	NC	NA	NA	0.52 U	0.52 U	0.52 U	0.52 U
Chloroform	7	0.5 U	0.5 U	11.7	5.6	0.9 U	5.1
Chloromethane	5	0.5 U	0.5 U	0.75 U	0.75 U	0.75 U	0.75 U
1,2-Dibromo-3-chloropropane	5	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dibromoethane	NC	0.5 U	0.5 U	NA	NA	NA	NA
1,2-Dichlorobenzene	4.7	0.5 U	0.5 U	0.56 U	0.56 U	0.56 U	0.56 U
1,3-Dichlorobenzene	5	0.5 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U
1,4-Dichlorobenzene	4.7	0.5 U	0.5 U	0.48 U	0.48 U	0.48 U	0.48 U
Dichlorodifluoromethane	5	NA	NA	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5	0.5 U	0.5 U	0.39 U	0.39 U	0.39 U	0.39 U
1,2-Dichloroethane	5	0.5 U	0.5 U	0.53 U	0.53 U	0.53 U	0.53 U
1,1-Dichloroethene	5	0.5 U	0.5 U	0.39 U	0.39 U	0.39 U	0.39 U
cis-1,2-Dichloroethene	5	0.5 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U
trans-1,2-Dichloroethene	5	0.5 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U

TABLE 10
GROUNDWATER ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Water Quality Standards/ Guidance Values (Class GA)	RW-MWRV4 E40158-13 Groundwater 09/30/98	RW-MWRV5 E40158-14 Groundwater 09/30/98	RMW2 E40577-4 Groundwater 10/09/98	RMW3 E40577-3 Groundwater 10/09/98	RMW4 E40577-1 Groundwater 10/09/98	RMW5 E40577-2 Groundwater 10/09/98
1,2-Dichloropropane	5	0.5 U	0.5 U	0.4 U	0.4 U	0.4 U	0.4 U
cis-1,3-Dichloropropene	5	0.5 U	0.5 U	0.26 U	0.26 U	0.26 U	0.26 U
trans-1,3-Dichloropropene	5	0.5 U	0.5 U	0.29 U	0.29 U	0.29 U	0.29 U
Ethylbenzene	5	7.7	18.6	0.41	0.17 U	0.91	0.17 U
2-Hexanone	50	0.5 U	0.5 U	NA	NA	NA	NA
Methylene chloride	5	0.5 U	0.5 U	0.61 U	0.61 U	0.61 U	0.61 U
4-Methyl-2-pentanone (MIBK)	NC	0.5 U	0.5 U	NA	NA	NA	NA
Styrene	5	0.57	1.4	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	5	0.5 U	0.5 U	0.7 U	0.7 U	0.7 U	0.7 U
Tetrachloroethene	5	0.5 U	0.5 U	0.23 U	0.23 U	0.23 U	0.23 U
Toluene	5	0.5 U	12.1	11.3	1.6	1.7	1.2
1,1,1-Trichloroethane	5	0.5 U	0.5 U	0.13 U	0.13 U	0.13 U	0.13 U
1,1,2-Trichloroethane	5	0.5 U	0.5 U	0.29 U	0.29 U	0.29 U	0.29 U
Trichloroethene	5	0.5 U	0.5 U	0.49 U	0.49 U	0.49 U	0.49 U
Trichlorofluoromethane	5	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U
Vinyl acetate	NC	0.5 U	0.5 U	NA	NA	NA	NA
Vinyl chloride	2	0.5 U	0.5 U	0.39 U	0.39 U	0.39 U	0.39 U
Xylene (total)	5	6.3	31.8	1 U	1 U	1 U	1 U
Semi-Volatile Organics [ug/L]							
2-Chlorophenol	1	10 U	10 U	0.99 U	0.99 U	0.98 U	0.98 U
4-Chloro-3-methyl phenol	1	10 U	10 U	0.75 U	0.75 U	0.74 U	0.74 U
2,4-Dichlorophenol	1	10 U	10 U	0.96 U	0.96 U	0.95 U	0.95 U
2,4-Dimethylphenol	1	10 U	10 U	1.4 U	1.4 U	1.4 U	1.4 U
2,4-Dinitrophenol	1	25 U	25 U	1.1 U	1.1 U	1.1 U	1.1 U
4,6-Dinitro-o-cresol	1	25 U	25 U	0.68 U	0.68 U	0.67 U	0.67 U
2-Methylphenol	1	10 U	10 U	NA	NA	NA	NA
3&4-Methylphenol	1	10 U	10 U	NA	NA	NA	NA
2-Nitrophenol	1	10 U	10 U	0.82 U	0.82 U	0.81 U	0.81 U
4-Nitrophenol	1	25 U	25 U	1 U	1 U	0.99 U	0.99 U

TABLE 10
GROUNDWATER ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Water Quality Standards/ Guidance Values (Class GA)	RW-MWRV4 E40158-13 Groundwater 09/30/98	RW-MWRV5 E40158-14 Groundwater 09/30/98	RMW2 E40577-4 Groundwater 10/09/98	RMW3 E40577-3 Groundwater 10/09/98	RMW4 E40577-1 Groundwater 10/09/98	RMW5 E40577-2 Groundwater 10/09/98
Pentachlorophenol	1	25 U	25 U	0.7 U	0.7 U	0.69 U	0.69 U
Phenol	1	10 U	10 U	1.2 U	1.2 U	1.2 U	1.2 U
2,4,5-Trichlorophenol	1	10 U	10 U	NA	NA	NA	NA
2,4,6-Trichlorophenol	1	10 U	10 U	0.63 U	0.63 U	0.62 U	0.62 U
Acenaphthene	20	23.4	13.7	1.2 U	1.2 U	2	1.2 U
Acenaphthylene	NC	24.6	10 U	1.2 U	1.2 U	1.2 U	1.2 U
Anthracene	50	4.1 J	10 U	1.2 U	1.2 U	1.2 U	1.2 U
Benzidine	5	NA	NA	1.9 U	1.9 U	1.9 U	1.9 U
Benzo(a)anthracene	0.002	2.7 J	10 U	1.2 U	1.2 U	1.2 U	1.2 U
Benzo(a)pyrene	ND	2.7 J	10 U	1.4 U	1.4 U	1.4 U	1.4 U
Benzo(b)fluoranthene	0.002	1.2 J	10 U	1.4 U	1.4 U	1.3 U	1.3 U
Benzo(g,h,i)perylene	NC	1.9 J	10 U	1.4 U	1.4 U	1.4 U	1.4 U
Benzo(k)fluoranthene	0.002	1.6 J	10 U	1.4 U	1.4 U	1.4 U	1.4 U
4-Bromophenyl phenyl ether	1	10 U	10 U	1.2 U	1.2 U	1.2 U	1.2 U
Butyl benzyl phthalate	50	10 U	10 U	1.5 U	1.5 U	1.5 U	1.5 U
2-Chloronaphthalene	10	10 U	10 U	1.3 U	1.3 U	1.3 U	1.3 U
4-Chloroaniline	5	10 U	10 U	1.3 U	1.3 U	1.3 U	1.3 U
Carbazole	NC	10 U	10 U	NA	NA	NA	NA
Chrysene	0.002	3.2 J	10 U	1.6 U	1.6 U	1.5 U	1.5 U
bis(2-Chloroethoxy)methane	5	10 U	10 U	1.5 U	1.5 U	1.4 U	1.4 U
bis(2-Chloroethyl)ether	1	10 U	10 U	2.3 U	2.3 U	2.3 U	2.3 U
bis(2-Chloroisopropyl)ether	5	10 U	10 U	1.3 U	1.3 U	1.3 U	1.3 U
4-Chlorophenyl phenyl ether	1	10 U	10 U	1.3 U	1.3 U	1.3 U	1.3 U
1,2-Dichlorobenzene	4.7	10 U	10 U	1.4 U	1.4 U	1.4 U	1.4 U
1,2-Diphenylhydrazine	ND	NA	NA	1.4 U	1.4 U	1.4 U	1.4 U
1,3-Dichlorobenzene	5	10 U	10 U	1.2 U	1.2 U	1.2 U	1.2 U
1,4-Dichlorobenzene	4.7	10 U	10 U	1.2 U	1.2 U	1.2 U	1.2 U
2,4-Dinitrotoluene	5	10 U	10 U	1.4 U	1.4 U	1.4 U	1.4 U
2,6-Dinitrotoluene	5	10 U	10 U	1.3 U	1.3 U	1.3 U	1.3 U

TABLE 10
GROUNDWATER ANALYTICAL RESULTS
CON EDISON RAVENSWOOD PHASE II INVESTIGATION

Sample ID No. / Lab ID No. / Matrix / Date	NYSDEC Water Quality Standards/ Guidance Values (Class GA)	RW-MWRV4 E40158-13 Groundwater 09/30/98	RW-MWRV5 E40158-14 Groundwater 09/30/98	RMW2 E40577-4 Groundwater 10/09/98	RMW3 E40577-3 Groundwater 10/09/98	RMW4 E40577-1 Groundwater 10/09/98	RMW5 E40577-2 Groundwater 10/09/98
3,3'-Dichlorobenzidine	5	20 U	20 U	1.7 U	1.7 U	1.7 U	1.7 U
Dibenzo(a,h)anthracene	NC	10 U	10 U	1.6 U	1.6 U	1.6 U	1.6 U
Dibenzofuran	NC	1.3 J	1.6 J	NA	NA	NA	NA
Di-n-butyl phthalate	50	10 U	10 U	1.4 U	1.4 U	1.4 U	1.4 U
Di-n-octyl phthalate	50	10 U	10 U	1.6 U	1.6 U	1.6 U	1.6 U
Diethyl phthalate	50	10 U	10 U	1.5 U	1.5 U	1.5 U	1.5 U
Dimethyl phthalate	50	10 U	10 U	1.5 U	1.5 U	1.5 U	1.5 U
bis(2-Ethylhexyl)phthalate	50	10 U	10 U	4	1.5 U	1.5 U	1.5 U
Fluoranthene	50	6.8 J	1.6 J	1.2 U	1.2 U	1.2 U	1.2 U
Fluorene	50	7.8 J	2.1 J	1.4 U	1.4 U	1.4 U	1.4 U
Hexachlorobenzene	0.35	10 U	10 U	1.4 U	1.4 U	1.4 U	1.4 U
Hexachlorobutadiene	5	10 U	10 U	1.2 U	1.2 U	1.2 U	1.2 U
Hexachlorocyclopentadiene	5	10 U	10 U	0.75 U	0.75 U	0.74 U	0.74 U
Hexachloroethane	5	10 U	10 U	1.3 U	1.3 U	1.2 U	1.2 U
Indeno(1,2,3-cd)pyrene	0.002	1.2 J	10 U	1.4 U	1.4 U	1.4 U	1.4 U
Isophorone	50	10 U	10 U	1.2 U	1.2 U	1.2 U	1.2 U
2-Methylnaphthalene	NC	2.4 J	5.4 J	NA	NA	NA	NA
2-Nitroaniline	5	25 U	25 U	NA	NA	NA	NA
3-Nitroaniline	5	25 U	25 U	NA	NA	NA	NA
4-Nitroaniline	5	25 U	25 U	NA	NA	NA	NA
Naphthalene	10	13.7	93.7	1.3 U	1.3 U	1.3 U	1.3 U
Nitrobenzene	5	10 U	10 U	1.2 U	1.2 U	1.2 U	1.2 U
N-Nitrosodimethylamine	NC	NA	NA	1.7 U	1.7 U	1.7 U	1.7 U
N-Nitroso-di-n-propylamine	NC	10 U	10 U	1.3 U	1.3 U	1.3 U	1.3 U
N-Nitrosodiphenylamine	50	10 U	10 U	1.5 U	1.5 U	1.5 U	1.5 U
Phenanthrene	50	12.8	2.8 J	1.3 U	1.3 U	1.3 U	1.3 U
Pyrene	50	8.3 J	1.2 J	1.4 U	1.4 U	1.4 U	1.4 U
1,2,4-Trichlorobenzene	5	10 U	10 U	1.4 U	1.4 U	1.4 U	1.4 U
Cyanide [mg/L]	0.10	0.09	0.055	NA	NA	NA	NA

TABLE 11

SUMMARY OF PHYSICAL, CHEMICAL AND FATE DATA FOR CHEMICAL CONSTITUENTS OF POTENTIAL CONCERN

Parameter	Water Solubility (mg/l) [a]	Vapor Pressure (mm-Hg) [a]	Henry's Law Constant (atm-m3/mole) [a]	Koc (ml/g) [a]	Log (Kow) [a]	Susceptable to Photolysis [b,c]	Susceptible to Hydrolysis [b,c]	Fish (l/Kg) [a]
VOLATILE ORGANICS:								
Non-Halogenated Aromatic:								
Benzene	1.75×10^{3}	9.52×10^{1}	5.59×10^{-3}	8.3×10^{1}	2.12	Negligible	No	5.2
Ethylbenzene	1.52×10^{2}	7.00×10^{0}	6.43×10^{-3}	1.10×10^{3}	3.15	Negligible	No	37.5
Toluene	5.35×10^{2}	2.81×10^{1}	6.37×10^{-3}	3.0×10^{2}	2.73	Negligible	No	10.7
Xylene	1.98×10^{2}	1.00×10^{1}	7.04×10^{-3}	2.40×10^{2}	3.26	Unavailable	No[d]	2.2[d]
SEMIVOLATILE ORGANICS:								
PAHs:								
Acenaphthene	3.42×10^{0}	1.55×10^{-3}	9.20×10^{-5}	4.60×10^{3}	4.00	Negligible	No	242
Acenaphthylene	3.93×10^{0}	2.90×10^{-2}	1.48×10^{-3}	2.50×10^{3}	3.70	Unavailable	No	119(b)
Anthracene	4.50×10^{-2}	1.95×10^{-4}	1.02×10^{-3}	1.40×10^{4}	4.45	Negligible	No	478(b)
Benzo(a)anthracene	5.70×10^{-3}	2.20×10^{-8}	1.16×10^{-6}	1.38×10^{6}	5.60	Negligible	No	Unavailable
Benzo(a)pyrene	1.20×10^{-3}	5.60×10^{-9}	1.55×10^{-6}	5.50×10^{6}	6.06	Negligible	No	Unavailable
Benzo(b)fluoranthene	1.40×10^{-2}	5.00×10^{-7}	1.19×10^{-5}	5.50×10^{5}	6.06	Unavailable	No	Unavailable
Benzo(g,h,i)perylene	7.00×10^{-4}	1.03×10^{-10}	5.34×10^{-8}	1.60×10^{-8}	6.51	Unavailable	No	Unavailable
Benzo(k)fluoranthene	4.30×10^{-3}	5.10×10^{-7}	3.94×10^{-5}	5.50×10^{5}	5.06	Unavailable	No	Unavailable
Chrysene	1.80×10^{-3}	6.30×10^{-9}	1.05×10^{-6}	2.00×10^{5}	5.61	Unavailable	No	Unavailable
Dibenzo(a,h)anthracene	5.00×10^{-4}	1.00×10^{-10}	7.33×10^{-8}	3.30×10^{6}	6.80	Unavailable	No	Unavailable
Fluoranthene	2.06×10^{-1}	5.00×10^{-6}	6.46×10^{-6}	3.80×10^{4}	4.90	Unavailable	No	1150
Fluorene	1.69×10^{0}	7.10×10^{-4}	6.42×10^{-5}	7.30×10^{3}	4.20	Unavailable	No	1300
Indeno(1,2,3-c,d)pyrene	5.30×10^{-4}	1.00×10^{-10}	6.86×10^{-8}	1.60×10^{6}	6.50	Unavailable	No	Unavailable

TABLE 11

SUMMARY OF PHYSICAL, CHEMICAL AND FATE DATA FOR CHEMICAL CONSTITUENTS OF POTENTIAL CONCERN

Parameter	Water Solubility (mg/l) [a]	Vapor Pressure (mm-Hg) [a]	Henry's Law Constant (atm-m3/mole) [a]	Koc (ml/g) [a]	Log (Kow) [a]	Susceptable to Photolysis [b,c]	Susceptible to Hydrolysis [b,c]	Fish (l/Kg) [a]
Naphthalene	$3.20x10^{1}$ [b]	$8.70x10^{-2}$ [b]	$4.60x10^{-4}$ [b]	$9.40x10^{2}$ [b]	3.29 [b]	Yes [d]	No	3.0 [d]
Phenanthrene	$1.00x10^{0}$	$6.80x10^{-4}$	$1.59x10^{-4}$	$1.40x10^{4}$	4.46	Unavailable	No	2630
Pyrene	$1.32x10^{-1}$	$2.50x10^{-6}$	$5.04x10^{-6}$	$3.80x10^{4}$	4.88	Unavailable	No	Unavailable
PCBs:								
Aroclor-1260	$2.70x10^{-2}$ [c]	$4.05x10^{-5}$ [c]	$4.60x10^{-3}$ [c]	$6.70x10^{5}$ [c]	7.15 [c]	No	No	$1.00x10^{5}$
INORGANICS:								
Cyanide	Unavailable	$7.60x10^{2}$ (for HCN)	Unavailable	Unavailable	Unavailable	Yes	Yes	Negligible

(a) - USEPA, 1986a. Superfund Public Health Manual, EPA 540/1-86-060.
(b) - Clement Associates, 1985. Chemical, Physical and Biological Properties of Compounds Present at Hazardous Waste Sites.
(c) - USEPA, 1982. Aquatic Fate Process Data for Organic Priority Pollutants. EPA 440/4-81-014.
(d) - Howard, P.H., 1990. Handbook of Environmental Fate and Exposure Data for Organic Chemicals. Lewis Publishers, MI.
(e) - Verschueran, K. (ed.), 1983. Handbook of Environmental Data on Organic Chemicals. Van Nostrand, NY.
* - Value listed is K_d.
NA - Not Applicable.

TABLE 12

SUMMARY OF BEHAVIORAL CHARACTERISTICS THAT CONTROL ENVIRONMENTAL FATE AND TRANSPORT OF CLASSES OF ORGANIC COMPOUNDS AND CYANIDE

Compound Class	Aqueous Solubility	Volatility	Adsorptive Afinity	Biodegradation/ Biotransformation	Photolysis Susceptibility	Hydrolysis Susceptibility	Oxidation	Bioconcentration In Fish
VOLATILE ORGANIC COMPOUNDS (VOCs)								
Non-halogenated VOCs	High to V. High	High to V. High	V. Low to Medium	High to V. High	V. Low	V. Low	V. Low	V. Low
SEMIVOLATILE ORGANIC COMPOUNDS (BNAs)								
PAHs	Low	Low	Medium to High	Medium to High	Low	V. Low	Low	V. Low to Medium
PCBs								
Aroclor 1260	V. Low	V. Low	V. High	V. Low	Low	V. Low	V. Low	V. High
INORGANICS								
Cyanide	High to V. High	V. Low to V. High	V. Low to Low	High	Medium to V. High	Medium to V. High	Low	V. Low

APPENDIX A

BORING LOGS
TRENCH CROSS SECTION

PROJECT: **ConEd Ravenswood** BORING NUMBER: **SB1**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/8/98
LOCATION: Queens, New York DATE COMPLETED: 9/8/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.59
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0					0-0.8' Asphalt			0	Material from 0.8 to
	1				Fill-ML	0.8-1.9' Bricks, cobbles, and gravel				6 feet is fill.
						in a medium gray-brown silt				Material from surface
	2					matrix (40%), dry.				to 10 feet appears clean.
					CL-Fill	1.9-6' Medium brown low			0	
	3					plasticity silty clay with 40%				
RW-SB1						cobbles, boulders, brick and	0930	9/8/98		
(3-3.5)	4					gravel, moist.				
									0	
	5									
	6									
		6			SP	6-15.5' Medium gray-brown coarse			21	
	7	9				to medium grained sand with				
		6				gravel, saturated at 13.5 feet.				
	8	6								
		3							9	
	9	3								
		3								
	10	2								
		3							11	Black staining from 10
	11	5								to 16 feet.
		10								
	12	4								
RW-SB1		6					1305	9/8/98	20	
(12-14)	13	11								
		14								
	14	16								
		3							10	
	15	7								

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

PAGE 1 OF 2.

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB1**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/8/98
LOCATION: Queens, New York DATE COMPLETED: 9/8/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.59
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet) 15	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
		15								
	16	26			BR	15.5' Weathered bedrock				TD = 16 feet
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT:	Consolidated Edison - Ravenswood Generating Station	BORING NUMBER:	SB2
PROJECT NO:	2003.0003.0000.00000	DATE STARTED:	9/2/98
LOCATION:	Queens, New York	DATE COMPLETED:	9/4/98
GEOLOGIST:	R. Onderko	GROUNDWATER DEPTH:	NR
DRILLER:	Allstate/ADT	ELEVATION:	15.65

DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/-OVA (ppm)	COMMENTS
	0									
						0-0.7' Asphalt				Material from 0.7 to
	1				GP	0.7-1' Gravel			0	14.2 feet is fill.
RW-SB2					ML	1-1.5' Light brown low plasticity	1145	9/2/98		Material from surface
(1-1.5)	2					silt with 20% gravel, dry				to 14.2 feet appears
					Fill-ML	1.5-3' Boluders, cobbles, brick and			0	clean.
	3					gravel in a 30% low plasticity				
						silt matrix, dry.				
	4				ML-Fill	3-14' Dark brown to black low				
						plasticity silt with 30% bricks,			0	
	5					wood, and gravel, moist.				
						Saturated at 12 feet.				
	6									
		9							128	
	7	17								
		14								
	8	11								
		4							89	
	9	8								
		5								
	10	5								
		4							34	
	11	3								
		3								
	12	3								
RW-SB2		3					1320	9/4/98	40	
(12-14.5)	13	20								
		32								
	14	34								
		50			BR	14' Bedrock			62	TD=14.2 feet
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB3**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/11/98
LOCATION: Queens, New York DATE COMPLETED: 9/14/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.45
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
					GP	0-0.25' Gravel				
	1				GP-ML	0.25-1' Gravel (50%) with low			0	Odors from hole from
						plasticity clayey silt, dry				3-6 feet, but OVA
	2				ML-Fill	1-3' Low plasticity silt (70%) with				reading were zero.
						cobbles, brick, and gravel, dry.				These readings were
	3									confirmed with Drager
					OL	3-6' Dark black tarlike material			0	tubes.
	4									
									0	Material below 6 feet
	5									appeared clean.
	6									
RW-SB3		7			SP-Fill	6-8' Gray-black, coarse grained	1500	9/14/98	56	
(6-8)	7	8				sand with 30% gravel and				
		4				brick fragments, dry.				
	8	3								
		5			ML	8-11' Mottled orange and gray			28	
	9	5				stiff, low plasticity clay, moist				
		8								
	10	8								
		9							14	
	11	9								
		11			SP-ML	11-16' Greenish brown fine to				
	12	10				medium grained sand with				
		3				30% silt, saturated at 11.75 feet			11	
	13	11								
		12								
	14	9								
		7							13	
	15	4								

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

PAGE 1 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB3**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/11/98
LOCATION: Queens, New York DATE COMPLETED: 9/14/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.45
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		12								
	16	40								
					BR	16' Bedrock				TD = 16 feet
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB4**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 8/28/98
LOCATION: Queens, New York DATE COMPLETED: 9/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 11.48
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
					GP	0-0.2' Gravel			0	Material from 0.2 to
	1				GP-ML	0.2-0.5' Gravel (70%) with dark				6 feet is fill.
						brown low plasticity silt, dry.				Material appears clean
RW-SB4	2				ML	0.5-1' Dark brown low plasticity	1030	8/31/98		from surface to 6 feet.
(1.5-2)						silt with 20% gravel, dry.			0	
	3				ML-Fill	1-3' Yellow brown low plasticity				
						silt with 25% cobbles, brick and				
	4					concrete rubble, dry.				
					ML-Fill	3-6' Large cobbles and boulders in			0	
	5					a 70% low plasticity silt matrix,				
						dry.				
	6									
		5			SP	6-20' Dark black coarse grained			90	Strong petroleum odor
	7	4				sand with gravel, saturated				and oil sheen at 6 feet.
		17								
	8	6								
		6							30	
	9	7								
		3								
	10	3								
		6							50	
	11	4								
		3								
	12	3								
RW-SB4		6					0940	9/3/98	122	
(12-14)	13	6								
		7								
	14	32								
		35							42	
	15	37								

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB4**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 8/28/98
LOCATION: Queens, New York DATE COMPLETED: 9/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 11.48
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		10								
	16	6								
		3							78	
	17	2								
		5								
	18	3								
		2							105	
	19	4								
		6								
	20	2								
		4			CL-SP	20-25.5' Dark green to black sandy			39	Petroleum odor
	21	4				clay (70%),				
		2								
	22	3								
		6							44	
	23	7								
		8								
	24	15								
RW-SB4		5					0940	9/3/98	35	
(24-26)	25	10								
		50								
	26				BR	25.5' Bedrock				TD = 25.5 feet
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-5**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/23/98
LOCATION: Queens, New York DATE COMPLETED: 9/24/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.89
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0					0-0.25' Asphalt			0	Material from 0.25 to
	1				CL-Fill	0.25-6' Dark brown silty (20%)				6 feet is fill.
						clay with 30% cobbles,				Material from surface
	2					boulders and gravel, moist.				to 11 feet appears clean.
									0	
	3									
	4									
									0	
	5									
RW-SB5							0950	9/23/98		
(5-5.5)	6									
		5			CL	6-11' Orange-brown, stiff, low			7	
	7	6				plasticity clay with 10-20%				
		6				brick fragments, dry.				
	8	12				Moist at 10 feet.				
		5							8	
	9	10								
		11								
	10	17								
RW-SB5		35					1205	9/24/98	13	
(10-11)	11	50								
						11' - Rock Obstruction				TD = 11 feet
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-6**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/11/98
LOCATION: Queens, New York DATE COMPLETED: 9/11/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 18.26
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0					0-0.2' Asphalt			0	Material from 0.2 to
	1				GP	0.2-0.7' Gravel in a 20% silt matrix				3 feet is fill.
					ML-GP	0.7-3' Medium brown clayey (20%)				Material from surface
RW-SB6	2					silt (40%) with 40% cobbles,	1100	9/11/98		7 feet appears clean.
(1.5-2)						brick and wood			0	
	3									
					SW	3-4' Tan to black well rounded				
	4					medium grained sand, dry				
					ML-CL	4-6' Medium brown clayey silt with			0	
	5					gravel, dry.				
	6									
RW-SB6		21			CL	6-7' Medium brown low plasticity	1330	9/11/98	3	
(6-7)	7	50				silt with gravel, sand and brick				
						moist.				TD = 7 feet
	8					7' Rock obstruction				
	9									
	10									
	11									
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB7**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/22/98
LOCATION: Queens, New York DATE COMPLETED: 9/24/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.9
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0				SP-ML	0-1.5' Brown silty sand with				Possible foundation and
	1					frequent gravel and cobbles				brick walls encountered
RW-SB7						dense, dry	0800	9/22/98		
(1-2)	2				Fill	1.5-5' Stone and bricks				Unable to drill below
						fry				5' due to concrete slab
	3									
	4									
	5									
						Concrete Obstruction				TD = 5 feet
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-8**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/18/98
LOCATION: Queens, New York DATE COMPLETED: 9/18/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.43
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0					0-0.25' Asphalt			0	Material 0.25 to 6
	1				GP-ML	0.25-1.5' Gravel in a 25% low				feet is fill.
						plasticity silt matrix, dry				Material appears clean
	2				Fill-ML	1.5-4' Brown, clayey, low plasticity				surface to 6 feet.
						silt with 50% gravel, boulders			0	
	3					and bricks, dry				
	4									
					Brick	4-4.5 Brick			0	
	5				Fill-ML	4.5-6' Brown clayey, low plasticity				
RW-SB8						silt with 50% gravel, boulders	1030	9/18/98		
(5-5.5)	6					and bricks, dry				
RW-SB8		15			ML-GP	6-9' Dark brown, low plasticity	1330	9/18/98	50	
(6-9)	7	18				silt with 30% gravel, dry				
		9								Dark black oily staining
	8	8								from 7-9 feet.
		6							228	
	9	8								
						9' Obstruction				Possible UST
	10									TD = 9 feet
	11									
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT:	**Consolidated Edison - Ravenswood Generating Station**	BORING NUMBER:	**SB-9**
PROJECT NO:	2003.0003.0000.00000	DATE STARTED:	9/17/98
LOCATION:	Queens, New York	DATE COMPLETED:	9/18/98
GEOLOGIST:	R. Onderko	GROUNDWATER DEPTH:	NR
DRILLER:	Allstate/ADT	ELEVATION:	14.96

DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet) 0	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
					GP	0-0.25' Gravel			0	Material from 0.25 to
	1				CL-Fill	0.25-4.75' Dark brown, silty, low				7.75 is fill.
						plasticity clay (40%) with 40%				Material from surface
	2					gravel, cobbles, and brick, dry				to 8 feet appears clean.
									0	
	3									
	4									
									0	
	5				SW	4.75-6' Medium orange-brown				
RW-SB9						fine to medium grained sand,	1000	9/17/98		
(5-5.5)	6					dry, well sorted				
		6			ML-Fill	6-7.75' Low plasticity silt with 30%			4	
	7	6				boulders, gravel, and brick, dry				
		2								
	8	1			SW	7.75-13' Orange coarse to medium				
		2				grained sand, saturated at 8.5			26	
	9	3				feet				Black staining and
		4								strong petroleum odor
	10	2								from 8.5 to 13 feet.
RW-SB9		12					0930	9/18/98	68	
(10-12)	11	23								
		8								
	12	6								
		5							20	
	13	6								
					BR	13' Bedrock				TD = 13 feet
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-10**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/16/98
LOCATION: Queens, New York DATE COMPLETED: 9/17/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.29
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA* (ppm)	COMMENTS
	0									
					GP	0-0.25' Gravel			0	Material from 0.25 to
	1				ML	0.25-1.5' Light brown low plasticity				9 feet is fill.
						silt with 10% gravel				
	2				Fill	1.5-5' Brick with 30% gravel, silt,				Possible former brick
						and cobbles, dry			0	foundation at 1.5 feet
	3									Material from surface
										to 5 feet appears clean.
	4									
									0	
	5									
RW-SB10					ML-Fill	5-9' Medium brown low plasticity	0930	9/16/98		
(5-5.5)	6					silt with 40% brick and gravel				
RW-SB10		4				moist at 6 feet.	1415	9/17/98	628	
(6-9)	7	1								
		2								
	8	2								
		1							NA	
	9	50								
						9' Obstruction				TD = 9 feet
	10									
	11									
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT:	Consolidated Edison - Ravenswood Generating Station	BORING NUMBER:	SB-11
PROJECT NO:	2003.0003.0000.00000	DATE STARTED:	9/16/98
LOCATION:	Queens, New York	DATE COMPLETED:	9/17/98
GEOLOGIST:	R. Onderko	GROUNDWATER DEPTH:	NR
DRILLER:	Allstate/ADT	ELEVATION:	15.6
DRILLING/SAMPLING METHOD:	Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon		

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
					GP	0-0.2' Gravel			0	Material from 0.2 to
	1				ML-Fill	0.2-2' Yellow-brown low plasticity				8 feet is fill.
						silt with 50% Bricks, cobbles,				Material from surface
	2					rebar and debris, dry				to 4 feet appears clean.
					ML	2-8' Medium brown, low plasticity			0	
	3					silt with 20% cobbles, brick, and				
						wood, saturated at 10 feet				
	4									
									NR	Black staining below
	5									4 feet.
RW-SB11							0900	9/16/98		Very poor recovery
(5-5.5)	6									below 5 feet .
		2							7	
	7	3								
		3								
	8	2								
		1				8-14' Medium brown low plasticity			NR	
	9	1				silt, saturated.				
		1								
	10	2								
		2							7	
	11	2								
		1								
	12	1								
		1							NR	
	13	4								
		1								
	14	2								
		1			ML	14-18.1' Stiff, dark black low			8	
	15	2				plasticity clay with 10% brick.				

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT:	**Consolidated Edison - Ravenswood Generating Station**	BORING NUMBER:	**SB-11**
PROJECT NO:	2003.0003.0000.00000	DATE STARTED:	9/16/98
LOCATION:	Queens, New York	DATE COMPLETED:	9/17/98
GEOLOGIST:	R. Onderko	GROUNDWATER DEPTH:	NR
DRILLER:	Allstate/ADT	ELEVATION:	15.6
DRILLING/SAMPLING METHOD:	Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon		

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		11								
	16	16								
RW-SB11		8					1230	9/17/98	16	
(16-18)	17	7								
		7								
	18	14								
		50			BR	18.1' Bedrock				TD = 18.1 feet
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-12**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/17/98
LOCATION: Queens, New York DATE COMPLETED: 9/18/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.03
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
					GP	0-0.25' Gravel			0	Material from 0.25 to
	1				Fill-ML	0.25-6' Bricks, boulders and				6 feet is fill.
						metal debris is a 25% low				Material appears clean
	2					plasticity silt matrix, dry				from surface to 11.75 feet.
									0	
	3									
	4									
									0	
RW-SB12	5						1500	9/17/98		
(4.5-5)										
	6									
		1			SP-ML	6-7' Yellow-brown, silty, fine			4	
	7	1				grained sand.				
		2			CL-ML	7-11.75 Green-gray low plasticity				
	8	2				silty clay, moist.				
		1				Saturated at 10.5 feet.			16	
	9	1								
		1								
	10	1								
RW-SB12		2					1130	9/18/98	32	
(10-12)	11	2								
		4								
	12	50			BR	11.75' Bedrock				TD = 11.75 feet
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB13**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/23/98
LOCATION: Queens, New York DATE COMPLETED: 9/28/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.02
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet) 0	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
						0-0.25' Asphalt				Material 0.25 to 6 feet
	1				ML-Fill	0.25'-6' Gravel, bricks, cobbles,				is fill.
						and boulders in a 50% low				Strong petroleum odor
	2					plasticity silt matrix, dry.				throughout hole.
	3									
	4									
	5									
RW-SB13							1505	9/23/98		
(5-5.5)	6									
		6			SP	6-17' Dark gray, medium to coarse			11	Oil sheen at 6 feet.
	7	1				grained silty (10%) sand,				
		2				saturated at 12 feet.				
	8	3								
		1							29	
	9	2								
		2								
	10	4								
RW-SB13		10					1100	9/28/98	431	
(10-12)	11	11								
		20								
	12	36								
		20							334	
	13	21								
		24								
	14	21								
		11							162	
	15	15								

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT:	**Consolidated Edison - Ravenswood Generating Station**	BORING NUMBER:	**SB13**
PROJECT NO:	2003.0003.0000.00000	DATE STARTED:	9/23/98
LOCATION:	Queens, New York	DATE COMPLETED:	9/28/98
GEOLOGIST:	R. Onderko	GROUNDWATER DEPTH:	NR
DRILLER:	Allstate/ADT	ELEVATION:	15.02

DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		14								
	16	13								
		13							48	
	17	50								
		50			BR	17' Bedrock				TD = 17 feet
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-14/14A**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/9/98
LOCATION: Queens, New York DATE COMPLETED: 10/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 12.08
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
					GP	0-0.25 Gravel			0	Material 0.25 to 6
	1				GP-ML	0.25-0.9' Gravel in a 30% low				feet is fill.
						plasticity silt matrix, dry				Material appears clean
	2				Fill	0.9-1.8' Bricks, rectangular shaped				surface to 4 feet.
						building rocks, rebar, and a			0	
	3					steel plate				
					ML-Fill	1.8-6' Bricks, boulders, cobbles,				
	4					wood, and gravel in a 70% silty				
						clay matrix, dry			0	Visible oil sheen at
	5					Moist at 4'10".				4' 10"
RW-SB14							1425	9/9/98		
(5-6)	6									
		20			ML	6-11' Medium brown sandy (20%)			39	
	7	5				low plasicity silt with 10%				
		5				gravel, moist.				
	8	3								
		2							54	
	9	2								
		1								
	10	2								
		1							94	
	11	1								
		2			CH	11-12' Dark black, medium plasticity				
	12	1				silty (20%), clay, moist				
		2			SP	12-18.75' Green-black, medium to			777	Oil sheen at 12 feet.
	13	4				fine grained silty (20%) sand,				Staining from 12 to
		5				saturated at 18 feet.				18.75 feet.
	14	12								
RW-SB14		14					0955	10/3/98	1145	
A(14-16)	15	14								

NOTES Boring SB14A was offset 12 feet east of SB-14 after an obstruction was encountered at 6 feet in SB-14.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-14/14A**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/9/98
LOCATION: Queens, New York DATE COMPLETED: 10/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 12.08
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		12								
	16	12								
		8							735	
	17	10								
		12								
	18	17								
		10			BR	18.75' Bedrock			17	TD = 18.75 feet
	19	50								
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-15**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/4/98
LOCATION: Queens, New York DATE COMPLETED: 9/8/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 13.22
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
					GP	0-0.2' Gravel			0	Material 0.2 to 6 feet
	1				GP	0.2-0.75' Gravel with 20% low				is fill.
						plasticity silt, dry				Material from surface
	2				Fill-ML	0.75-6' Bricks, boulders, cobbles				to 10 feet appears clean.
						and gravel in a 25% low			0	
	3					plasticity silt matrix, moist				
						below 5 feet.				
	4									
									0	
	5									
RW-SB15							1020	9/4/98		
(5-5.5)	6									
		5			SP-Fill	6-13' Dark brown, coarse to			26	
	7	4				medium grained sand with 40%				
		4				brick and gravel, saturated at				
	8	8				10.5 feet.				
		4							184	
	9	6								
		7								
	10	14								
RW-SB15		5					1515	9/8/98	252	
(10-12)	11	6								Oil sheen at 10.5 feet
		12								
	12	23								
		30							166	
	13	50								
					BR	13' Bedrock				TD = 13 feet
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-16**

PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/24/98

LOCATION: Queens, New York DATE COMPLETED: 10/3/98

GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR

DRILLER: Allstate/ADT ELEVATION: 14.91

DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
						0-0.4' Asphalt			0	Material from 0.4 to
	1				ML	0.4-4.5' Compact, brown, low				7.5 feet is generally fill.
						plasticity silt with gravel, dry.				Material appears clean
	2									from surface to 17.75
									0	feet.
	3									
	4									
									0	
	5				SP	4.5-5.5' Poorly sorted medium to				
RW-SB16						coarse grained sand, dry.	1025	9/24/98		
(5-5.5)	6				ML-GP	5.5-7.5' Medium brown low			7	
		4				plasticity silt with 30% gravel,				
	7	6				dry.				
		5								
	8	4			SW	7.5-12' Well sorted medium grained			10	
		4				tan "beach" sand, moist				
	9	8								
		8								
	10	7							NR	
		5								
	11	5								
		6								
	12	7							11	
		2			CL-ML	12-14' Dark brown silty (30%) clay				
	13	4				(50%) with 20% gravel, moist.				
		4								
	14	5							12	
		7			SP	14-17.75' Green-black medium				
	15	5				grained sand, saturated at 16 ft.				

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)

ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-16**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/24/98
LOCATION: Queens, New York DATE COMPLETED: 10/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 14.91
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		12								
	16	16								
RW-SB16		17					1105	10/3/98	13	
(16-18)	17	18								
		17			BR	17.75' Bedrock				TD = 17.75 feet
	18	50								
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-17**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/25/98
LOCATION: Queens, New York DATE COMPLETED: 10/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 14.81
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
						0-0.25' Asphalt			0	Material from 0.25 to
	1				CL-ML	0.25-6' Medium brown, low				13 feet is fill.
						plasticity, silty (30%) clay (40%)				Material appears clean
	2					with cobbles, brick, gravel, and				from surface to 12 feet.
						boulders, dry.			0	
	3									
	4									
									0	
	5									
RW-SB17							0925	9/25/98		
(5-5.5)	6									
		7			ML-GP	6-11' Medium brown, low plasticity			9	
	7	8				silt with 30% gravel, dry.				
		9								
	8	5								
		6							10	
	9	10								
		9								
	10	9								
		9							9	
	11	12								
		30			SW	11-12' Medium grained tan "beach"				
	12	30				sand, moist.				
		9			CL-ML	12-13' Dark brown, silty (30%), low			9	Oil sheen at 12 feet
	13	8				plasticity clay (50%) with 20%				
		8				gravel, saturated				
	14	6			SP	13'17' Green-black medium grained				
RW-SB17		10				sand, saturated.	1155	10/3/98	10	
(14-16)	15	10								

NOTES: HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-17**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/25/98
LOCATION: Queens, New York DATE COMPLETED: 10/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 14.81
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		15								
	16	16								
		15							6	
	17	50								
					BR	17' Bedrock				TD = 17 feet
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-18**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/9/98
LOCATION: Queens, New York DATE COMPLETED: 9/10/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 19.25
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
						0-0.2' Asphalt			0	Material from 0.2 to 6
	1				GP-ML	0.02-1' Gravel in a matrix of 30%				feet is fill.
						low plasticity silt, dry				Material from surface
	2				ML-Fill	1-2.5' Medium brown low plasticity				to 17 feet appears clean.
						silt with 40% cobbles, boulders			0	
	3					and gravel, dry.				
					ML-CL	2.5-6' Clayey (40%), low plasticity				
	4					silt with minor amounts of bricks				
						and cobbles, dry.			0	
	5									
RW-SB18							1310	9/9/98		
(5-5.5)	6									
		7			SP-ML	6-13' Medium brown silty sand			48	
	7	4				with 20% angular gravel, dry.				
		3								
	8	3								
		3							9	
	9	3								
		3								
	10	3								
		4							6	
	11	4								
		5								
	12	3								
RW-SB18		7					1325	9/10/98	18	
(12-14)	13	7								
		8			CL	13-18.75' Greenish-gray, stiff, low				
	14	8				plasticity clay, moist.				
		6							10	
	15	6								

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-18**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/9/98
LOCATION: Queens, New York DATE COMPLETED: 9/10/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 19.25
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		7								
	16	8								
		8							5	
	17	7								
		6								Saturated at 17'
	18	6								
		3							6	
	19	50								
					BR	18.75' Bedrock				TD = 18.75 feet
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-19A**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/22/98
LOCATION: Queens, New York DATE COMPLETED: 9/24/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.67
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
						0-0.3 Asphalt			NR	Material 0.3 to 6 feet
	1				SP-GP	0.3-0.9' Light brown gravelly				is fill.
						sand, dense, moist.				
	2				SP-GP	0.9-2' Olive brown gravelly				
RW-SB19						sand, dense, moist.	1500	9/22/98	NR	
A(2-3)	3				GP	2-2.3' Gravel layer				Product saturated
					SP-ML	2.3-3.5' Light brown sand and				Material appears clean
	4					gray silt, dense, moist				from 2.3 to 14.5 feet.
					ML-SW	3.5-6' Orange brown silt and fine			NR	
	5					grained sand, dense, moist.				
	6									
		2				6-8.5' Brown low plasticity silt,			8	
	7	4				dry.				
		7								
	8	8								
		2							10	
	9	4			CL	8.5-11.5 Mottled greenish-gray				
		6				and orange stiff, low plasticity				
	10	10				clay, moist				
RW-SB19		5					1115	9/24/98	18	
A(10-12)	11	7								
		7								
	12	9			SW	11.5-15' Green-gray medium grained				
		8				sand, saturated .			8	
	13	15								
		25								
	14	25								
		15							7	
	15	50			BR	15' Bedrock				

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-20A**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/22/98
LOCATION: Queens, New York DATE COMPLETED: 9/24/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.66
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
						0-0.25 Asphalt			0	Material from 0.25 to 6
	1				GP	0.25-1.2' Gravel with sand and silt				feet is fill.
RW-SB20					ML-SP	1.2-1.5 Tan silt and sand, dense,dry	1030	9/22/98		Material from surface
A(1-2)	2				ML-SP	1.5-2' Dark brown silt and sand				to 14.5 feet appears
						dense, moist.			0	clean.
	3				SP-ML	2-3.5' Light brown fine grained				
						sand and gray silt, dense, moist.				
	4				SP-ML	3.5-6' Olive brown fine sand and				
						silt, dense, moist.			0	
	5									
	6									
		1			CL	6-8' Mottled orange and gray			6	
	7	2				low plasticity clay, moist.				
		3								
	8	5								
		7				8-9' Orange medium grained			6	
	9	5				sand, moist.				
		6				9-14.5' Mottled orange and gray				
	10	12				low plasticity clay, moist.				
		4							8	
	11	5								
		8								
	12	12								
RW-SB20		5					1020	9/24/98	9	
(A(12-14)	13	11								
		13								
	14	13								
		50							11	
	15				BR	14.5' Bedrock				TD = 14.5 feet

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-21**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/29/98
LOCATION: Queens, New York DATE COMPLETED: 10/1/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 14.91
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
						0-0.25' Gravel			0	Material from 0.25 to
	1				Fill-ML	0.25-1.5' 75% brick and 25% low				6 feet is fill.
						plasticity silt, dry.				Material from surface
	2				Fill-ML	1.5-2.5' Large boulders and cobbles				to 11.5 feet appears
						in a 40% low plasticity silt			0	clean.
	3					matrix, dry.				
					ML-SP	2.5-6' Dark black sandy (40%) low				Petroleum odor
	4					plasticicty silt, dry.				
									0	
	5									
RW-SB21							0925	9/29/98		
(5-5.5)	6									
RW-SB21		6			CL	6-8.5' Mottled orange and gray,			11	
(6-8)	7	6				stiff, low plasticity clay.	1115	10/1/98		
		6				Moist.				
	8	12								
		10							7	
	9	16			SP	8.5-11.5' Reddish-tan, silty, fine				
		23				grained sand, moisr.				
	10	28								
		10							6	
	11	12								
		17								
	12	50			BR	11.5' Bedrock				TD = 11.5 feet
	13									
	14									
	15									

NOTES: HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-22**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/29/98
LOCATION: Queens, New York DATE COMPLETED: 10/1/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.00'
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
						0-0.25' Gravel			0	Material 0.25 to 6 feet
	1				Fill-ML	0.25-1.5' 75% brick and 25% low				is fill.
						plasticity silt, dry.				Material appears clean
	2				Fill-ML	1.5-2.5' Large boulders and cobbles				from surface to 11.5 feet.
RW-SB22						in a 40% low plasticity silt	1030	9/29/98	10	
(2-3)	3					matrix, dry.				
					ML-SP	2.5-6' Dark black sandy (40%) low				
	4					plasticicty silt, dry.				
									8	Petroleum odor at 3.5
	5									feet.
	6									
		13			CL	6-11.5' Greenish-gray, stiff			7	
	7	9				stiff, low plasticity clay.				
		13				moist.				
	8	18								
RW-SB22		14					1010	10/1/98	15	
(8-10)	9	18								
		16								
	10	25								
		17							8	
	11	22								
		25								
	12	50			BR	11.5' Bedrock				TD = 11.5 feet
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT:	**Consolidated Edison - Ravenswood Generating Station**	BORING NUMBER:	**SB-23**
PROJECT NO:	2003.0003.0000.00000	DATE STARTED:	9/29/98
LOCATION:	Queens, New York	DATE COMPLETED:	10/1/98
GEOLOGIST:	R. Onderko	GROUNDWATER DEPTH:	NR
DRILLER:	Allstate/ADT	ELEVATION:	15.55

DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
						0-0.25' Gravel			0	Material 0.25 to 6 feet
	1				Fill-ML	0.25-1.5' 75% brick and 25% low				is fill.
						plasticity silt, dry.				Material appears clean
	2				Fill-ML	1.5-2.5' Large boulders and cobbles				from surface to 11.5 feet.
RW-SB23						in a 40% low plasticity silt	1350	9/29/98	0	
(2-3)	3					matrix, dry.				
					ML-SP	2.5-6' Dark black sandy (40%) low				
	4					plasticicty silt, dry.				
									0	
	5									
	6									
		2			SP	6-11.5' Medium to coarse grained			24	
	7	3				dark black sand with 10% gravel,				
		4				Grain size becomes coarser with				
	8	2				depth, saturated at 9 feet.				
RW-SB23		4					0930	10/1/98	26	
(8-10)	9	4								
		3								Petroleum odor
	10	8								at 9 feet.
		9							24	
	11	11								
		25								
	12	50			BR	11.5' Bedrock				TD = 11.5 feet
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-24**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/28/98
LOCATION: Queens, New York DATE COMPLETED: 9/28/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.41
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0					0-0.25' Asphalt			0	Material from 0.25 to
	1				GP	0.25-0.5' Gravel				6 feet is fill.
					ML-Fill	0.5-4.5' Brown, low plasticity silt				Material from surface to
	2					with boulders, brick, and gravel				8.75 feet appears clean.
						dry.			0	
	3									
	4									
									0	
	5				BRICK	4.5-4.7' Brick				
RW-SB24					ML-Fill	4.7-6' Brown, low plasticity silt	1035	9/28/98		
(5-5.5)	6					with boulders, brick, and gravel				
RW-SB24		12				dry.	1205	9/28/98	11	
(6-9)	7	6			SP-GP	6-8.75' Dark black coarse grained				
		5				sand and gravel (50%).				
	8	10				Moist, saturated at 8 feet.				
		10							15	
	9	50								
					BRICK	8.75' Brick wall or vault				TD = 8.75 feet
	10									
	11									
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-25**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/28/98
LOCATION: Queens, New York DATE COMPLETED: 9/28/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.54
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
						0-0.25' Asphalt			0	Material from 0.25 to 6
	1				GP	0.25-0.5' Gravel				feet is fill.
					ML-Fill	0.5-6' Brown, low plasticity silt				Material from surface
	2					with boulders, brick, and gravel				to 6 feet appears clean.
						dry.			0	
	3									
	4									
									0	
	5									
RW-SB25							1005	10/1/98		
(5-5.5)	6									
		5			CL	6-10' Mottled orange and gray			95	Strong petroleum odor
	7	7				low plasticity clay.				and staining from 6 to
		7				Moist, saturated at 9.5 feet.				10 feet.
	8	6								
RW-SB25		12					1245	10/1/98	106	
(8-10)	9	15								
		20								
	10	24								
		50			BR	10' Bedrock				TD = 10 feet
	11									
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station**
BORING NUMBER: **SB-26**
PROJECT NO: 2003.0003.0000.00000
DATE STARTED: 9/24/98
LOCATION: Queens, New York
DATE COMPLETED: 9/28/98
GEOLOGIST: R. Onderko
GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT
ELEVATION: 16.45
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0					0-0.3 Asphalt			0	Material 0.3 to 6 feet
	1				ML-Fill	0.3-6' Medium brown low plasticity				is fill.
						silt with boulders, cobbles				Material from surface
	2					and bricks, dry.				to 6 feet appears clean.
									0	
	3									
	4									
									0	
	5									
RW-SB26							1450	9/24/98		
(5-5.5)	6									
		3			ML-CL	6-7' Dark black clayey silt			4	Black staining
	7	3				moist.				Strong petroleum odor
		4			CL-ML	7-14' Mottled tan brown and gray				below 6 feet.
	8	8				low plasticity silty (30%) clay,				
		4				saturated at 11.5 feet.			5	
	9	7				Thin sand zones (<6" thick) are				
		10				present below 11 feet.				
	10	13								
RW-SB26		9					1100	9/28/98	7	
(10-12)	11	14								
		12								
	12	8								
		5							6	
	13	6								
		9								
	14	9								
		19			SW-ML	14-17.5' Fine to medium grained,			5	
	15	14				micaceous sand with 30% silt.				

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **SB-26**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/24/98
LOCATION: Queens, New York DATE COMPLETED: 9/28/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.45
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		42								
	16	20								
		19							6	
	17	23								
		24								
	18	50			BR	17.5' Bedrock				TD = 17.5 feet
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station**	BORING NUMBER: **T1**
PROJECT NO: 2003.0003.0000.00000	DATE STARTED: 10/1/98
LOCATION: Queens, New York	DATE COMPLETED: 10/2/98
GEOLOGIST: R. Onderko	GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT	ELEVATION: 17.42
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon	

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0					0-0.5 Asphalt			0	Material from 0.5 to 8.5
	1				ML-Fill	0.5-6' Medium brown low plasticity				feet appears to be fill
						silt with 50% large boulders,				and rubble.
	2					concrete and reinforcing wire.				Material appears clean.
						dry.			0	
	3									
	4									
									0	
	5									
	6									
RW-T1		13			SP-Fill	6-8.5' Corase grained sand,	1215	10/2/98	8	
(6-8.5)	7	22				gravel and brick, moist.				
		8								
	8	21								
		26								
	9	50				8.5 Concrete obstruction				TD = 8.5 feet
						(possibly the base of fomer				
	10					AST)				
	11									
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **T2**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 10/2/98
LOCATION: Queens, New York DATE COMPLETED: 10/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 15.52
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
					GP	0-0.3' Gravel			0	Material from 0.3 to
	1				ML-Fill	0.3'-6' Medium brown low plasticity				11.2 feet is fill and
						silt with 30% gravel and 20%				rubble.
	2					brick.				Material appears clean
									0	from surface to 9.5 feet
	3									
	4									
									0	
	5									
	6									
		6			ML-GP	6-7.5' Medium brown low plasticity			47	
	7	3				silt with 40% gravel, dry.				
		3								
	8	3			SP	7.5-9.5' Black, very coarse grained				
RW-T2		1				sand, saturated.	1250	10/3/98	98	
(8-10)	9	2								
		2								
	10	5			SP	9.5-11.2' Green-black coarse				Oil sheen present
		12				grained sand, saturated.			38	
	11	5								
		50				11.2' Concrete				TD = 11.2
	12									
	13									
	14									
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **T3**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/30/98
LOCATION: Queens, New York DATE COMPLETED: 10/1/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: NR
DRILLER: Allstate/ADT ELEVATION: 16.99
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
						0-0.4' Asphalt			0	Material from 0.3 to
	1				CL-Fill	0.4-3.5' Medium brown low plasticity				13.4 feet is fill and
						clay with rock and brick debris,				rubble.
	2					dry.				Material appears clean
									0	from furface to 8.5 feet.
	3									
	4				ML	3.5-6' Dark black sticky, low				Petroleum odor
						plasticity silt.			10	
	5									
	6									
		10			ML-CL	6-11'Dark grayish-black clayey (30%)			29	
	7	12				sandy (10%), low plasticity silt,				
		11				saturated at 8.5 feet.				
	8	6								
		3							34	
	9	3								Oil sheen and petroleum
		10								odor at 8.5 feet.
	10	9								Staining below 9 feet.
RW-T3		6					1325	10/1/98	338	
(10-12)	11	5								
		3			SP-ML	11-13.4' Fine to medium grained				
	12	2				sand with 30% silt and 20%				
		5				gravel, saturated.			275	
	13	6								
		50								
	14					13.4 ' Concrete				TD = 13.4 feet
	15									

NOTES HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV1A**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/10/98
LOCATION: Queens, New York DATE COMPLETED: 9/10/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 11.86 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 19.4
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
					GP	0-0.2' Gravel			0	
	1				GP-ML	0.2-0.9' Gravel in a 30% low				Material from 0.2 to
						plasticty silt matrix, dry.				6 feet is fill.
	2				Fill-GP	0.9-3' Boulders, cobbles and brick				Material from surface
						in a 30% silt matrix, dry.			0	to 18 feet appears
	3									clean.
					CL-GP	3'-6' Medium brown low plasticity				
	4					clay with 30% gravel and				
						cobbles and 20%silt, dry.			0	
	5									
	6									
RW-		7			ML	6'-11.75' Medium brown, low	0820	9/10/98	6	
MWRV1	7	4				plasticity, sandy (20%)				
A(5-5.5)		6				silt, dry.				
	8	7								
		3							5	
	9	2								
		2								
	10	3								
		4							6	
	11	3								
		5								
	12	3			CL	11.75-18' Mottled gray and rust				
		5				orange low plastcity silt,			4	
	13	5				moist from 11.75 to 13.5 ft.,				
		5				saturated at 13.5 feet.				
	14	7								
		6							4	
	15	6								

NOTES Monitoring well screened interval = 9 - 19 feet bls.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million
bgs - below ground surface

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV1A**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/10/98
LOCATION: Queens, New York DATE COMPLETED: 9/10/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 11.86 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 19.4
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		7								
	16	6								
RW-		5					1130	9/10/98	7	
MWRV1	17	6								
A(16-18)		6								
	18	7								
		7			SP	18-19' Black, coarse grained sand.			3	Black staining
	19	16								from 18-19 feet
					BR	19' Bedrock				TD=19 feet
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV2**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/8/98
LOCATION: Queens, New York DATE COMPLETED: 9/9/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 3.47 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 13.49
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet) 0	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
					GP	0.0.2' Gravel			0	
	1				Stone	0.2-1.5' Rectangular stone blocks.				Material from 0.2 to
										5 feet is fill.
	2				ML-Fill	1.5-5' Medium brown silty (20%)				
						low plasticity clay with 30%			0	Perched water at
	3					cobbles, brick and gravel				2 feet bgs.
						dry.				
	4									
									0	
	5									
RW-					ML-CL	5-12' Medium brown clayey, low	1325	9/8/98		
MWRV2	6					plasticity silt with 10% coarse				
(5-5.5)		1				gravel, saturated.			10	
	7	1								
		5								
	8	8								
		7							14	
	9	8								
		8								
	10	7								
		8							7	
	11	10								
		13								
	12	14								
		5			SP-GP	12-16.25' Dark black, coarse			5	Oil sheen and strong
	13	5				grained sand (50%) and				petroleum odor
		14				gravel (50%), saturated.				present at 12 feet.
RW-	14	19								
RMW3		3					1050	9/9/98	20	
(14-16)	15	2								

NOTES Monitoring well screened interval = 6 - 16 feet bls.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million
bgs - below ground surface

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV2**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/8/98
LOCATION: Queens, New York DATE COMPLETED: 9/9/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 3.47 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 13.49
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		2								
	16	3								
		50			BR	16.25 ' Bedrock				TD = 16.25 feet
	17									
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

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PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV3**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 8/27/98
LOCATION: Queens, NY DATE COMPLETED: 9/4/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 8.84 feet bgs on 10/12/98
DRILLER: ADT ELEVATION: 11.02
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5'), HSA (below 5') / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
					GP	0-0.25' Gravel			0	
	1				GP-ML	0.25'-1.25' Gravel with 30%				Material from 0.25 to
						medium brown silt.			0	5 feet is fill.
	2				ML-Fill	1.25'-5' Medium brown, low				Material from surface
						plasticity silt with 40%			4	12 feet appears clean.
	3					brick, rock, cobbles and				
RW-						wood, dry.	1015	8/28/98	0	
MWRV3	4									
(3-3.5)									0	
	5									
					ML	5'-12' Medium brown, low plastcity			4	
	6					silt with 20% gravel and 10%				
		2				fine sand, moist.			11	
	7	3								
		1								
	8	1								
		1							12	
	9	2								
		5								
	10	2								
		3							14	
	11	4								
		5								
	12	6								
RW-		3			SP	12'-22' Dark black, coarse to	0920	9/4/98	37	Oil sheen at 12 feet.
MWRV3	13	5				medium grained sand with				Petroleum odor and
(12-14)		5				30% gravel. Saturated at				staining from 12 to
	14	2				13 feet.				26 feet,
		4							32	
	15	4								

NOTES Monitoring well screened interval = 10 - 20 feet bls.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million
bgs - below ground surface

PAGE 1 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV3**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 8/27/98
LOCATION: Queens, NY DATE COMPLETED: 9/4/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 8.84 feet bgs on 10/12/98
DRILLER: ADT ELEVATION: 11.02
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5'), HSA (below 5') / Split Spoon

SAMPLE ID	DEPTH (feet) 0	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15								(ppm)	
		5								
	16	7								
		7							12	
	17	9								
		7								
	18	8								
		3							67	
	19	4								
		5								
	20	4								
		3							17	
	21	4								
		4								
	22	2								
		4			SP-ML	22'-26' Medium brown coarse			304	Oil Sheen and
	23	7				grained sand with 50%				staining present.
		3				low plasticity silt.				
	24	5								
RW-		6					0955	9/4/98	336	
MWRV3	25	15								
(24-26)		13								
	26	30								
		50			BR	26' - Bedrock				TD = 26 feet
	27									
	28									
	29									
	30									

NOTES:

PAGE 2 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV4**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/1/98
LOCATION: Queens, New York DATE COMPLETED: 9/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 9.49 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 7.52
DRILLING/SAMPLING METHOD: Hand Dug to 5 feet, HSA below 5 feet / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
					GP	0-0.2' Gravel			0	material from 0.2
	1				GP-ML	0.2-0.75' Gravel in a 30% silt matrix				to 4 feet is fill.
					ML-Fill	0.75-4' Large cobbles, boulders,				Material from surface
	2					bricks and concrete in a 50%				to 12 feet appears clean.
RW-						medium brown, low	1010	9/1/98	0	
MWRV2	3					plasticity silt matrix, dry.				
(2-2.5)										
	4									
					ML	4-6' Medium brown, low plasticity			0	
	5					clay with 20% gravel, dry.				
	6									
		2			ML-GP	6-12' Medium to light brown, low			11	
	7	2				plasticity silt with 30%				
		3				gravel, dry.				
	8	4								
		5							12	
	9	12								
		8								
	10	4								
		2							10	
	11	6								
		10								
	12	4								
		5			SP	12-24' Medium to coarse grained			14	Slight petroleum odor
	13	6				sand with 10% silt and 10%				and visisble oil sheen
		8				gravel, saturated at 13 feet.				Oil staining from 12 to
RW-	14	4								24 feet.
MWRV2		2					1430	9/3/98	51	
(14-16)	15	1								

NOTES Monitoring well screened interval = 10 - 20 feet.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million
bgs - below ground surface

PAGE 1 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV4**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/1/98
LOCATION: Queens, New York DATE COMPLETED: 9/3/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 9.49 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 7.52
DRILLING/SAMPLING METHOD: Hand Dug to 5 feet, HSA below 5 feet / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		6								Black staining
	16	4								from 12 to 24
		1							28	feet.
	17	2								
		1								
	18	5								
		2							60	
	19	5								
		5								
	20	6								
		5							23	
	21	6								
		7								
	22	6								
		4							41	
	23	10								
		4								
	24	6								
		2			CL-ML	24-25' Low plasticity silty (30&)			28	
	25	1				clay.				
					BR	Bedrock				TD = 25 feet
	26									
	27									
	28									
	29									
	30									

NOTES:

PAGE 2 OF 2

PROJECT:	Consolidated Edison - Ravenswood Generating Station	BORING NUMBER:	MWRV5
PROJECT NO:	2003.0003.0000.00000	DATE STARTED:	8/27/98
LOCATION:	Queens, New York	DATE COMPLETED:	9/8/98
GEOLOGIST:	R. Onderko	GROUNDWATER DEPTH:	13.43 feet bgs on 10/12/98
DRILLER:	Allstate/ADT	ELEVATION:	15.52
DRILLING/SAMPLING METHOD:	Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon		

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECO-VERY	PRO-FILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
					GP	0-0.25' Gravel			0	Material from 0.25
	1				Fill-ML	0.25-2' Bricks, cobbles, and rock				to 6 feet is fill.
						fragments in a 30% low				Material from surface
	2					plasticity silt matrix, dry.				to 22.5 feet appears
RW-					ML	2-6' Light orange-brown low	1500	8/27/98	0	clean.
MWRV5	3					plasticity silt with small				
(2-2.5)						amounts of rock and brick,dry.				
	4									
									0	
	5									
	6									
		4			SP	6-12' Medium brown to gray,			5	
	7	10				medium to coarse grained				
		5				sand with 20% silt, moist.				
	8	2								
		3							7	
	9	1								
		1								
	10	1								
		1							8	
	11	2								
		1								
	12	1								
		2			CL	12-22.5' Medium brown silty (20%)			8	
	13	2				low plasticity clay with traces				
		2				of sand and brick, saturated.				
	14	3								
		2							9	
	15	1								

NOTES Monitoring well screened interval = 9-19 feet bls.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million
bgs - below ground surface

PAGE 1 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **MWRV5**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 8/27/98
LOCATION: Queens, New York DATE COMPLETED: 9/8/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 13.43 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 15.52
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		1								
	16	2								
		2							10	
	17	3								
		2								
	18	2								
RW-		2					0950	9/8/98	13	
MWRV5	19	1								
(18-20)		1								
	20	2								
		1							10	
	21	1								
		2								
	22	3								
		50							10	
	23				BR	22.5' Bedrock				TD = 22.5 feet
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

PAGE 2 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **RMW2**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/21/98
LOCATION: Queens, New York DATE COMPLETED: 9/30/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 7.14 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 15.53
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
					GP	0-0.3' Gravel				
	1				SP-Fill	0.3-2.5' Brown silty sand with				Material from 0.3 to
						bricks and cobbles, dense, dry.				2.5 feet is fill.
	2									Material from surface
										to 13 feet appears
	3				ML	2.5-5' Tan brown silt, dry.				clean.
	4									
	5									
					ML-GP	5-6' Dark brown low plasticity				
	6					silt with 50% gravel, dry.				
					SW	6-12' Medium grained orange-				
	7					brown fine grained sand, dry.				
						Becomes clayey sand 8'.				
	8					Saturated				
	9									
	10									
	11									
	12									
					CL-SP	12-13' Medium orange-brown				
	13					sandy clay.				
						13' Obstruction				TD = 13 feet
	14									
	15									

NOTES Screened interval is from 3 to 13 feet.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million
bgs - below ground surface

PAGE 1 OF 1

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **RMW3**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/11/98
LOCATION: Queens, New York DATE COMPLETED: 9/14/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 9.82 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 16.91
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	0									
					GP	0-0.3' Gravel			0	Material from 0.3 to 6
	1				ML	0.3'-4' Medium brown, low				feet is fill.
						plasticity silt with cobbles and				Material from surface
	2					bricks, dry.				to 17 feet appears clean.
									0	
	3									
	4									
					GP	4-5' Asphaltic gravel, dry.			0	
	5									
					CL-ML	5-6' Low plasticity silty clay with				
	6					occasional gravel, dry.				
		5			SW-ML	6-9.5' Orange-brown, fine grained			5	
	7	3				silty sand, moist.				
		2								
	8	2								
		2							5	
	9	3								
		6								
	10	5			CL	9.5-13.5 Mottled orange-brown				
		6				and red, stiff, low plasticity			6	
	11	6				silty (10%) clay, dry.				
		9								
	12	9								
		7							5	
	13	6								
		8								
	14	7			SP-ML	13.5-17' Medium orange brown				
		10				coarse grained silty sand with			8	
	15	8				10% gravel, saturated at 15.75'.				

NOTES Screened interval is 6.5 to 16.5 feet bls.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million
bgs - below ground surface

PAGE 1 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **RMW3**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/11/98
LOCATION: Queens, New York DATE COMPLETED: 9/14/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 9.82 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 16.91
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	15									
		6								
	16	12								
		8							6	
	17	9								
		50			BR	17' Bedrock				TD = 17 feet
	18									
	19									
	20									
	21									
	22									
	23									
	24									
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

PAGE 2 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **RMW4**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/10/98
LOCATION: Queens, New York DATE COMPLETED: 9/11/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 10.04 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 16.38
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS.	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/OVA (ppm)	COMMENTS
	0									
					GP	0-0.3' Gravel				Material from 0.3 to
	1				ML-Fill	0.3-2.5' Brown gray, low plasticity				7.5 feet is fill.
						silt with 50% gravel and cobbles,				Material from surface
	2					dry.				to 11 feet appears clean.
	3				SP-GP	2.5-3' Black asphaltic coarse sand				
						and gravel, dry.				
	4				ML	3-4' Medium brown, clayey, low				
						plasticity silt with 20% gravel.				
	5				SP-GP	3-5' Black asphaltic coarse sand				
						and gravel, dry.				
	6				ML-GP	5-7.5' Medium brown silt with 25%				
		14				gravel, dry.				
	7	7								
		3								
	8	4			CL-ML	7.5-14.5' Greenish-gray, low				
		4				plasticity silty (30%) clay.				
	9	3				Moist.				
		2								
	10	1								
		2								
	11	2								
		4								Black staining and
	12	4								petroleum odor at
		4								11 feet.
	13	4								
		4								
	14	4								
		4			CL-ML	14.5'21' Brownish-black, low				
	15	3				plasticity silty clay, moist.				

NOTES Screened interval is 13 to 23 feet bls.
HNu/OVA - Readings recorded using an organic vapor analyzer (OVA)
ppm - parts per million
bgs - below ground surface

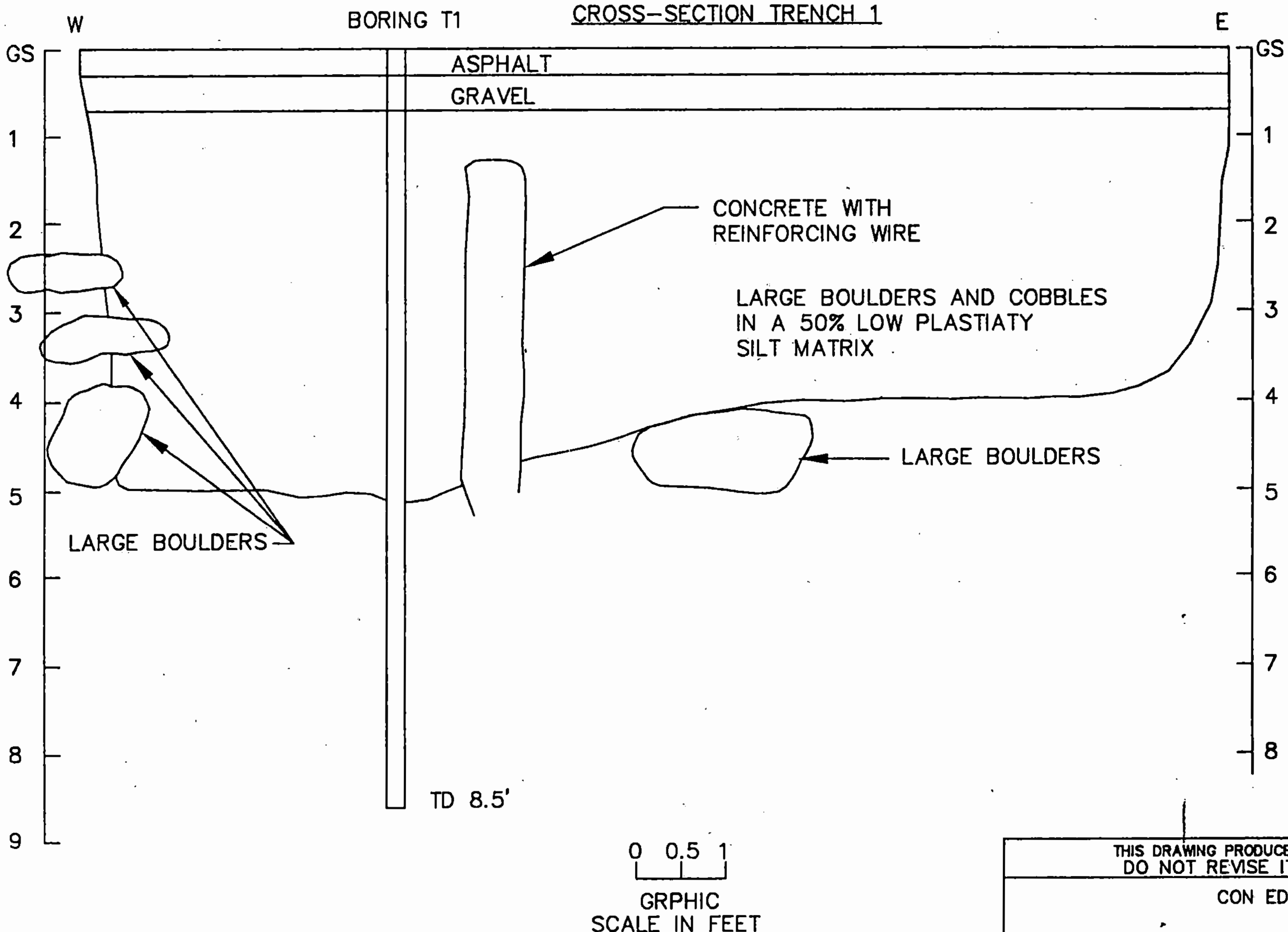
PAGE 1 OF 2

PROJECT: **Consolidated Edison - Ravenswood Generating Station** BORING NUMBER: **RMW4**
PROJECT NO: 2003.0003.0000.00000 DATE STARTED: 9/10/98
LOCATION: Queens, New York DATE COMPLETED: 9/11/98
GEOLOGIST: R. Onderko GROUNDWATER DEPTH: 10.04 feet bgs on 10/12/98
DRILLER: Allstate/ADT ELEVATION: 16.38
DRILLING/SAMPLING METHOD: Power Vacuum (0 - 5 feet), HSA (below 5 feet) / Split Spoon

SAMPLE ID	DEPTH (feet)	BLOWS per 6"	RECOVERY	PROFILE	USCS CLASS	MATERIAL DESCRIPTION	COLLECTION Time	COLLECTION Date	HNu/ OVA (ppm)	COMMENTS
	15									
		4								
	16	4								
		4								
	17	3								
		5								Saturated at 17
	18	4								feet.
		3								
	19	3								
		2								
	20	3								
		3								
	21	2								
		2			CL	21-23.75' Mottled rose red and				
	22	2				gray, stiff, nonplastic clay with				
		2				<10% silt, saturated.				Strong petroleum
	23	2								odor in the last
		5								6" of borehole.
	24	50			BR	23.75 Bedrock				TD = 23.75 feet
	25									
	26									
	27									
	28									
	29									
	30									

NOTES:

PAGE 2 OF 2



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DO NOT REVISE IT MANUALLY

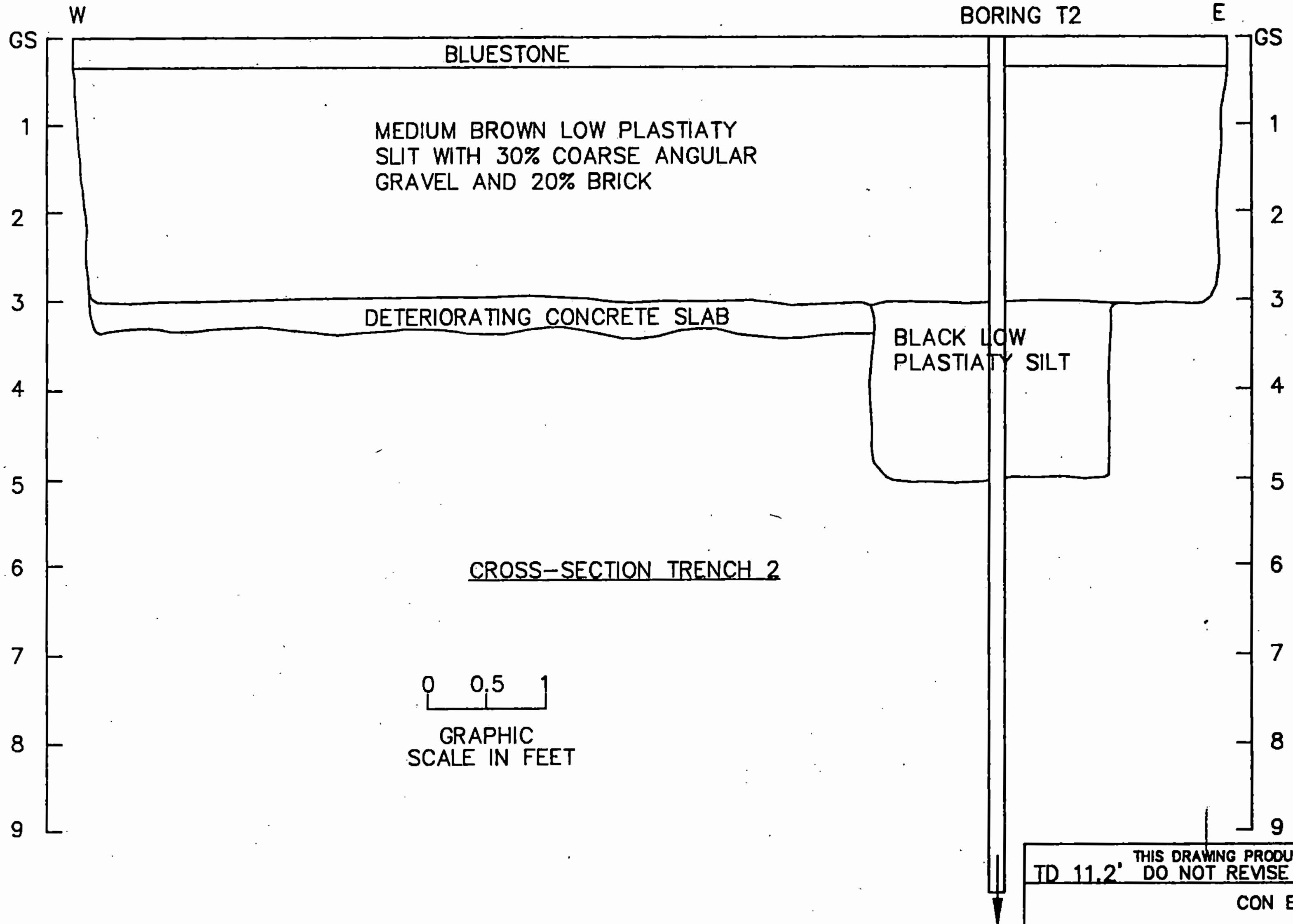
CON EDISON

RAVENSWOOD GENERATING STATION
LONG ISLAND CITY, NEW YORK

FIGURE
CON EDISON PHASE II INVESTIGATION
TEST TRENCH AT T-1

FOSTER WHEELER ENVIRONMENTAL CORPORATION
OFFICE LOCATION, STATE

CAD FILE NAME: CE10238A.DWG DATE: 10/26/98
PLOT SCALE: 1=1 TIME: 8:55 AM



THIS DRAWING PRODUCED ON AUTOCAD
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CON EDISON

RAVENSWOOD GENERATING STATION
LONG ISLAND CITY, NEW YORK

FIGURE
CON EDISON PHASE II INVESTIGATION
TEST TRENCH AT T-2

FOSTER WHEELER ENVIRONMENTAL CORPORATION
OFFICE LOCATION, STATE

CAD FILE NAME: CE10238B.DWG DATE: 10/23/98
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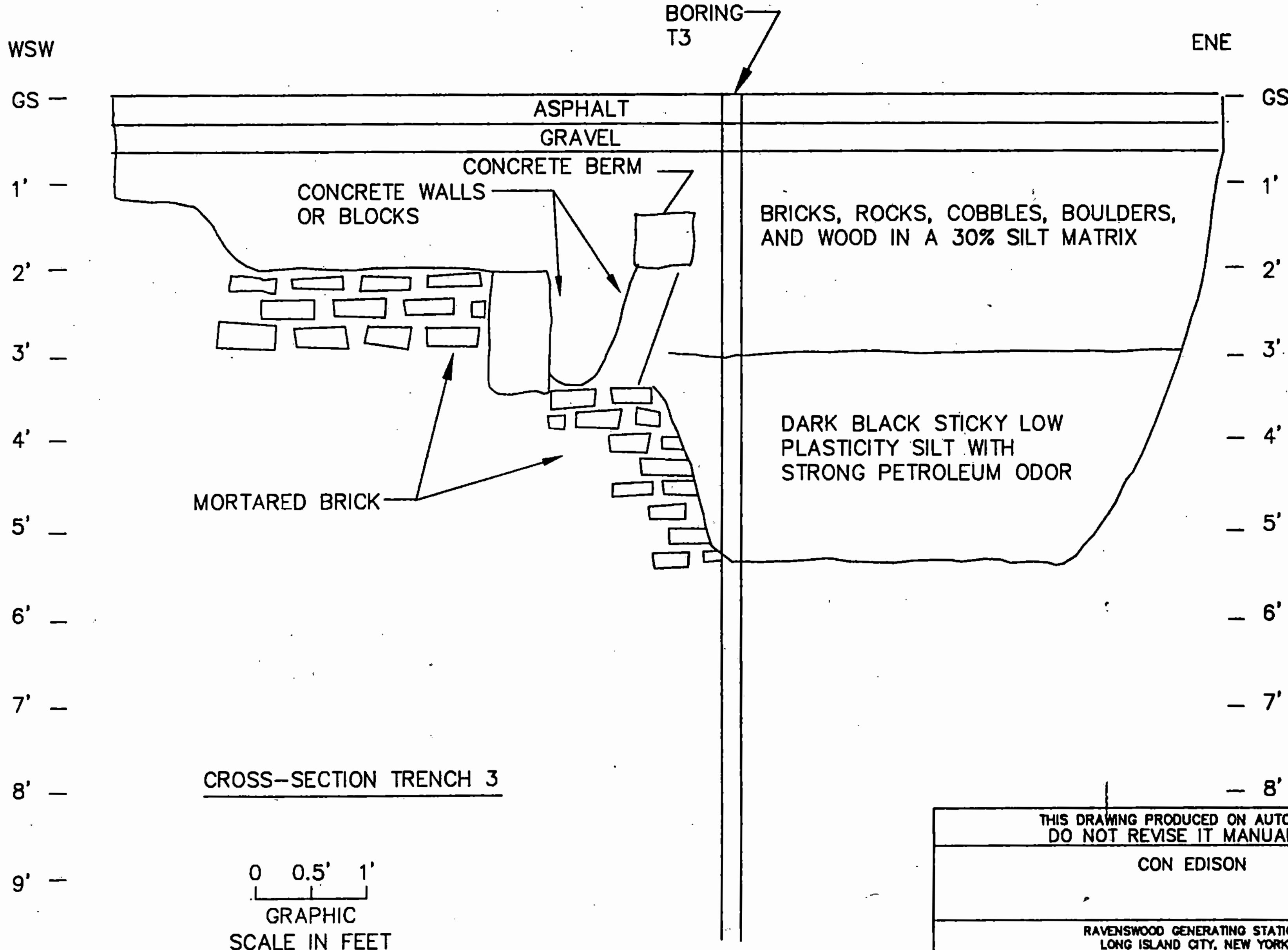

CROSS-SECTION TRENCH 3

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CON EDISON

RAVENSWOOD GENERATING STATION
LONG ISLAND CITY, NEW YORK

FIGURE
CON EDISON PHASE II INVESTIGATION
TEST TRENCH AT T-3

FOSTER WHEELER ENVIRONMENTAL CORPORATION
OFFICE LOCATION, STATE

CAD FILE NAME: CE1D238C.DWG DATE: 10/23/98
PLOT SCALE: 1=1 TIME: 4:45 PM

APPENDIX B

MONITORING WELL CONSTRUCTION DIAGRAMS
WELL PURGE DATA SHEETS
SURVEY DATA

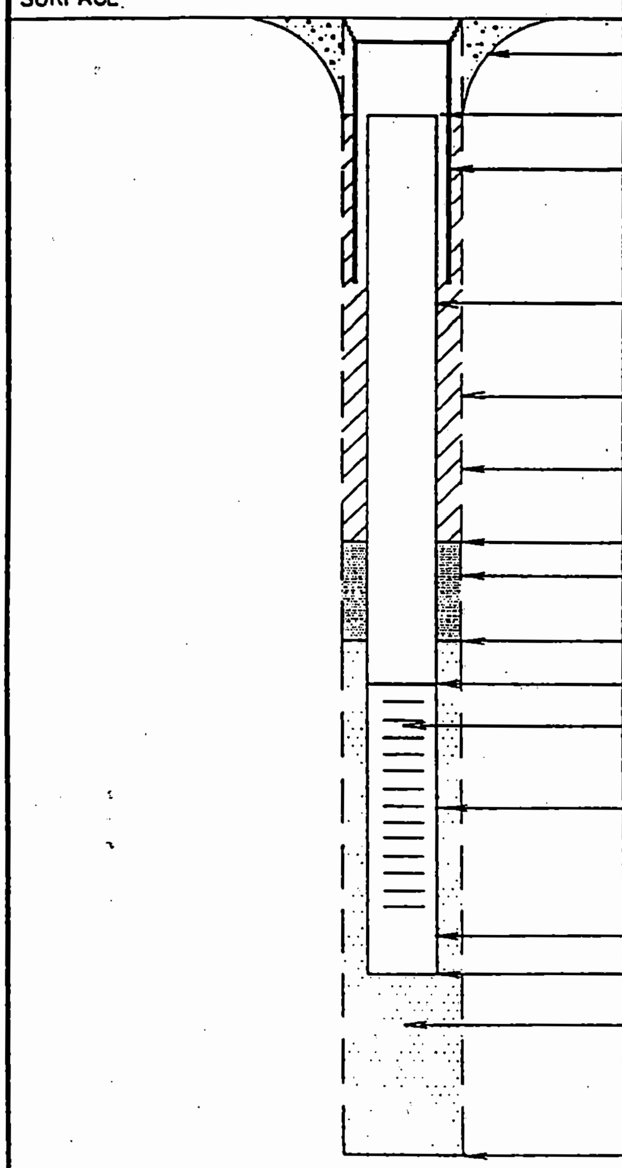
UNCONSOLIDATED MONITORING WELL CONSTRUCTION DIAGRAM

WELL NO. MWRV1A

PROJECT: ConEd Ravenswood
PROJECT NO. 2003 0003 0000 00000
ELEVATION: ______ DATE: 9/10/98
FIELD GEOLOGIST: Robert Onderko

DRILLER: Aquifer Drilling & Testing
DRILLING METHOD: HSA
DEVELOPMENT METHOD: Pump & Surge

GROUND SURFACE



ELEVATION OF TOP OF SURFACE CASING: ______
TYPE OF SURFACE SEAL: Concrete
GROUND SURFACE ELEVATION: ______
ELEVATION OF TOP OF RISER: ______
I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Flush Mount steel
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 6"
TYPE OF BACKFILL: Bentonite - Portland Grout
ELEVATION/DEPTH TOP OF SEAL: 5'
TYPE OF SEAL: Bentonite Pellets
ELEVATION/DEPTH TOP OF SAND PACK: 7'
ELEVATION/DEPTH TOP OF SCREEN: 9'
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.02" x 10'
TYPE OF SAND PACK: Quartz Filter sand
SUMP
ELEVATION/DEPTH BOTTOM OF SCREEN: 19'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 19.5'
TYPE OF BACKFILL BELOW OBSERVATION WELL: None
ELEVATION/DEPTH OF HOLE: 19.5'

NOT TO SCALE

UNMW2.DWG

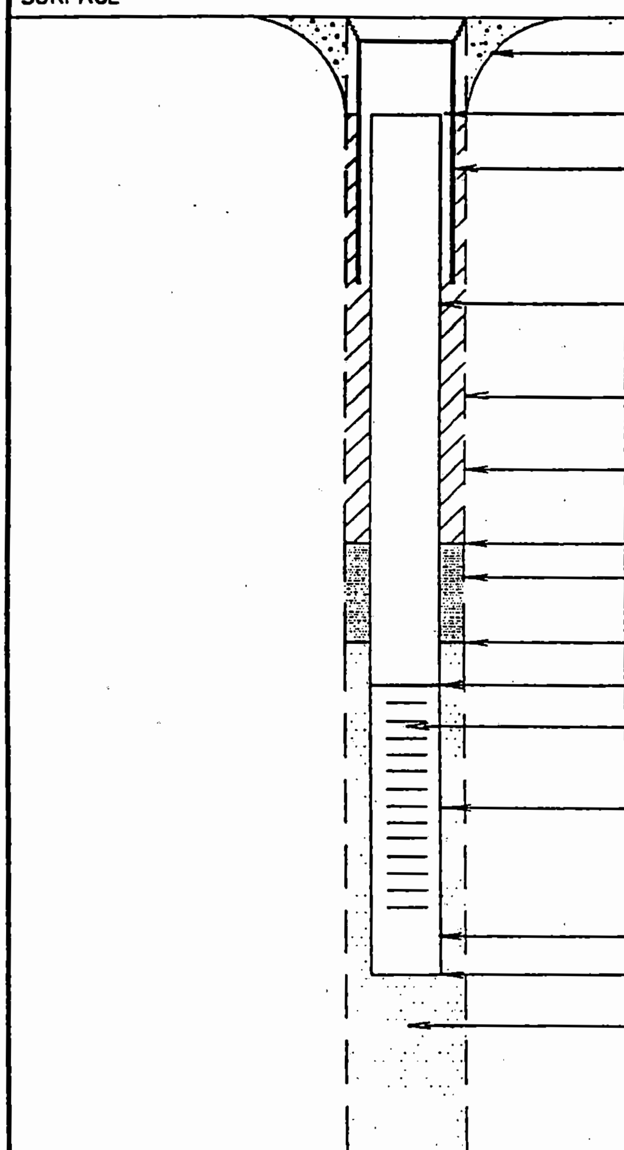
UNCONSOLIDATED
MONITORING WELL
CONSTRUCTION DIAGRAM

WELL NO. MWRV2

PROJECT ConEd Ravenswood
PROJECT NO. 2003 0003 0000 00000
ELEVATION ______ DATE 9/9/98
FIELD GEOLOGIST Robert Onderka

DRILLER Aquifer Drilling & Testing
DRILLING METHOD HSA
DEVELOPMENT METHOD Pump & Surge

GROUND SURFACE



ELEVATION OF TOP OF SURFACE CASING: ______
TYPE OF SURFACE SEAL: Concrete
GROUND SURFACE ELEVATION: ______
ELEVATION OF TOP OF RISER: ______
I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Flush Mount Steel
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 6"
TYPE OF BACKFILL: Bentonite - Portland Grout
ELEVATION/DEPTH TOP OF SEAL: 2'
TYPE OF SEAL: Bentonite Pellets
ELEVATION/DEPTH TOP OF SAND PACK: 4'
ELEVATION/DEPTH TOP OF SCREEN: 6'
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.02" x 10'
TYPE OF SAND PACK: Quartz Filter Sand
SUMP
ELEVATION/DEPTH BOTTOM OF SCREEN: 16'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 16.5'
TYPE OF BACKFILL BELOW OBSERVATION WELL: NONE
ELEVATION/DEPTH OF HOLE 16.5'

NOT TO SCALE

UNMW2.DWG

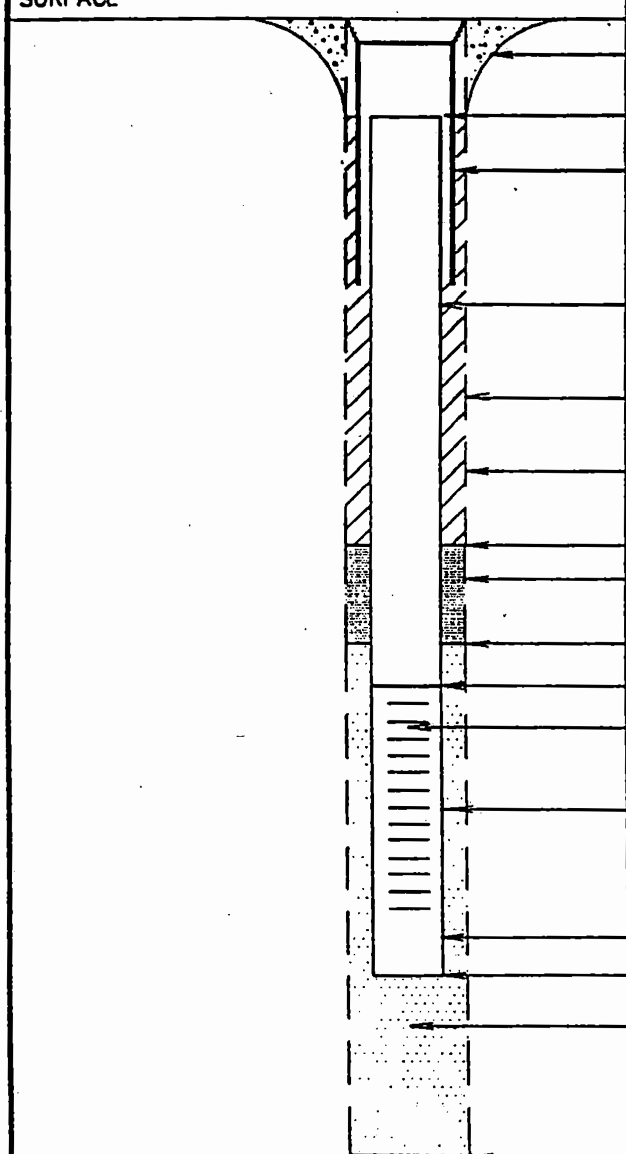
UNCONSOLIDATED
MONITORING WELL
CONSTRUCTION DIAGRAM

WELL NO. MWRV-3

PROJECT: Con Ed Ravenswood
PROJECT NO.: 2003 0003 0000 00000
ELEVATION: ______ DATE: 9/4/98
FIELD GEOLOGIST: Robert Onderko

DRILLER: Aquifer Drilling & Testing
DRILLING METHOD: HSA
DEVELOPMENT METHOD: Pump & Surge

GROUND SURFACE



ELEVATION OF TOP OF SURFACE CASING: ______
TYPE OF SURFACE SEAL: Concrete
GROUND SURFACE ELEVATION: ______
ELEVATION OF TOP OF RISER: ______
I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Flush Mount Steel
RISER PIPE I.D.: 2"
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 6"
TYPE OF BACKFILL: Bentonite-Portland Grout
ELEVATION/DEPTH TOP OF SEAL: 6'
TYPE OF SEAL: ______
ELEVATION/DEPTH TOP OF SAND PACK: 8'
ELEVATION/DEPTH TOP OF SCREEN: 10'
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.02" x 10'
TYPE OF SAND PACK: Quartz Filter Sand
SUMP
ELEVATION/DEPTH BOTTOM OF SCREEN: 20'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 20.5'
TYPE OF BACKFILL BELOW OBSERVATION WELL: Bentonite Pellets
ELEVATION/DEPTH OF HOLE: 26'

NOT TO SCALE

UNMW2.DWG

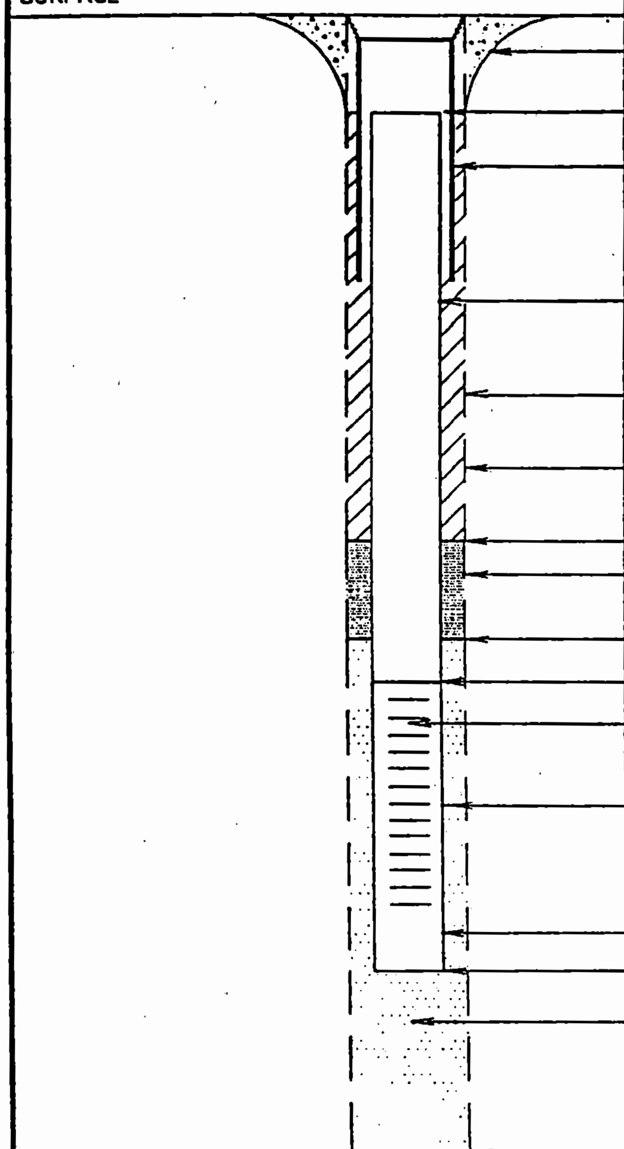
UNCONSOLIDATED
MONITORING WELL
CONSTRUCTION DIAGRAM

WELL NO. MWRV4

PROJECT ConEd Ravenswood
PROJECT NO. 2003 0003 0000 00000
ELEVATION ______ DATE 9/3/98
FIELD GEOLOGIST Robert J Onderko

DRILLER Aquifer Drilling & Testing
DRILLING METHOD HSA
DEVELOPMENT METHOD Pump & Surge

GROUND SURFACE



ELEVATION OF TOP OF SURFACE CASING: ______
TYPE OF SURFACE SEAL: Concrete
GROUND SURFACE ELEVATION: ______
ELEVATION OF TOP OF RISER: ______
I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Flush Mount Steel
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 6"
TYPE OF BACKFILL: Portland-Bentonite Grout
ELEVATION/DEPTH TOP OF SEAL: 6'
TYPE OF SEAL: Bentonite Pellets
ELEVATION/DEPTH TOP OF SAND PACK: 8'
ELEVATION/DEPTH TOP OF SCREEN: 10'
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.02" x 10'
TYPE OF SAND PACK: Quartz Filter Sand
SUMP
ELEVATION/DEPTH BOTTOM OF SCREEN: 20'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 20.5'
TYPE OF BACKFILL BELOW OBSERVATION WELL: Bentonite Pellets
ELEVATION/DEPTH OF HOLE 25.5'

NOT TO SCALE

UNMW2.DWG

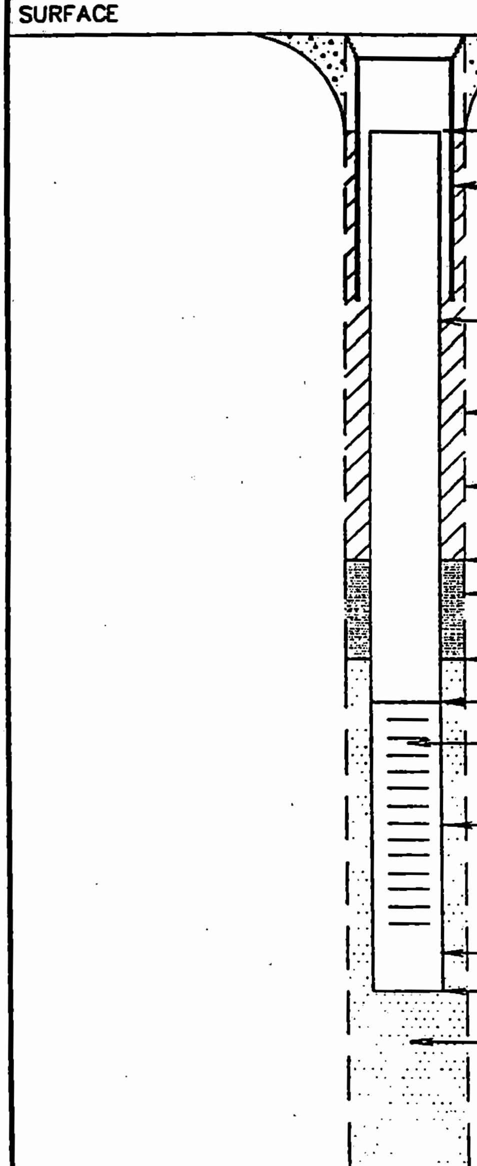
UNCONSOLIDATED
MONITORING WELL
CONSTRUCTION DIAGRAM

WELL NO. MWRV5

PROJECT ConEd Ravenswood
PROJECT NO. 2003 0003 0000 00000
ELEVATION ______ DATE 9/8/98
FIELD GEOLOGIST Robert Onderko

DRILLER Aquifer Drilling & Testing
DRILLING METHOD HSA
DEVELOPMENT METHOD Pump & Surge

GROUND SURFACE



ELEVATION OF TOP OF SURFACE CASING: ______
TYPE OF SURFACE SEAL: Concrete
GROUND SURFACE ELEVATION: ______
ELEVATION OF TOP OF RISER: ______
I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Flush Mount Steel
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 6"
TYPE OF BACKFILL: Bentonite-Portland Grout
ELEVATION/DEPTH TOP OF SEAL: 5'
TYPE OF SEAL: Bentonite Pellets
ELEVATION/DEPTH TOP OF SAND PACK: 7'
ELEVATION/DEPTH TOP OF SCREEN: 9'
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.02" x 10'
TYPE OF SAND PACK: Quartz Filter Sand
SUMP
ELEVATION/DEPTH BOTTOM OF SCREEN: 19.0
ELEVATION/DEPTH BOTTOM OF SAND PACK: 19.5
TYPE OF BACKFILL BELOW OBSERVATION WELL: Bentonite Pellets
ELEVATION/DEPTH OF HOLE 22.5

NOT TO SCALE

UNMW2.DWG

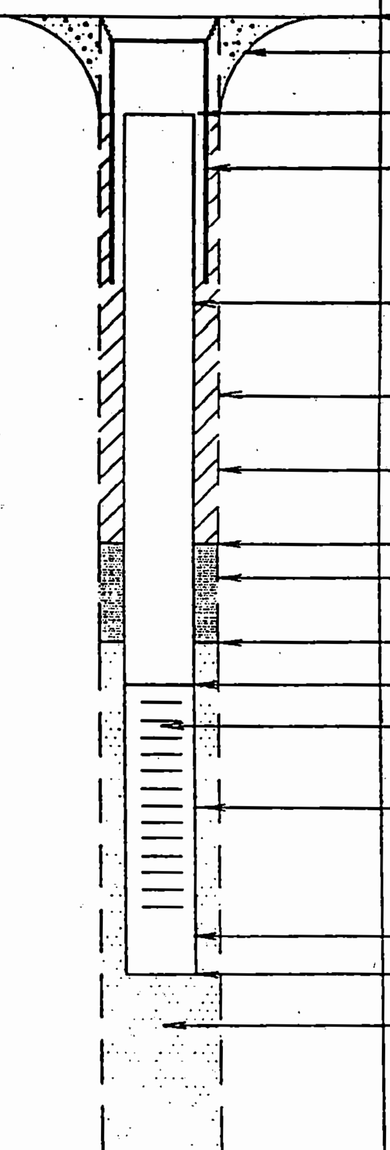
UNCONSOLIDATED
MONITORING WELL
CONSTRUCTION DIAGRAM

WELL NO. RMW2

PROJECT ConEd Ravenswood
PROJECT NO. 2003 0003 0000 00000
ELEVATION ______ DATE 9/30/98
FIELD GEOLOGIST Robert Onderka

DRILLER Aquifer Drilling & Testing
DRILLING METHOD HSA
DEVELOPMENT METHOD Pump & Surge

GROUND SURFACE



ELEVATION OF TOP OF SURFACE CASING: ______
TYPE OF SURFACE SEAL: Concrete
GROUND SURFACE ELEVATION: ______
ELEVATION OF TOP OF RISER: ______
I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Flush Mount Steel
RISER PIPE I.D. ______
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 8"
TYPE OF BACKFILL: Portland - Bentonite Grout
ELEVATION/DEPTH TOP OF SEAL: 1'
TYPE OF SEAL: Bentonite Pellets
ELEVATION/DEPTH TOP OF SAND PACK: 2'
ELEVATION/DEPTH TOP OF SCREEN: 3'
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.02" x 10'
TYPE OF SAND PACK: Quartz Filter Sand
SUMP
ELEVATION/DEPTH BOTTOM OF SCREEN: 13.0'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 13.5
TYPE OF BACKFILL BELOW OBSERVATION WELL: NONE
ELEVATION/DEPTH OF HOLE 13.5

NOT TO SCALE

UNMW2.DWG

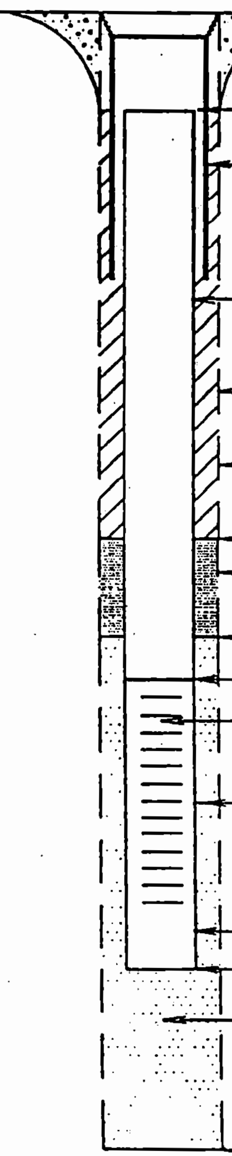
UNCONSOLIDATED
MONITORING WELL
CONSTRUCTION DIAGRAM

WELL NO. RMW 3

PROJECT ConEd Ravenswood
PROJECT NO. 2003 0003 0000 00000
ELEVATION ______ DATE 9/14/98
FIELD GEOLOGIST Robert Ondreko

DRILLER Aquifer Drilling Testing
DRILLING METHOD HSA
DEVELOPMENT METHOD Pump & Surge

GROUND SURFACE



ELEVATION OF TOP OF SURFACE CASING: ______
TYPE OF SURFACE SEAL: Concrete
GROUND SURFACE ELEVATION: ______
ELEVATION OF TOP OF RISER: ______
I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Flush Mount Steel
RISER PIPE I.D. 4"
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 8"
TYPE OF BACKFILL: Portland - Bentonite Grout
ELEVATION/DEPTH TOP OF SEAL: 2.5'
TYPE OF SEAL: Bentonite Pellets
ELEVATION/DEPTH TOP OF SAND PACK: 4.5'
ELEVATION/DEPTH TOP OF SCREEN: 6.5'
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.02" x 10'
TYPE OF SAND PACK: Quartz Filter Sand
SUMP
ELEVATION/DEPTH BOTTOM OF SCREEN: 16.5'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 17'
TYPE OF BACKFILL BELOW OBSERVATION WELL: NONE
ELEVATION/DEPTH OF HOLE 17'

NOT TO SCALE

UNMW2.DWG

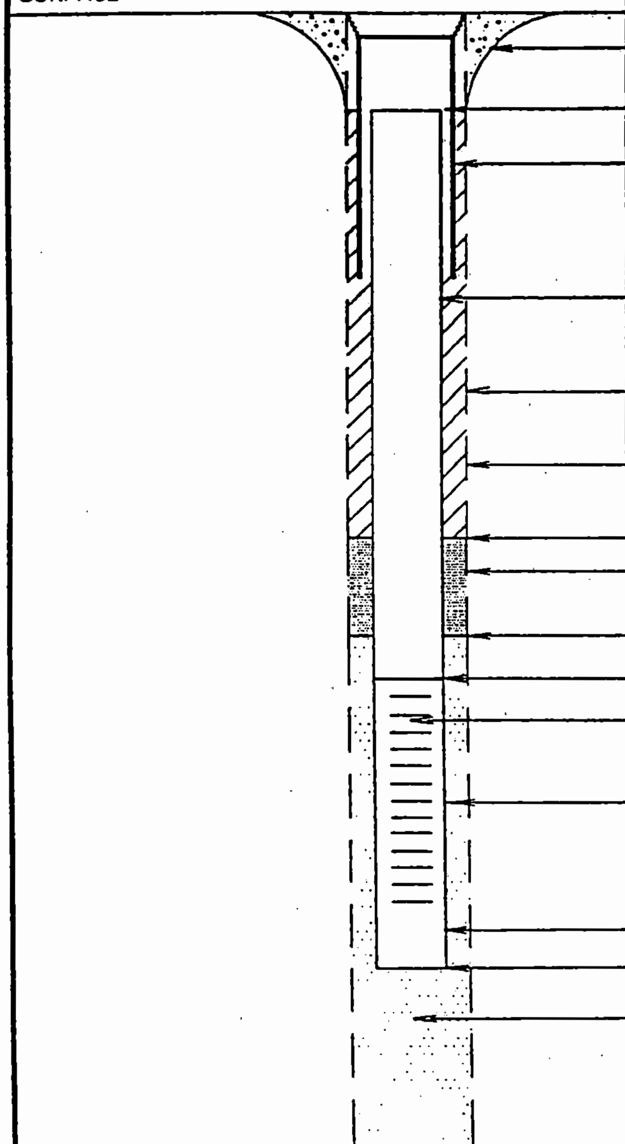
UNCONSOLIDATED MONITORING WELL CONSTRUCTION DIAGRAM

WELL NO. RMW 4

PROJECT ConEd Ravenswood
PROJECT NO. 2003 0003 0000 00000
ELEVATION ______ DATE 9/11/98
FIELD GEOLOGIST Robert J. Onderko

DRILLER Aquifer Drilling & Testing
DRILLING METHOD HSA
DEVELOPMENT METHOD Pump & Surge

GROUND SURFACE



ELEVATION OF TOP OF SURFACE CASING: ______
TYPE OF SURFACE SEAL: Concrete
GROUND SURFACE ELEVATION: ______
ELEVATION OF TOP OF RISER: ______
I.D. OF SURFACE CASING: 6"
TYPE OF SURFACE CASING: Steel Flush Mount
RISER PIPE I.D. 4"
TYPE OF RISER PIPE: PVC
BOREHOLE DIAMETER: 8"
TYPE OF BACKFILL: Portland - Bentonite Grout
ELEVATION/DEPTH TOP OF SEAL: 9.0'
TYPE OF SEAL: Bentonite Pellets
ELEVATION/DEPTH TOP OF SAND PACK: 11.0'
ELEVATION/DEPTH TOP OF SCREEN: 13.0'
TYPE OF SCREEN: PVC
SLOT SIZE X LENGTH: 0.02" x 10'
TYPE OF SAND PACK: Quartz Filter Sand
SUMP
ELEVATION/DEPTH BOTTOM OF SCREEN: 23.0'
ELEVATION/DEPTH BOTTOM OF SAND PACK: 23.5'
TYPE OF BACKFILL BELOW OBSERVATION WELL: Bentonite
ELEVATION/DEPTH OF HOLE 23.75'

NOT TO SCALE

UNMW2.DWG

WELL PURGE DATA SHEET

Well I.D. RMW 2　　　　Date 10-9-98

Well Depth (from TOC) = 12.64 ft
Well Diameter (d) = 4.0 in
Static Water Level (from TOC) = 7.43 ft
Well Radius (d/2) = 2.0 in

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = 12.64 - 7.43
T = 5.21 ft

Gallons of Water per Well Volume

$$\text{Volume} = 0.163 \times T(\text{ft}) \times r(\text{in})^2$$

$$= 0.163 \times 5.21 \times 2^2$$

= 3.39 gallons

Total Water Purged

Design = 10.2 gallons

Actual = 4.5 gallons

Water Quality

	TIME	pH	SPEC. CONDUC. (umhos/cm)	TEMPERATURE (oC)	DO (ppm)	En (mu)	Turb
Initial	0958	9.59	1.03	19.8	.47		173
Volume 1	1005	9.67	1.00	20.7	.43		7100
Volume 2							
Volume 3							
Volume 4							
Volume 5							

Purge Method

_____ SUCTION PUMP _____ SUBMERSIBLE PUMP _____ BAILER _____ OTHER (SPECIFY) _____

Notes/Observations: Vol 1: Water m brown, turbid. When the second volume of purging was attempted, only ~1 gal was able to be purged. Recovery was not sufficient. At 1410, samples were collected from RMW2 despite insufficient recovery

Sampler(s): M. Greenberg, J. Schaffer

WELL PURGE DATA SHEET

Well I.D. RMW-3 Date 10-9-98

Well Depth (from TOC) = 14.10 ft
Well Diameter (d) = 4.0 in
Static Water Level (from TOC) = 9.76 ft
Well Radius (d/2) = 2.0 in

North side casing

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = 14 - 9.76
T = 4.24 ft

Gallons of Water per Well Volume

$$\text{Volume} = 0.163 \times T(\text{ft}) \times r(\text{in})^2$$
$$= 0.163 \times 4.24 \times 2^2$$
$$= 2.76 \text{ gallons}$$

Total Water Purged

Design = 2.76 gallons

Actual = 5.0 gallons

Water Quality

	TIME	pH	SPEC. CONDUC. mS/cm JS ~~(umhos/cm)~~	TEMPERATURE (oC)	DO (ppm)	Eh (mu)	Turb
Initial	0826	5.43	0.643	24.3	0.73		61
Volume 1	0830	~~5.84~~	~~0.749~~	24.4	~~1.42~~		~~600~~
Volume 2	1018	6.81	0.748	24.6	1.42		600
Volume 3	1245	6.2	0.94	24.5	1.43		979
Volume 4							
Volume 5							

Purge Method
_____ SUCTION PUMP ✓ SUBMERSIBLE PUMP _____ BAILER _____ OTHER (SPECIFY)

Notes/Observations: Water appears tea colored purges 1, 2
Vol 3 - Water appears m brown, very turbid.

Sampler(s): John Schaffer Matt Greenberg

agal. and 1 gal.

WELL PURGE DATA SHEET

Well I.D. RMW 4 Date 10-9-98

Well Depth (from TOC) = 21.86 ft
Well Diameter (d) = 4.0 in
Static Water Level (from TOC) = 9.84 ft
Well Radius (d/2) = 2.0 in

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = 21.86 - 9.84
T = 12.02 ft

Gallons of Water per Well Volume

$$\text{Volume} = 0.163 \times T(\text{ft}) \times r(\text{in})^2$$

$$= 0.163 \times 12.02 \times 2^2$$

= 7.8 gallons

Total Water Purged

Design = ~~7.8~~ 23.4 gallons

Actual = 21.0 gallons

Water Quality

	TIME	pH	SPEC. CONDUC. (umhos/cm)	TEMPERATURE (oC)	DO (ppm)	Eh (mu)	Turb
Initial	0904	6.87	.811	21.7	.31		52
Volume 1	0921	7.19	.775	22.0	.50		>1000
Volume 2	1030	6.93	1.02	21.9	.22		>100
Volume 3	1055	6.96	1.05	21.9	0.08		>100
Volume 4							
Volume 5							

Purge Method

____ SUCTION PUMP ✓ SUBMERSIBLE PUMP ____ BAILER ____ OTHER (SPECIFY) ____

Notes/Observations: Initial: Color: Dk grey, low turbidity
Vol 1: Water turning greyer, more turbid.
Vol 2: Water grey colored.

Sampler(s): John Schaffer Matt Greenberg

WELL PURGE DATA SHEET

Well I.D. NW-RV1A Date 9/30/98

Well Depth (from TOC) = 16.59 ft
Well Diameter (d) = 2 in
Static Water Level (from TOC) = 11.81 ft
Well Radius (d/2) = 1 in

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = 16.59 - 11.81
T = 4.78 ft

Gallons of Water per Well Volume

$$\text{Volume} = 0.163 \times T(\text{ft}) \times r(\text{in})^2$$

$$= 0.163 \times 4.78 \times 1^2$$

= 0.78 gallons

Total Water Purged

Design = 0.78x3=2.34 gallons

Actual = 4 gallons

Water Quality

	TIME	pH	SPEC. CONDUC. (umhos/cm)	TEMPERATURE (oC)	DO (ppm)	Turb ~~Eh (mv)~~
Initial	0921	6.25	1.04	22.1	1.93	
Volume 1	0924	6.39	0.98	22.2	1.55	
Volume 2	0927	6.59	1.00	22.0	8.85	~~799~~ 750
Volume 3	0939	6.5	1.03	21.7	2.86	999
Volume 4						
Volume 5						

Purge Method
___ SUCTION PUMP ___ SUBMERSIBLE PUMP ✓ BAILER ___ OTHER (SPECIFY) ___

Notes/Observations: Initial: Lt tan color.

Vol 3: M. brown color, turbid.

Sampler(s): M. Greenberg, L. Blake-Floyd

WELL PURGE DATA SHEET

Well I.D. MWRV2 Date 9/30/98

Well Depth (from TOC)	=	13.71	ft
Well Diameter (d)	=	2	in
Static Water Level (from TOC)	=	4.77	ft
Well Radius (d/2)	=	1	in

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = 13.71 - 4.77
T = 8.94 ft

13.71
-4.77
8.94

Gallons of Water per Well Volume

$$\text{Volume} = 0.163 \times T(\text{ft}) \times r(\text{in})^2$$

$$= 0.163 \times 8.94 \times 1^2$$

= 1.46 gallons

Total Water Purged

Design = 1.46x3 = 4.37 gallons

Actual = 5 gallons

Water Quality

	TIME	pH	SPEC. CONDUC. (umhos/cm)	TEMPERATURE (oC)	DO (ppm)	Turb ~~Eh~~ (mu)
Initial	1105	7.14	0.337	22.8°C	1.34	537
Volume 1	1110	7.26	0.335	22.2°C	1.20	999
Volume 2	1115	7.24	0.320	21.5°C	1.32	999
Volume 3	1120	7.25	0.312	21.4°C	1.37	1000
Volume 4						
Volume 5						

Purge Method

____ SUCTION PUMP ____ SUBMERSIBLE PUMP ✓ BAILER ____ OTHER (SPECIFY) ____

Notes/Observations: oil/water interface probe detected no oil.
1st Volume water gray cloudy - product sheen
2nd Volume water olive brown cloudy product sheen

Sampler(s): L. Blake, M. Greenberg

WELL PURGE DATA SHEET

Well I.D. MWRy 3 **Date** 9/30/98

Well Depth (from TOC)	=	19.52	ft
Well Diameter (d)	=	2	in
Static Water Level (from TOC)	=	7.99	ft
Well Radius (d/2)	=	1	in

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = 19.52 - 7.99
T = 11.53 ft

Gallons of Water per Well Volume

$$\text{Volume} = 0.163 \times T(\text{ft}) \times r(\text{in})^2$$
$$= 0.163 \times 11.53 \times 1^2$$
$$= 1.88 \text{ gallons}$$

Total Water Purged

Design = 5.64 gallons

Actual = 7.5 gallons

Water Quality

	TIME	pH	SPEC. CONDUC. (umhos/cm)	TEMPERATURE (oC)	DO (ppm)	~~Eh~~ Turb (mu)
Initial	1430	7.24	42.9	23.0	1.25	382
Volume 1	1434	7.20	50.7	22.6	.52	>1000
Volume 2	1437	7.11	50.3	22.7	.44	>1000
Volume 3	1440	7.11	49.7	22.8	.44	>1000
Volume 4						
Volume 5						

Purge Method

___ SUCTION PUMP ___ SUBMERSIBLE PUMP √ BAILER ___ OTHER (SPECIFY) ___

Notes/Observations: Initial = Water is darkgrey to black with ~~heavy~~ product layer sheen Slight Odor detected.
Vol 3 - Same as initial, except sheen is ~~more~~ greater

Sampler(s): M. Greenberg, L. Blake-Rayot

WELL PURGE DATA SHEET

Well I.D. MW RV4 Date 9/30/98

Well Depth (from TOC) = 20.20 ft
Well Diameter (d) = 2 in
Static Water Level (from TOC) = 8.67 ft
Well Radius (d/2) = 1 in

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = 20.20 - 8.67
T = 11.53 ft

Gallons of Water per Well Volume

Volume = 0.163 x T(ft) x $r(in)^2$

= 0.163 x 11.53 x 1^2
= 1.88 gallons

Total Water Purged

Design = 1.88 x 3 = 5.6 gallons

Actual = 5.5 gallons

Water Quality

	TIME	pH	SPEC. CONDUC. (umhos/cm)	TEMPERATURE (oC)	DO (ppm)	Turb. ~~Eh~~ (mu)	Sal. %
Initial	1355	7.23	56.9	24.3	1.55	322	3.3
Volume 1	1405	7.33	56.6	23.8	.90	>1000	
Volume 2	1409	7.33	56.9	23.8	.88	142	
Volume 3	1413	7.331	57.2	23.8	.72	93	
Volume 4							
Volume 5							

Purge Method

___ SUCTION PUMP ___ SUBMERSIBLE PUMP ✓ BAILER ___ OTHER (SPECIFY)

Notes/Observations: Initial - Large amount of oil sheen present. Water is dark grey.

Sampler(s):

WELL PURGE DATA SHEET

Well I.D. MW RV5 Date 9/30/98

Well Depth (from TOC) = 19.15 ft
Well Diameter (d) = 2 in
Static Water Level (from TOC) = 13.15 ft
Well Radius (d/2) = 1 in

Height of Water in Well

T = Depth (ft) - Static Water Level (ft)
T = 19.15 - 13.15
T = 6 ft

Gallons of Water per Well Volume

$$\text{Volume} = 0.163 \times T(\text{ft}) \times r(\text{in})^2$$

$$= 0.163 \times 6 \times 1^2$$

$$= 0.978 \text{ gallons}$$

Total Water Purged

Design = 3x0.978 = 2.93 gallons

Actual = 5 gallons

Water Quality

	TIME	pH	SPEC. CONDUC. (umhos/cm)	TEMPERATURE (oC)	DO (ppm)	Turb ~~Eh (mv)~~
Initial	1150	7.09	10.7	25.5	1.43	415
Volume 1	1152	7.19	10.9	25.4	1.66	999
Volume 2	1153	7.21	12.4	25.6	1.47	999
Volume 3	1159	7.16	15.2	25.5	1.67	999
Volume 4	1202	7.16	20.9	25.7	1.80	999
Volume 5	1206	7.15	22.1	25.6	1.55	>1000

Purge Method
____ SUCTION PUMP ____ SUBMERSIBLE PUMP ✓ BAILER ____ OTHER (SPECIFY)

Notes/Observations: Vol 1 - Water appears dark brown. Some surface product present.
Vol 3- Water dark brown with product.

Sampler(s): M. Greenberg, L. Blake-Rayot

Ravenswood Generating Station

ɔject: Coned
ɩnt statistics:

Thu Oct 15 21:08:51 1998

Current Coordinate Listing (All)

ɩnt	Northing	Easting	Elevation	Description
4	1784.9100	1002.5600	15.88	CC
5	1901.2900	1005.3200	16.00	CC
15	2014.2600	1008.7100	10.91	CC
16	2089.4700	1011.5300	10.92	CC
100	1809.2963	1118.2557	15.68	PK TR PT. 17
101	1855.6371	1291.2880	14.84	PK TR 18
102	1803.2483	1172.5056	15.52	MW 5
103	1602.3129	1137.1728	14.91	SB 16
104	1557.3026	1139.5691	14.81	SB 17
105	2063.2663	1582.2115	17.75	PK TR PT. 19
106	1836.2146	1295.5740	15.02	SB 13
107	1841.6632	1412.0051	16.41	SB 24
108	1841.1942	1430.3841	16.43	SB 08
109	1839.8654	1447.5686	16.45	SB 26
110	1858.5061	1430.7013	16.54	SB 25
111	1907.3283	1198.9717	13.22	SB 15
112	2037.9889	1141.0366	12.08	SB 14A
113	2039.3522	1125.3383	11.93	SB 14
114	2003.8615	1273.6430	13.49	MW 2
115	2009.3772	1359.9839	15.03	SB 12
116	1952.5813	1379.0083	16.71	T3 2FT WIDE
117	1957.5289	1391.0057	16.99	T3 2FT WIDE
118	1954.9941	1384.7952	16.91	T3 2FT WIDE
119	2063.3639	1440.7928	16.90	SB 7
120	1383.2407	1688.1578	16.74	PK TR 20
121	2090.7231	1552.5811	17.73	T1 2F WIDE
122	2091.3387	1558.4641	17.42	T1 2F WIDE
123	2092.2278	1565.3029	17.79	T1 2F WIDE
124	1813.6898	1591.4651	15.52	T2
125	1719.4046	1637.6984	14.96	SB 9
126	1903.3759	1565.0961	16.89	SB 5
127	1899.6919	1735.2954	16.67	SB 19A
128	1918.6443	1715.1714	16.66	SB 20A
129	1921.6877	1733.6149	17.02	MWRV1 1
130	1975.9181	1727.3986	19.25	SB 18
131	1998.2971	1726.0451	19.40	MW 1A
132	2014.7733	1724.0257	19.38	SB 19
133	1995.3415	1706.6783	19.52	SB 20
134	2093.7374	1640.9480	18.26	SB 06
135	1440.9936	1658.2679	15.60	SB 11
136	1383.5266	1664.7152	16.38	MW 4
137	1445.3428	1564.5407	15.55	SB 23
138	1467.9194	1540.2351	15.00	SB 22
139	1455.7268	1533.3495	15.23	HS 3

Ravenswood Generating Station

ject: Coned   Thu Oct 15 21:08:55 1998

Current Coordinate Listing (All)

nt	Northing	Easting	Elevation	Description
140	1445.3962	1518.9475	14.91	SB 21
141	1430.6167	1543.4975	15.45	SB 03
142	1367.3454	1503.6330	15.53	MW 2
143	1578.0746	1655.5156	15.29	SB 10
144	2068.7071	1073.1117	11.48	SB 4
145	2010.3466	1040.8770	11.02	MW 3
146	1949.0058	1027.6786	7.52	MW 4
147	1118.0341	1653.5294	15.83	PK TR PT. 21
148	1259.0880	1646.5147	16.91	RMW 3
149	1292.6755	1496.3441	15.35	RMW 1
150	1049.7934	1499.2261	15.27	PK TR 22
151	1092.1360	1274.7955	15.59	SB 1
152	1093.3749	1234.8439	15.65	SB 2