Public Service Electric and Gas Company

Former Front Street Gas Works

Newark, New Jersey

Remedial Investigation Report

March 1999

Prepared For:

Public Service Electric and Gas Company
80 Park Plaza
Newark, NJ 07101

Prepared By:

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A Subsidiary of Thermo TerraTech
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Project No. 263709

Exhibit "A"

CERTIFICATION

Pursuant to N.J.A.C. 7:26C-1.2(b)

Regarding the Remedial Investigation Report dated February 1999 for the Former Front Street Gas Works Site located in Newark, New Jersey:

"I certify, under penalty of law, that the information provided in this document is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information, and that I am committing a crime of the fourth degree if I make a written false statement that I do not believe to be true. I am also aware that, if I knowingly direct or authorize the violation of any statue, I am personally liable for the penalties."

KILLAM ASSOCIATES

Albert J. Mellini, P.E.
Type/Print Name

Executive Vice President
Title

Signature

3-29-99
Date

Sworn to and subscribed before me on this 29 day of March 1999

Signature of Notary Public
(Stamp and Seal/Commission Expiration Date)

LORENE H. PRIMICH
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Oct. 8, 2001

Exhibit "B"

CERTIFICATION

Pursuant to N.J.A.C. 7:26C-1.2

Based on the Certification of Albert J. Mellini dated 3/29/99 (attached hereto as Exhibit "A") and information obtained in connection with my status as Project Manager for the preparation of the Remedial Investigation Report (dated February 1999) for PSE&G's Former Front Street Gas Works site located in Newark, New Jersey:

"I certify, under penalty of law, that the information provided in the document is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statue, I am personally liable for the penalties."

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

Warren Straubmuller	Project Manager
Type/Print Name	**Title**
Signature	3/31/99 **Date**

Sworn to and subscribed before me on this 31st day of March .

Marilyn G. Romano
Notary Public - New Jersey
(Stamp and Seal/Commission Expiration Date)

MARILYN G. ROMANO
NOTARY PUBLIC OF NEW JERSEY
Commission Expires 10/11/2001

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Exhibit "C"

CERTIFICATION

Pursuant to N.J.A.C. 7:26C-1.2(c)

Based on the Certification of Albert J. Mellini dated 3/29/99 (attached hereto as Exhibit "A") and the Certification of Warren Straubmuller dated 3/31/99 (attached hereto as Exhibit "B") regarding the Remedial Investigation Report (dated February 1999) for PSE&G's Former Front Street Gas Works site located in Newark, New Jersey:

"I certify, under penalty of law, that I have personally examined and am familiar with the document, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information, and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statue, I am personally liable for the penalties."

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

Stanley LaBruna — **Type/Print Name**

Vice President - Environment, Health & Safety — **Title**

Signature

3/31/99 — **Date**

Sworn to and subscribed before me on this 31st day of March 1999

Marilyn G. Romano

Notary Public - New Jersey

(Stamp and Seal/Commission Expiration Date)

MARILYN G. ROMANO
NOTARY PUBLIC OF NEW JERSEY
Commission Expires 10/11/2001

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1.0 INTRODUCTION

Public Service Electric & Gas Company (PSE&G) retained Thermo TerraTech (TerraTech) to perform a Remedial Investigation (RI) at a former manufactured gas plant (MGP) known as the Former Front Street Gas Works (Site). The Site is located on McCarter Highway in the City of Newark, New Jersey (Figure 1). The RI at the Site was performed as required by the Memorandum of Agreement (MOA) with the New Jersey Department of Environmental Protection (NJDEP) dated August 29, 1995. The RI was undertaken because of contamination found during the Site Screening Sampling Plan performed by Langan Engineering and Environmental Services, Inc. (Langan) in September 1997 as well as investigations performed by BCM Engineers (BCM), the United States Army Corps of Engineers (USACOE) and the New Jersey Department of Transportation (NJDOT).

The purpose of conducting the RI was to define the environmental impact on the subsurface from previous activities at the Site. In order to assess the environmental impacts, data gaps were identified and a scope of work was prepared to address those data gaps. The information was presented in the Remedial Investigation Workplan (RIWP) which was prepared by Woodward Clyde Consultants. The RIWP proposed:

- delineation of soil contamination;
- closure of the eight underground storage tanks (USTs) and investigation of the surrounding soils;
- investigation of the potential off-site transport of organic vapors in the subsurface;
- investigation of groundwater quality and aquifer characteristics.

The RIWP was approved by the NJDEP on March 11, 1998.

The RI field work was conducted between June and November 1998. All work was conducted in accordance with the approved RIWP, modifications to the RIWP memorialized in PSE&G's May

11, 1998 letter, the Technical Requirements for Site Remediation (NJAC 7:26E) and the NJDEP Field Sampling Procedures Manual (1992).

This Remedial Investigation Report (RIR) describes the activities and discusses the findings of the work conducted.

2.0 BACKGROUND

2.1 Site Location

The Site is located in the northeast part of New Jersey in the City of Newark in Essex County. The Site is comprised of two parcels of property separated by McCarter Highway (formerly Front Street) (Figure 2). Each of these parcels is described below.

Parcel 1: Parcel 1 (Block 3, Lot 13 and Block 4, Lot 1 on the tax map of the City of Newark) encompasses an area of approximately 2.7 acres and is bordered by a restaurant to the north, the Passaic River to the east, a public parking facility to the south, and McCarter Highway (Route 21) to the west.

Parcel 2: Parcel 2 (Block 14, Lot 28 on the tax map of the City of Newark) encompasses an area of approximately 0.23 acres and is bordered by Lombardy Street to the north, McCarter Highway to the east and public parking facilities to the south and west.

2.2 Site Description

Parcel 1 is divided into two tiers separated by a driveway and a terrace. The upper tier (higher elevation) is located on the western portion, adjacent to McCarter Highway, while the lower tier is adjacent to the Passaic River. There are no existing above grade structures associated with the former MGP operations/support facilities. Below grade, there are active electrical lines along the western portion of Parcel 1 perpendicular to McCarter Highway and an active natural gas main running parallel to the property line between Parcel 1 and McCarter Highway. The utility locations are depicted on Figure 2.

Parcel 1 contains concrete and brick foundations of former buildings and gravel-covered and paved parking areas with a block retaining wall between the two tiers. Parcel 1 is enclosed by

fencing and is not accessible to the public. Former manufacturing facilities were limited to Parcel 1.

Parcel 2 contains an unpaved parking area. Parcel 2 is enclosed by a fence and is not accessible to the public. Parcel 2 contained only support facilities (e.g. offices, stables, etc.).

2.3 Operating History

The operating history described below for the Site is based on maps and other information available in PSE&G files, previous reports for the Site (i.e. Preliminary Evaluation and Prioritization of 15 Manufactured Gas Plant Sites (BCM Engineers, February 1989)(which included reviews of Sanborn Fire Insurance Maps)), and aerial photographs. Based on the review of these documents, a chronological presentation of pertinent Site features and activities has been prepared and is presented below.

1868	Citizens Gas Light Company of Newark (Citizens) organized.
1869-1872	Parcel 1 (except for a small parcel along McCarter Highway) acquired by Citizens through a series of transactions. MGP operations may be presumed to have commenced sometime during this period.
1884	Remainder of Parcel 1 acquired by Citizens.
1891	Part of Parcel 2 acquired by Citizens.
1892	MGP equipment (including coal sheds, retort, iron tar tank, naphtha tank, and two iron gas holders) present on Parcel 1.
1895	Citizens merged with others to form Newark Gas Company.
1898	Additional mergers occurred to form Newark Consolidated Gas Company. Newark Consolidated Gas Company leased its property, plant and franchises to the United Gas Improvement Company, which then leased these assets to the Essex and Hudson Gas Company.

1903	Remainder of Parcel 2 acquired. Wagon shed, stable, storeroom, meter repair shop, and carriage room located on Parcel 2. Site included in lease to Public Service Corporation of New Jersey.
1908	A third gas holder, an ammonia tank, and two tar tanks present on Parcel 1 in addition to other MGP equipment previously noted. Engine room constructed over the location of the iron tar tank. Naphtha and gas tanks now identified as oil tanks.
1909	Public Service Corporation assigns lease to Public Service Gas Company.
1924	Public Service Gas Company merges with Public Service Electric Company to form PSE&G.
1926	Site used as an auxiliary production facility.
1930	Site operating as a "reserve plant." An additional gas holder (#4) is present near the north property line. Retort house converted to a meter shop. Coal shed no longer used for coal storage, coal is now stored in stockpile near the southern property line.
c. 1937	MGP facilities withdrawn from service. Removal of MGP facilities initiated from the Site. Site continues to serve as a holder station. Purifying house converted to storage/garage.
1947	Holder #1 and the three oil tanks adjacent to the purifying house removed. Holders No. 2 and 3 and building present.
1950s	Holder station facilities removed from the Site.
c. 1960	Site used as a district operations headquarters for gas department service and street operations.
1973	Parcel 1: Storeroom and garage shown at locations of former purifying house and meter room. Parcel 1 also has vehicle parking areas. A "10-inch artesian well" is shown at the southern property line near the Passaic River. Five USTs (2-4,000 gallon gasoline, 2-550 gallon gasoline, and 1-550 gallon "white gas" tank) and two pump islands located on Parcel 1. Parcel 2: Offices and parking lot located on Parcel 2.

1977	Two additional USTs installed (1-6,000 gallon unleaded gasoline, and 1-2,000 gallon unleaded gasoline).
1978	One additional UST installed (6,000 gallon unleaded gasoline).
1980	Retort house, generator house, and boiler house structures removed from the Site.
1995	District Headquarters relocated and MOA filed with NJDEP.
1997	Parcels 1 and 2 vacant with no aboveground structures.

According to available information, the Site utilized the coal gas process, water gas process and carbureted water gas process. The coal gas manufacturing process involved the thermal reduction of coal in retorts. Processes common to coal gas manufacturing included coal charging, thermal reduction of coal, gas generation, condensing, cooling, gas cleanup and storage.

The water gas manufacturing process involved passing steam over and through an incandescent bed of hot coke, coal or other carbonaceous material. The manufacturing equipment consisted of a generator, waste heat boiler, and a wash box. The generator contained the coke bed; the waste heat boiler was used to extract heat from the gas produced or from the products of combustion when heating the coke bed; and, the wash box was used to cleanup the gas of all condensables.

The carbureted water gas manufacturing process was the water gas process enriched with a thermally cracked hydrocarbon such as oil. The manufacturing equipment consisted of a generator, carburetor, superheater, waste heat boiler, and wash box. The generator contained the coke bed used for generating the water gas and providing heat to the carburetor and superheater. The carburetor was where the hydrocarbon was added, usually vaporizing and being thermally cracked on checker brick installed in the carburetor. The superheater, also filled with checker brick, was where the thermally cracked hydrocarbon was reformed into methane, ethane, and other gaseous hydrocarbons.

2.4 Physical Setting

2.4.1 Land Use Assessment

Parcel 1 lies within the Second Industrial District (I-2). The principle permitted uses within I-2 are residential, commercial, business or light industry. Parcel 2 lies within the Fourth Business District (B-4). The permitted uses within B-4 are residential, retail sales, office, or business use. These zoning classifications may be re-designated in the future as a result of redevelopment efforts in the area.

The State of New Jersey, the City of Newark, and certain private developers are currently investigating a redevelopment of the area in and around the Site as part of a redevelopment of the Passaic River waterfront. The waterfront redevelopment project (known as the Joseph G. Minish Passaic River Waterfront Park and Historic Area) includes plans prepared by the USACOE New York District for the installation of sheet piling and the construction of a new bulkhead along the riverbank on the east side of Parcel 1. NJDOT also has plans to widen McCarter Highway. The widening includes the acquisition of a 50-foot wide strip of land traversing the western border of Parcel 1.

2.4.2 Topography and Site Drainage

Parcel 1 consists of two topographical tiers separated by steep slopes and retaining walls. The average elevation of the upper tier along McCarter Highway is 38 feet above mean sea level (MSL). The average elevation of the lower tier along the Passaic River is 10 feet above MSL. Because most of the Parcel is capped (foundations and pavement) surface water infiltration is suspected to be low. Surface water runoff from Parcel 1 drains into the Passaic River.

Parcel 2 is relatively flat with an average elevation of 40 feet above MSL. Surface water runoff from Parcel 2 flows into storm sewers along McCarter Highway. The storm sewer system in this

area of Newark is reportedly combined with the sanitary sewer system with discharge to the Passaic Valley Sewerage Commission (PVSC) treatment facility.

2.4.3 Wetlands/Surface Waters

According to the National Wetlands Inventory (NWI), the Site is categorized as upland. The Passaic River is classified as "estuarine - open water/unknown bottom." There are no other inventoried wetlands or other surface water bodies within 1,000 feet of the Site.

The Passaic River flows from north to south with tidal flow in the area of the Site. Approximately 4.5 miles downstream of the Site, the Passaic River flows into Newark Bay. The Passaic River is classified as "SE3" in the area of the Site. "SE" is the general surface water classification applied to saline waters of estuaries. The following uses are designated for SE3 surface water bodies: secondary contact recreation; maintenance and migration of fish populations; migration of diadromous fish; maintenance of wildlife; and any other reasonable uses.

2.4.4 Local Climate and Rainfall

The climate in Essex County is generally temperate. The average annual rainfall is approximately 44 inches. The mean annual temperature is 55 degrees Fahrenheit (°F) with a monthly mean low of 23 °F in January and a monthly mean high of 87 °F in July (Source: Office of the New Jersey State Climatologist, 1997).

2.5 Geologic Setting

2.5.1 Regional Geology

The Site is located in a geologically complex area. It is located in the Newark Basin physiographic province, a northwestward-dipping wedge of faulted and folded sedimentary rocks punctuated by flood basalts of late Triassic and early Jurassic age, intruded by diabase dikes, sills, and laccoliths. The rocks of the Brunswick Group constitute the stratigraphically highest geologic unit in the Newark Basin. Geologic maps (Nichols, 1968; Lyttle and Epstein, 1987) indicate that the region of the Site is underlain at depth by consolidated strata of the Passaic Formation, the oldest unit of the Brunswick Group in New Jersey. The formation lithology consists of grayish-red to reddish-brown, thinly- to thickly-bedded shale, siltstone, sandstone, and conglomerate with subordinate cycles of gray and greenish-gray thinly-bedded shale and siltstone (Olsen, 1980; Van Houten, 1988).

These deposits were buried below later Mesozoic and Cenozoic coastal and marine deposits which were subsequently eroded away. During times of lower sea level than present, the terrain was deeply incised by streams. Some of these former stream valleys are as much as 300 feet below present sea level. The valleys are characterized by fluvial deposits that were subsequently buried by sediments related to cyclical glaciation.

The glaciogenic deposits, mapped by Stanford et al. (1990, 1995), consist of till to the west and glacial lake deposits at and to the east of the Site. The glacial lake deposits consist of lake bottom silts and clays, lacustrine fan and deltaic deposits, and minor ice-contact stratified deposits. In the area in the immediate vicinity of the Site, the map of Stanford et al. (1995) shows "deltaic/lacustrine fan deposits (sand and gravel)." The glacio-lacustrine deltaic deposit is approximately 2 square miles in area, extending to both sides of the Passaic River. The river has cut completely through the deltaic deposit and the portion on the west side of the Passaic River is no longer physically connected with the portion to the east. Immediately east of the bisected delta is an area mapped as glacial lake bottom deposits. These are rather extensive and represent much of the area of the extinct glacial Lake Hackensack, which covered parts of Bergen, Essex, Hudson, and Union Counties. There is a buried valley immediately east southeast of the Site.

The buried valley in the bedrock is part of a trough that runs parallel to the strike of the bedrock and marks the location of a pre-glacial stream valley. Sands and gravels are preserved in this valley beneath the overlying till plain of the Wisconsinan Glaciation. These coarse sediments constitute a buried valley aquifer that extends from Bergen County to the vicinity of Cranford, in Union County. Locally, the trough it occupies has been called the Kenilworth-Newark Valley (Nemickas, 1974). Nichols (1968) describes the buried valley deposits in "northern Newark, where the valley runs parallel to the Passaic River," as containing several deposits of sand and gravel interbedded with clay and till. The sand and gravel deposits are described as ranging from 1 to 19 feet thick and being "encountered mostly at depths of less than 50 feet and depths of more than 220 feet below land surface."

Where the glacial deposits are eroded by the Passaic River, they are partly covered by estuarine deposits consisting mainly of silty clays.

2.5.2 Site Geology

The bedrock beneath the Site, is a siltstone characterized by interbedded friable (high-permeability) and blocky (low-permeability) layers that strikes approximately 28 degrees east of north and dips toward the northwest at an angle of approximately 8 degrees. In the vicinity of the Site, the bedrock is approximately 10 to 30 feet below MSL. Figure 3 depicts the topography of the top of the bedrock on-site.

The overburden on the Site is consistent with what one would expect with glacial depositional processes. The interpretation is based on drilling logs provided in Appendix A. There are 12 to 20 feet of fill material below which are native deposits. The upper tier (deltaic depositional environment) is marked by deltaic deposits 20 feet thick. Although no sedimentary structures were identified in the split spoon samples, these deposits, being primarily clean, silty, or gravelly fine- to medium-grained sands, are interpreted to be delta forset beds. A basal deposit of silt (with trace-to-some clay), approximately 4 to 6 feet thick, is present beneath the coarser

forset beds and is interpreted as a pro-deltaic environment. Underlying this silt stratum are glacial till sediments composed of clay, silt, sand, and gravel, which directly overlie the bedrock.

The lower tier, representing fluvial and estuarine depositional environments, is characterized by a 4- to 8-foot thick gray slightly organic clay underlying fill material. This clay was probably deposited as the result of flocculation of clay minerals upon reaching the brackish estuarine environment of the lowermost Passaic River. Underlying this clay are occasional fluvial sand and gravel deposits ranging in thickness between 2 and 4 feet. Since the Passaic River has truncated the earlier deltaic deposits, the estuarine clays are deposited directly on till in the southeastern portion of the lower tier, adjacent to the river. Further to the west, the pre-existing deltaic deposits are not completely eroded, and the estuarine clays on-lap directly upon the pro-delta silts exposed by erosion of the overlying fine-to-medium sands. Lithologic cross sections have been included as Figures 4, 5, and 6 which graphically depict subsurface conditions.

2.6 Hydrogeologic Setting

Regional groundwater flow discharges into the Passaic River, the Second River, Newark Bay, the Elizabeth River, and the drainage system around Newark Airport (which is the approximate location of the former Bound River). There is downward leakage through glacial deposits and exposed bedrock.

There appear to be two distinct water-bearing zones in the overburden soils beneath Parcel 1. Shallow groundwater, referred to as the "A" Horizon, occurs above the pro-delta silt and the estuarine clay, which together form a semi-confining layer which extends across the Site and probably continues an indefinite distance off-site. This semi-confining layer continues underneath the Passaic River. The deeper water-bearing zone referred to as the "B" Horizon occurs beneath the confining layer. There does not appear to be a confining unit separating this unit from the underlying bedrock. Consequently, the "B" Horizon and the bedrock are

considered a single aquifer unit. This conclusion is supported by the presence of free product in the bedrock.

Synoptic groundwater elevations were measured on September 16, 1998 as part of the groundwater sampling episode. These data, presented on Table 1, indicate a flow toward the Passaic River. From previous investigations, it is known that both the "A" and "B" Horizons are influenced by the tidal fluctuations of the Passaic River. To evaluate the response of the hydraulic gradient to tidal fluctuations, water levels in seven wells (MW-2, MW-2A, MW-3, MW-3A, MW-3BR, P-2, and P-2A as shown on Figure 2) and the river were continuously recorded between October 14 and 17, 1998 by automatic data loggers equipped with pressure transducers. As indicated on Figure A of Appendix B, the water levels in all of the monitored wells, except P-2, exhibit a clear response to tidal fluctuations. Additionally, MW-3A exhibits a response to another external factor, possibly off-site pumping (e.g. basement dewatering via sump pump), which causes the tidal fluctuation curve to be erratic, rather than smooth but does not affect the overall groundwater flow. Tidal monitoring illustrated that the strongest responses to tidal fluctuations were found in the wells adjacent to the river and at the semi-confined wells in the Upper Tier, as would be expected.

The data from monitoring wells P-2, P-2A, MW-2, and MW-3 (located at respective corners of a tetrahedron) were evaluated to understand the horizontal and vertical gradient and determine the tidal effects on magnitude and direction of hydraulic gradient. The water level elevations from these wells were evaluated to calculate an azimuth bearing (degrees clockwise from north) and an angle of plunge (degrees downward from horizontal) for each hour in the period of data collection. These data were then used as input in a stereonet program (RockWare®) to calculate descriptive statistics for the azimuth and the angle of plunge of the hydraulic gradient utilizing a Schmidt projection. As indicated on Figure B of Appendix B, the results of this evaluation demonstrate that the mean direction of the hydraulic gradient is 71.5° east of north, with a downward mean plunge of 81.8° from the horizontal. The spherical variance was only 0.0001, indicating that direction of the hydraulic gradient is little affected by the tidal fluctuation during

the period of the measurements. Therefore, mean flow at the Site is always toward the Passaic River and the downward component of the hydraulic gradient is predominant.

2.7 Receptor Evaluation

A well search was conducted as part of the 1989 Preliminary Site Investigation. A second well search was completed as part of this RI to update the results from 1989. Fourteen industrial and domestic wells were located by the well search (Table 2). The nearest wells are located at the intersection of Lombardy and Broad Street in the Bell Atlantic and Mutual Life buildings. Figure 7 shows the well locations and the well records are attached as Appendix C. There were no public supply wells discovered in the search. Since groundwater flows east toward to the Passaic River, these wells are not receptors.

The Passaic River is an ecological receptor. An ecological evaluation of the river, including the area adjacent to, upstream, and downstream of the Site, is being conducted by others at the direction of, and with oversight from, the USEPA.

Subsurface utilities have been discounted as potential receptors because they are at significantly higher elevations then the encountered contamination.

3.0 PREVIOUS INVESTIGATIONS

Five environmental investigations have been conducted on or adjacent to the Site. These include a 1995 study by the USACOE for a streambank restoration project; a 1996 study by the USACOE for the Joseph G. Minish Passaic River Waterfront Park and Historic Area; a 1996/97 study by the NJDOT for the widening of McCarter Highway; a supplemental USACOE study; and a 1997 Site Screening performed by Langan for PSE&G. Results from these studies are summarized below. Figure 2 depicts boring locations from these previous investigations.

3.1 USACOE Studies (1995/1996)

The purpose of the 1995 study by the USACOE was to determine the existence, nature and extent of hazardous and toxic materials within a construction project area along the west side of the Passaic River. The construction project included the repair of the bulkhead along the west side of the river, involving the excavation of soil and sediments.

The purpose of the 1996 study by the USACOE was similar to the 1995 study and would also provide planning data for an expanded project known as the "Joseph G. Minish Passaic River Waterfront Park and Historic Area." The expanded construction project includes construction of a public marina, scenic overlook, recreation facilities and a promenade. The promenade would cross the riverfront area of Parcel 1.

A detailed description of each boring was provided in the RIWP. The USACOE performed borings in the Passaic River at or near the Site and on shore. Findings revealed elevated concentrations of semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs) and metals. There was evidence of free product and/or black staining and strong petroleum hydrocarbon (PHC) odors present in the three borings (WT-10, WT-11 and WT-12) drilled in the Passaic River closest to the Site. The borings conducted on shore revealed the presence of free product and PHC odors.

3.2 NJDOT Study (1996/97)

As part of the 1996/97 NJDOT study, seven soil borings (EB-32 through EB-36 and MEB-74 and MEB-75 as shown on Figure 2) were advanced along the western boundary of Parcel 1 near or in the locations of former Gas Holders No. 1, 2 and 3. These borings were drilled to depths ranging from 10 to 18 ft below ground surface (bgs). The boring logs indicate fill (including coal, concrete, brick and asphalt fragments), sand, gravel, and shale and siltstone fragments. Photoionization detector (PID) readings did not indicate organic vapor concentrations above background. Some black staining was noted. Chemical analyses of soil samples collected from these soil borings indicated exceedances of the most stringent NJDEP Soil Cleanup Criteria for polynuclear aromatic hydrocarbons (PAHs), beryllium, lead and thallium.

3.3 USACOE Supplemental Study (1997)

During September 1997, prior to implementation of the Site Screening, soil boring S-3 was advanced in the southeast corner of Parcel 1. This boring was drilled as part of a geotechnical study for the construction of a river bank bulkhead. This boring was observed and logged by Langan on behalf of PSE&G. Free product and/or organic odors were noted at different strata, including bedrock.

3.4 Langan Site Screening Sampling (1997)

In order to gather sufficient data to develop the RIWP, PSE&G prepared and implemented a Site Screening Sampling Plan (Site Screening), to identify the general geology and environmental conditions. The 1997 Site Screening performed by Langan for PSE&G included fifteen soil borings, four pairs of shallow/deep piezometers (P-1/P-1A through P-4/P-4A), and five temporary well points (TWP-1 through TWP-5) along the Passaic River (Figure 2). Synoptic water level measurements were obtained, and the potential for tidal influences upon groundwater elevations was assessed. One round of groundwater samples was collected from the piezometers

and temporary well points and submitted for laboratory analysis. The fill/vent ports of five USTs were also investigated.

The Site Screening Program included a sample location plan, field observations of MGP residuals, boring logs, well construction summaries, NJDEP Forms A and B, groundwater elevation survey data, groundwater sampling field parameters, groundwater analytical results, and UST investigation results. The results were previously provided in Appendix D of the RIWP.

The soil borings identified the subsurface stratigraphy as well as a broad view of the environmental conditions under Parcel 1. The borings also were utilized to investigate some of the former MGP structures. The findings indicated that soil contamination would require more exhaustive investigation.

The groundwater investigation indicated that there were contaminant exceedances above and below a clay/silt layer and that groundwater was tidally influenced, but groundwater flow directions were not confirmed. The conclusion made from this portion of the investigation was that further delineation of groundwater contamination would be required.

4.0 REMEDIAL INVESTIGATION - SOIL

As discussed in Section 3.0, previously conducted investigations have determined that soil contamination exists beneath Parcel 1 above and below the silt/clay layer. The presence of contaminated soil beneath the silt/clay layer warranted an investigation as to whether these contaminants have migrated into the underlying bedrock. The following sections will discuss the delineation of soil contamination, the extent of the silt/clay layer, and the impact of contamination on the bedrock. All work was conducted in accordance with the May 1992 NJDEP *Field Sampling Procedures Manual* (DEP-FSPM) and N.J.A.C. 7:26 E.

A soil investigation was undertaken to further characterize the soil contamination. Previous investigations conducted at the Site provided limited analytical information about the contaminants on-site. The information that was collected indicated exceedances of the Residential Direct Contact Soil Cleanup Criteria (RDCSCC) and the presence of free product. A grid of fourteen soil borings (B-11 through B-24) and nineteen test trenches was proposed for contamination delineation. The borings were biased toward former MGP structures and the perimeter of the Site, and the trenches biased to locate former MGP structures. Based on the findings of the initial borings and test trenches, additional borings (B-25 through B-48) were added to assist in the horizontal and vertical delineation of soil contamination. Boring locations are depicted on the Site Plan (Figure 2), test trenches are located on Figure 8 and boring logs are provided in Appendix A.

Soil borings were installed by Advanced Drilling Inc., of Washington, New Jersey, utilizing hollow stem auger and mud rotary drilling techniques. Soil samples were collected from the borings by driving 2-inch diameter split spoons. Before each use, the split spoons were decontaminated in accordance with the Field Sampling Procedures Manual. If free product was observed immediately above the semi-confining silt or clay, the boring was stopped and steel casing was installed into the unit so that the product would not be mobilized into the "B" horizon.

Upon completion, all borings were sealed with an 80/20 mix of portland cement and granulated bentonite.

Test trenches were installed by Creamer Environmental Inc. of Hackensack, New Jersey. The trenches were installed to investigate the subsurface conditions and locations of former MGP structures. There were no soil samples collected from the trenches.

Soil samples were collected from borings B-11 through B-23 and analyzed for volatile organic compounds plus a library search for up to ten tentatively identified compounds (VO+10) (EPA SW-846, GC/MS Method 8260B) utilizing the NJDEP methanol preservation sampling technique; semi-volatile organics plus a library search for up to twenty tentatively identified compounds (SVOC+20) (EPA SW-846, GC/MS Method 8270C); and the Target Analyte List (TAL) of metals including Cyanide (Cn) (EPA SW-846 Methods 6010B, 7471A, and 9012M) . Samples were collected for laboratory analysis in accordance with the following guidelines:

- The first sample was collected from a discrete 6-inch interval within the 0-2 ft bgs depth interval to determine if the surface soils were contaminated at that location. Because most boring locations were in paved areas, the discrete sample was collected immediately below the pavement material.
- The second sample was collected from the 6-inch interval directly above the first encountered groundwater.
- The third sample was collected at the bottom of the boring from the 6-inch interval directly above the bedrock.

Additional soil samples were analyzed in the lower tier of Parcel 1 (borings B-11 through B-17) according to the following:

- The fourth sample was collected from the 6-inch interval with the highest PID reading between the first encountered groundwater (second lab sample) and the top of the clay unit, if the PID reading was greater than the PID reading of the second lab sample.
- A fifth sample was collected from the 6-inch interval with the highest PID reading below the clay, if the PID reading was greater than the PID reading of the third lab sample.

Additional soil samples were analyzed in the upper tier of Parcel 1 (borings B-18 through B-23) according to the following:

- A fourth sample was collected from the 6-inch interval with the highest PID reading between the surface soil (first lab sample) and the first encountered groundwater (second lab sample), if the PID reading was greater than the PID reading of the second lab sample
- A fifth sample was collected from the 6-inch interval with the highest PID reading between the first encountered groundwater (second lab sample) and the overburden/bedrock interface (third lab sample), if the PID reading was greater than the PID reading of the third lab sample.

There were some in-field modifications to this initial plan as discussed below. Boring B-24 was installed inside the wall of Gas Holder #3, but was sampled, to the extent possible, according to the above guidelines. Borings B-25 through B-48 were installed to further delineate the findings of the initial boring program. These additional borings were sampled with a bias to the detected contamination from the initial boring.

The RIWP proposed to treat Parcel 1 as one area of concern (AOC). However, based upon the results of the RI, it was decided to subdivide the Parcel into several different AOCs , as each has its own distinguishing environmental concerns. Following is a description of each AOC and its relationship to data gaps identified in the RIWP. AOCs for shallow soils (0 to 2 feet), "A" horizon, and "B" horizon soils are included on the Soil Contaminant Box Maps depicted as Figures 9a, 9b and 10, respectively. Contaminant concentrations which exceed the most

stringent NJDEP Soil Cleanup Criteria have also been depicted on these plans. A summary of the laboratory data collected from the soil borings has been included as Tables 3A, 3B and 3C, a laboratory summary is included as Appendix D and the NJDEP Electronic Deliverable diskettes are included in Appendix D. All boring logs have been included as Appendix A.

4.1 Data Gap No. 1 - Delineation of Soil Contamination

As a result of the field work phase of the RI, the AOCs were identified and delineated. The AOCs are divided among the surface soils, defined as the interval from 0 to 2 feet below grade, the "A" horizon, defined as the interval below the surface soils and above the semi-confining unit, and the "B" horizon, defined as the interval including and below the semi-confining unit and above bedrock. The following section describes the AOC and the potential contaminant sources.

Shallow Soil Contamination

AOC-S1 - This AOC, depicted on Figure 9A, encompasses a majority of Parcel 1 and is characterized by elevated PAH and metal soil contaminants in the surficial soils (0 to 2 feet). During trenching of TT-11A, which was installed to investigate subsurface conditions of Gas Holder #1, and TT-10, which was installed to investigate a tar seep along the retaining wall, a tar-like product was observed seeping from immediately below the asphalt. The boundaries of this AOC are defined by retaining walls which exist along the northern and southern property lines.

AOC-S2 - This AOC is depicted on Figure 9A as encompassing a small area in the southwest corner of the Lower Tier. This AOC is visibly defined by cyanide contaminated soil that is teal in color. An analytical sample was collected from this area and confirmed cyanide above the most stringent DEP soil cleanup criteria.

"A" Horizon Soil Contamination

AOC-A1 - This AOC has been depicted on Figure 9B as encompassing a majority of the Lower Tier, and the northern portion of the Upper Tier. AOC-A1 is characterized by elevated soil contamination and NAPL from the surface soils down to the top of the semi-confining unit. The AOC was developed with the findings from borings B-7A, B-8, B-9, B-10, B-11, B-12, B-14, B-15, B-19, B-26, MW-2, MW-3, P-3, P-4, S-3, and test trenches TT-3, TT-5B, TT-8, and TT-14. The borings and associated contaminant exceedances utilized for the characterization of this AOC are depicted on Figure 9B.

During drilling activities the observed PID readings were predominantly 25 ppm or lower, although there were two readings of over 100 ppm (B-15 at 12 feet (155 ppm), and B-26 at 6 to 8 feet (120 ppm)). The soil contaminants present were predominantly SVOCs, with some concentrations of VOCs and metals. The product observed in the borings and in the test trenches had a distinctive MGP odor. The product was black with an oily texture.

The test trenches were installed to evaluate the subsurface conditions around former MGP structures. TT-3 was installed to investigate the conditions around a former tar tank. During excavation, MGP residuals were observed between 4 and 5 feet below grade inside the walls of the tank. TT-5B investigated a former tar separator and encountered MGP residuals outside the confines of the concrete vault at a depth of 4 feet. TT-8 investigated two former oil tanks and encountered residuals at approximately 7 feet below grade. TT-14 encountered MGP residuals from a former tar tank at a depth of approximately 2.5 feet.

Based upon knowledge of MGP operations historically, the source of the contamination present in AOC-A1 is likely related to storage, processing, and transportation of the tar during routine Site operations. A portion of this AOC is in an area scheduled for the construction of a river walk. For this reason, the subsurface soils may come into human contact during construction.

AOC-A2 - This AOC has been depicted on Figure 9B as encompassing the southern portion of the Upper Tier, extending west across McCarter Highway into Parcel 2, and south into the adjacent property. The AOC was defined by the extent of either MGP residual product or soil contaminant concentrations from the first encountered groundwater to the top of the semi-confining unit above the most stringent NJDEP Soil Cleanup Criteria (SCC) Field observations and analytical data from borings B-21, B-23, B-27, B-28, B-30, B-31, B-33, B-35, B-36, B-38, and MW-1 were used to define this AOC. The horizontal extent of the AOC was delineated based on borings not displaying an MGP impact (B-16, B-20, B-22, B-40, B-39, B-37, B-41, B-42, B-46, and B-48). AOC-A2 is distinguishable from A1 by a heavier phase MGP product with generally lower PID readings in impacted areas. The borings and associated contaminant exceedances utilized for the characterization of this AOC are depicted on Figure 9B.

During drilling activities, the observed PID readings peaked as high as 3,779 ppm in soil collected from MW-1A and were significantly higher than those detected in AOC-A1. The soil contaminants present are predominantly SVOCs and VOCs. The product observed in the borings was determined to be of MGP origin and was observed to be approximately 4 to 5 feet thick. Based on its distinct odor, volatility and location, lighter phase drip oil is the suspected source. There were two drip legs associated with Gas Holder #3 and the reported operation of the drip oil pump formerly located in the southwest corner of Parcel 1 (exact location unknown). The drip leg to the southeast of the holder was discovered during UST removal activities and its location is presented on Figure 2. The drip leg to the southwest was not discovered during the RI, but the location was addressed by both borings and wells. This AOC contributes to the dissolved-phase groundwater contamination.

"B" Horizon Soil Contamination

AOC-B1 - This AOC has been depicted on Figure 10 as encompassing a majority of the Lower Tier. AOC-B1 was defined by the extent of either MGP residual product or soil contaminant concentrations above the most stringent NJDEP Soil Cleanup Criteria below the semi-confining

unit. Field observations and/or analytical data from borings B-11, B-15, MW-2A and P-4A were used to define this AOC. The horizontal extent of the AOC was based on borings not displaying a MGP impact (B-32, MW-5BR, B-17, B-22, B-20, B-16, MW-3, MW-3A, and MW-3BR). The borings and associated contaminant exceedances utilized for the characterization of this AOC are depicted on Figure 10.

During drilling activities, the observed PID readings were less than 2 ppm. The soil contaminants present were predominantly SVOCs, with a trace of benzene. The MGP residual observed in the borings was black with an oily texture and was observed to be as thick as 18 feet at boring B-12.

4.2 Data Gap No. 2 - Delineation of Clay Layer

As discussed in Section 2.5, there were two distinct depositional processes at work at this Site. The Upper Tier has been defined as a deltaic depositional environment, while the Lower Tier represents a fluvial depositional environment. As there were two distinct environments depositing these sediments, there are also two distinct fine-grained deposits. Underlying the Upper Tier and extending under a portion of the Lower Tier is a moderate brown silt deposit with varying amounts of clay. A wedge of brown clayey silt has also been identified encroaching from the north. An organic grey clay extends from the Passaic River to a position adjacent to the silty deposits of the Upper Tier (Figure 11 depicts these units). The stratigraphy is depicted graphically on lithologic cross sections presented as Figures 4, 5, and 6.

4.3 Data Gaps No. 3 and 17 - Investigation of Bedrock

The property which lies south of the Site formerly housed the Ballantine Brewery. The brewery used on-site wells for process water. In the early 1900s, Ballantine reported water pumped from on-site wells contained tar. Research (see Section 5.5) has failed to produce specific detail on these on-site wells except that the wells were generally installed several hundred feet into the

bedrock. The bedrock core samples from boring S-3 (southeast corner of Parcel 1 and adjacent to the former Ballantine Brewery) exhibited naphthalene odors and elevated PID readings that indicated the potential presence of contamination in the bedrock.

For these reasons, it was determined that the bedrock required further investigation. The RIWP objective was to determine fracture orientation, and to evaluate potential pathways for contaminant transport utilizing 10 feet of core sample. Four bedrock borings were proposed, however, only three were installed as an artesian well, unearthed during test trenching, was used in the investigation. The RIWP proposed to rock core 10 feet, however, the rock cores were extended further to look for free product and fracture zones.

Bedrock borings were installed by initially setting 6-inch diameter steel casing approximately 5 feet into competent bedrock. After the grout was allowed to set for at least 24 hours, rock coring was initiated using NX sized core barrels. All core samples collected were immediately screened with a PID for the presence of volatile vapors. Samples were visually inspected for the presence of MGP residuals or product sheens. The cores were described for rock type, fracture orientation, rock quality description (RQD), and degree of weathering.

The bedrock encountered during the RI was composed primarily of siltstone with minor interbedded sandstone. The primary fractures observed in the bedrock are bedding planes which appeared as horizontal fractures in the cores (the true dip of the bedrock in this area is approximately 8° to the northwest, which is difficult to observe in cores). Occasional inclined fractures were observed throughout the cores.

Following is a brief description of the findings from the three bedrock borings. Boring logs, including lithologic descriptions and PID readings, have been included as Appendix A.

Boring - MW-3BR - The boring for the installation of MW-3BR was installed in the southeast corner of the Lower Tier of Parcel 1. The core at this location was extended from 33 to 124 feet

bgs to include the significant fracture observed during a video log of the nearby artesian well (please refer to discussion of artesian well in Section 5.4). A zone of significant fracturing was observed from approximately 106 to 111.5 feet bgs which likely corresponds to the artesian well fracture.

MGP odors, sheens and some minor amounts of tar-like products were observed from 43 to 74 feet and again from 92.6 to 124 feet. When coring the length of 99 to 104 feet, product was observed in the drilling fluid exiting the bore hole.

Boring - MW-4BR - The boring for the installation of MW-4BR was installed near the southwest corner of the Lower Tier of Parcel 1. The core at this location extended from 37 to 62 feet bgs. The core was extended for 25 feet to evaluate potential MGP impact downdip of MW-3BR. MGP odors, sheens and some minor amounts of tar-like products were observed from 37 to 46 feet. There was no visual evidence of MGP impact beneath 46 feet.

Boring - MW-5BR - The boring for the installation of MW-5BR was installed near the northwest corner of the Lower Tier of Parcel 1. The core at this location extended from 47 to 72 feet. Coring was conducted for 25 feet to evaluate for MGP impacts. The bedrock in this location was well weathered and highly fractured for the entire 25 foot core. There were no MGP odors, sheens or product observed during the installation of this boring.

5.0 REMEDIAL INVESTIGATION - GROUND WATER

As discussed in Section 3.0, previous investigations determined that groundwater contamination exists beneath Parcel 1. The investigations detected dissolved-phase groundwater contaminants above ("A" water horizon) and below ("B" water horizon) the semi-confining unit. The presence of contaminated groundwater warranted an investigation as to the lateral and vertical extent of the impact. The following sections discuss the delineation of groundwater contamination, the hydrogeologic nature of the affected aquifers, the Site conditions for natural attenuation, and the potential local receptors and sources for contamination. Aquifer modeling was also conducted and is described herein, but additional data is required to complete the model.

5.1 Data Gap No. 4 - Delineation of Groundwater Contamination

The initial Site Screening, conducted by Langan in 1997, showed that the "A" water horizon in the Upper Tier of Parcel 1 contained concentrations of organic compounds (benzene, xylene, and naphthalene) and inorganic analytes above the NJDEP Class IIA Ground Water Quality Standards (GWQS). With the exception of benzene, these concentrations decreased in the "B" water horizon. For the Lower Tier of Parcel 1, groundwater in the "A" water horizon contained concentrations of organic compounds (benzene, ethylbenzene, xylene, acenaphthalene, naphthalene, pyrene, fluoranthene, and fluorene) and inorganic analytes. The concentrations generally decreased in the "B" water horizon except for benzene at P-3/P-3A, and ethylbenzene, xylene and naphthalene at P-4/P-4A.

Based on the findings of the Site Screening investigation, it was proposed to conduct additional investigations in an attempt to further delineate and characterize the dissolved phase contamination at the Site. The RI focused on the organic contaminants in groundwater that resulted from MGP contamination. Three "A" water horizon (MW-1, 2 and 3), three "B" water horizon (MW-1A, 2A and 3A) and four bedrock monitoring wells (MW-3BR, 4BR, 5BR and 6BR) were proposed in the RIWP. As discussed herein, four "A" water horizon (MW-1, 2, 3, and

6), three "B" water horizon (MW-1A, 2A, and 3A) and three bedrock monitoring wells (3BR, 4BR, 5BR) were actually installed in accordance with the DEP-FSPM, the RIWP, and the modification letter to the DEP dated June 1998. The overburden monitoring wells were installed in clusters in the northeast, southeast, and southwest corners of Parcel 1, and bedrock wells were installed in the southeast, southwest, and northwest corners of the Lower Tier of Parcel 1. The wells were installed and developed during the summer of 1998 by Advanced Drilling Inc. of Washington, New Jersey in accordance with NJDEP well construction protocols. All drilling logs and well certification forms A and B have been provided as Appendix A. All wells were surveyed by Keller and Kirkpatrick for elevation and location after installations were complete.

In the "A" water horizon the wells were screened from above the water table to near the top of the semi-confining unit. The "B" water horizon wells were screened from beneath the semi-confining unit to near the top of bedrock.

Groundwater elevations were measured on September 16, 1998 and October 14 through 17, 1998. Groundwater samples were collected in accordance with the RIWP on September 16 and 17, 1998. Depth to water ranged from 2.65 to 34.56 feet below the top of PVC in the monitoring wells. Groundwater samples were collected from all Site wells with the exception of P-4, which was impacted with free phase MGP product. Groundwater sampling was performed utilizing the EPA low-flow sampling technique. Samples were collected from either the highest conductive zone, or the mid-point between either top of water or top of screen (whichever was lower) and the bottom of the well. Samples were analyzed for VO+10, SVOC+20, metals, cyanide, total dissolved solids (TDS) and chlorides by Accutest Laboratories of Dayton, NJ (NJ Laboratory Certification No.12129). The results of the groundwater quality analyses are shown on Table 4; groundwater elevations and field chemistries are included as Table 1; a laboratory summary is included as Appendix E; NJDEP Electronic Deliverable diskettes attached in Appendix D; and groundwater sampling logs are included as Appendix F. The complete analytical data packages are not included in this report, however, they are on-file at PSE&G Headquarters in Newark, NJ. Based on data validation of the laboratory packages by JMR Associates and Valerie Smith, most

of the data is reliable. Data has been qualified with an "R" when it has been determined to be unreliable. Data validators performed a structured data review based on standard operating procedures from the NJDEP Division of Publicly Funded Site Remediation. Below is a general summary of the items that were evaluated. Method specific items were also evaluated to determine the validity of the data (e.g. Internal Standards for GC/MS analysis and ICP Interference Check Solutions for metals ICP analysis).

- The data package deliverables were evaluated for completeness as described in N.J.A.C. 7:26, Appendix A.
- Sample holding times were checked to ascertain the validity of the data.
- All tuning and calibration records were checked to determine that they meet method specific criteria.
- Method, trip and field blanks were evaluated to determine any field or lab contamination.
- Matrix spikes and duplicates were assessed to determine the precision and accuracy of a method using a specific matrix.
- Lab control samples and blank spikes were assessed to determine the laboratory's precision and accuracy for each method.
- Calculations were spot-checked when sufficient raw data was available.

BTEX (benzene, toluene, ethylbenzene, and xylene) isoconcentration contour maps (Figure 12A and 13A) and groundwater contour maps (Figure 12B and 13B) have been prepared for the "A" and "B" water horizons. A Groundwater Contaminant Box Map is included as Figure 14. These figures depict the contaminant plume both above and below the semi-confining unit. Groundwater flow direction, and known soil contaminated areas were considered for the construction of Figures 12A and 13A. More work is required to complete "A" horizon groundwater delineation to the east, northwest and south, and "B" horizon groundwater delineation to the east, northwest, west and south. Dissolved phase contamination in the bedrock was minimal, therefore an isoconcentration map is not presented.

5.2 Data Gap No. 5 - Aquifer Characteristic Testing

Aquifer permeability tests (slug tests) were performed between September 23 and 25, 1998 at sixteen monitoring wells to determine the hydraulic conductivity (K). The slug tests at the unconfined (MW-1, MW-2, MW-3, P-1, P-2, and P-3) and semi-confined wells (MW-1A, MW-2A, MW-3A, P-1A, P-2A, P-3A, and P-4A) were conducted by instantaneously removing approximately one gallon of water from each well using a bailer, and then measuring the rate of rise of the water level in the well. The slug tests at the bedrock wells (MW-3BR, MW-4BR, and MW-5BR) were conducted by instantaneously placing an enclosed, filled bailer into the well, and then measuring the rate of fall of the water level in the well. An automatic data logger, equipped with a down-hole pressure transducer, continuously recorded the changing water level until it attained an elevation corresponding to a recovery of greater than 90% of the removed/installed volume. Monitoring wells MW-6 and P-4 were not tested due to an insufficient volume of water and the presence of coal tar, respectively.

The test data were analyzed using the Bouwer and Rice method (Bouwer and Rice, 1976; Bouwer, 1989) for determining hydraulic conductivities of an unconfined or confined aquifer with partially or completely penetrating wells. The Bouwer and Rice method utilizes the saturated thickness of the aquifer (D), the depth of the well bottom below the static water level (H), and the length of the screened interval below the static water level (L), in addition to the semi-log slope of the recovery data, to calculate hydraulic conductivity. Since hydraulic conductivity is overwhelmingly influenced by the most permeable stratigraphic layer which intersects the saturated portion of the screened interval, the well boring logs were reviewed to determine the most permeable layer. The thickness of the most permeable layer, in relation to the well screen and static water level, was then utilized to calculate the parameters of D, H, and L. A summary of this evaluation and the hydraulic conductivity results are presented in Table 5. Graphs of the actual tests and more detailed computations are presented in Appendix B.

Antecedent monitoring was performed at all monitoring well locations to evaluate the extent of any tidal influence at the time of the permeability testing. Several of the wells (MW-2, MW-2A, and MW-3) located immediately adjacent to the Passaic River were corrected for a background tidal influence. One monitoring well (P-3A) exhibited such a strong response to the tidal change that the corrected data continued to exhibit a curvilinear response which could not be analyzed. Other wells, known to exhibit tidal fluctuations, did not need to be corrected as the water level in the Passaic River was relatively steady (slack water) at the time of testing or the test data period did not exhibit any significant impact from tidal influence.

As indicated on Table 5, the analyses yielded values ranging from 0.36 ft/day (MW-3) to 144.3 ft/day (MW-2) in the unconfined wells, 0.15 ft/day (P-4A) to 45.9 ft/day (MW-3A) in the semi-confined wells, and 1.44×10^{-2} ft/day (MW-5BR) to 15.3 ft/day (MW-3BR) in the bedrock wells. The geometric mean hydraulic conductivity value was 7.46 ft/day for the unconfined wells, 4.07 ft/day for the semi-confined wells, and 1.45 ft/day for the bedrock wells.

5.3 Data Gap No. 6 - Natural Attenuation Evaluation

The ASTM Remediation by Natural Attenuation (RNA) guide (ASTM, 1997) suggests that there are three lines of evidence to be explored in assessing natural attenuation at a site: 1) primary line of evidence (documented loss of contaminants from the site); 2) secondary line of evidence (geochemical indicators of naturally occurring degradation); and 3) tertiary line of evidence (optional data such as microbiological information and modeling of contaminant transport).

Table 6 summarizes groundwater sampling conducted at the Site to assess natural attenuation of the principal contaminants of concern (BTEX and naphthalene). In horizon "A", "clean" groundwater is found upgradient in MW-6. In the source area well (MW-1), BTEX levels are a high of 17.51 mg/l. In the downgradient well (MW-3), BTEX levels drop to 0.07 mg/l. Naphthalene also exhibits a decrease from 9.94 mg/l at MW-1 to non-detect at MW-3. Groundwater moving through horizon "B" collects 2.79 mg/l of BTEX in the source area (MW-

1A) and drops to non-detect at MW-3A. Similarly, naphthalene levels start at 1.04 mg/l at MW-1A and drop to 0.0017 mg/l in MW-3A. These reductions in contaminant levels represent a primary line of evidence of natural attenuation processes such as biodegradation, dispersion, dilution and adsorption.

The secondary line of evidence relates more directly to the effect of biodegradation on the plume. BTEX compounds constitute the primary food source for hydrocarbon-degrading bacteria, but naphthalene is degradable as well, and since it will represent a "demand" on available electron acceptors, will be included in this analysis. These compounds are subject to both aerobic and anaerobic processes. Indigeneous microbial communities will use a variety of electron acceptors in an effort to degrade available organic material. The sequence of electron-acceptor utilization is set by the amount of energy available from each process (called a Terminal Electron Acceptor Process, or TEAP). Since dissolved oxygen provides the most energy to the degrading bacteria, it is the preferred electron-acceptor. Once the available oxygen is consumed, other anaerobic bacteria will become better able to compete and will start to use the alternate electron acceptors. The sequence of TEAPs, as typically reported (Wiedemeier et al., 1995), involve oxygen, nitrate, ferrous iron and manganese (IV), sulfate and carbon dioxide.

The general trends observed at almost all degradable hydrocarbon contaminated sites are evident at the Site. Table 6 indicates that between the "clean" upgradient well (MW-6) and the source area well (MW-1) in horizon "A", the following changes occur:

Dissolved Oxygen	decreases from 4.6 mg/l to 0.43 mg/l
Nitrate	decreases from 27.4 mg/l to ND
Dissolved Iron	increases from ND to 10.4 mg/l
Dissolved Manganese	increases from 0.7 mg/l to 9.0 mg/l
Sulfate	decreases from 98 mg/l to 66.3 mg/l

Each of these changes is consistent with the hypothesis of sequential aerobic/anaerobic biodegradation. The dissolved oxygen, nitrate and sulfate that are present in the upgradient

groundwater are used as electron acceptors (although sulfate is not completely utilized). Iron that is available as coatings of aquifer sediments is transformed from the oxidized state (Fe III) to the soluble, reduced state (Fe II), increasing iron levels in groundwater. Manganese reduction is also occurring and is included here even though that process is not always described in the literature on natural attenuation (since manganese is not as ubiquitous as iron). The final process in the sequence, the reduction of carbon dioxide producing methane (methanogenesis), was not assessed, but is likely occurring in the core of the plume.

It is possible to roughly quantify the amount of degradation attributable to each process. Table 7 uses the changes in electron acceptors or redox species (increased iron and manganese levels results from the transformation of oxidized species to reduced (more soluble) species) to calculate the expressed assimilative capacity (EAC) of each process. For example, studies indicate that approximately 3.14 mg/l of dissolved oxygen is utilized in the aerobic degradation of 1 mg/l of BTEX hydrocarbon. Similar utilization factors have been developed for each TEAP (Rifai et al., 1998), and those values are used in Table 7 to assess the amount of hydrocarbons that can be degraded by the aquifer. The sum of all EACs is 14.94 mg/l, which is similar in range to the highest BTEX concentration encountered at the Site (17.51 mg/l). Adding naphthalene (9.94 mg/l in MW-1) to the list of degradable hydrocarbons raises the total to 27.45 mg/l, compared to the EAC of 14.94 mg/l. Still, this suggests that the aquifer has the capacity to constrain the plume to some finite distance from the source area since electron acceptors are inputted into the plume along its entire perimeter. Given that upgradient well MW-6 is screened only in horizon "A", it is not possible to apply a similar analysis to horizon "B." Table 6 indicates that the source well (MW-1A) contains little iron or manganese, suggesting these TEAPs are not significant. Dissolved oxygen and nitrate are very low, suggesting those processes may be active. Sulfate levels are inconclusive.

Other indicators which point to biodegradation in horizon "A" include the change in pH, alkalinity and temperature in the source area relative to upgradient. Each of the TEAPs described produces CO_2 as an end product (even methanogenesis). This accumulation of CO_2

typically depresses pH and, in aquifers with carbonate minerals as part of the matrix, increases alkalinity. Also, the increased microbial activity in a source zone compared to upgradient would result in a slight increase in temperature between the two areas.

5.4 Data Gap No. 7 - Historic Artesian Well Investigation

The 1973 revision of the property plan showed an artesian well located along the southern property line in the Lower Tier. The well was not referenced in the Well Permit Inventory presented in the 1989 Preliminary Site Assessment, therefore, its presence and status were evaluated during the RI.

Advanced Geological Services performed a ground penetrating radar (GPR) survey on June 2, 1998 to locate the artesian well. GPR identified an area for excavation, and upon excavation, the well was found in an open top concrete vault with a steel plate covering the top. The well was approximately 165 feet deep and 10 inches in diameter.

It was decided to utilize this well in place of a fourth bedrock well. Advanced Drilling subcontracted William Stothoff Drilling Co. to perform a down hole video taping of the well for delineation of fractures and bedrock description. The initial video quality was poor due to a large amount of debris that obscured the view of the bedrock. The well exhibited what appeared to be a weathered bedding plane or fracture from 106 to 109 feet below grade. Other minor fractures or bedding planes were identified and their locations were recorded. A second attempt was made to video the well after the casing was scrubbed and the well purged of one volume of water. The second video was still of poor quality.

It was decided to sample the water quality in the artesian well in an attempt to delineate the vertical distribution of dissolved contaminants in the bedrock aquifer. Samples were collected at 45 feet (beneath the steel casing), 107 feet (the middle of the weathered zone), and 145 feet (near bottom of well). Samples were collected utilizing the EPA low-flow sampling technique.

Samples were analyzed for VO+10, SVOC+20, metals, TDS, and chlorides. Sample results have been summarized on Table 4. Results depict fairly uniform contaminant concentrations across these three zones of detected parameters. Uniformity was also observed in the temperature log (Appendix E) where the water temperature did not vary more than 0.6 °C.

The well was abandoned by tremie grouting with an 80/20 grout/bentonite mixture on October 22, 1998. A well abandonment report is included in Appendix A.

5.5 Data Gap No. 8 - Well Search

A well search was conducted as part of the 1989 Preliminary Site Investigation. A second well search was conducted during the RI to update the results from 1989. This well search consisted of reviewing the NJDEP's and the City of Newark's well records. The well search did not provide any information regarding the former Ballantine Brewery wells. Fourteen industrial and domestic wells were identified by the well search. The nearest wells are located at the intersection of Lombardy and Broad Street in the Bell Atlantic and Mutual Life buildings approximately 500 feet west and upgradient of the Site. There were no public supply wells identified in the search. The on-site groundwater flow was consistently toward the Passaic River, therefore, the industrial and domestic wells are not potential receptors (see Section 2.7). Figure 7 depicts the well locations and the well records have been summarized on Table 2 and attached as Appendix C.

5.6 Data Gap No. 9 - Records Review

An Electronic File Search was obtained from Environmental Data Resources (EDR) which utilized the federal and state Environmental Record Sources stipulated by American Society of Testing and Materials (ASTM). It was requested that EDR map any site located within the minimum search distance required for a respective federal and state Environmental Record Source. EDR's report has been included in Appendix G. A list of the federal and state Standard

Environmental Record Sources reviewed and applicable approximate minimum search distances are presented below.

Source	Date	Search Distance
USEPA National Priorities List (NPL)	September 1997	1 mile
USEPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List	December 1997	0.5 miles
USEPA Resource Conservation and Recovery Information System (RCRIS), Treatment, Storage and Disposal (TSD) List	January 1998	0.5 miles
USEPA RCRIS Corrective Action Sites List (CORRACTS)	December 1997	1 mile
USEPA RCRIS Facilities Database Small Quantity Generators List (SM GEN)	January 1998	0.25 miles
USEPA RCRIS Facilities Database Large Quantity Generators List (LG GEN)	January 1998	0.25 miles
USEPA Emergency Response Notification System (ERNS) List	September 1997	Subject site
NJDEP Known Contaminated Sites in New Jersey Except those Associated with the Bureau of Underground Storage Tanks (SHWS) List	September 1997	1 mile
NJDEP Solid Waste Management Section, Solid Waste Facilities Directory (SWF/LF),	October 1997	0.5 mile
NJDEP New Jersey Leaking Underground Storage Tanks (LUST) List	September 1997	0.5 mile
NJDEP Underground Storage Tanks (UST) List	October 1997	0.25 miles

For the purposes of this report, adjoining properties are defined as any real property or properties that are contiguous or partially contiguous with that of the subject property, or would be contiguous or partially contiguous with that of the subject property but for a street, road, or other public thoroughfare separating them.

A review of the data received during this investigation revealed no likely off-site sources for the contamination present at the Site. For a detailed description of the file review, please refer to Appendix G.

MW-6 was installed in Parcel 2 to serve as an upgradient monitoring point to determine whether an upgradient source may be contributing to the dissolved phase contamination on-site. Samples collected from this well revealed only minor dissolved metal contamination above NJDEP GWQS. Soil samples (B36, 37, 38, 39, and 41) were also collected from Parcel 2 and reveal MGP residual product along the eastern property line but not further west. These data indicate that an upgradient off-site source is not suspected in contributing to the on-site contamination of the overburden.

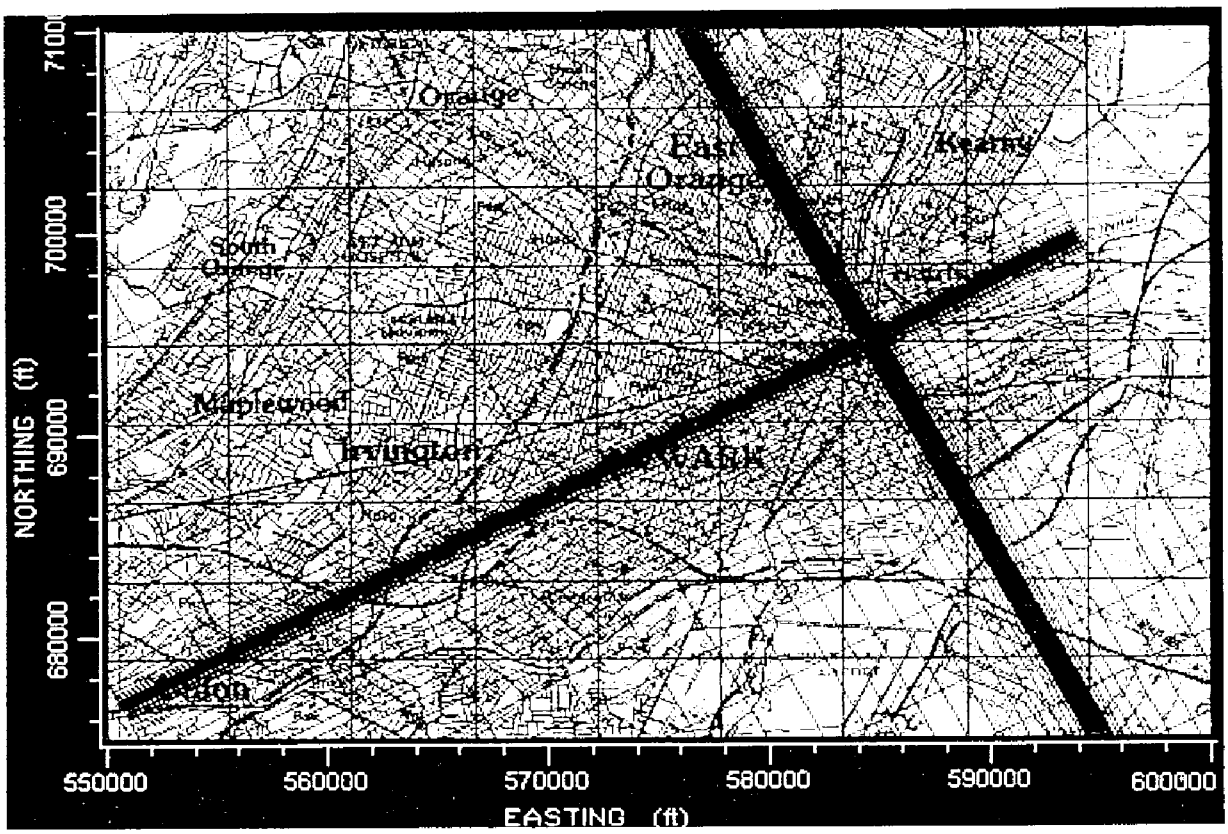
5.7 Data Gap No. 10 - Aquifer Modeling

Aquifer modeling was performed to predict the hydraulic impact of the construction of an impermeable retaining wall, consisting of sheet piling, along the Passaic River adjacent to the Site. Toward this purpose, an aquifer hydraulic simulation was created. The model simulates the recharge, aquifer hydraulics, and discharge in the vicinity of the Site. It takes into consideration the regional stratigraphy, the structure of the bedrock and the overburden deposits, and the results of on-site hydraulic conductivity testing and water level measurements. The model is a steady-state simulation of the present Site conditions and was calibrated against present head conditions. The simulation was used to determine flows through the overburden and upper bedrock and to the Passaic River as exist currently and was used to predict changes in groundwater elevations in wells, hydraulic gradient, and groundwater flow direction in response to the hydraulic barrier to be introduced when the wall is constructed as part of the waterfront development.

5.7.1 Hydrogeological Framework

The Site and the surrounding region were modeled utilizing Visual Modflow ® (version 2.60), a three-dimensional graphical groundwater flow program, based upon the U.S.G.S. modular three-dimensional aquifer simulation package MODFLOW (McDonald and Harbaugh, 1988). The structure of the model consisted of a discretized grid with 94 columns, 88 rows, and 4 layers. A plan view is shown in the text figure below. The model grid was rotated 28° west of north so that flow would be modeled parallel to the proposed barrier in the vicinity of the Site. Within the confines of the model boundaries lie the Passaic River to the east, the drainage system of Newark Airport and the Arthur Kill to the South, the Elizabeth River to the west, and the Second River to the north. These features provided natural hydrogeologic boundaries in relation to the Site.

The water elevations at the hydrogeologic boundaries were determined utilizing a U.S.G.S.



topographic map of the pertinent area. Those features at sea level (e.g., the Passaic River south of Kearny, the Newark Airport drainage system, and the Arthur Kill) were modeled as constant heads with elevations of 0 feet above mean sea level (ft MSL). The other rivers were set as drains with general heads representative of those indicated on the topographic maps and with a streambed conductance of 1,000 ft/day. All hydrogeologic boundaries (constant heads and drains) were modeled in Layers 1, 2 and 3. These water bodies were not considered to bisect the bedrock or the buried valley aquifer (Layer 4).

The grid was discretized to provide high resolution in the vicinity of the Site and progressively expanded off-site, providing less resolution away from the area of concern. In the Site area, the four model layers simulated the varying hydrogeology. The unconfined layer (Layer 1) representing the "A" Horizon was divided into two zones (deltaic and fill) based on stratigraphic information summarized in the well and boring logs. The deltaic zone was predominantly on the western portion of the Site while the fill zone was predominantly on the eastern portion of the Site. The silt/clay layer (Layer 2) also had two zones representing the brown silt predominantly on the western portion of the Site and the gray clay predominantly on the eastern portion of the Site, towards the river. The "B" Horizon (Layer 3) was consistent throughout the Site as was the bedrock layer (Layer 4). Outside of the Site, the parameters for each layer were modified. Since the glacial till is the predominant overburden material throughout the region, the off-site areas of Layers 1, 2, and 3, away from the area of concern, were modeled utilizing till parameters. In addition, to the south, the model contained a second zone in Layers 3 and 4 to represent a greater till thickness and the presence of the buried valley aquifer system, respectively.

At the Site, the geologic logs were evaluated to determine the bottom elevations of Layers 1, 2, and 3, as described above, and the layer bottoms were created using these elevations. Away from the Site, the bottom elevations of Layers 1, 2, and 3 were modeled as constants, based on boring log observations at the borders of the Site as well as in response to regional changes. The bottom of the bedrock layer (Layer 4) was consistent across the model.

5.7.2 Local Recharge

An estimate of regional recharge was obtained using a modification of the method presented in Charles *et al.* (1993). The method uses land use/land cover (LULC) overlays, which make use of up to 13 LULC codes to divide the region of interest into constituent areas. These overlays are constructed for the area or municipality under consideration and are then overlaid on an appropriately scaled soils map. This further divides the area of interest into numerous sub-regions, each with a specific soil type and LULC code. Charles *et al.* (1993) provides a set of "recharge factors" and "recharge constants" for each possible combination of soil type and LULC code. The recharge factor is then multiplied by a "basin factor," which is always equal to 1.3, and a "climate factor," which is provided by Charles *et al.* (1993) for each municipality in New Jersey. The recharge constant for each subregion is then subtracted from the product of these factors to obtain the recharge rate, in inches per year. Multiplying the recharge rate by the area of the subregion would allow an estimate of the value of the subregion as a recharge area.

The land use in the upgradient portions of the modeled area is primarily residential. The lot sizes are rather small. Consequently, the Charles *et al.* (1993) LULC designation of 1, "Residential (65% impervious), 1/8 acre lots - usually multi-family dwelling units," was used for a general estimate of the regional recharge.

There are no published NRCS Soil Surveys for Essex and Hudson Counties. Since the method makes use of NRCS Soil Survey soil designations, a modification of this method was necessary. The modification employed here is simply to consider the main soil types present in the closest sections of neighboring Union and Bergen Counties, for which soil surveys are available. The adjacent regions in these counties are geologically comparable to the Essex County areas included within the aquifer model. It was reasoned that if the soils were the same on either side of area of interest, we could have some assurance that the modeled soils would be the same. Except for the designation "urban land, " which could represent any pre-existing soil type, more than 90 percent of the area in the closest portions of Bergen and Union counties is covered by

Boonton soils. The remainder are Dunellen Soils or surface water. Charles *et al.* (1993) treats all the soils within a soil unit as hydraulically equivalent. Consequently, the recharge factors and recharge constants are the same for all the soil groups within the Boonton unit, regardless of whether they are "stony silt loams, 8-15 percent slopes" or "very stony silt loams, 15-30 percent slopes."

Boonton soils, with an LULC code of 1, are assigned a Recharge Factor of 4.70 and a Recharge Constant of 2.62. The climate factors for Newark, Belleville, East Orange, Irvington, Hillside, and Elizabeth are 1.31, 1.44, 1.39, 1.31, 1.31, and 1.31, respectively. The average is approximately 1.34. Applying the recharge formula of Charles *et al.* (1993) to this loosely defined area yields an annual recharge rate of 5.57 inches per year (= [1.3 x 4.70 x 1.34] - 2.62). This was the general regional recharge rate applied across the modeled area.

5.7.3 Initial Values for Hydraulic Parameters

The geometric mean hydraulic conductivity values were utilized as initial values in the aquifer numerical model for the unconfined layer (7.46 ft/day), the semi-confined layer (4.07 ft/day), and the bedrock (1.45 ft/day). Hydraulic conductivity values for the clay/silt layer were obtained from triaxial permeability testing performed on collected Shelby tube samples. These triaxial permeability results are summarized on Table 5 and the data are presented in Appendix B. Since there were significant variations between computed hydraulic conductivity values among monitoring wells within the same layer, each geometric mean was not considered to be an explicit value for each layer, but rather a starting point in the numerical model. The final hydraulic conductivity values in the calibrated model varied from these starting values but remained within the range of test results. In addition, the triaxial permeability results were determined to be representative, but not definitive of the brown silt and gray clay. Final hydraulic conductivity values in the brown silt and gray clay in the calibrated model varied from these starting values. Table 8 contains a summary of all hydraulic conductivity values utilized in the final, calibrated simulation.

5.7.4 Calibration

Synoptic water levels observed on October 14, 1998 at the on-site wells were used as calibration targets in the model. The water levels at the respective locations of each monitoring well were simulated. For each calibration run, these simulated heads were compared with the water level elevations measured in the field. The initial starting hydraulic parameters utilized in the model produced simulated water level elevations that (1) exceeded the target elevations in the "A" Horizon, (2) were similar to those observed in the "B" Horizon, and (3) were comparable to those in the bedrock. Based upon these initial results, different parameters were modified to calibrate the model and obtain a best-fit for the water levels in all three horizons. A plot of the calculated heads versus observed heads for the final calibration run is presented on Figure C included in Appendix B.

Originally, only one zone (fill/deltaic) was modeled in Layer 1 on-site. To better simulate the change in horizontal hydraulic gradient, it was determined that distinct transmissivity zones were required for the predominantly fill portion of the Site and the predominantly deltaic portion of the Site, as discussed in Section 2.5. The hydraulic parameters for these two zones were based on the hydraulic testing results performed at wells that were located in these two areas. The two zones in Layer 2 underwent only slight modification. It was determined that the horizontal and vertical hydraulic conductivities of the brown silt were greater in relation to the gray clay than originally modeled. The final values for the brown silt and the gray clay are in agreement with literature values. There were no changes to the hydraulic parameters in Layer 3 except in the area of the buried valley aquifer. It was determined that the thickness of the till overlying the buried valley aquifer was substantially thicker than in other parts of the region. Therefore, the horizontal hydraulic conductivity (K_h) was increased and the vertical hydraulic conductivity (K_v) was decreased to simulate this greater thickness. The hydraulic parameters in Layer 4 were only slightly modified from starting values (i.e., original K_h = 1.45 ft/day, original K_v = .145 ft/day; final K_h = 2 ft/day, final K_v = .2 ft/day) away from the buried valley aquifer. At the buried valley aquifer, there were no changes to the hydraulic parameters. Initial values of recharge, constant

heads, and drain elevations and conductances were not modified during calibration.

The simulated hydraulic gradients were well matched to the observed gradients in the "A" Horizon in terms of magnitude and direction. While the magnitude of the simulated hydraulic gradient in the "B" Horizon was similar to the observed, the simulated direction was the same as that of the "A" Horizon. As discussed earlier (Section 2.6), the observed hydraulic gradient in the "B" Horizon is directed somewhat more to the north on Site than that of the "A" Horizon. This is probably the result of a major bedrock fracture in the vicinity of MW-2A that resulted in a bedrock channel in that area (Figure 3). Since the most likely discharges for the bedrock aquifer are the Passaic River and the buried valley aquifer, which are to the east and south of the Site, respectively, it is assumed that the northeastward component in the "B" Horizon on the Site is regional. Consequently, we did not attempt to match it in calibration. The effect of not considering this deviation is to perhaps overestimate the amount of flow that passes toward the south and into the buried valley aquifer. This is conservative from the perspective of preserving the water quality of the buried valley aquifer.

5.7.5 Simulation Results

The calibrated model, representing steady-state present conditions, indicates that approximately 2,330 ft^3/day of flow enters the Site from upgradient in the "A" Horizon. Approximately 370 ft^3/day is added on-site due to infiltration of precipitation. In the "B" Horizon, 5,350 ft^3/day enters from the off-site upgradient and 600 ft^3/day leaks in from the "A" Horizon on-site.

In the "A" Horizon, approximately 1,800 ft^3/day leaves the Site by discharging into the Passaic River, 300 ft^3/day flows laterally off-site toward the south, and 600 ft^3/day flows downward into the "B" Horizon. In the "B" Horizon, approximately 920 ft^3/day discharges upward into the Passaic River, 1,430 ft^3/day under-flows the Passaic River and ultimately discharges into the buried valley aquifer, approximately 1,000 ft^3/day flows off-site toward the north, and approximately 2,590 ft^3/day leaves the Site by flowing southward, ultimately to discharge in the

river or the buried valley aquifer.

The results of the predictive simulation, which features an impermeable vertical wall (to be installed by the USACOE) penetrating from the water table to bedrock and extending from Bridge Street to Jackson Street along the Passaic River, demonstrate that the groundwater flow will be significantly affected by the wall. The simulation predicts that approximately 1,940 ft^3/day of flow enters the Site from upgradient in the "A" Horizon. Approximately 370 ft^3/day is added on-site due to infiltration of precipitation. In the "B" Horizon, 5,640 ft^3/day enters from the off-site upgradient and 1,450 ft^3/day leaks in from the "A" Horizon (compared to 600 ft^3/day without the wall).

In the "A" Horizon, the barrier effectively prevents groundwater from leaving the Site by directly discharging into the Passaic River. Instead, 890 ft^3/day flows laterally off-site toward the south, and 1,450 ft^3/day flows downward into the "B" Horizon. In the "B" Horizon, approximately 1,030 ft^3/day discharges upward into the Passaic River, 1,520 ft^3/day under-flows the Passaic River and ultimately discharges into the buried valley aquifer, approximately 1,490 ft^3/day flows off-site toward the north, and approximately 3,170 ft^3/day leaves the Site by flowing southward, ultimately to discharge in the river or the buried valley aquifer (compared to 2,590 ft^3/day without the wall).

6.0 MGP RESIDUAL INVESTIGATION

During the Site Screening, the remnants of several former MGP related structures were identified on-site. Some of these were physically discovered, while others were referenced on historic site plans. The locations, subsurface condition, and potential environmental impact were not known. The RIWP outlined an investigation using test trenches to identify former MGP related structures and associated contamination. The test trenches were excavated by Creamer Environmental and their locations are shown on Figure 8. The following sections describe the investigation findings.

6.1 Data Gap No. 11 - Valve House Investigation

The RIWP required the investigation into the source of the MGP residuals along the retaining wall on the Upper Tier of Parcel 1. During the RI, visible MGP residuals were observed along the retaining wall between borings B-18 and B-19. A concern was that the residual product was emanating from the former valve house (Figure 2) which was depicted on the historic site plans. To investigate this occurrence, a test trench (TT-10) (Figure 8) was installed on the upper tier side of the retaining wall to a depth corresponding with the observed tar-like product.

The trench was approximately 6 feet deep and encountered only fill material. At 1.5 to 2 feet below grade, a gravel layer was encountered that contained a tar-like material. The excavation was widened towards the retaining wall by 1.5 feet, and from 2 to 3 feet below grade where loose bricks were encountered that also contained the tar like material. At the bottom of the brick layer, a tar seep was observed. No evidence regarding the presence of the valve house or the source of the tar was found, therefore this data gap has not been closed. The tar encountered during excavation was replaced at its originally discovered depth.

6.2 Data Gap No. 12 - Delineation of MGP Residuals

The RIWP required the investigation into previously detected MGP residuals in the subsurface. MGP residuals were observed at various depths at five boring locations (B-2, B-6A, B-8, TWP-3 and P-4A) during the Site Screening. The extent of the residuals in these locations was unknown and required investigation. Please refer to Section 4.1 for a discussion of AOCs at the Site. Based on these AOC delineations, this data gap is closed.

6.3 Data Gaps No. 13 and 14 - Investigation of Former MGP Structures

Tar Tank - Northeast Corner of Lower Tier

An attempt was made to dig the trench (TT-1) through the center of the tar tank. This attempt failed as the tank was either completely encased in concrete, which could not be broken, or the concrete was the foundation for an aboveground tar tank. During the Site Screening, an unsuccessful attempt was made to advance boring B-7 through this tank. TT-1 and boring B-7A were performed adjacent to the concrete structure to a depth of approximately 5 feet. There were no observed MGP residuals adjacent to this structure, nor was there any evidence which would indicate what the structure was. For this reason, the structure is being referred to as simply a concrete vault on the figures.

20,000-Gallon Tar Tank - Adjacent to Passaic River

The trench (TT-2) was excavated to a depth of approximately 5 feet and encountered what appeared to be a foundation for an aboveground tank. There was no visual evidence of MGP residuals in this trench. For this reason, the structure is being referred to as simply a concrete slab on the figures.

During the Site Screening, B-8 was advanced through this slab. The boring found that the slab was approximately 3 feet thick. The log also describes free product contamination in the soils from approximately 7.5 feet to the bottom of the boring at 20 feet.

4,000-Gallon Tar Tank - Adjacent to Passaic River

The trench (TT-3) was excavated through the center of the tank which was either square or rectangular in shape (based on the walls having no curvature, the entire tank was not uncovered) with metal plating lining the inside of the concrete and brick walls of the tank. Water was trapped in the tank at a depth of approximately 2 feet. A tar-like product was encountered in the tank between 4 and 5 feet. TT-3 extended to a depth of 5 feet but did not encounter the bottom of the tank.

9,750-Gallon Tar Well - Lower Tier

A portion of the tar well was visible at the surface east of the 20,000-gallon tar tank investigated by TT-2. The dimensions of the tar well were approximately 25 feet by 13 feet. The top of the tar well had three 2 to 4 inch diameter holes which were probed to determine the contents of the well. The tar well was 5.5 feet deep and was almost completely full of water. There appeared to be a wooden piling of some sort visible in one of the larger holes. TT-4B was installed to a depth of approximately 5 feet perpendicular to the western edge of the well and there was no visual evidence of MGP residuals.

Former Tar Separator Vault - Lower Tier

TT-5A & 5B uncovered a concrete vault and tar separator. TT-5A investigated the north edge of the concrete vault and TT-5B investigated the south edge of the vault and west side of the separator. TT-5A encountered tar inside the vault at approximately 5.5 feet, but there was no evidence of tar outside the vault. TT-5B discovered MGP residuals from approximately 4 to 5 feet (the bottom of the trench) outside of the vault. The remainder of the trench was excavated to 3 to 4 feet to avoid generating large quantities of impacted soil. The interior of this separator had one to two inches of MGP residuals on the bottom.

6,400-Gallon Tar Well and 4,000-Gallon Liquor Well

TT-6A was excavated from north to south in the assumed location of these two structures. The trench was excavated to a depth of approximately 5 feet and encountered neither the structures

nor MGP residuals. The trench did encounter the foundation of the brick building which caused water to enter the trench. TT-6B was installed near the water seep and extended to the east from TT-6A. This trench encountered no evidence of the tar or liquor wells nor MGP residuals.

Gas Holder #4 - Northwest Corner-Lower Tier

The trench (TT-7) was excavated through what was the assumed center of the holder and to a depth of approximately 7 feet. The trench only unearthed the northwest wall of the holder. The southeast wall was not encountered. There was no evidence of MGP residuals at this location. Borings B-6 and B-13 (Section 4.1) were installed inside the holder and revealed no MGP residuals on the floor of the holder at approximately 9 feet deep.

115,000-Gallon Tar Tank and 80,000-Gallon Oil Tank

The trench (TT-8) was excavated through what was the assumed location of the tanks. TT-8 was installed to a depth of approximately 5 feet, but did not encounter the tanks. It is probable that these tanks were aboveground. A test hole was excavated during trenching to investigate the possible presence of a floor or foundation to the tanks. Between 7 and 9 feet, oily product was discovered. There was no evidence of a foundation.

Soil borings B-9 and B-14 were installed to investigate this area and encountered neither evidence of the tanks nor MGP residuals.

Two 50,000-Gallon Oil Tanks

TT-9 was excavated on the ramp to the west of the oil and tar tank investigated by TT-8. The trench was excavated through what was the assumed location of the tanks. The trench was excavated to only approximately 5 feet bgs to protect the integrity of the retaining wall. The excavation did not encounter either the tanks or MGP residuals. Coal fragments were discovered from 1 to 2.5 feet below grade.

Valve House - Upper Tier

The valve house was not located. The discussion for TT-10 and how it relates to the valve house has been provided as Section 6.1.

Gas Holder #1 - Northern Portion - Upper Tier

TT-11A was excavated to bisect the gas holder to determine its approximate size. Two portions of the brick wall of the holder were uncovered during the trenching, and there was a slight MGP odor at approximately 8 feet deep at the approximate center of the holder. The trench was excavated to 10 feet below surface. TT-11B was installed to confirm a third point on the wall. The wall was encountered, but there was no evidence of MGP residuals in the trench. B-1 and B-29 were excavated inside the holder and found no evidence of MGP residuals. The bottom of the holder was encountered at 13 feet.

Gas Holder #2 - Central Portion - Upper Tier

TT-12A was not excavated as proposed, since the subsurface condition and location of the holder was determined during UST removals (Section 7.1). TT-12B was excavated in the northwest portion of the holder and encountered the concrete wall. There was no evidence of MGP residuals in this location. The UST removal excavation discovered a one foot thick layer of MGP residuals in the bottom fill material. Some of this material was removed during the excavation of gasoline contaminated soil. B-2 encountered this material at approximately the same depth and encountered the bottom of the holder at approximately 12 feet deep.

Gas Holder #3 - Southern Portion - Upper Tier

TT-13A was excavated from southwest to northeast across the holder. The trench was excavated to approximately 10 feet but did not encounter the holder bottom. An attempt was made on the northeast side to determine the depth, by extending the trench to approximately 14 feet deep. This attempt had to be stopped due to the large quantity of water which was encountered at approximately 11 feet deep in the holder. There were MGP odors present in the fill being removed from beneath the water. Borings B-3, B-3A, B-3B, B-24 and B-27 were all installed

inside the holder. The holder has a conical bottom with an approximate 2.5 foot rise toward the center. There was no inner ring wall observed in this holder.

Tar Tank - Adjacent to Passaic River

TT-14 was added to the original scope of work upon the discovery of an historic site plan depicting a tar tank to the east of the tar separator vault. The trench encountered what appeared to be the corner of a structure (being referred to as the tar tank). There were MGP residuals in the excavation from 2.5 to 4 feet below grade. The bottom of the tank was encountered at 4 feet deep.

7.0 MISCELLANEOUS INVESTIGATIONS

7.1 Data Gap No. 15 - UST Removals

Eight USTs were previously identified at the Site which required location and removal. The first phase of the UST investigation involved locating the USTs via ground penetrating radar (GPR). The second phase involved removal and disposal of the USTs.

Advanced Geological Services performed the GPR survey to locate the USTs. Several traverses were made across the suspected locations of the USTs that identified the locations of USTs E-1, E-2 and E-3 within gas holder #2. The remaining five USTs were not identified by GPR. However, the fill pipes were discovered for USTs A-3, A-4 and E-4 east of gas holder #3. USTs A-1 and A-2 were located with a test pit during excavation activities within gas holder #2. All tank locations were confirmed upon excavation and are shown on Figure 2.

Between June 3 and 8, 1998, the eight USTs were removed by Creamer Environmental Inc. Construction Permits were obtained from the City of Newark (Appendix H), and the NJDEP was notified on May 14,1998. The copy of the notification to the DEP and facility questionnaire are on file with PSE&G.

Creamer Environmental excavated the overlying soil and exposed the top of each UST. For USTs E-3 and E-4 (contents listed on following table), a manhole was cut in the top of each tank using a spark free air chisel to allow access for tank cleaning. For the six gasoline USTs, Creamer inerted the interior of each tank by placing dry ice into the UST and allowing a sufficient amount of time to pass prior to cutting the tank open. After inerting the UST, a manhole was cut in each UST utilizing a spark free air chisel to allow access for tank cleaning.

After manholes were cut, Creamer Environmental entered the USTs to begin cleaning. All free standing product was removed by Clean Harbors via vacuum truck and transferred into an on-site

frac tank. Following the removal of the liquid product, the sludge in the bottom of each tank was removed by Lorco Petroleum Services via vacuum truck. After each tank was cleaned, they were removed from the excavation and placed on plastic for inspection (conditions of each tank are described in the following table). Following inspection, Creamer Environmental hauled the USTs off-site for disposal at a local scrap metal facility (receipts included in Appendix I).

UST A-1 and A-2 discharged gasoline to the subsurface inside holder #2. The fill material underneath and around these two USTs was saturated with gasoline. Because of the quantity of gasoline that was present in the holder, it was decided to excavate all material contaminated with free phase gasoline. Approximately 500 tons of soil were removed from the holder in an excavation depicted on Figure 15. Because the discharge occurred within a gas holder, excavation ceased upon encountering the wall and floor (10 to 12 feet below grade). Four post-excavation samples (EXC-1, 2, 3 and 4) were collected at the bottom side wall (approximately 10 feet bgs) of the excavation upon completion of the free product contaminated soil removal. Benzene and xylene were detected in the post-excavation soil samples at levels slightly above the most stringent NJDEP cleanup criteria (Table 9). Lead was also detected above the most stringent NJDEP cleanup criteria in sample EXC-3.

To investigate the possibility of gasoline migration through the holder wall, boring B-25 was installed northeast of the holder, in close proximity to the UST locations. The soils did not reveal any evidence of gasoline contamination and a sample collected at 11.5 to 12 feet bgs did not show contamination above the NJDEP SCC.

As discussed above, soil contamination was noted in the excavation for USTs A-1 and A-2. The contaminated soil was removed below these tanks and below E-1 and E-2 to the bottom of the former gas holder. The soil being removed was periodically evaluated for the presence of free product contamination using an organic vapor monitor (OVM) and performing soil/water agitation tests. Free product contaminated soil was immediately hauled off-site under Clean Harbors supervision. Soil was transported to and disposed of at an approved facility.

A summary of all waste removed by PSE&G is included in Appendix I.

In accordance with DEP protocols, PSE&G called the DEP Hotline and reported that a release had occurred from USTs which were being removed as part of a RI. PSE&G also indicated that the Case Manager was Mark Walters and that all other communications would be to him. The NJDEP issued case number 98-06-05-1215-15.

After the USTs were removed, post-excavation soil sampling was conducted to assess the impact the discharge from USTs A-1 and A-2 had on the subsurface soils. Post-excavation samples were collected from UST A-1, A-2, E-1 and E-2 along the excavation sidewalls due to the soil removal described above. All samples were collected in accordance with NJDEP-FSPM, and in accordance with N.J.A.C. 7:26-E. Soil samples were also collected from USTs E-4, A-3 and A-4 in accordance with N.J.A.C. 7:26-E. Results from sample E4-3, although above the most stringent NJDEP SCC can be attributed to the contamination associated with the drip leg located southeast of holder #3.

A description of each UST is provided in the table below. A UST sample location plan has been provided as Figure 15, the sample results have been summarized on Table 9 and a laboratory summary is provided as Appendix J.

UST No.	E-1	E-2	E-3	E-4	A-1	A-2	A-3	A-4
Length (ft.)	29	29	12	6	24	24	10.5	10.5
Width (ft.)	6	5.8	5.5	4	5.3	5.3	4	4
Capacity (gal.)	6,000	6,000	2,000	550	4,000	4,000	1,000	1,000
Contents	gasoline	gasoline	diesel	waste oil	gasoline	gasoline	gasoline	gasoline
Construction	steel	steel	steel	steel	steel	steel	steel	steel
Condition	good	good	good	good	poor/holes	poor/holes	good	good

7.2 Data Gap No. 16 - Soil Gas Investigation

One concern at the Site was the possible presence of volatile vapors in the subsurface. Previous investigations identified elevated PID/FID readings in overburden soils above the groundwater. To investigate the possibility of migrating vapors, a soil gas survey was conducted on June 2, 1998. Tracer Research Corporation of Monmouth Junction, New Jersey was retained to conduct the survey. Ten soil gas samples were collected along the northern, southern and western property lines (Figure 2). Samples were collected from the 0 to 2 feet bgs interval and field analyzed for BTEX. The findings of the investigation revealed no BTEX impact in the subsurface vapors.

8.0 SUMMARY OF FINDINGS

This section summarizes the findings and recommendations of the RI conducted at the Site. The information provided in this section is based upon the results of this RI. Section 8.1 summarizes the findings of the soil investigation. Section 8.2 summarizes the findings of the bedrock investigation. Section 8.3 summarizes the findings of the groundwater investigation. Section 8.4 summarizes the MGP structures investigation. Section 8.5 summarizes the findings of miscellaneous investigations conducted during the RI.

8.1 Soil Investigation

From the data collected, the following soil AOCs have been identified.

8.1.1 Shallow Soils

AOC-S1 encompasses the majority of Parcel 1. The concern in this AOC is the presence of elevated PAH and metal soil contamination in the surface soils (0 to 2 feet). No free product was observed within the soils, however, tar was observed immediately underneath the asphalt and elevated laboratory results were evident. AOC-S1 has not been fully delineated to the northwest and south, however, the presence of retaining walls along both of these property boundaries likely represents the extent of the contamination.

AOC-S2, a sub-area of AOC-S1, contains cyanide impacted soil at the surface in the southwest corner of the Lower Tier. This area requires additional investigation to determine the horizontal and vertical extent of impacted soil.

8.1.2 "A" Horizon Soils

AOC-A1 encompasses a majority of the Lower Tier of Parcel 1. The primary concern in this AOC is the presence of MGP residual free product. This product has been discovered above the semi-confining clay layer. Soil samples collected from this AOC exhibit elevated SVOC, VOC, and inorganic contamination. These soils may come into human contact during the construction of the river front park, and they represent a potential source of groundwater contamination. AOC-A1 has been fully delineated.

AOC-A2 encompasses the southern portion of the Upper Tier and extends westward across McCarter Highway into Parcel 2, off-site to the south, and east toward the Passaic River. The concerns in this area are the presence of MGP free product contamination in the saturated zone above the silt layer. Soil samples collected from this area exhibited elevated PAHs, VOCs, and inorganics. The contaminated soils in the upper tier and under Parcel 2 are at least 20 feet deep, while off-site to the south contaminated soil is encountered between 10 and 15 feet deep. AOC-A2 has not been fully delineated and requires further investigation.

8.1.3 "B" Horizon Soils

AOC-B1 encompasses a majority of the Lower Tier of Parcel 1. The primary concern in this AOC is the presence of MGP residual free product in the northeast corner. Soil samples collected from this AOC exhibit elevated concentrations of SVOCs and benzene. AOC-B1 has not been fully delineated and requires further investigation.

8.2 Bedrock Investigation

As discussed in Section 4.3, the former Ballantine Brewery used wells for process water. These wells were reportedly several hundred feet deep and open in the bedrock. Ballantine reported that water pumped from these wells contained tar. During the USACOE investigation, the

bedrock boring (S-3) installed at the southeast corner of the Site, revealed free product and PHC odors. Therefore, the bedrock was investigated.

The remedial investigation determined that the bedrock underlying the Site is composed primarily of siltstone. MGP residuals were observed in MW-3BR and MW-4BR at the southeast corner of the Site, corroborating the findings of the USACOE. The extent to which MGP residuals have migrated onto the former Ballantine property requires further investigation

8.3 Groundwater Investigation

Ten monitoring wells were installed (MW-1, 1A, 2, 2A, 3, 3A, 3BR, 4BR, 5BR, and 6) to further evaluate and delineate the extent of groundwater contamination under the Site. The results indicate that groundwater is contaminated with MGP residuals, predominantly, BTEX and naphthalene. The investigation has concluded that the primary source area for the dissolved phase volatile contamination is from AOCs A1 and A2.

Of the inorganics, iron and manganese exceedances can be assigned to the effects of anaerobic biodegradation, as previously discussed. Sodium is consistently high across the Site (even in the upgradient well MW-6). There are isolated exceedances of arsenic, lead and thallium that are insufficient to warrant action on their own. Aluminum above standards is more widespread and is also present in the upgradient well.

Groundwater contamination in the "A" and "B" horizons and the bedrock have not been fully delineated and requires further investigation.

8.4 MGP Structures

As the Site was an MGP plant in the late 1800s and early 1900s, a portion of the RI was conducted to determine the location and subsurface conditions of former MGP equipment and

facilities. A test trench program was implemented (in association with a number of soil borings) to delineate the remnants of these structures. Some of the oil and tar tanks which were indicated on historic plans were located. The locations of former MGP facilities have been depicted on figures within this report.

8.5 Miscellaneous Investigations

Eight USTs were removed from the Site during the RI. Two of the USTs had discharged gasoline into gas holder #2. The gas holder prevented migration of this gasoline into the groundwater. Contaminated fill from within the holder was excavated and hauled off-site. Some residual soil contamination was left but does not warrant further remedial actions because of the low concentrations detected and its isolation within the holder. This residual contamination will be incorporated into an overall Site deed notice.

A soil gas survey was conducted to determine if there were volatile vapors migrating off-site and impacting receptors. Soil gas samples collected from the south, west and north property lines found that there was no subsurface impact from volatile vapors. Therefore, there will be no impact on surface receptors.

The USACOE has conducted geotechnical studies along the Passaic River waterfront at or near the Site in connection with certain flood protection projects. These studies included the drilling of borings in the Passaic River at a number of locations including areas at or near the Site. Evidence of free product and/or black staining and strong PHC odors were observed in three of these locations. The Passaic River immediately north and south of the Site is currently being investigated by a third party at the direction of, and with supervision from, the USEPA. This investigation includes an extensive series of borings, a human and ecological risk assessment, and a feasibility study. It is believed that the USACOE data are being, or will be, considered in connection with this study. It is anticipated that the USEPA-directed investigation will be completed on or by 2001.

9.0 RECOMMENDATIONS

9.1 Introduction

The remedial investigation did not complete the delineation of soil and groundwater contamination related to the Site. PSE&G proposes to conduct additional investigations to close the remaining data gaps. The proposed work, as described below and depicted on Figure 16, will require access agreements with the surrounding property owners. The NJDEP will be notified in advance of conducting the work, and an RIR Addendum will be submitted providing the results of the investigation.

9.2 Soils

Soil contamination in the deeper "A" horizon was not delineated to the northwest of B-35 and southeast of B-47 (MAP Enterprises property). It is proposed to collect additional delineation samples based on the highest PID reading above the clay/silt layer. One soil sample will be collected northwest of B-35 at the intersection of McCarter Highway and Lombardy Place while installing proposed monitoring wells (see Section 9.3). Three soil samples will be collected from the proposed temporary well point (TWP) locations southeast of B-47. The soil samples will be analyzed for VO+10, SVO+20 and TAL inorganics.

9.3 Bedrock

The bedrock investigation adjacent to the former Ballantine Brewery property detected MGP residuals. There are written descriptions as to the location of the former production well on this property. It is proposed to install a bedrock well (MW-11BR) at the former production well's location. The bedrock will be continuously cored to a stratigraphic depth corresponding to the fractured interval noted in the former artesian well and MW-3BR (approximately 107 feet bgs). Observations will be made on the bedrock structure and presence of MGP residuals. A well will

be installed and constructed of 20 feet of open screen starting approximately 10 feet into the bedrock surface. Groundwater from this well will be sampled as described in Section 9.4.

9.4 Groundwater

Groundwater contamination was not fully delineated in the "A" and "B" horizons. In order to delineate the plumes, a number of temporary well points and wells are proposed.

In the "A" horizon, nine groundwater point samples are proposed along the downgradient edge of the plume. Three points are located on Parcel 1 between previously installed points and wells to close data gaps. On the MAP Enterprises property, six points are located to define the plume toward the southeast. The points will be installed by augering to the water table and collecting a groundwater sample in accordance with Alternative Ground Water Sampling Techniques Guide (July 1994).

The groundwater samples will be analyzed for VO+10 and naphthalene.

Four wells (MW-7, MW-8, MW-9 and MW-10) will be installed in the "A" horizon following the groundwater point sampling. One well (MW-7) will be an upgradient well located at the intersection of McCarter Highway and Lombardy Place. One well (MW-8) will be located downgradient of B-26 on Parcel 1 to monitor groundwater quality in the middle of the Site along the river. One well (MW-9) will be located on the downgradient edge of the MAP Enterprise property based on TWP results. One well (MW-10) will be located adjacent to B-47 (MAP Enterprise property) to evaluate floating free product. The wells will be 2-inch PVC with the exception of MW-10, which will be 4-inch.

Four wells (MW-6A, MW-7A, MW-8A and MW-9A) will be installed in the "B" horizon to complete delineation. MW-6A and MW-7A will be paired with MW-6 and MW-7 to provide upgradient groundwater quality data. MW-8A will be paired with MW-8 to monitor

groundwater quality in the middle Parcel 1 along the river directly downgradient of P4 and P4A. MW-9A will be paired with MW-9 to assess the impact to groundwater quality in the "B" horizon.

At the completion of well installation, the proposed wells (including the bedrock well described in Section 9.3) will be sampled using the EPA's low-flow sampling technique. The samples will be analyzed for VO+10, SVO+20 and TAL inorganics. In addition, the sample from MW-6A will be analyzed for nitrate (NO_3), sulfate (SO_4), alkalinity, and total and dissolved iron to complete the natural attenuation assessment. The 18 existing wells and piezometers will be sampled at the same time using techniques from the Field Sampling Procedures Manual (May 1992). Groundwater samples collected from the existing wells will be analyzed for VO+10 and naphthalene only based on previous investigations. Quality control samples will include trip blanks, field blanks and duplicates.

9.5 RIR Addendum

The data collected will be used to: revise soil contamination maps to better delineate the "A" horizon; revise the groundwater contaminant isopleth maps; and to refine the aquifer model described in Section 5.7. These results will be presented to the NJDEP in an RIR Addendum.

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Table 1

Public Service Electric and Gas Company
Former Front Street Gas Works

Groundwater Sample Data Summary

Well No.	Permit No.	Date Completed	Total Depth	Screened Interval	Ground Elevation	TOC Elevation	09/16/98 DTW	09/16/98 WL Elev	09/16/98 pH	09/16/98 Temp	09/16/98 Cond.	09/16/98 DO	09/16/98 Turb	09/16/98 ORP	10/14/98 DTW	10/14/98 WL Elev
MW-1	26-51013	07/02/98	35	20-35	38.55	38.28	29.08	9.20	6.64	18.90	930	0.43	8.1	14.5	29.1	9.18
MW-1A	26-51014	07/14/98	59	49-59	38.48	38.06	34.56	3.50	6.99	18.97	1049	0.81	NA	-5.4	30.87	7.19
MW-2	26-51015	07/01/98	15.5	2.5-15.5	9.88	9.51	6.90	2.61	6.75	22.68	11358	2.52	8.2	8.4	9.01	0.50
MW-2A	26-51016	07/28/98	34.5	24-34	9.86	9.58	7.02	2.56	7.17	17.12	1524	0.42	6.1	-15.0	9.22	0.36
MW-3	26-51017	06/30/98	14.5	3-14	9.13	8.74	6.15	2.59	6.77	20.12	1684	0.37	6.4	6.5	8.04	0.70
MW-3A	26-51018	07/16/98	29	24-29	8.82	8.38	2.65	5.73	7.28	15.99	8.24	0.26	8.0	-22.4	2.43	5.95
MW-3BR	26-51019	07/31/98	55	35-55	9.04	8.81	4.05	4.76	7.67	15.64	898	0.20	5.4	-43.0	3.85	4.96
MW-4BR	26-51020	08/11/98	62	42-62	13.53	13.28	7.65	5.63	9.23	17.98	940	0.75	3.1	-130.0	8.14	5.14
MW-5BR	26-51021	08/10/98	72	52-72	19.24	19.22	14.55	4.67	11.48	16.58	1074	0.61	16.0	-262.0	14.6	4.62
MW-6	26-51694	08/29/98	32	17-32	38.43	38.11	NA	NA	7.24	17.85	430	4.60	95.0	-7.7	27.95	10.16
P-1		09/18/97	43	23-43	37.44	37.07	27.55	9.52	6.61	18.88	1633	0.52	4.8	16.4	27.52	9.55
P-1A		09/18/97	58.7	48.4-58.4	37.37	37.08	31.60	5.48	7.64	18.79	1303	0.48	7.0	-42.1	32.63	4.45
P-2		09/19/97	44	24-44	39.44	38.98	29.72	9.26	6.97	18.18	1468	0.32	8.0	-3.1	29.67	9.31
P-2A		09/19/97	70	60-70	39.31	39.08	34.18	4.90	7.76	18.08	584	0.33	6.1	-49.7	35.39	3.69
P-3		09/18/97	18	3-18	10.01	9.77	5.45	4.32	6.64	19.65	2342	0.92	8.4	17.1	5.44	4.33
P-3A		09/18/97	30.1	19.7-29.7	9.98	9.63	8.00	1.63	6.55	17.28	1870	0.30	140.0	17.5	6.11	3.52
P-4		09/18/97	16	3-16	10.40	10.13	NA	NA	NS	NS	NS	NS	NS	NS	NA	NA
P-4A		09/18/97	26.2	16.2-26.2	10.53	10.29	3.61	6.68	8.8	18.09	14505	0.35	5.1	4.4	2.54	7.75

Notes:
- Elevation in feet above mean sea level (MSL)
- TOC = Top of Casing
- DTW = Depth to Water
- WL Elev = Groundwater Elevation
- Temp = Degrees Celcius
- Cond = Conductivity
- DO = Dissolved Oxygen
- Turb - Turbidity
- ORP = Oxygen Reduction Potential

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Table 2
Public Service Electric and Gas Company
Former Front Street Gas Works
Newark, New Jersey

Wells Located in NJDEP One-Mile Radius Well Search

Well Ref. #	Well Permit #	Owner	Total Depth of Well (ft)	Casing Depth (ft)	Approximate Distance from Site (ft)*	Use	Date Installed
1	26-3140	Barton Realty Co., Inc.	385	N/A	1,800	I	06/10/65
2	26-3064	George Welech Company	300	45	3,200	I	06/04/65
3	26-3209	Continental Insurance Co.	300	58	2,400	I	07/65
4	26-3233	Klines Department Stores	400	62	4,000	I	09/16/65
5	46-35633	Prudential Service Company	717	N/A	4,600	I	1925
6	46-35634	Prudential Service Company	546	N/A	3,400	I	06/38
7	26-2804	New Jersey Rollong Mills	400	99	5,000	I	07/06/63
8	26-4008	Harrison Supply Company	174	88	3,900	I	09/28/66
9	26-5159	Englehard Industries	400	79	3,400	I	06/20/81
10	26-3532	550 Broad Street Associates	300	52	2,000	D	05/12/66
11	26-3149	Mutual Benefit Life Insurance Company	312	45	1,200	D	07/08/65
12	26-3173	New Jersey Bell Telephone Company	215	65	1,200	D	07/26/65
13	26-3777	Prudential Insurance Company	324	39	2,400	D	03/30/66
14	26-4982	Harbak	194	194	1,900	D	04/17/81

Notes:

D - Domestic
I - Industrial / Process / Cooling / Irrigation
N/A - Information not available
* - Measured from center of site.

Table 3a

Public Service Electric and Gas Company
Former Front Street Gas Works

Surface Soil Sample Results

ANALYSIS:		DATE		06/26/98	06/25/98	06/19/98	06/22/98	06/23/98	06/24/98	06/08/98	06/29/98	06/17/98	06/11/98	06/09/98	06/16/98	07/09/98	07/01/98	07/01/98	06/30/98
		DEPTH (FT BGS)		1-1.5'	0-0.5'	0-6"	0-0.5'	1-1.5'	0-0.5'	0-0.5'	1-1.5'	1-1.5'	1.5-2'	0-0.5'	3.5-4'	0-0.5'	4-4.5'	1-1.5'	0-0.5'
		SAMPLE NO.		B-11	B-12	B-13	B-14	B-15	B-16	B-17	B-18	B-19	B-20	B-22	B-23	B-26	MW-1	MW-2	MW-3
PAHs:	RDC Criteria	NRDC Criteria	IGW Criteria																
Naphthalene	230	4200	100	**110 J**	5.5	ND	8.4	0.064 J	ND	4.7	0.34 J	36	0.67	0.043 J	0.14 J	7.1	4.6	1.5 J	0.65 J
2-Methylnaphthalene	NS	NS	NS	88 J	0.95	ND	3.1 J	0.11 J	ND	4	0.69	87	1.3	ND	0.31 J	13	7.9	1.6 J	ND
Acenaphthylene	NS	NS	NS	140 J	0.24 J	ND	17	0.29 J	220 J	20	0.13 J	26	0.46	0.045 J	1.1	58	2.2 J	16 J	0.43 J
Acenaphthene	3400	10000	100	25	ND	ND	1.4 J	0.044 J	ND	2.8 J	0.17 J	5.6	0.22 J	ND	0.31 J	9.9	4.3	1.8	ND
Fluorene	2300	10000	100	79 J	ND	ND	4.7	0.22 J	ND	10	0.5	54	0.74	0.31 J	0.79	26	7.3	2.2	ND
Phenanthrene	NS	NS	NS	1,100	1.9	0.087 J	40	0.71	53 J	150	2.7	260	5.7	0.22 J	5.6	430	35	83	1.4 J
Anthracene	10000	10000	100	**210**	0.20 J	ND	16	0.22 J	ND	29	0.3 J	38	0.56	0.041 J	1.1	93	6.3	13	ND
Fluoranthene	2300	10000	100	**1,000**	1.5	0.10 J	60	0.75	**200 J**	**180**	1.5	**150**	4	0.45	4.7	**370**	22	**260**	3.1 J
Pyrene	1700	10000	100	**1,200**	1.4	0.17 J	82	1.3	**300 J**	**150**	2.3	**220**	5.6	0.59	6.8	**300**	42	**500**	3.1 J
Benzo(a)anthracene	0.9	4	500	**540**	**0.93**	0.089 J	**48**	0.6	**170 J**	**85**	0.81	**81**	**2**	0.25 J	**3.1**	**160**	**12**	**64**	**1.4 J**
Chrysene	9	40	500	**460**	1.2	0.11 J	**45**	0.67	**88 J**	**79**	0.94	**82**	2.4	0.31 J	3.5	**140**	**14**	**78**	2.1 J
Benzo(b)fluoranthene	0.9	4	50	**560**	**1.7**	ND	**83**	0.66	**620**	**110**	0.64	**85**	**2**	0.62	**3**	**160**	**9.4**	**100**	**2.1 J**
Benzo(k)fluoranthene	0.9	4	500	ND	0.58	ND	**30**	0.18 J	**200 J**	**37**	0.21 J	**20**	0.84	0.41	**0.97**	**52**	**4.5**	ND	0.84 J
Benzo(a)pyrene	0.66	0.66	100	**360**	**0.96**	ND	**64**	0.6	**550**	**70**	0.61	**66**	**2**	0.26 J	**3**	**120**	**9.7**	**65**	**1.6 J**
Indeno(1,2,3-cd)pyrene	0.9	4	500	**230**	**1.1**	ND	**32**	0.28 J	**500**	**58**	0.35 J	**38**	**2**	0.34 J	**2.1**	**85**	**6.8**	**88**	**1.4 J**
Dibenz(a,h)anthracene	0.66	0.66	100	**31**	0.31 J	ND	**2.8 J**	0.067 J	**140 J**	**12**	0.11 J	**3.4**	0.44	0.086 J	0.54	**12**	**4.8**	**8.6**	ND
Benzo(g,h,i)perylene	NS	NS	NS	210	1.1	ND	28	ND	570	44	0.37	44	2	0.37	2.1	79	3.4 J	97	1.1 J
VOCs:																			
Benzene	3	13	1	**3**	**1.4**	ND	**1.2**	ND	ND	ND	ND	0.33 J	ND	ND	ND	0.49 J	ND	ND	ND
Toluene	1000	1000	500	3.8	6	ND	1.5	ND	ND	ND	ND	0.41 J	ND	ND	ND	0.68	ND	ND	ND
Ethylbenzene	1000	1000	100	ND	0.67 J	ND	0.17 J	ND	ND	ND	ND	ND	ND	ND	ND	0.24 J	ND	ND	ND
Xylene	410	1000	10	2.7	8.1	ND	1.3	ND	ND	ND	ND	1.4	ND	ND	ND	0.99	ND	ND	0.73 J
Styrene	23	97	100	0.37 J	ND	ND	0.21 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1 - Trichloroethane	210	1000	50	ND	ND	ND	ND	0.30 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Elements:																			
Silver	110	4100	NS	ND	0.90 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.58 J	ND	ND	24
Arsenic	20	20	NS	7.8	**32.1**	2.4	7.1	2.4	2.3	7.2	2.4	8.7	6.1	1.9	3	12	2.1	6.8	**23.1**
Barium	700	47000	NS	82	106	69	118	62	57	54	66	62	71	54	62	119	52	131	590
Beryllium	1	1	NS	ND	0.22 J	0.34 J	0.23 J	0.51 J	0.36 J	ND	0.5 J	0.31 J	0.42 J	0.34 J	0.28 J	0.32 J	0.36 J	ND	ND
Cadmium	39	100	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21 J	ND	0.33 J	2.25 J
Chromium	78000	78000	NS	7.9	10.7	13	11.3	15.2	10.9	11.3	13.7	45.5	11.9	11.4	7.9	21.5	15.8	17.4	48.4
Copper	600	600	NS	21.3	308	25.9	39	41.3	29.5	184	27.8	92.5	47.9	29.6	69.3	**681**	32.1	173	**8,930**
Thallium	2	2	NS	**2.23 J**	**7**	ND	ND	1.40 J	ND	1.26 J	**2.7**	1.04 J	ND	ND	ND	1.92 J	ND	**3.2**	**7.2**
Mercury	14	270	NS	0.6	0.46	0.2	3.7	1.77	0.2	5.5	2.6	4.3	4.1	5.4	1.42	1.27	0.17	1.63	**18**
Nickel	250	2400	NS	13.9	11.5	9.2	7.7	14.2	12.3	1.6 J	17.7	14.9	11.5	8.8	9.4	12.6	13.1	16.5	34.6
Lead	400	600	NS	100 E	**3320 E**	72.4	**514**	95.1	141	262	53.6 E	155	394	82.5	**1090**	**5280**	59.3	371	**117,000**
Antimony	14	340	NS	ND	**36**	ND	ND	ND	13.5 J	ND	ND	ND	ND	ND	ND	**72**	ND	ND	**1,190**
Selenium	63	3100	NS	3.2	9.2	ND	2.3	ND	0.72 J	0.65 J	0.94 J	ND	0.52 J	ND	ND	0.93 J	ND	2.4	6.2
Vanadium	370	7100	NS	19.2	21.3	20.6	17.3	23.1	21.8	12.3	20	31.3	15.9	13.6	12.2	20	19	25.3	13.1
Zinc	1500	1500	NS	27	70	110	51	63	53	19	42	80	59	35	100	152	42	**4910**	**2,950**
Cyanide	1100	21000	NS	2.32	0.98	ND	15.9	1.73	11.9	691	ND	4.97	9.74	0.18	ND	8.76	0.11 J	1.25	15.7

Notes:

All results are shown in mg/kg.
B = Analyte detected in Field Blank.
D = Sample diluted prior to analysis.
E = Estimated value due to interference.
J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC.

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Table 3b

Public Service Electric and Gas Company
Former Front Street Gas Works

"A" Horizon Soil Sample Results

ANALYSIS:				DATE	06/26/98	06/26/98	06/25/98	06/25/98	06/19/98	06/19/98	06/22/98	06/22/98	06/23/98	06/23/98	06/23/98	06/24/98	06/24/98	06/08/98	06/08/98	06/29/98	06/29/98
				DEPTH (FT BGS)	5-5.5'	9.5-10'	5.5-6'	19.5-20'	15.5-16'	18.5-19'	4.5-5'	9.5-10'	3.5-4'	12-12.5'	12-12.5'	3.5-4'	11-11.5'	18.5-19'	25.5-26'	11.5-12'	21-21.5'
				SAMPLE NO	B-11	B-11	B-12	B-12	B-13	B-13	B-14	B-14	B-15	B-15	Dup(B-15)	B-16	B-16	B-17	B-17	B-18	B-18
PAHs:	RDC Criteria	NRDC Criteria	IGW Criteria																		
Naphthalene	230	4200	100		0.86	9.5	**3000**	**1400**	0.39	0.081 J	13	**110**	0.086 J	**360**	**430**	ND	0.35 J	ND	ND	ND	ND
2-Methylnaphthalene	NS	NS	NS		0.65	5.8	440 J	610	0.88	ND	26	26	0.19 J	130	160	ND	0.069 J	ND	ND	ND	ND
Acenaphthylene	NS	NS	NS		8.1 J	20	360 J	33	0.22 J	ND	7	2.5 J	0.081 J	7.9	7.6	ND	ND	ND	ND	ND	ND
Acenaphthene	3400	10000	100		0.97	60	83 J	**300**	0.18 J	ND	2.2 J	5.5 J	ND	12	14	ND	ND	ND	ND	ND	ND
Fluorene	2300	10000	100		3.3	46	**340 J**	**150 J**	0.62	ND	12	7.3	0.15 J	19	22	ND	0.097 J	ND	ND	ND	ND
Phenanthrene	NS	NS	NS		31	120	1100	400	2.2	ND	34	17	0.46	46	53	ND	0.067 J	0.049 J	ND	0.040 J	ND
Anthracene	10000	10000	100		13	47	**360 J**	**110 J**	0.52	ND	6.6	3.5 J	0.12 J	14	15	ND	ND	ND	ND	ND	ND
Fluoranthene	2300	10000	100		63	59	**890**	**140 J**	1	ND	22	11	0.29 J	23	26	ND	ND	0.041 J	ND	ND	ND
Pyrene	1700	10000	100		**130**	**120**	**580**	**170 J**	1.7	ND	42	19	0.5	20	23	ND	ND	0.055 J	ND	0.045 J	ND
Benzo(a)anthracene	0.9	4	500		**40**	**35**	**250 J**	**75 J**	0.63	ND	**17**	**7.7**	0.20 J	**8.5**	**9.5**	ND	ND	ND	ND	ND	ND
Chrysene	9	40	500		**38**	**34**	**210 J**	**68 J**	0.72	ND	**19**	8.6	0.23 J	7.4	8.3	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	0.9	4	50		**33**	**19**	**210 J**	**45**	0.47	ND	**21**	**11**	0.15 J	**8.4**	**8.9**	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	0.9	4	500		**17**	**8.7**	**51**	**15**	0.21 J	ND	**8.5**	**3.8 J**	0.045 J	**3.1 J**	**3.0 J**	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	0.66	0.66	100		**32**	**25**	**210 J**	**55**	0.52	ND	**20**	**10**	0.15 J	**8**	**8.9**	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.9	4	500		**29**	**12**	**120 J**	**24**	0.19 J	ND	**8.5**	**4.1 J**	ND	**2.7 J**	**4.7**	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	0.66	0.66	100		**2.6**	**7.2**	**21**	**7.6**	ND	ND	**2.4 J**	ND	ND	**0.72 J**	**1.2 J**	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NS	NS	NS		25	8.9	100 J	22	ND	ND	7.5	3.6 J	0.042 J	ND	ND	ND	ND	ND	ND	ND	ND
VOCs:																					
Benzene	3	13	1		**2.6**	**6.7**	**87**	**4.8 J**	ND	0.39 J	0.47 J	**2.4**	ND	**14**	**8.4**	ND	ND	ND	ND	ND	ND
Toluene	1000	1000	500		1.8	7.5	72	ND	ND	ND	0.51 J	0.39 J	ND	0.46 J	0.30 J	ND	0.25 J	ND	ND	ND	ND
Ethylbenzene	1000	1000	100		ND	12	25	**140**	ND	ND	ND	33	ND	43	25	ND	0.78	ND	ND	ND	ND
Xylene	410	1000	10		0.80 J	7.5	**140**	**140**	ND	ND	1.6	**12**	ND	**90**	**59**	ND	0.99	ND	ND	ND	ND
Styrene	23	97	100		ND	ND	15	ND	ND	ND	0.29 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1 - Trichloroethane	210	1000	50		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Elements:																					
Silver	110	4100	NS		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	20	20	NS		2.4	7.7	7.8	1.2	1.8	1.7	3.7	8.1	2.1	1.4	1.6	1.5	0.77 J	1.6	ND	1.3	0.61 J
Barium	700	47000	NS		22	35	107	29	66	38	69	44	44	40	37	66	23	28	10.1 J	47	12
Beryllium	1	1	NS		0.26 J	0.36 J	0.99	0.31 J	0.54 J	0.38 J	0.44 J	ND	0.47 J	0.40 J	0.29 J	0.7	ND	0.32 J	ND	0.46 J	0.25 J
Cadmium	39	100	NS		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	78000	78000	NS		8.4	30	18.1	12	17.4	9.5	25.9	15.4	12.6	15.1	15.2	15.6	5.8	9.6	5.1	13.3	4.7
Copper	600	600	NS		66.3	43.6	20.8	18.3	30.9	26	52.6	36.7	34.1	14.3	17.1	19.8	15.4	7.4	3.93 J	16.9	4.00 J
Thallium	2	2	NS		**2.19 J**	**3.3**	**2.26 J**	**2.3**	ND	ND	ND	ND	1.78 J	1.52 J	0.97 J	**3.2**	ND	ND	ND	**2.5**	1.44 J
Mercury	14	270	NS		0.0962 J	0.54	0.116 J	0.0297 J	0.19	0.0411 J	2	1	0.2	0.0066 J	0.0066 J	0.0055 J	ND	0.17	0.0161 J	0.0392 J	0.0048 J
Nickel	250	2400	NS		25.5	51	19.4	8.7	14.5	11.4	18.1	14.3	13.4	11.2	9.7	17.3	6.0 J	6.5	3.7 J	15.7	4.3 J
Lead	400	600	NS		44 E	56.5 E	60.8 E	7 E	24.4	39.9	166	189	41.9	34.2	7.8	7.6 E	3.2	5.7	3.2	6.8 E	2.3 E
Antimony	14	340	NS		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	63	3100	NS		1.10 J	5	2.4	0.72 J	ND	2.3	ND	1.8 J	0.68 J	ND	ND	1.17 J	ND	ND	ND	0.81 J	0.81 J
Vanadium	370	7100	NS		20.1	24.6	28.2	16.4	32.9	14.8	26	14	17.5	15.6	17.7	22	9.6	12.3	6.8	17.1	7.5
Zinc	1500	1500	NS		71	119	53	20	35	24	81	47	43	27	23	36	16	22	17	37	12
Cyanide	1100	21000	NS		2.86	0.32	2.47	0.32	5.93	ND	3.34	2.18	2.37	ND	ND	1.8	ND	0.55	3.1	ND	0.99

Notes:

All results are shown in mg/kg.
B = Analyte detected in Field Blank.
D = Sample diluted prior to analysis
E = Estimated value due to interference.
J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC.

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Table 3b

Public Service Electric and Gas Company
Former Front Street Gas Works

"A" Horizon Soil Sample Results

ANALYSIS:				DATE	06/29/98	06/15/98	06/15/98	06/15/98	06/11/98	06/11/98	06/11/98	06/18/98	06/18/98	06/18/98	06/18/98	06/09/98	06/10/98	06/10/98	06/16/98	06/16/98	06/16/98
				DEPTH (FT BGS)	31.5-32'	25.5-26'	27.5-28'	31.5-32'	19.5-20'	29.5-30'	41.5-42'	8.5-9'	12.5-13'	26.5-27'	30-30.5'	21.5-22'	25.5-26'	31.5-32'	25.5-26'	27.5-28'	31.5-32'
				SAMPLE NO.	B-18	B-19	B-19	B-19	B-20	B-20	B-20	B-21	B-21	B-21	B-21	B-22	B-22	B-22	B-23	B-23	B-23
PAHs:	RDC Criteria	NRDC Criteria	IGW Criteria																		
Naphthalene	230	4200	100		0.21 J	41	ND	2.8	ND	ND	ND	0.4	0.6	**2400**	**1200**	57	ND	ND	**810**	**570**	19
2-Methylnaphthalene	NS	NS	NS		ND	21	ND	0.8	ND	ND	ND	0.69	1.1	1400	450	22	ND	ND	400	260	16
Acenaphthylene	NS	NS	NS		ND	0.81	ND	0.093 J	ND	ND	ND	11	7.8	450	160	0.24 J	ND	0.049 J	120	57	10
Acenaphthene	3400	10000	100		ND	0.42	ND	ND	ND	ND	ND	0.33 J	0.37	40	13 J	0.18 J	ND	ND	15	4.4 J	1.1
Fluorene	2300	10000	100		ND	0.76	0.049 J	0.062 J	0.30 J	ND	ND	1.1	1.2	**240**	77 J	0.62	ND	0.37 J	73	30	6.9
Phenanthrene	NS	NS	NS		0.052 J	1.8	0.059 J	0.53	0.074 J	ND	ND	1.4	2.9	510	160	0.38 J	ND	0.46	180	67	29
Anthracene	10000	10000	100		ND	0.39	0.18 J	ND	ND	ND	ND	3.9	2.9	**120**	43 J	0.062 J	ND	ND	44	18	9.5
Fluoranthene	2300	10000	100		ND	0.73	0.32 J	ND	0.039 J	ND	ND	2.8	4.2	**120**	43 J	0.11 J	ND	ND	46	19	13
Pyrene	1700	10000	100		ND	0.97	0.34 J	ND	0.066 J	ND	ND	6.6	10	**200**	60 J	0.23 J	ND	ND	66	26	16
Benzo(a)anthracene	0.9	4	500		ND	0.29 J	ND	ND	ND	ND	ND	**4.5**	**5.2**	**67**	**25 J**	0.062 J	ND	ND	**25**	**10**	**6.6**
Chrysene	9	40	500		ND	0.27 J	ND	ND	ND	ND	ND	5.4	6.4	**61**	**21 J**	0.064 J	ND	ND	**23**	8.9 J	5.6
Benzo(b)fluoranthene	0.9	4	50		ND	0.17 J	ND	ND	0.37	ND	ND	**8.9**	**7.6**	**36**	**12**	0.44	ND	ND	**14**	**5.3 J**	**3.7**
Benzo(k)fluoranthene	0.9	4	500		ND	0.061 J	ND	ND	0.31 J	ND	ND	**2.9**	**2.3**	**14**	**3.7**	0.36 J	ND	ND	**4.2 J**	**1.7 J**	**1.2**
Benzo(a)pyrene	0.66	0.66	100		ND	0.20 J	ND	ND	ND	ND	ND	**11**	**11**	**53**	**17 J**	ND	ND	ND	**20**	**7.6 J**	**5.3**
Indeno(1,2,3-cd)pyrene	0.9	4	500		ND	0.098 J	ND	ND	ND	ND	ND	**8.3**	**6.6**	**18**	**4.8**	ND	ND	ND	**6.8 J**	**2.4 J**	**1.8**
Dibenz(a,h)anthracene	0.66	0.66	100		ND	ND	ND	ND	ND	ND	ND	**2.2**	**1.8**	**5.3 J**	**1.6**	ND	ND	ND	**2.4 J**	ND	0.55
Benzo(g,h,i)perylene	NS	NS	NS		ND	0.12 J	ND	ND	ND	ND	ND	8.4	5.4	16	4	ND	ND	ND	6.3 J	2.5 J	1.7
VOCs:																					
Benzene	3	13	1		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1000	1000	500		ND	ND	ND	0.18 J	ND	ND	ND	ND	ND	57	59	ND	ND	ND	29	1.2	0.19 J
Ethylbenzene	1000	1000	100		0.29 J	2.3	ND	0.88	ND	ND	ND	ND	ND	17	51	0.54 J	ND	ND	63	4.3	28
Xylene	410	1000	10		0.62 J	**15**	ND	2.5	ND	ND	ND	ND	ND	**450**	**370**	3.3	ND	ND	**180**	**17**	**31**
Styrene	23	97	100		ND	ND	ND	0.59 J	ND	ND	ND	ND	0.17 J	**160**	**130**	ND	ND	ND	**54**	6.3	ND
1,1,1 - Trichloroethane	210	1000	50		ND	ND	ND	ND	ND	ND	ND	0.18 J	0.19 J	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Elements:																					
Silver	110	4100	NS		ND	ND	ND	ND	ND	ND	ND	1.43 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	20	20	NS		0.75 J	ND	ND	0.63 J	0.44 J	0.54 J	1.9	2.6	2	0.49 J	ND	1.3	0.6 J	1.5	0.58 J	0.74 J	ND
Barium	700	47000	NS		10.3 J	7.93 J	6.91 J	25	31	15	71	45	77	14	8.22 J	49	7.95 J	35	8.81 J	10.6 J	12
Beryllium	1	1	NS		ND	ND	ND	ND	0.27 J	ND	0.47 J	0.29 J	0.39 J	ND	ND	0.42 J	ND	0.25 J	ND	ND	ND
Cadmium	39	100	NS		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	78000	78000	NS		4.7	5.4	4.4 J	4.72 J	7.9	4.71 J	13.2	9.2	12.2	3.35 J	3.87 J	9.9	3.96 J	6.8	3.51 J	5.5	4.7
Copper	600	600	NS		5.5	6	5	6.3	9.5	6.1	10.8	13.1	21.6	9.2	6.3	14.7	4.21 J	7	5.5	4.34 J	7.8
Thallium	2	2	NS		**2.03 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	14	270	NS		ND	0.0032 J	ND	ND	0.0095 J	ND	0.0043 J	1.18	0.41	ND	ND	0.0114 J	ND	ND	ND	ND	ND
Nickel	250	2400	NS		5.3 J	5.5 J	4.3 J	5.1 J	7.3	3.9 J	13.4	9.5	10	4.4 J	4.0 J	9.5	3.3 J	5.9 J	4.09 J	4.64 J	5.4 J
Lead	400	600	NS		1.7 E	2.1	2	2.5	4.1	3.1	6.9	58.1	96.2	2.2	2	5.5	2.5	3.8	10.4	6.5	2.3
Antimony	14	340	NS		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	63	3100	NS		0.66 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	370	7100	NS		6.7	5.9	5.5	6.6	9.4	6.4	18.2	12.1	15.6	5.5	5.8	13.5	6	9.6	4.9	8.4	6.5
Zinc	1500	1500	NS		9.2 J	9.5 J	14	11.8 J	19	9.7 J	32	50	43	11.2 J	8.7 J	23	8.2 J	14	12	9.5 J	11.5 J
Cyanide	1100	21000	NS		ND	1.52	7.52	ND	ND	ND	ND	5.62	3.19	0.25	0.72	ND	1.53	0.31	0.48	0.15	ND

Notes:

All results are shown in mg/kg.
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J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC

Table 3b

Public Service Electric and Gas Company
Former Front Street Gas Works

"A" Horizon Soil Sample Results

ANALYSIS:	RDC Criteria	NRDC Criteria	IGW Criteria	DATE DEPTH (FT BGS) SAMPLE NO.	06/16/98 25.5-26' Dup(B-23)	06/17/98 11.5-12' B-25	07/09/98 3.5-4' B-26	07/09/98 7.5-8' B-26	07/01/98 26.5-27' MW-1	07/01/98 27.5-28' MW-1	07/02/98 33.5-34' MW-1	07/01/98 5.5-6' MW-2	07/01/98 15-15.5' MW-2	06/30/98 3.5-4' MW-3	06/30/98 13.5-14' MW-3	08/05/98 29.5-30' B-24	08/05/98 29-29.5' B-30	08/07/98 21-21.5' B-31	08/14/98 19-19.5' B-32	08/15/98 31-31.5' B-34	08/15/98 21.5-22' B-35
PAHs:																					
Naphthalene	230	4200	100		11	ND	5.4	**2000**	46	**690**	**1600**	52	1.9 J	1.4	0.084 J	ND	**487**	**1420**	ND	0.242	**299**
2-Methylnaphthalene	NS	NS	NS		12	ND	2.0 J	530	150	660	520	17	1.8 J	0.86	ND	ND	139	576	ND	0.0386 J	89.3
Acenaphthylene	NS	NS	NS		7	ND	76	120 J	23 J	180	140 J	18 J	0.31 J	2.2	ND	ND	46.8	76.4	ND	0.0192 J	0.617
Acenaphthene	3400	10000	100		0.87	ND	4.7	**660**	54	76	15	6.7	1.7 J	1.5	0.17 J	ND	2.67	**130**	ND	ND	0.766
Fluorene	2300	10000	100		4.2	ND	17	**330**	72	**130**	**200**	30	1.8 J	2	0.056 J	ND	26	**116**	ND	ND	1.45
Phenanthrene	NS	NS	NS		11	0.10 J	150	900	140	220	260	230	3.1	22	0.063 J	ND	48	234	ND	0.0407 J	1.37
Anthracene	10000	10000	100		2.5	ND	47	**220**	57	**100**	**180 J**	53	1.9 J	5.1	ND	ND	13.3 J	67.1	ND	0.0146 J	0.231
Fluoranthene	2300	10000	100		3	0.061 J	**390**	**450**	52	97	**180 J**	**170**	3.2	30	0.063 J	ND	13.6 J	71.9	ND	ND	0.267
Pyrene	1700	10000	100		4.2	0.091 J	**450**	**460**	53	77	57 J	**180**	3.1	27	0.069 J	ND	22.1	**132**	ND	0.0214 J	0.463
Benzo(a)anthracene	0.9	4	500		**1.7**	0.047 J	**160**	**160 J**	**23**	**28 J**	**25 J**	**51**	**0.92 J**	**14**	ND	ND	**6.4**	**48.1**	ND	ND	0.162 J
Chrysene	9	40	500		1.5	0.040 J	**140**	**150 J**	**20**	**23 J**	**33**	**44**	0.83 J	**13**	ND	ND	5.83	**45.9**	ND	ND	0.152 J
Benzo(b)fluoranthene	0.9	4	50		**0.91**	ND	**160**	**120 J**	**10**	**17**	**15**	**74**	**3.1**	**15**	ND	ND	**2.49**	**19 J**	ND	ND	0.0414 J
Benzo(k)fluoranthene	0.9	4	500		0.30 J	ND	**56**	**49 J**	**3.9**	**6.8**	**5.8**	**22**	ND	**4.8**	ND	ND	**1.98**	**19.8 J**	ND	ND	0.0469 J
Benzo(a)pyrene	0.66	0.66	100		**1.3**	ND	**170**	**140 J**	**18**	**85**	**28**	**87**	**2.5**	**13**	ND	ND	**4.73**	**37.3 J**	ND	ND	0.0611 J
Indeno(1,2,3-cd)pyrene	0.9	4	500		0.47	ND	**130**	**76 J**	**5**	**11**	**9.8**	**29**	**2**	**5.9**	ND	ND	**1.07**	**10.6 J**	ND	ND	0.0243 J
Dibenz(a,h)anthracene	0.66	0.66	100		0.15 J	ND	**12**	**9.1**	**2.8**	**4.4**	**4.2**	**6.6**	ND	**1.6**	ND	ND	0.598	**5.81 J**	ND	ND	ND
Benzo(g,h,i)perylene	NS	NS	NS		0.42	ND	140	76 J	3.6	11	9.6	29	ND	4.6	ND	ND	1.11	14.6 J	ND	ND	0.0382 J
VOCs:																					
Benzene	3	13	1		ND	ND	0.31 J	**61**	ND	ND	**35**	ND	0.23 J	ND	ND	ND	**5.01 J**	ND	0.646	ND	ND
Toluene	1000	1000	500		ND	ND	0.29 J	29	ND	0.96	**550**	ND	ND	ND	ND	ND	164	2.12 J	ND	ND	ND
Ethylbenzene	1000	1000	100		ND	ND	ND	66	0.19 J	5.6	91	ND	ND	ND	ND	ND	41.4	57.7	ND	1.3	0.255 J
Xylene	410	1000	10		ND	ND	0.18 J	**91**	1.8	**17**	**820**	ND	ND	0.18 J	ND	ND	**269**	**160**	0.19 J	1.1	2.81
Styrene	23	97	100		ND	ND	ND	ND	ND	ND	**550**	ND	ND	ND	ND	ND	**190**	ND	ND	ND	ND
1,1,1 - Trichloroethane	210	1000	50		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Elements:																					
Silver	110	4100	NS		ND	ND	ND	ND	ND	ND	ND	ND	ND	0.52 J	ND	<1.2	<1.2	<1.2	<1.2	<1.2	<1.1
Arsenic	20	20	NS		ND	1.6	13.7	2.5	0.65 J	0.74 J	0.90 J	3.3	2.9	9.6	3.8	1.2	<1.2	1.7	1.3	<1.2	<1.1
Barium	700	47000	NS		10.4 J	95	113	48	6.40 J	7.87 J	15	34	27	46	44	48.2	<25	44.7	<24	<24	32.4
Beryllium	1	1	NS		ND	0.75	**1.54**	0.48 J	ND	0.17 J	ND	0.24 J	0.29 J	0.40 J	0.40 J	<0.6	<0.63	<0.60	<0.59	<0.60	<0.57
Cadmium	39	100	NS		ND	ND	2.5	ND	ND	ND	ND	ND	ND	ND	ND	<0.6	<0.63	<0.60	<0.59	<0.60	<0.57
Chromium	78000	78000	NS		5.3	21.6	21.7	10	3.80 J	4.31 J	5.2	11.3	15	15.1	11.8	18.5	6.4	8.8	6.9	6.2	7.2
Copper	600	600	NS		6	41.4	517	36.3	10.2	13.7	9.4	32.8	69.7	96.7	29.6	8.4	7.9	8.1	4.5	8.2	9.3
Thallium	2	2	NS		ND	0.96 J	**2.5**	ND	0.75 J	ND	ND	0.94 J	ND	**5.3**	**2.8**	**2.7**	<1.2	<1.2	<1.2	<1.2	<1.1
Mercury	14	270	NS		ND	0.0360 J	0.63	0.25	0.0091 J	0.0107 J	0.0074 J	0.86	0.13	0.78	0.106 J	<0.12	<0.12	<0.12	<0.12	0.34	<0.11
Nickel	250	2400	NS		3.89 J	24.7	67.7	10.6	3.5 J	3.9 J	4.6 J	14.4	9.9	17.8	10.8	5.2	<5.0	6.4	4.7	<4.8	6
Lead	400	600	NS		3	12	**972**	77.6	2.6	3.4	3	85.1	64.4	**741**	62.3	<12	<12	<12	<12	<12	<11
Antimony	14	340	NS		ND	ND	ND	ND	ND	ND	ND	ND	ND	8.8 J	ND	<7.2 J	<7.5 J	<7.2 J	<7.1 J	<7.2 J	<6.9 J
Selenium	63	3100	NS		ND	ND	1.4	0.81 J	ND	ND	ND	0.80 J	0.88 J	4.4	1.16 J	<12	<12	<12	<12	<12	<11
Vanadium	370	7100	NS		8.3	29.9	17.6	11.7	6.5	6.5	6.9	20.4	15.2	27.2	18.9	11.6	8.7	14	14.3	8	11
Zinc	1500	1500	NS		8.8 J	61	575	48	12	12	11.5 J	35	37	63	29	15	9.6	15.6	19	11	21.1
Cyanide	1100	21000	NS		ND	0.41	18.5	14.4	ND	ND	ND	1.95	0.36	0.63	0.16	NA	NA	NA	<1.2	<1.2	<1.1

Notes:

All results are shown in mg/kg.
B = Analyte detected in Field Blank.
D = Sample diluted prior to analysis.
E = Estimated value due to interference.
J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC

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Table 3b

Public Service Electric and Gas Company
Former Front Street Gas Works

"A" Horizon Soil Sample Results

ANALYSIS:		DATE	08/17/98	08/18/98	10/10/98	10/17/98	10/17/98	11/07/96	11/07/98	11/07/98	11/08/98	11/08/98
		DEPTH (FT BGS)	32-32.5'	6-6.5'	31.5-32'	31.5-32'	30-30.5'	26.5-27'	16-16.5'	23.5-24'	16-16.5'	15-15.5'
		SAMPLE NO.	B-36	B-37	B-39	B-40	B-41	B-42	B-45	B-45	B-46	B-48
PAHs:	RDC Criteria	NRDC Criteria	IGW Criteria									
Naphthalene	230	4200	100	**283**	ND	ND	ND	ND	ND	0.203	4.47	ND	0.174 J
2-Methylnaphthalene	NS	NS	NS	28.1	ND	ND	ND	ND	ND	ND	0.662	ND	ND
Acenaphthylene	NS	NS	NS	2.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	3400	10000	100	2.78	ND	ND	ND	ND	ND	0.127	0.214	ND	ND
Fluorene	2300	10000	100	3.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	NS	NS	NS	4.15	0.044 J	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	10000	10000	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	2300	10000	100	2.58	0.0733 J	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	1700	10000	100	3.06	0.0808 J	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	0.9	4	500	**0.905**	0.0528 J	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	9	40	500	0.718	0.0547 J	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	0.9	4	50	ND	0.0637 J	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	0.9	4	500	ND	0.046 J	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	0.66	0.66	100	ND	0.0643 J	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.9	4	500	0.039 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	0.66	0.66	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NS	NS	NS	0.036 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
VOCs:													
Benzene	3	13	1	**65.5**	ND	ND	ND	ND	ND	**1.62**	0.695 J	ND	0.334 J
Toluene	1000	1000	500	**687**	ND	ND	ND	ND	ND	ND	ND	ND	0.421 J
Ethylbenzene	1000	1000	100	**765**	ND	ND	ND	ND	ND	0.297 J	1.73	ND	0.863
Xylene	410	1000	10	**1310**	ND	ND	ND	ND	ND	ND	1.44	ND	0.612 J
Styrene	23	97	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1 - Trichloroethane	210	1000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Elements:													
Silver	110	4100	NS	<1.2	<1.1	<1.2	<1.2	<1.2	<1.1	<1.2	<1.2	<1.2	<1.2
Arsenic	20	20	NS	1.2	1.8	1.3	<1.2	1.2	<1.1	2.5	<1.2	<1.2	1.7
Barium	700	47000	NS	<24	41.9	36.9	<25	<24	24.0 J	59.6 J	47.3 J	<24	<25
Beryllium	1	1	NS	<0.59	0.68	0.65	<0.62	<0.61	<0.55	<0.60	<0.58	<0.61	<0.62
Cadmium	39	100	NS	<0.59	<0.54	<0.63	<0.62	<0.61	<0.55	<0.60	<0.58	<0.61	<0.62
Chromium	78000	78000	NS	10	18.9	12.7	4.8	6	5.2	15.9	16.2	6	6.8
Copper	600	600	NS	9.2	21.5	10.7	7.7	6.7	7.5	63.2	10.5	7.8	7.1
Thallium	2	2	NS	<1.2	<1.1	<1.2	<1.2	<1.2	**3.3**	**7.1**	**6.2**	**5.2**	**4.2**
Mercury	14	270	NS	0.12	<0.11	<0.11	<0.12	<0.12	<0.11	0.2	<0.11	<0.11	<0.095
Nickel	250	2400	NS	6	15	10.7	<5.0	5.1	<4.4	12.4	11.2	<4.9	<4.9
Lead	400	600	NS	<12	<11	<12	<12	<12	<11	32.2 J	<12	<12	<12
Antimony	14	340	NS	<7.1 J	<6.4 J	<7.5	<7.4	<7.3	<6.6 J	<7.2 J	<7.0 J	<7.3 J	<7.4 J
Selenium	63	3100	NS	<12	<11	<12	<12	<12	<11	<12	<12	<12	<12
Vanadium	370	7100	NS	10.1	23	17.4	7.6	9.1	8.4	21.7	22.3	8.2	11.5
Zinc	1500	1500	NS	13.1	34.6	26.4	124	9.4	9.0 J	34.3 J	28.0 J	11.1 J	11.2 J
Cyanide	1100	21000	NS	<1.2	<1.1	<1.2	<1.2	<1.2	<1.1	<1.2	<1.2	<1.2	<1.2

Notes:

All results are shown in mg/kg.
B = Analyte detected in Field Blank.
D = Sample diluted prior to analysis.
E = Estimated value due to interference.
J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC.

Table 3c

Public Service Electric and Gas Company
Former Front Street Gas Works

"B" Horizon Soil Sample Results

ANALYSIS:		DATE		07/27/98	07/27/98	07/17/98	06/19/98	06/19/98	06/22/98	06/22/98	06/23/98	06/23/98	06/24/98	06/24/98	06/08/98	06/09/98	06/29/98	06/15/98	06/11/98	06/10/98
		DEPTH (FT BGS)		24.5-25'	31.5-32'	27.5-28'	25.5-26'	42.5-43'	17.5-18'	35.5-36'	21.5-22'	33.5-34'	17-17.5'	29.5-30'	41-41.5'	53.5-54'	52.5-53'	57.5-58'	54.5-55'	53.5-54'
		SAMPLE NO.		B-11	B-11	B-12	B-13	B-13	B-14	B-14	B-15	B-15	B-16	B-16	B-17	B-17	B-18	B-19	B-20	B-22
PAHs:	RDC Criteria	NRDC Criteria	IGW Criteria																	
Naphthalene	230	4200	100	ND	5.2	NA	ND	ND	6.7	0.16 J	0.26 J	ND	0.051 J	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	NS	NS	NS	ND	13	NA	ND	ND	1.4	ND	0.17 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	NS	NS	NS	ND	2.3	NA	ND	ND	ND	ND	0.073 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	3400	10000	100	ND	25	NA	0.073	ND	0.24 J	ND	0.049 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	2300	10000	100	ND	16	NA	ND	ND	0.18 J	ND	0.14 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	NS	NS	NS	ND	39	NA	ND	ND	0.15 J	ND	0.4	ND	ND	ND	ND	0.072 J	ND	ND	ND	ND
Anthracene	10000	10000	100	ND	12	NA	ND	ND	ND	ND	0.13 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	2300	10000	100	ND	12	NA	ND	ND	0.071 J	ND	0.21 J	ND	ND	ND	ND	0.044 J	ND	ND	ND	ND
Pyrene	1700	10000	100	ND	17	NA	ND	ND	0.11 J	ND	0.20 J	ND	ND	ND	ND	0.057 J	ND	ND	ND	ND
Benzo(a)anthracene	0.9	4	500	ND	**5.5**	NA	ND	ND	0.057 J	ND	0.086 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	9	40	500	ND	5.1	NA	ND	ND	0.052 J	ND	0.077 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	0.9	4	50	ND	**3.3**	NA	ND	ND	ND	ND	0.081 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	0.9	4	500	ND	**1.2**	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	0.66	0.66	100	ND	**4.5**	NA	ND	ND	0.072 J	ND	0.075 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.9	4	500	ND	**1.1**	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	0.66	0.66	100	ND	0.34 J	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NS	NS	NS	ND	0.87	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VOCs:																				
Benzene	3	13	1	**2**	ND	0.30 J	ND	ND	0.17 J	ND	**3.9**	0.60 J	ND	ND	ND	ND	ND	**1.2**	ND	ND
Toluene	1000	1000	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.20 J	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1000	1000	100	4.1	ND	4.7	ND	ND	2.5	ND	0.27 J	ND	0.54 J	ND	ND	ND	0.26 J	ND	ND	ND
Xylene	410	1000	10	0.74	ND	1.7	ND	ND	1.7	ND	0.50 J	ND	0.69 J	ND	ND	ND	0.56 J	ND	ND	ND
Styrene	23	97	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1 - Trichloroethane	210	1000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Elements:																				
Silver	110	4100	NS	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	20	20	NS	1.6	1.2	NA	1.3	0.56 J	2.5	1.4	0.63 J	2	1.9	1.05 J	1.2	2	1.3	1.6	2.6	2
Barium	700	47000	NS	19	151	NA	46	71	29	92	31	125	26	82	41	112	114	139	207	99
Beryllium	1	1	NS	0.26 J	0.78	NA	0.47 J	0.67	0.48 J	**1.05**	0.24 J	0.82	0.25 J	0.38 J	0.33 J	0.96	0.79	**1.07**	0.96	0.67
Cadmium	39	100	NS	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	78000	78000	NS	8	17.5	NA	14.8	19.8	15.1	24.2	9.3	23.7	7.1	16.2	10.3	31.2	21.2	30.5	23.9	31.7
Copper	600	600	NS	3.02 J	14.2	NA	12.2	6.1	12.8	10.4	10.4	11.4	8.6	10	9.2	11.1	8.4	11.6	13.7	12.5
Thallium	2	2	NS	ND	ND	NA	ND	ND	ND	ND	ND	1.85 J	1.18 J	**2.3**	ND	1.23 J	**2.9**	1.13 J	ND	ND
Mercury	14	270	NS	ND	ND	NA	ND	ND	0.0130 J	ND	0.0058 J	ND	ND	ND	0.0169 J	0.0254 J	0.0039 J	ND	ND	0.0202 J
Nickel	250	2400	NS	5.2 J	16.2	NA	11.7	21.9	12.5	27.7	8	26.3	6.8	10.6	9.3	27.8	24.4	32.1	28.1	20.1
Lead	400	600	NS	2.9	10.2	NA	6.1	9.8	9.2	12.7	6.4	12.1	3.9	6.2 E	5.1	13.9	11.3 E	13.6	11.9	12.5
Antimony	14	340	NS	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	63	3100	NS	ND	ND	NA	ND	ND	0.45 J	ND	ND	ND	ND	0.45 J	ND	ND	ND	ND	ND	ND
Vanadium	370	7100	NS	13	24	NA	22.3	25.1	22.9	30.2	10.8	31	9.9	29.3	12.6	29	25.2	40	29	22.6
Zinc	1500	1500	NS	21	40	NA	29	49	31	66	18	58	15	23	22	61	50	70	59	46
Cyanide	1100	21000	NS	ND	ND	NA	ND	ND	ND	ND	0.28	ND	ND	ND	0.34	ND	ND	ND	ND	ND

Notes:

All results are shown in mg/kg.
B = Analyte detected in Field Blank.
D = Sample diluted prior to analysis.
E = Estimated value due to interference.
J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC.

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Table 3c

Public Service Electric and Gas Company
Former Front Street Gas Works

"B" Horizon Soil Sample Results

ANALYSIS:				DATE	06/16/98	07/24/98	07/24/98	07/24/98	07/13/98	07/14/98	07/28/98	07/28/98	07/16/98	07/16/98	06/07/98	06/08/98	06/10/98	06/16/98	06/18/98	06/19/98
				DEPTH (FT BGS)	56.5-57'	24.5-25'	26.5-27'	34-34.5'	41.5-42'	58-58.5'	29.5-30'	39-39.5'	26.5-27'	26.5-27'						
				SAMPLE NO.	B-23	B-26	B-26	B-26	MW-1A	MW-1A	MW-2A	MW-2A	MW-3A	Dup MW-3A	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank
PAHs:	RDC Criteria	NRDC Criteria	IGW Criteria																	
Naphthalene	230	4200	100		ND	NA	ND	ND	0.079 J	ND	ND	17	ND	ND	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NS	NS	NS		ND	NA	ND	ND	ND	ND	ND	3.2 J	ND	ND	NA	NA	NA	NA	NA	NA
Acenaphthylene	NS	NS	NS		0.04 J	NA	0.040 J	ND	ND	ND	ND	12	ND	ND	NA	NA	NA	NA	NA	NA
Acenaphthene	3400	10000	100		ND	NA	1.5	0.098 J	ND	ND	ND	96	ND	ND	NA	NA	NA	NA	NA	NA
Fluorene	2300	10000	100		ND	NA	0.26 J	ND	ND	ND	ND	52	ND	ND	NA	NA	NA	NA	NA	NA
Phenanthrene	NS	NS	NS		0.083 J	NA	0.99	0.18 J	0.055 J	ND	0.052 J	170	ND	ND	NA	NA	NA	NA	NA	NA
Anthracene	10000	10000	100		ND	NA	0.26 J	0.067 J	ND	ND	0.046 J	44	ND	ND	NA	NA	NA	NA	NA	NA
Fluoranthene	2300	10000	100		0.041 J	NA	0.31 J	0.14 J	0.051 J	ND	0.11 J	54	ND	0.043 J	NA	NA	NA	NA	NA	NA
Pyrene	1700	10000	100		0.060 J	NA	0.39	0.18 J	0.064 J	ND	0.15 J	78	ND	0.084 J	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.9	4	500		ND	NA	0.10 J	0.063 J	ND	ND	0.055 J	**28**	ND	ND	NA	NA	NA	NA	NA	NA
Chrysene	9	40	500		ND	NA	0.084 J	0.055 J	ND	ND	0.049 J	**24**	ND	ND	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.9	4	50		ND	NA	0.048 J	ND	ND	ND	0.039 J	**17**	ND	ND	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.9	4	500		ND	NA	ND	ND	ND	ND	ND	**8.2**	ND	ND	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.66	0.66	100		ND	NA	0.060 J	0.042 J	ND	ND	0.042 J	**23**	ND	ND	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.9	4	500		ND	NA	ND	ND	ND	ND	ND	**9.1**	ND	ND	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.66	0.66	100		ND	NA	ND	ND	ND	ND	ND	**2.4 J**	ND	ND	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NS	NS	NS		ND	NA	ND	ND	ND	ND	ND	8.8	ND	ND	NA	NA	NA	NA	NA	NA
VOCs:																				
Benzene	3	13	1		ND	**1.1**	**1.2**	ND	0.33 J	0.16 J	**1.5**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1000	1000	500		ND	ND	ND	ND	0.19 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1000	1000	100		ND	10	ND	ND	0.25 J	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene	410	1000	10		ND	2.9	ND	ND	0.51 J	ND	6.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	23	97	100		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1 - Trichloroethane	210	1000	50		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Elements:																				
Silver	110	4100	NS		ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Arsenic	20	20	NS		1.3	NA	3	0.78 J	1.5	2.4	0.68 J	2.5	3.3	2.6	NA	NA	NA	NA	NA	NA
Barium	700	47000	NS		138	NA	103	156	73	220	77	16	75	230	NA	NA	NA	NA	NA	NA
Beryllium	1	1	NS		0.91	NA	0.33 J	0.54 J	0.36 J	**1.11**	0.7	0.23 J	0.62	**1.15**	NA	NA	NA	NA	NA	NA
Cadmium	39	100	NS		ND	NA	ND	ND	ND	0.20 J	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Chromium	78000	78000	NS		23.3	NA	11.8	13.9	7.3	24.2	16.6	7.4	16.5	19.8	NA	NA	NA	NA	NA	NA
Copper	600	600	NS		9.6	NA	3.60 J	9.8	40.7	13	8	3.25 J	8.3	9.4	NA	NA	NA	NA	NA	NA
Thallium	2	2	NS		ND	NA	ND	ND	ND	**3.3**	0.81 J	ND	**2.06 J**	1.92 J	NA	NA	NA	NA	NA	NA
Mercury	14	270	NS		ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Nickel	250	2400	NS		27.6	NA	6.7	14.7	8.7	33.1	20.2	4.7 J	16.4	27.7	NA	NA	NA	NA	NA	NA
Lead	400	600	NS		10.7	NA	2.9	6.2	5.2	13.5	9.3	1.8	8.2	13.5	NA	NA	NA	NA	NA	NA
Antimony	14	340	NS		ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Selenium	63	3100	NS		ND	NA	0.52 J	ND	ND	ND	0.75 J	0.77 J	ND	ND	NA	NA	NA	NA	NA	NA
Vanadium	370	7100	NS		28.2	NA	27.9	17.7	8.3	30	23.7	11.9	21.5	19.9	NA	NA	NA	NA	NA	NA
Zinc	1500	1500	NS		57	NA	26	36	23	75	47	19	42	72	NA	NA	NA	NA	NA	NA
Cyanide	1100	21000	NS		ND	NA	ND	ND	0.19	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA

Notes:

All results are shown in mg/kg.
B = Analyte detected in Field Blank.
D = Sample diluted prior to analysis.
E = Estimated value due to interference.
J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC.

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Table 3c

Public Service Electric and Gas Company
Former Front Street Gas Works

"B" Horizon Soil Sample Results

ANALYSIS:		DATE		06/22/98	06/23/98	06/25/98	06/26/98	06/30/98	07/01/98	07/09/98	07/14/98	07/16/98	07/17/98	07/24/98	07/27/98	08/05/98	10/09/98	10/17/98
		DEPTH (FT BGS)																
		SAMPLE NO.		Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank	Trip blank
PAHs:	RDC Criteria	NRDC Criteria	IGW Criteria															
Naphthalene	230	4200	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3400	10000	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2300	10000	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	10000	10000	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2300	10000	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1700	10000	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.9	4	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	9	40	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.9	4	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.9	4	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.66	0.66	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.9	4	500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.66	0.66	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs:																		
Benzene	3	13	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	1000	1000	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1000	1000	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene	410	1000	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	23	97	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1 - Trichloroethane	210	1000	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Elements:																		
Silver	110	4100	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	20	20	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	700	47000	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	1	1	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	39	100	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	78000	78000	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	600	600	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	2	2	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	14	270	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	250	2400	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	600	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	14	340	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	63	3100	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	370	7100	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	1500	1500	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	1100	21000	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

All results are shown in mg/kg.
B = Analyte detected in Field Blank.
D = Sample diluted prior to analysis.
E = Estimated value due to interference.
J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC.

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Table 3c

Public Service Electric and Gas Company
Former Front Street Gas Works

"B" Horizon Soil Sample Results

ANALYSIS:		DATE DEPTH (FT BGS) SAMPLE NO.		11/06/98 Trip blank
PAHs:	RDC Criteria	NRDC Criteria	IGW Criteria	
Naphthalene	230	4200	100	NA
2-Methylnaphthalene	NS	NS	NS	NA
Acenaphthylene	NS	NS	NS	NA
Acenaphthene	3400	10000	100	NA
Fluorene	2300	10000	100	NA
Phenanthrene	NS	NS	NS	NA
Anthracene	10000	10000	100	NA
Fluoranthene	2300	10000	100	NA
Pyrene	1700	10000	100	NA
Benzo(a)anthracene	0.9	4	500	NA
Chrysene	9	40	500	NA
Benzo(b)fluoranthene	0.9	4	50	NA
Benzo(k)fluoranthene	0.9	4	500	NA
Benzo(a)pyrene	0.66	0.66	100	NA
Indeno(1,2,3-cd)pyrene	0.9	4	500	NA
Dibenz(a,h)anthracene	0.66	0.66	100	NA
Benzo(g,h,i)perylene	NS	NS	NS	NA
VOCs:				
Benzene	3	13	1	ND
Toluene	1000	1000	500	ND
Ethylbenzene	1000	1000	100	ND
Xylene	410	1000	10	ND
Styrene	23	97	100	ND
1,1,1 - Trichloroethane	210	1000	50	ND
Inorganic Elements:				
Silver	110	4100	NS	NA
Arsenic	20	20	NS	NA
Barium	700	47000	NS	NA
Beryllium	1	1	NS	NA
Cadmium	39	100	NS	NA
Chromium	78000	78000	NS	NA
Copper	600	600	NS	NA
Thallium	2	2	NS	NA
Mercury	14	270	NS	NA
Nickel	250	2400	NS	NA
Lead	400	600	NS	NA
Antimony	14	340	NS	NA
Selenium	63	3100	NS	NA
Vanadium	370	7100	NS	NA
Zinc	1500	1500	NS	NA
Cyanide	1100	21000	NS	NA

Notes:

All results are shown in mg/kg.
B = Analyte detected in Field Blank.
D = Sample diluted prior to analysis.
E = Estimated value due to interference.
J = Detected below method detection limit.
FT BGS = Feet Below Ground Surface
NA = Not Analyzed for this parameter
ND = Not Detected
NS = No Soil Cleanup Criteria.
Shaded/bold = Parameter exceeds most stringent SCC.

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Table 4

Public Service Electric and Gas Company
Former Front Street Gas Works

Groundwater Sample Results

ANALYSIS:	SAMPLE NO	MW-1	MW-1*	MW-1A	DUPE	MW-1A*	DUPE*	MW-2	MW-2A	MW-2A*	MW-2	MW-2*	MW-3	MW-3*	MW-3A	MW-3A*	MW-3BR	MW-4BR	MW-5BR	MW-6
	DATE	09/16/98	09/16/98	09/16/98	09/16/98	09/16/98	09/16/98	09/17/98	09/17/98	09/17/98	09/23/98	09/23/98	09/17/98	09/17/98	09/17/98	09/17/98	09/17/98	09/17/98	09/17/98	09/17/98
	Groundwater Quality Standards				(MW-1A)		(MW-1A)													
VOLATILE ORGANICS:																				
Benzene	1	**413**	NA	**1340**	**1140**	NA	NA	ND	**580**	NA	NA	NA	**72.1**	NA	ND	NA	**21**	**1.4**	**449**	0.55 J
Chloroform	6	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	1.7 J	1.0 J	**18.4 J**	ND
Toluene	1,000	**3540**	NA	11.1 J	ND	NA	NA	ND	4.8 J	NA	NA	NA	0.48 J	NA	ND	NA	0.62 J	ND	ND	ND
Ethylbenzene	700	**4390**	NA	**991**	**857**	NA	NA	ND	132	NA	NA	NA	0.53 J	NA	0.65 J	NA	23.6	0.55 J	ND	ND
Xylene	1,000	**6870**	NA	450	369	NA	NA	ND	83.4	NA	NA	NA	0.62 J	NA	ND	NA	7	ND	ND	ND
Styrene	100	**2330**	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Total TICs	500	**11670**	NA	**1718**	**1290**	NA	NA	ND	**907**	NA	NA	NA	141.1	NA	6.1	NA	166.3	ND	ND	23.6
SEMI-VOLATILE ORGANICS:																				
Phenol	4,000	ND	NA	ND	ND	NA	NA	ND	4.6 J	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Acenaphthene	400	13.2	NA	5.8	5.4	NA	NA	ND	171	NA	NA	NA	10.7	NA	13.1	NA	223	33.4	ND	ND
Acenaphthylene	NS	246 J	NA	ND	ND	NA	NA	ND	9.7	NA	NA	NA	ND	NA	ND	NA	6.2	ND	ND	ND
Anthracene	2,000	11.2	NA	ND	ND	NA	NA	ND	16.8	NA	NA	NA	ND	NA	ND	NA	11.6	ND	ND	ND
Benzo(a)anthracene	NS	2.0 J	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Benzo(a)pyrene	NS	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Benzo(b)fluoranthene	NS	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Benzo(g,h,i)perylene	NS	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Benzo(k)fluoranthene	NS	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Carbazole	NS	ND	NA	ND	ND	NA	NA	ND	10.7	NA	NA	NA	2.4 J	NA	ND	NA	10.6	ND	ND	ND
Chrysene	NS	2.0 J	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Dibenz(a,h)anthracene	NS	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
Dibenzofuran	NS	6.7	NA	ND	ND	NA	NA	ND	17.4	NA	NA	NA	0.71 J	NA	ND	NA	17.6	ND	ND	ND
Fluoranthene	300	5.5	NA	ND	ND	NA	NA	ND	5.8	NA	NA	NA	1.1 J	NA	ND	NA	13.7	ND	ND	ND
Fluorene	300	46	NA	ND	ND	NA	NA	ND	77	NA	NA	NA	4.8 J	NA	ND	NA	23	1.7 J	ND	ND
Indeno(1,2,3-cd)pyrene	NS	ND	NA	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	ND	NA	ND	ND	ND	ND
2-Methylnaphthalene	100	**530**	NA	16.4	17	NA	NA	ND	25.5	NA	NA	NA	ND	NA	ND	NA	8.4	ND	0.17 J	ND
Naphthalene	300	**9940**	NA	**1040**	**1090**	NA	NA	ND	**490**	NA	NA	NA	ND	NA	1.7 J	NA	40.4	2.1 J	1.4 J	ND
Phenanthrene	NS	46.5	NA	ND	ND	NA	NA	ND	90.7	NA	NA	NA	ND	NA	1.6 J	NA	40.2	ND	1.3 J	ND
Pyrene	200	6.2	NA	ND	ND	NA	NA	ND	4.8 J	NA	NA	NA	ND	NA	1.3 J	NA	10.4	ND	ND	ND
INORGANICS																				
Aluminum	200	**530**	<200	<200	<200	<200	<200	<200	**505**	<200	NA	NA	<200	<200	**1100**	<200	<200	**361**	**2210**	**825**
Antimony	20	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Arsenic	8	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Barium	2,000	345	244	742	712	671	679	<200	<200	<200	NA	NA	452	297	231	<200	<200	242	<200	<200
Beryllium	20	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium	4	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NA	NA	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Chromium	100	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10	<10	<10	<10	<10	<10	<10
Copper	1,000	<25	<25	<25	<25	<25	<25	<25	<25	<25	NA	NA	<25	<25	<25	<25	<25	<25	<25	<25
Iron	300	**25300**	**10400**	**645**	**538**	<100	<100	<100	**12000**	242	**67100**	<100	**5810**	241	**2620**	<100	**807**	<100	**2170**	**1140**
Lead	10	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	4.1	NA	NA	4.6	<3.0	3.3	<3.0	7	<3.0	<3.0	3.3
Manganese	50	**9480**	**9000**	**738**	**650**	**682**	**679**	**320**	**6360**	**5970**	**11800**	**715**	**3580**	**3090**	**1650**	**1410**	**1200**	**330**	45	**786**
Mercury	2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	NA	NA	<0.20	<0.20	<0.20	<0.20	0.56	<0.20	<0.20	<0.20
Nickel	100	<40	<40	<40	<40	<40	<40	<40	<40	<40	NA	NA	<40	<40	<40	<40	<40	<40	<40	<40
Selenium	50	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.6
Silver	NS	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA	<10	<10	<10	<10	<10	<10	<10	<10
Sodium	50,000	**75800**	**72600**	**134000**	**121000**	**120000**	**124000**	**2530000**	**268000**	**230000**	NA	NA	**224000**	**174000**	**102000**	**85400**	**134000**	**271000**	**104000**	**62500**
Thallium	10	8.6	**11.9**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.3	NA	NA	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	NS	<50	<50	<50	<50	<50	<50	<50	<50	<50	NA	NA	<50	<50	<50	<50	<50	<50	<50	<50
Zinc	5,000	<20	<20	<20	<20	<20	<20	<20	<20	<20	NA	NA	<20	<20	<20	<20	<20	<20	23.5	22.4
Cyanide	200	23.0	NA	<10	<10	NA	NA	110	84.0	NA	NA	NA	**330**	NA	<10	NA	<10	<10	<10	<10

Notes:
All results are shown in ug/l.
NA = Not analyzed for this parameter.
ND = Not Detected
NS = No Groundwater Quality Standards
Shaded/bold = Parameter exceeds GWQS.
J = Indicates an estimated value
* = Groundwater filtered for metals analysis.

Table 4

Public Service Electric and Gas Company
Former Front Street Gas Works

Groundwater Sample Results

ANALYSIS:	SAMPLE NO.	MW-6*	P-1	P-1A	P-2	P-2A	P-3	P-3A	P-4A	AW-45	AW-107	AW-140	Field blank	Field blank	Trip blank	Trip blank
	DATE	09/17/98	09/16/98	09/16/98	09/16/98	09/16/98	09/17/98	09/17/98	09/17/98	09/17/98	09/17/98	09/17/98	09/16/98	09/17/98	09/14/98	09/16/98
	Groundwater Quality Standards															
VOLATILE ORGANICS:																
Benzene	1	NA	ND	**1210**	ND	**13.3**	**148**	**1900**	**10800**	**50.6**	**31.2**	**28.8**	ND	ND	ND	ND
Chloroform	6	NA	ND	ND	ND	ND	ND	ND	ND	ND	0.27 J	0.37 J	ND	ND	ND	ND
Toluene	1,000	NA	644	18 J	ND	ND	0.79 J	ND	40.2 J	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	700	NA	**758**	600	92.6	5	11.3	99.9 J	**1590**	0.47 J	0.36 J	ND	ND	ND	ND	ND
Xylene	1,000	NA	**1940**	357	47.3	ND	4.4 J	28.7 J	**4010**	ND	1.2 J	1.2 J	ND	ND	ND	ND
Styrene	100	NA	**658**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total TICs	500	NA	**4280**	**2240**	**1738**	48.5	**1888**	**2790**	**7580**	ND	ND	ND	ND	ND	ND	ND
SEMI-VOLATILE ORGANICS:																
Phenol	4,000	NA	ND	ND	ND	ND	ND	21.2	25.5	ND	ND	ND	ND	ND	NA	NA
Acenaphthene	400	NA	5.7	ND	122	ND	95.4	1.7 J	14.7	ND	13.6	20.1	ND	ND	NA	NA
Acenaphthylene	NS	NA	21.1	ND	11.8	ND	ND	ND	1.7 J	ND	ND	ND	ND	ND	NA	NA
Anthracene	2,000	NA	2.5 J	ND	9.1	ND	4.1 J	ND	2.8 J	ND	ND	ND	ND	ND	NA	NA
Benzo(a)anthracene	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Benzo(a)pyrene	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Benzo(b)fluoranthene	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Benzo(g,h,i)perylene	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Benzo(k)fluoranthene	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Carbazole	NS	NA	3.0 J	ND	ND	ND	4.9 J	ND	36.1	ND	ND	ND	ND	ND	NA	NA
Chrysene	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Dibenz(a,h)anthracene	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Dibenzofuran	NS	NA	6.1	ND	7.1	ND	8.5	ND	11.8	ND	ND	0.95 J	ND	ND	NA	NA
Fluoranthene	300	NA	2.2 J	ND	2.5 J	ND	0.89 J	ND	ND	ND	ND	1.3 J	ND	ND	NA	NA
Fluorene	300	NA	7.5	ND	38.5	ND	53.2	ND	24	ND	ND	1.4 J	ND	ND	NA	NA
Indeno(1,2,3-cd)pyrene	NS	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
2-Methylnaphthalene	100	NA	**135**	77.5	13.3	ND	11.6	0.95 J	**722**	ND	ND	ND	ND	ND	NA	NA
Naphthalene	300	NA	**3610**	**3340**	**385**	11.1	6.4	33.7	**11200**	1.6 J	ND	ND	ND	ND	NA	NA
Phenanthrene	NS	NA	23.5	1.6 J	55.6	ND	25.7	ND	15	ND	ND	ND	ND	ND	NA	NA
Pyrene	200	NA	1.8 J	ND	2.2 J	ND	ND	ND	ND	ND	ND	1.2 J	ND	ND	NA	NA
INORGANICS																
Aluminum	200	<200	**391**	<200	**226**	<200	<200	**17000**	**552**	**421**	<200	<200	<200	<200	NA	NA
Antimony	20	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
Arsenic	8	<5.0	6.4	<5.0	<5.0	<5.0	<5.0	**12.7**	7.2	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
Barium	2,000	<200	492	305	506	300	578	944	326	<200	<200	<200	<200	<200	NA	NA
Beryllium	20	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
Cadmium	4	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NA	NA
Chromium	100	<10	<10	<10	<10	<10	<10	70.7	<10	<10	<10	<10	<10	<10	NA	NA
Copper	1,000	<25	<25	<25	<25	<25	<25	27.6	<25	<25	<25	<25	<25	<25	NA	NA
Iron	300	<100	**7180**	254	**2200**	**378**	**19600**	**71700**	**21200**	**1340**	**1650**	**3090**	<100	<100	NA	NA
Lead	10	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	**36.7**	4.7	**43.4**	**49.4**	**21**	<3.0	<3.0	NA	NA
Manganese	50	**686**	**1070**	**488**	**3680**	**186**	**5890**	**13800**	**9850**	**1110**	**841**	**1270**	<15	<15	NA	NA
Mercury	2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.21	0.79	<0.20	1.4	<0.20	<0.20	<0.20	NA	NA
Nickel	100	<40	<40	<40	<40	<40	<40	53	<40	<40	<40	<40	<40	<40	NA	NA
Selenium	50	6.2	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
Silver	NS	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	NA
Sodium	50,000	**61200**	**220000**	**76800**	**133000**	**62600**	**242000**	**281000**	**114000**	**79300**	**75900**	**99800**	<5000	<5000	NA	NA
Thallium	10	<5.0	5.6	<5.0	<5.0	<5.0	<5.0	**17.8**	**13.6**	<5.0	<5.0	<5.0	<5.0	<5.0	NA	NA
Vanadium	NS	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	NA	NA
Zinc	5,000	<20	<20	<20	<20	<20	<20	114	21.4	21.6	<20	<20	22.7	<20	NA	NA
Cyanide	200	NA	**480**	<10	<10	<10	<10	75.0	<10	<10	<10	<10	<10	<10	NA	NA

Notes:
All results are shown in ug/l.
NA = Not analyzed for this parameter.
ND = Not Detected
NS = No Groundwater Quality Standards.
Shaded/bold = Parameter exceeds GWQS.
J = Indicates an estimated value
* = Groundwater filtered for metals analysis.

Table 5

Public Service Electric and Gas Co.
Former Front Street Gas Works

Permeability Test Summary

Well No.	K (ft/day)	Description of Unit Tested
MW-1	2.5	silty fine Sand (29.21' to 34')
MW-1A	0.57	11" Sand & Gravel (54' to 55') and clean, weathered siltstone (58' to 58.5')
MW-2	144.3	silty, sandy gravel (12' to 14')
MW-2	0.00012	grey slightly organic clay (16-18')
MW-2A	38	fine-medium-coarse Sand (20' to 28.5'), except clay (22' to 24')
MW-3	0.36	fine-medium-coarse Sand (8.05' to 12.25')
MW-3A	45.9	fine-medium-coarse Sand & Gravel (>9" thick in 23-25' spoon)
MW-3BR	15.3	Bedrock aquifer (28' to 54') friable; minor blocky layers (thickest 39' to 43')
MW-4BR	13.8	Bedrock aquifer (32' to 62'+)
MW-5BR	0.0144	Bedrock aquifer (42' to 72'+)
MW-6	N/A	
P-1	2.73	silty fine Sand (28' to 40')
P-1A	1.86	coarse-fine Sand (43' to 58.7')
P-2	62	medium-fine sand (30.5' to 32.5')
P-2A	16.3	coarse-fine sand (54' to 66')
P-3	7.85	silty coarse-fine sand (5.91' to 13.5')
P-3A	N/A	
P-4	N/A	
P-4A	0.15	silty coarse-fine Sand (17' to 26')
B-13	0.0002	grey slightly organic clay (20-22')
B-14	0.00045	grey slightly organic clay (16-17')
B-20	0.00964	silt (38-39.5')

Geometric Mean K	Aquifer
7.46 ft/day	Unconfined Wells (MW-1, MW-2, MW-3, P-1, P-2, and P-3)
4.07 ft/day	Semi-Confined Wells (MW-1A, MW-2A, MW-3A, P-1A, P-2A, and P-4A)
1.45 ft/day	Bedrock Wells (MW-3BR, MW-4BR, and MW-5BR)

Note:
- N/A = Result Not Available

Table 6

Public Service Electric and Gas Co.
Former Front Street Gas Works

Groundwater Sampling for Natural Attenuation

	Horizon A					Horizon B		
	Upgradient	Source	Downgradient			Source	Downgradient	
	MW-6	MW-1	MW-2	MW-3		MW-1A	MW-2A	MW-3A
	17-Sep-98	16-Sep-98	23-Sep-98	17-Sep-98		16-Sep-98	16-Sep-98	17-Sep-98
BTEX	ND	17.51	ND	0.07		2.79	0.80	ND
Naphthalene	ND	9.94	ND	ND		1.04	0.49	0.0017
Dissolved Oxygen	4.6	0.43	2.52	0.37		0.81	0.42	0.26
Nitrate	27.4	< 0.11	0.58	< 0.11		< 0.11	< 0.11	< 0.11
Sulfate	98	66.3	621	35.4		25.1	< 10	44.5
Iron - Dissolved	< 0.10	10.4	< 0.10	0.241		< 0.10	0.242	< 3.0
Iron - Total	1.14	25.3	67.1	5.81		0.648	12	2.82
Manganese - Dissolved	0.686	9.00	0.715	3.09		0.682	5.97	1.41
Manganese - Total	0.78	9.48	11.8	3.58		0.738	37	1.65
Alkalinity, Total	66.2	483	155	316		491	543	172
TOC	1.7	14.2	NS	6.4		41.1	7.9	1.2
TDS	564	564	NS	1160		751	1020	
pH	7.24	6.64	6.75	6.77		6.99	7.17	7.28
Temperature (C)	17.85	18.9	22.68	20.12		18.97	17.12	15.99
Conductivity (uS/cm)	430	930	11358	1684		1049	1524	8.24
RedOx Potential (mV)	-7.7	14.5	8.4	6.5		-5.4	-15	-22.4

Table 7

Public Service Electric and Gas Co.
Former Front Street Gas Works

Expressed Assimilative Capacity

TEAP	Upgradient MW-6 17-Sep-98	Source MW-1 16-Sep-98	concentration change	Utilization Factor	Expressed Assimilative Capacity	%
Dissolved Oxygen	4.6	0.43	4.17	3.14	1.33	8.9%
Nitrate	27.4	< 0.11	27.40	4.86	5.64	37.7%
Sulfate	98	66.3	31.70	4.71	6.73	45.0%
Iron - Dissolved	< 0.10	10.4	-10.40	21.9	0.47	3.2%
Manganese - Dissolved	0.686	9.00	-8.31	10.78	0.77	5.2%
Total					14.94	100.0%

NOTES: all results are in mg/l
TEAP - Terminal Electron Acceptor Process
EAC - Expressed Assimilative Capacity
Utilization factors from Bioplume III User's Manual, version 1.0, EPA January 1998

Table 8

Public Service Electric and Gas Company
Former Front Street Gas Works

Calibrated MODFLOW Ground Water Model Values

Layer	Zone	Horizontal Hydraulic Conductivity *(ft/day)*	Vertical Hydraulic Conductivity *(ft/day)*	Specific Storage *(1/ft)*	Specific Yield	Layer Type	Description
1	a	20	20	N/A	0.25	Unconfined	Deltaic Deposits (western portion of site)
1	b	10	1	N/A	0.25	Unconfined	Fill (eastern portion of site)
2	a	5E-04	5E-04	3E-06	1E-04	Confined	Gray Clay (eastern portion of site)
2	b	5E-02	5E-03	1E-05	1E-03	Confined	Brown Silt (western portion of site)
3	a	3.51	3.51	1E-05	0.1	Confined	Glacial Till
3	b	70	0.175	1E-05	0.1	Confined	Glacial Till (overlying Buried Valley Aquifer System)
4	a	2	0.2	3E-07	0.01	Confined	Bedrock
4	b	2000	0.2	3E-07	0.2	Confined	Buried Valley Aquifer

Note:
- N/A = Specific Storage Not Applicable in an Unconfined Layer

Table 9

Public Service Electric and Gas Company
Former Front Street Gas Works

UST Soil Sample Results

ANALYSIS:	RDC Criteria	NRDC Criteria	IGW Criteria	SAMPLE NO	E3-1	E3-2	E3-3	E3-4	E3-5	E4-1	E4-2	E4-3	E4-4	UST7-1	UST7-2	UST7-3	UST7-4	UST7-5	UST8-1	UST8-2	UST8-3	UST8-4	EXC-1
				DEPTH (FT BGS)	8'	8'	8'	8'	8'	7'	7'	7'	7'	8'	8'	8'	8'	8'	8'	8'	8'	8'	10'
				DATE	06/08/98	06/08/98	06/08/98	06/08/98	06/08/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/05/98	06/10/98
SVOC:																							
Naphthalene	230	4200	100		NA	NA	NA	NA	NA	NA	NA	0.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	3400	10000	100		NA	NA	NA	NA	NA	NA	NA	0.23 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	2300	10000	100		NA	NA	NA	NA	NA	NA	NA	0.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	10000	10000	100		NA	NA	NA	NA	NA	NA	NA	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2300	10000	100		NA	NA	NA	NA	NA	NA	NA	3.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1700	10000	100		NA	NA	NA	NA	NA	NA	NA	6.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.9	4	500		NA	NA	NA	NA	NA	NA	NA	**3.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	9	40	500		NA	NA	NA	NA	NA	NA	NA	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.9	4	50		NA	NA	NA	NA	NA	NA	NA	**4.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.9	4	500		NA	NA	NA	NA	NA	NA	NA	**1.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.66	0.66	100		NA	NA	NA	NA	NA	NA	NA	**3.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.9	4	500		NA	NA	NA	NA	NA	NA	NA	**4.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.66	0.66	100		NA	NA	NA	NA	NA	NA	NA	**1.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	28	520	10		NA	NA	NA	NA	NA	NA	NA	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-dinitrotoluene	1	4	10		NA	NA	NA	NA	NA	NA	NA	0.32 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-nitrosodiphenylamine	140	600	100		NA	NA	NA	NA	NA	NA	NA	0.092 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs:																							
Benzene	3	13	1		NA	NA	NA	NA	NA	NA	NA	0.53 J	NA	ND	0.2 J	ND	ND	ND	0.2 J	0.35 J	ND	ND	ND
Toluene	1000	1000	500		NA	NA	NA	NA	NA	NA	NA	0.81	NA	0.6 J	1.4	0.18 J	0.16 J	ND	0.35 J	0.42 J	0.26 J	ND	ND
Ethylbenzene	1000	1000	100		NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	0.64 J	ND	ND	ND	ND	ND	ND	ND	ND
Xylene	410	1000	10		NA	NA	NA	NA	NA	NA	NA	0.95	NA	1.9	8.7	0.16 J	0.24 J	ND	0.55 J	0.53 J	0.26 J	ND	ND
1,1,1-TCA	210	1000	50		NA	NA	NA	NA	NA	NA	NA	ND	NA	2.2	2.1	0.28 J	ND	ND	0.9	0.99	2.8	ND	ND
PCE	4	6	1		NA	NA	NA	NA	NA	NA	NA	ND	NA	0.19 J	0.17 J	ND	ND	ND	ND	ND	0.43	ND	ND
1,1-DCA	570	1000	10		NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	0.6 J	ND	ND	ND	ND	ND	0.26 J	ND	
Inorganic Elements:																							
Antimony	14	340	NS		NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	700	47000	NS		NA	NA	NA	NA	NA	NA	NA	82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	1	1	NS		NA	NA	NA	NA	NA	NA	NA	0.21 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	39	100	NS		NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	78000	78000	NS		NA	NA	NA	NA	NA	NA	NA	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	600	600	NS		NA	NA	NA	NA	NA	NA	NA	33.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	250	2400	NS		NA	NA	NA	NA	NA	NA	NA	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	110	4100	NS		NA	NA	NA	NA	NA	NA	NA	1.8 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	370	7100	NS		NA	NA	NA	NA	NA	NA	NA	13.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	1500	1500	NS		NA	NA	NA	NA	NA	NA	NA	56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	2	2	NS		NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	20	20	NS		NA	NA	NA	NA	NA	NA	NA	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	63	3100	NS		NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	400	600	NS		NA	NA	NA	NA	NA	NA	NA	401	NA	222	141	113	128	63	143	98	78	19	73
Mercury	14	270	NS		NA	NA	NA	NA	NA	NA	NA	3.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	1100	21000	NS		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPHC:	NS	NS	NS		64	26 J	58	99	ND	126	171	303	268	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCBs:	0.49	2	50		NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
All results are shown in mg/kg.
FT BGS = Feet Below Ground Surface
ND = Not Detected
NS = No Soil Cleanup Criterion.
NA = Not Analyzed For
Shaded/bold = Parameter exceeds most stringent SCC.
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Table 9

Public Service Electric and Gas Company
Former Front Street Gas Works

UST Soil Sample Results

ANALYSIS:		SAMPLE NO.		EXC-2	EXC-3	EXC-4
		DEPTH (FT BGS)		10'	10'	10'
		DATE		06/10/98	06/10/98	06/10/98
SVOC:	RDC Criteria	NRDC Criteria	IGW Criteria			
Naphthalene	230	4200	100	NA	NA	NA
Acenaphthene	3400	10000	100	NA	NA	NA
Fluorene	2300	10000	100	NA	NA	NA
Anthracene	10000	10000	100	NA	NA	NA
Fluoranthene	2300	10000	100	NA	NA	NA
Pyrene	1700	10000	100	NA	NA	NA
Benzo(a)anthracene	0.9	4	500	NA	NA	NA
Chrysene	9	40	500	NA	NA	NA
Benzo(b)fluoranthene	0.9	4	50	NA	NA	NA
Benzo(k)fluoranthene	0.9	4	500	NA	NA	NA
Benzo(a)pyrene	0.66	0.66	100	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.9	4	500	NA	NA	NA
Dibenz(a,h)anthracene	0.66	0.66	100	NA	NA	NA
Nitrobenzene	28	520	10	NA	NA	NA
2,4-dinitrotoluene	1	4	10	NA	NA	NA
N-nitrosodiphenylamine	140	600	100	NA	NA	NA
VOCs:						
Benzene	3	13	1	**1.5**	**9.9**	ND
Toluene	1000	1000	500	1	32	ND
Ethylbenzene	1000	1000	100	4.9	6.3	ND
Xylene	410	1000	10	**24**	31	ND
1,1,1-TCA	210	1000	50	ND	ND	ND
PCE	4	6	1	ND	ND	ND
1,1-DCA	570	1000	10			
Inorganic Elements:						
Antimony	14	340	NS	NA	NA	NA
Barium	700	47000	NS	NA	NA	NA
Beryllium	1	1	NS	NA	NA	NA
Cadmium	39	100	NS	NA	NA	NA
Chromium	78000	78000	NS	NA	NA	NA
Copper	600	600	NS	NA	NA	NA
Nickel	250	2400	NS	NA	NA	NA
Silver	110	4100	NS	NA	NA	NA
Vanadium	370	7100	NS	NA	NA	NA
Zinc	1500	1500	NS	NA	NA	NA
Thallium	2	2	NS	NA	NA	NA
Arsenic	20	20	NS	NA	NA	NA
Selenium	63	3100	NS	NA	NA	NA
Lead	400	600	NS	269	**474**	4.6 J
Mercury	14	270	NS	NA	NA	NA
Cyanide	1100	21000	NS	NA	NA	NA
TPHC:	NS	NS	NS	NA	NA	NA
PCBs:	0.49	2	50	NA	NA	NA

Notes:
All results are shown in mg/kg.
FT BGS = Feet Below Ground Surface
ND = Not Detected
NS = No Soil Cleanup Criterion.
NA = Not Analyzed For
Shaded/bold = Parameter exceeds most stringent SCC.
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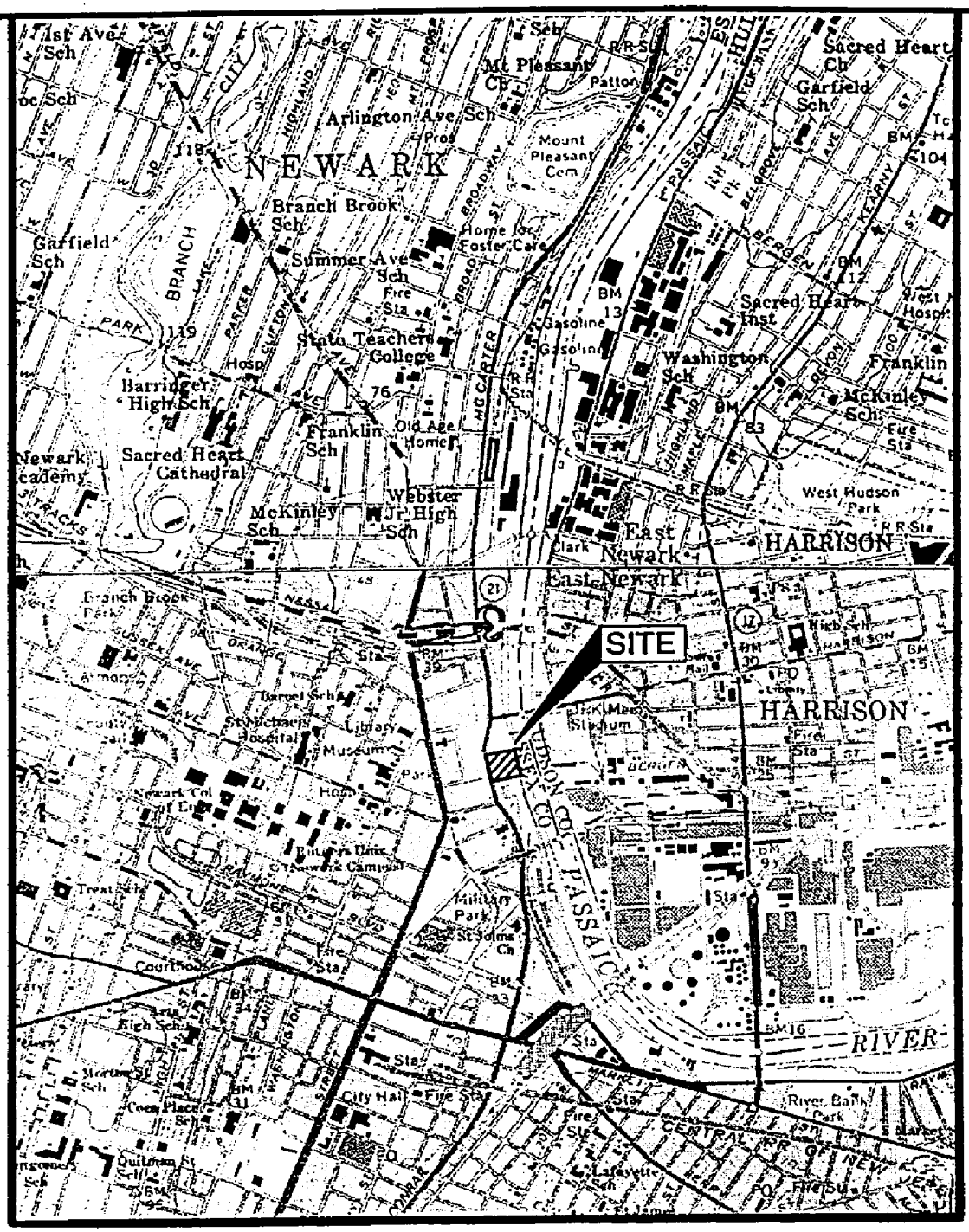

Scale: 1" = 2,000'

Source: Elizabeth, NJ-NY & Orange, NJ
U.S.G.S Topographic
Quadrangles
7.5 Minute Series

Photorevised 1981

Location: Latitude: 40°-44'-35.88"
Longitude: 74°-10'-02.64"

N

Figure 1

Public Service Electric and Gas Co.
Former Front Street Gas Works
Newark, New Jersey

Site Location Map

Killam
Associates ▫ Consulting Engineers

K:\ENG\263709\REPORTS\SITELOC5.MAP

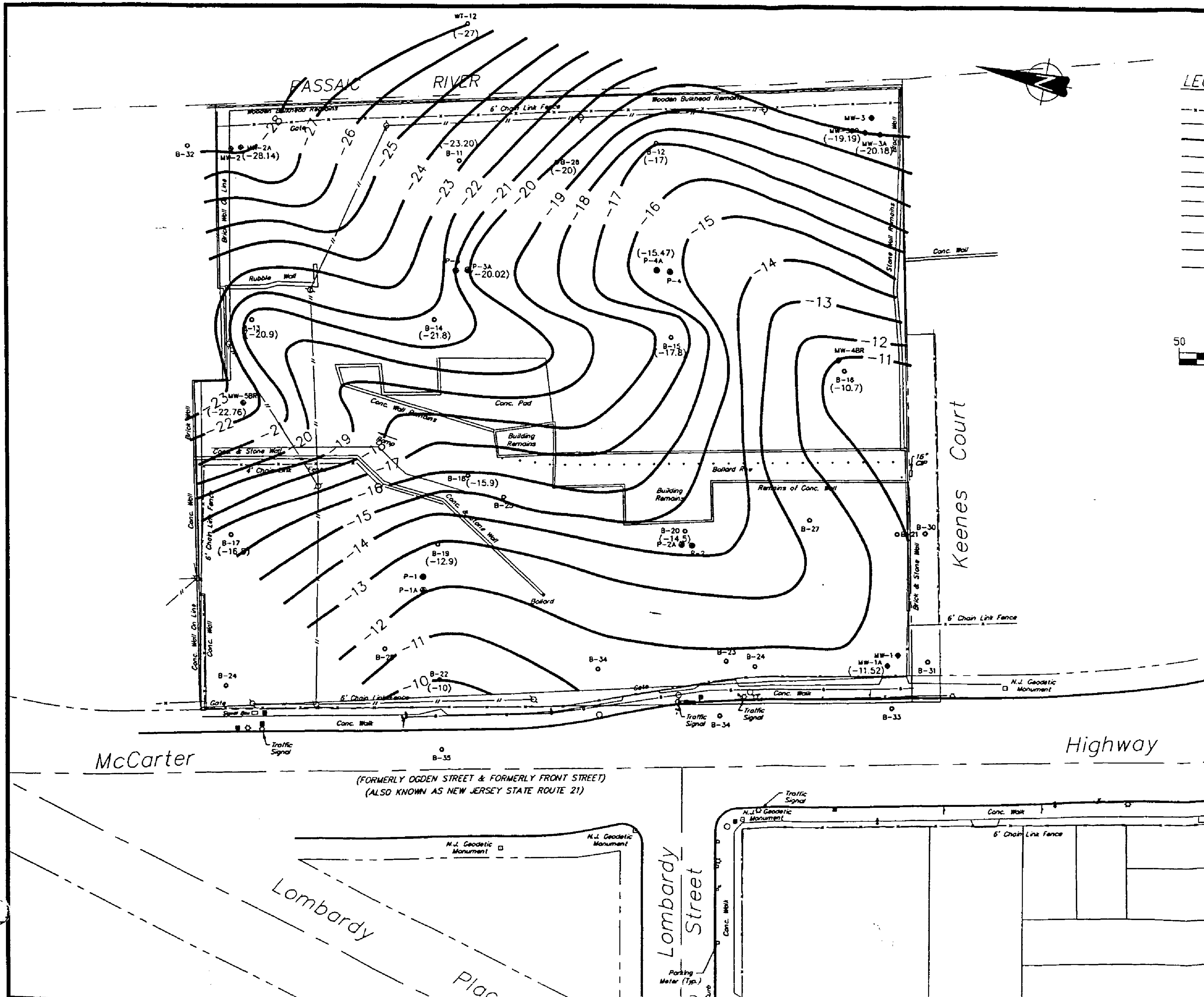

FIGURE 3
PUBLIC SERVICE ELECTRIC & GAS
FORMER FRONT STREET GAS WORKS
NEWARK, NEW JERSEY
TOP OF BEDROCK ELEVATION CONTOURS

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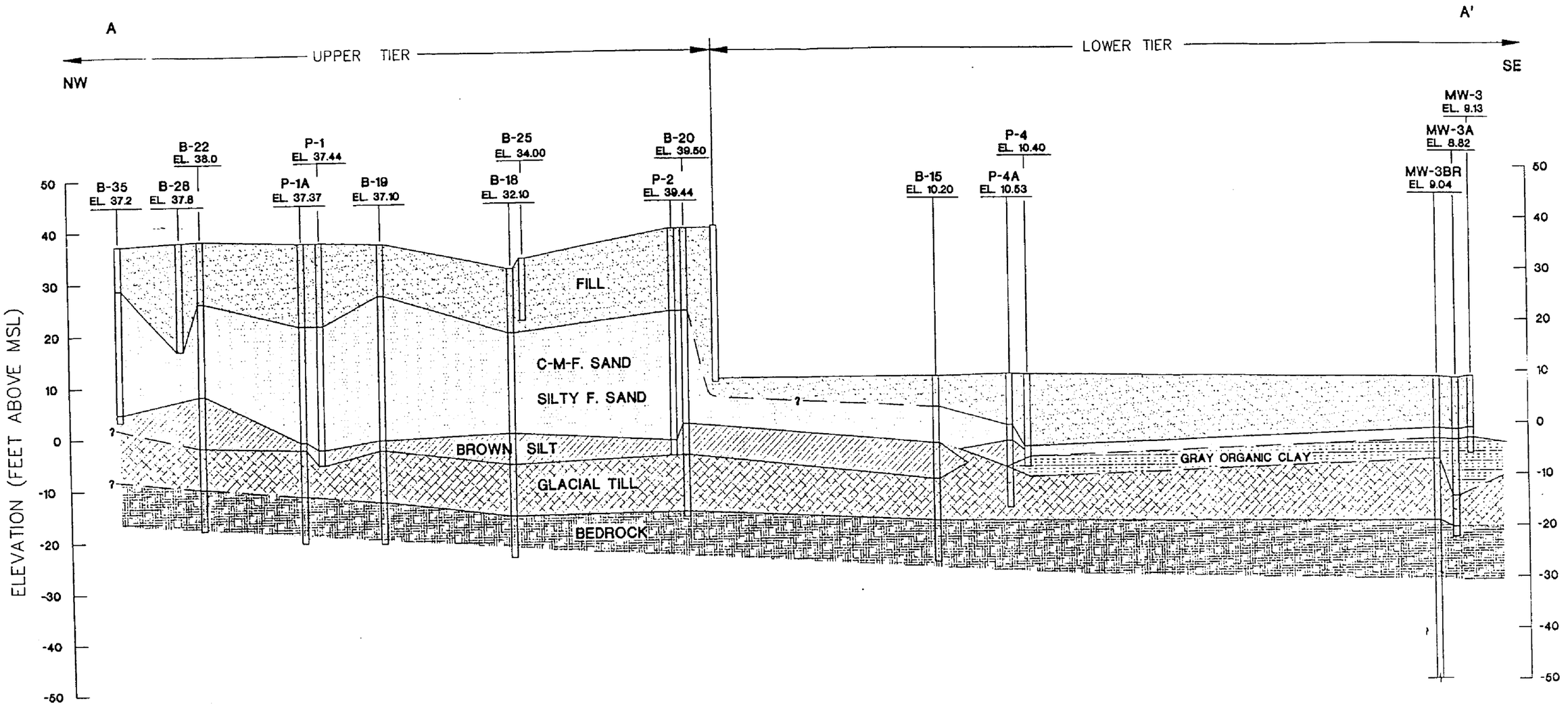

PROFILE A-A'

APPROXIMATE HORIZONTAL SCALE

30 0 30 60

SCALE IN FEET

APPROXIMATE VERTICAL SCALE

20 0 20 40

SCALE IN FEET

FIGURE 4

PUBLIC SERVICE ELECTRIC & GAS CO.

FORMER FRONT STREET GAS WORKS

NEWARK, NEW JERSEY

LITHOLOGIC CROSS SECTION (A-A')

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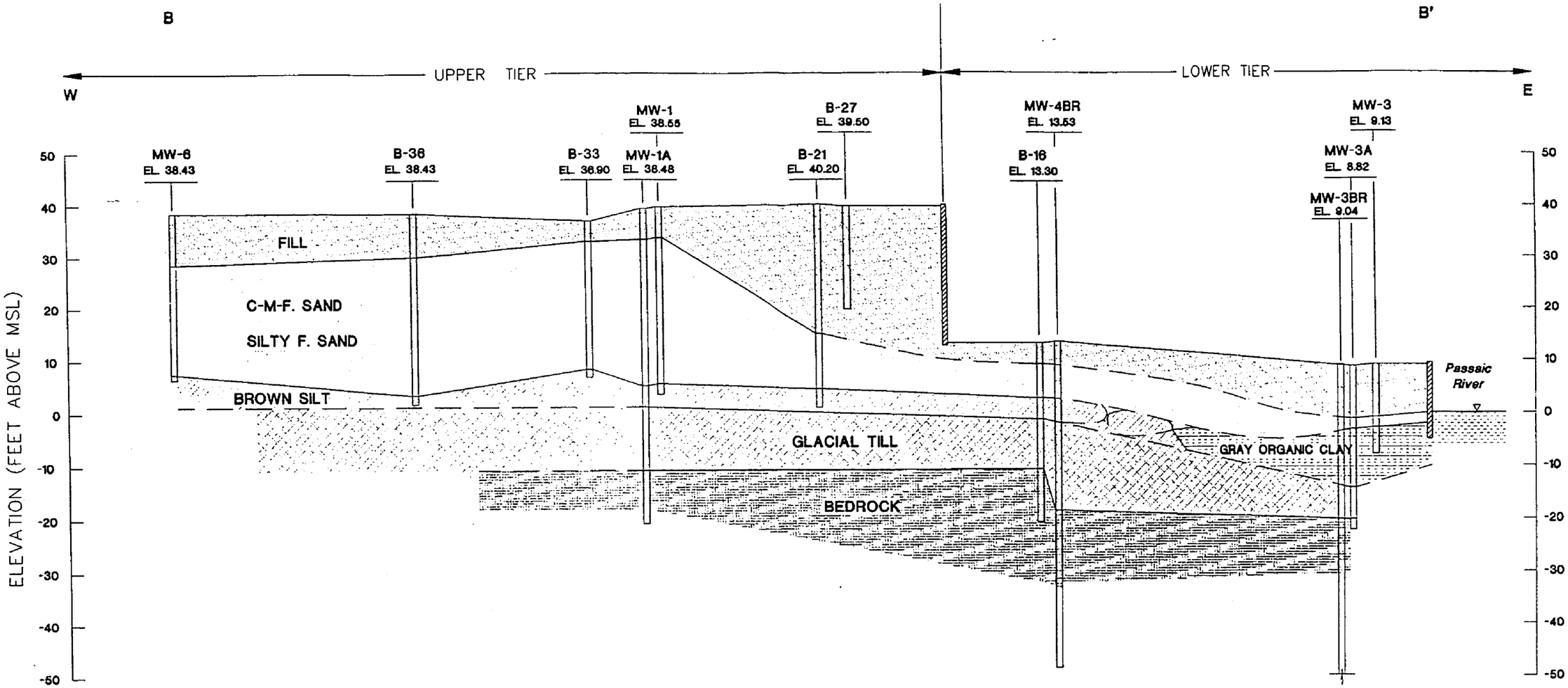
TIERRA-B-018140



PROFILE B-B'

APPROXIMATE HORIZONTAL SCALE

20 0 20 40

SCALE IN FEET

APPROXIMATE VERTICAL SCALE

40 0 40 80

SCALE IN FEET

L:\263709\CROSSSEC

FIGURE 5

PUBLIC SERVICE ELECTRIC & GAS CO.

FORMER FRONT STREET GAS WORKS

NEWARK, NEW JERSEY

LITHOLOGIC CROSS SECTION (B-B')

Killam Associates Consulting Engineers

TIERRA-B-018141

C

C'

NW

SE

B-39
EL. 38.43

B-38
EL. 38.43

B-33
EL. 36.90

MW-1A
EL. 38.48

MW-1
EL. 38.55

B-31
EL. 38.50

FILL

C-M-F. SAND

SILTY F. SAND

BROWN SILT

GLACIAL TILL

BEDROCK

ELEVATION (FEET ABOVE MSL)

50
40
30
20
10
0
-10
-20
-30
-40
-50

PROFILE C-C'

APPROXIMATE HORIZONTAL SCALE

20 0 20 40

SCALE IN FEET

APPROXIMATE VERTICAL SCALE

20 0 20 40

SCALE IN FEET

FIGURE 6

PUBLIC SERVICE ELECTRIC & GAS CO.

FORMER FRONT STREET GAS WORKS

NEWARK, NEW JERSEY

LITHOLOGIC CROSS SECTION (C-C')

Killam

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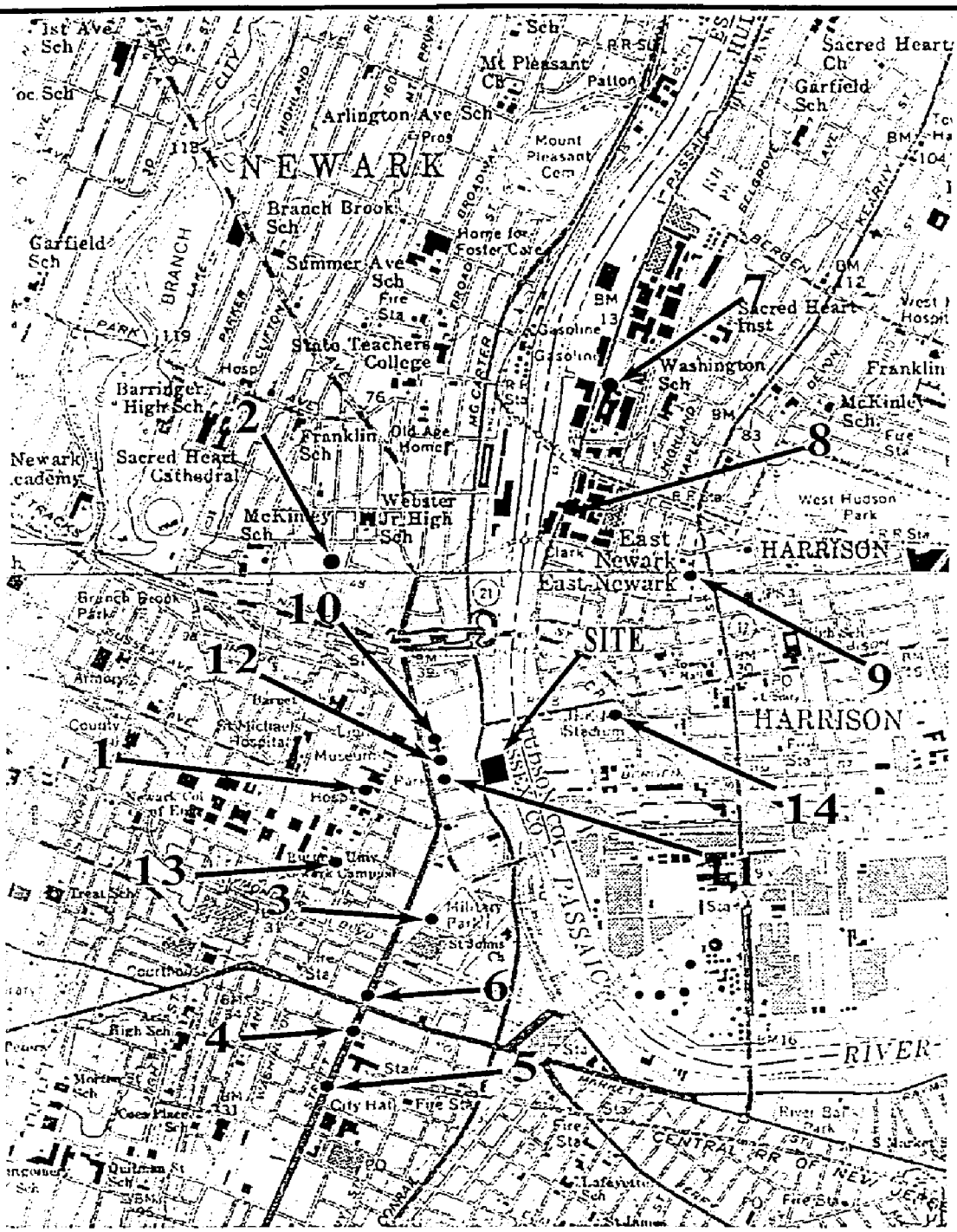
TIERRA-B-018142



Scale: 1" = 2,000'

Source: Elizabeth, NJ-NY & Orange, NJ

U.S.G.S Topographic Quadrangles

7.5 Minute Series

Photorevised 1981

Location: Latitude: 40°-44'-35.88"

Longitude: 74°-10'-02.64"

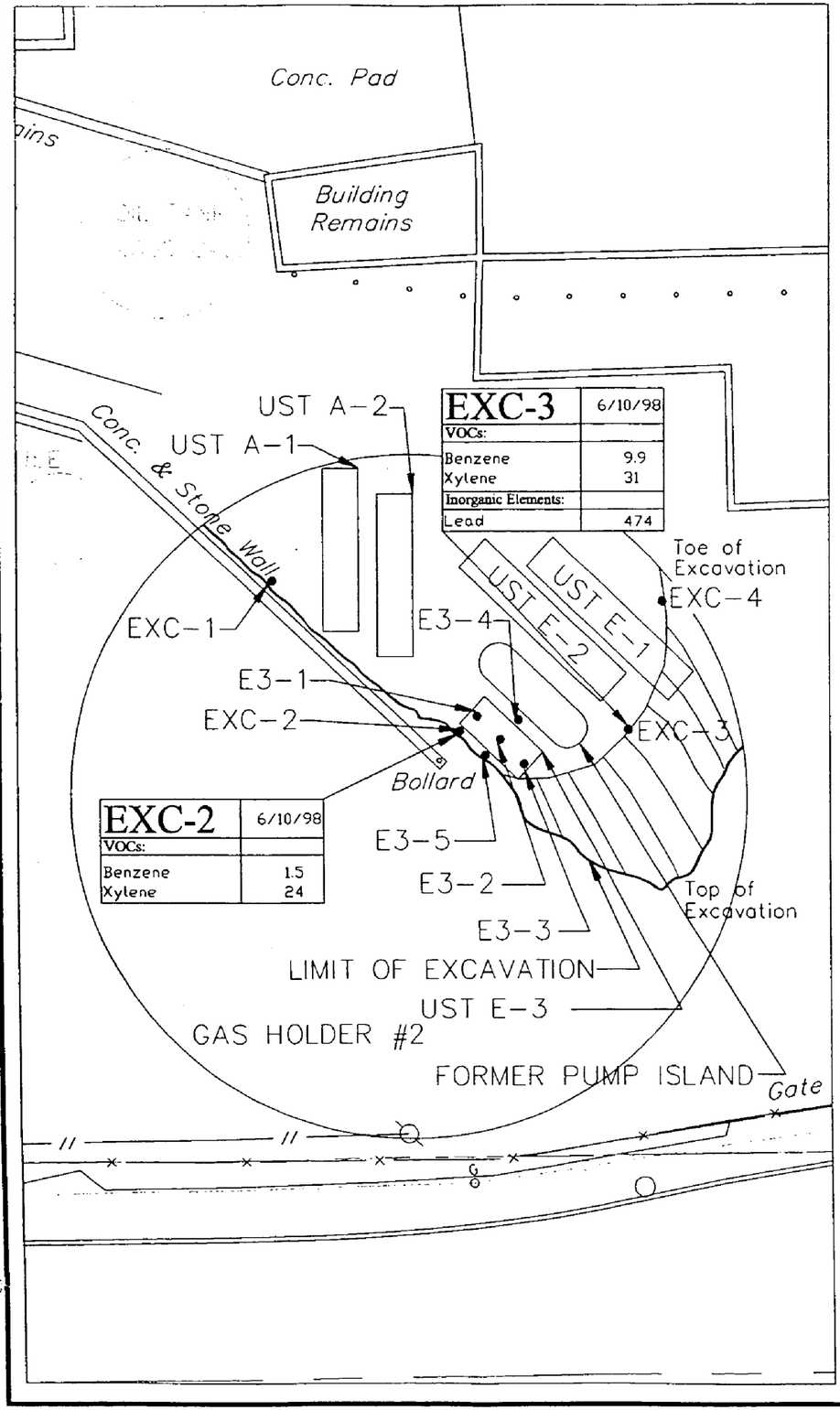
N

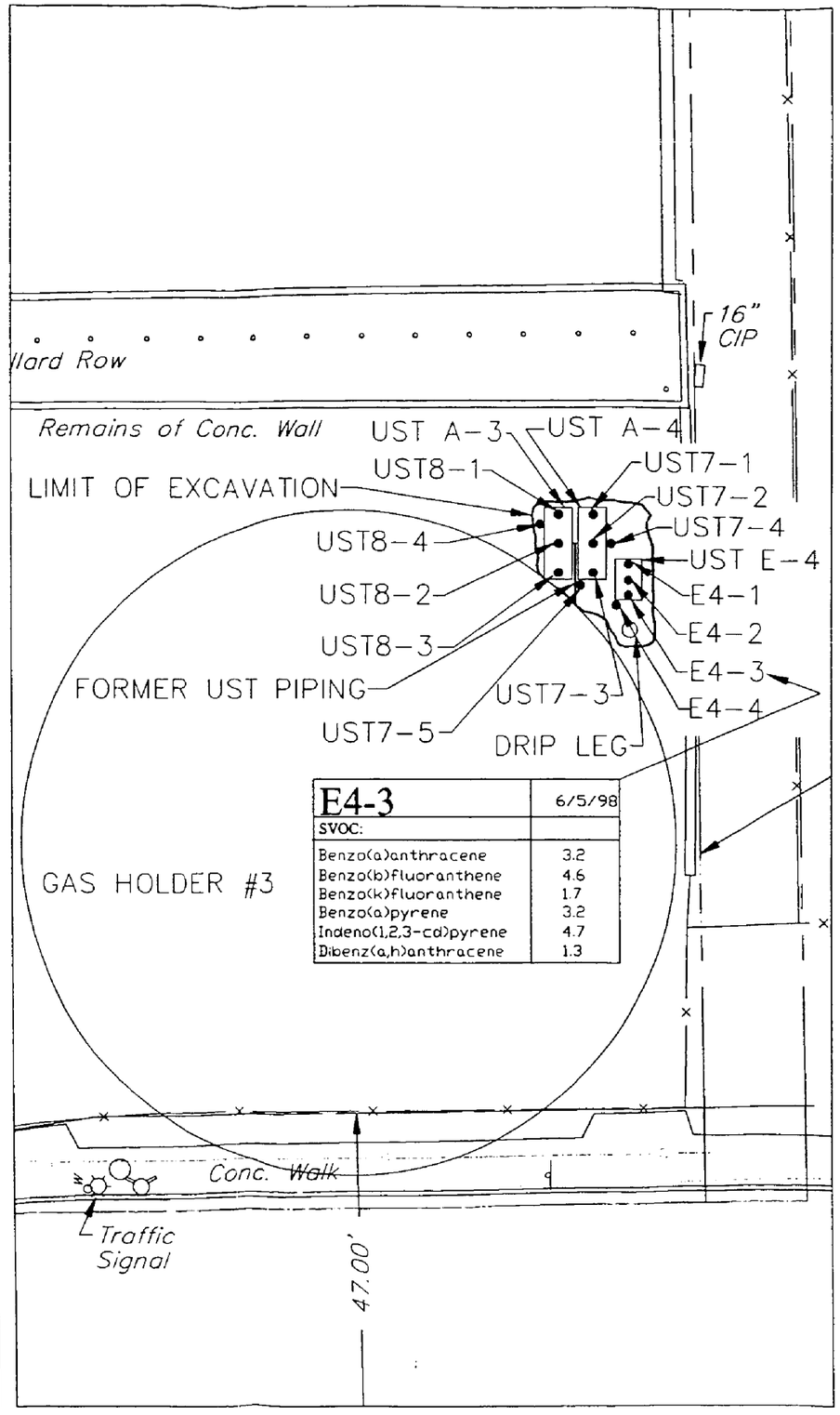
Figure 7

Public Service Electric and Gas Co.
Former Front Street Gas Works
Newark, New Jersey

Well Search Location Map

Killam
Associates = Consulting Engineers





SOIL CLEANUP CRITERIA

PARAMETER	RDC Criteria	NRDC Criteria	IGW Criteria	EPA Region III Residential
SVOC:				
Benzo(a)anthracene	0.9	4	500	0.87 C
Benzo(b)fluoranthene	0.9	4	50	0.87 C
Benzo(k)fluoranthene	0.9	4	500	8.7 C
Benzo(a)pyrene	0.66	0.66	100	0.087 C
Indeno(1,2,3-cd)pyrene	0.9	4	500	0.87 C
Dibenz(a,h)anthracene	0.66	0.66	100	0.087 C
VOCs:				
Benzene	3	13	1	22 C
Xylene	410	1,000	10	160,000 N
Inorganic Elements:				
Lead	400	600	NS	NS

NOTES:
All results are shown in mg/kg.
NS = No Standard exists.
RDC Criteria = Residential Direct Contact Soil Cleanup Criteria.
NRDC Criteria = Non Residential Direct Contact Soil Cleanup Criteria.
IGW Criteria = Impact to Ground water Soil Cleanup Criteria.
N = Noncarcinogenic effect.
C = Carcinogenic effect.
J = Detected below method detection limit

LEGEND

● *Soil Sample Location*

40 0 40 80
SCALE IN FEET

FIGURE 15

PUBLIC SERVICE ELECTRIC & GAS Co.
FORMER FRONT STREET GAS WORKS
NEWARK, NEW JERSEY

UST SAMPLE LOCATION MAP

Killam Associates Consulting Engineers

L:\263709\UST

PASSAIC RIVER

Wooden Bulkhead Remains
5' Chain Link Fence
Wooden Bulkhead Remains
Gate
Brick Wall
Brick Wall On Line
Stone Wall Remains
Conc. Wall
Rubble Wall
Conc. Pad
Conc. Wall Remains
Building Remains
Ramp
Conc. & Stone Wall
4' Chain Link Fence
Bollard Row
Remains of Conc. Wall
Building Remains
Conc. & Stone Wall
6' Chain Link Fence
Conc. Wall
Conc. Wall On Line
Conc. Wall
Brick & Stone Wall
6' Chain Link Fence
Gate
Gate
6' Chain Link Fence
Conc. Walk
Conc. Walk
Traffic Signal
Traffic Signal
Traffic Signal
Traffic Signal
N.J. Geodetic Monument
N.J. Geodetic Monument
N.J. Geodetic Monument
Conc. Walk
6' Chain Link Fence
Parking Meter (Typ.)

(ND) MW-2A MW-2
(72.1) MW-3
MW-38R
MW-3A
MW-4BR
MW-5BR
MW-1
MW-1A
(164.49)
(3,342)
(139.9)
(17,513)
(14.75' WIDE)
(66' R.O.W.)
(66' R.O.W.)

B-32 119.8'
B-11
B-26
B-12
B-45
B-48
B-13
B-14
B-15
B-16
B-47
B-18
B-25
B-20
B-19
B-1
B-27
B-21
B-30
B-43
B-44
B-46
B-28
B-22
B-34
B-23
B-24
B-31
B-42
B-24
B-35
B-34
B-33

P-3
P-3A
P-4A
P-4
P-2A
P-2
P-1
P-1A

? 100
? 1,000
? 10,000
? 10,000
? 1,000
? 100
? 10
? 1
MW-6(0.55)

Keenes Court
McCarter Highway
(FORMERLY OGDEN STREET & FORMERLY FRONT STREET)
(ALSO KNOWN AS NEW JERSEY STATE ROUTE 21)
Lombardy Place
Lombardy Street

LEGEND

- Fence
- Overhead Wire
- Curb Line
- Edge Of Pavement
- Gas Markup
- Water Markup
- Telephone Markup
- Electric Markup
- Right-Of-Way
- Centerline
- BTEX CONTOUR
- (17,513) BTEX CONCENTRATION (ug/l)
- Utility Pole
- Sign
- Manhole
- Round Grate Inlet
- Storm Inlet
- Water Valve
- Gas Valve
- Lamp Post
- Hydrant
- Guy Anchor
- Sanitary Clean Out
- Piezometer
- Boring Location
- Monitoring Well

50 0 50 100
SCALE IN FEET

FIGURE 12 A

PUBLIC SERVICE ELECTRIC & GAS CO.

FORMER FRONT STREET GAS WORKS
NEWARK, NEW JERSEY

BTEX ISOCONCENTRATION MAP
"A" WATER HORIZON
(September 17, 1998)

Killam
Associates ◻ Consulting Engineers

L:\263709\GROUNDWATER

TIERRA-B-018145

PASSAIC RIVER

Wooden Bulkhead Remains

6' Chain Link Fence

Brick Wall

Stone Wall Remains

Conc. Wall

Keenes Court

(14.75' WIDE)

Rubble Wall

Brick Wall & Conc. Wall

Conc. Pad

Conc. Wall Remains

Ramp

Building Remains

Conc. & Stone Wall

4' Chain Link Fence

Bollard Row

Remains of Conc. Wall

Conc. & Stone Wall

Bollard

Conc. Wall On Line

Conc. Wall

Gate

Signal Box

Conc. Walk

Traffic Signal

N.J. Geodetic Monument

McCarter Highway

(FORMERLY OGDEN STREET & FORMERLY FRONT STREET)
(ALSO KNOWN AS NEW JERSEY STATE ROUTE 21)

Lombardy Place

(66' R.O.W.)

Lombardy Street

(66' R.O.W.)

Parking Meter (Typ.)

MW-2A
MW-2 (0.5')
MW-3 (0.70')
MW-3BR
MW-3A
MW-4BR
MW-5BR
MW-6 (10.16')
MW-1 (9.18')
MW-1A
P-1 (9.55')
P-1A
P-2 (9.31')
P-2A
P-3 (4.33')
P-3A
P-4 (NA)
P-4A

B-11, B-12, B-13, B-14, B-15, B-16, B-17, B-19, B-20, B-21, B-22, B-23, B-24, B-25, B-26, B-27, B-28, B-30, B-31, B-32 (119.8'), B-33, B-34, B-35, B-42, B-43, B-44, B-45, B-46, B-47, B-48

LEGEND

- Fence
- Overhead Wire
- Curb Line
- Edge Of Pavement
- Gas Markup
- Water Markup
- Telephone Markup
- Electric Markup
- Right-Of-Way
- Centerline
- 5 — GROUNDWATER CONTOUR (10-14-98)
- (9.18') GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- Utility Pole
- Sign
- Manhole
- Round Grate Inlet
- Storm Inlet
- Water Valve
- Gas Valve
- Lamp Post
- Hydrant
- Guy Anchor
- Sanitary Clean Out
- Piezometer
- Boring Location
- Monitoring Well

50 0 50 100
SCALE IN FEET

FIGURE 12 B
PUBLIC SERVICE ELECTRIC & GAS CO.
FORMER FRONT STREET GAS WORKS
NEWARK, NEW JERSEY
GROUNDWATER CONTOUR MAP
"A" WATER HORIZON
(September 17, 1998)

Killam
Associates ◻ Consulting Engineers

L:\263709\GROUNDWATER

PASSAIC RIVER

Keenes Court

McCarter Highway

(FORMERLY OGDEN STREET & FORMERLY FRONT STREET)
(ALSO KNOWN AS NEW JERSEY STATE ROUTE 21)

Lombardy Place

Lombardy Street

LEGEND

- Fence
- Overhead Wire
- Curb Line
- Edge Of Pavement
- Gas Markup
- Water Markup
- Telephone Markup
- Electric Markup
- Right-Of-Way
- Centerline
- BTEX CONTOUR
- EXTRAPOLATED BTEX CONTOUR
- (2,185) BTEX CONCENTRATION (ug/l)
- Utility Pole
- Sign
- Manhole
- Round Grate Inlet
- Storm Inlet
- Water Valve
- Gas Valve
- Lamp Post
- Hydrant
- Guy Anchor
- Sanitary Clean Out
- Piezometer
- Boring Location
- Monitoring Well

SCALE IN FEET: 50 0 50 100

FIGURE 13 A

PUBLIC SERVICE ELECTRIC & GAS CO.

FORMER FRONT STREET GAS WORKS
NEWARK, NEW JERSEY

BTEX ISOCONCENTRATION MAP
"B" WATER HORIZON
(September 17, 1998)

Killam
Associates ◻ Consulting Engineers

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PASSAIC RIVER

Wooden Bulkhead Remains

6' Chain Link Fence

Wooden Bulkhead Remains

Gate

Brick Wall On Line

Rubble Wall

Stone Wall Remains

Brick Wall

Conc. Wall

Conc. Wall Remains

Conc. Pad

Building Remains

Ramp

Conc. & Stone Wall

4' Chain Link Fence

Ballard Row

16" CIP

Building Remains

Remains of Conc. Wall

Keenes Court

Conc. Wall

6' Chain Link Fence

Conc. & Stone Wall

Conc. Wall On Line

Conc. Wall

Ballard

6' Chain Link Fence

Gate

Signal Bar

Conc. Walk

Traffic Signal

Traffic Signal

Conc. Walk

N.J. Geodetic Monument

Gate

Traffic Signal

McCarter Highway

(FORMERLY OGDEN STREET & FORMERLY FRONT STREET)
(ALSO KNOWN AS NEW JERSEY STATE ROUTE 21)

N.J. Geodetic Monument

N.J. Geodetic Monument

Lombardy Place

(66' R.O.W.)

Lombardy Street

Traffic Signal

N.J. Geodetic Monument

Conc. Walk

6' Chain Link Fence

Conc. Walk

Parking Meter (Typ.)

Drop Curb

MW-6

B-32 119.8'

MW-2A
MW-2 (0.36')

B-11

B-26

B-12

MW-3
(4.96') MW-3B

MW-3A
(5.95')

B-45

B-48

B-13

B-14

P-3
P-3A (3.52')

P-4A
(4.18')
P-4

B-15

(5.14')
MW-4BR

B-16

B-47

MW-5BR
(4.62')

B-18

B-25

B-17

B-19

B-20

(3.69) P-2A
P-2

B-27

B-21

B-50

B-43

B-44

B-46

P-1
(4.45') P-1A

B-28

B-34

B-23

B-24

MW-1
(7.19') MW-1A

B-31

B-42

B-24

B-22

B-33

B-34

B-35

LEGEND

- Fence
- Overhead Wire
- Curb Line
- Edge Of Pavement
- Gas Mainlup
- Water Mainlup
- Telephone Mainlup
- Electric Mainlup
- Right-Of-Way
- Centerline
- Groundwater Contour
- Groundwater Flow Direction
- Utility Pole
- Sign
- Manhole
- Round Grate Inlet
- Storm Inlet
- Water Valve
- Gas Valve
- Lamp Post
- Hydrant
- Guy Anchor
- Sanitary Clean Out
- Piezometer
- Boring Location
- Monitoring Well

50 0 50 100
SCALE IN FEET

FIGURE 13 B
PUBLIC SERVICE ELECTRIC & GAS CO.
FORMER FRONT STREET GAS WORKS
NEWARK, NEW JERSEY
GROUNDWATER CONTOUR MAP
"B" WATER HORIZON
(September 17, 1998)

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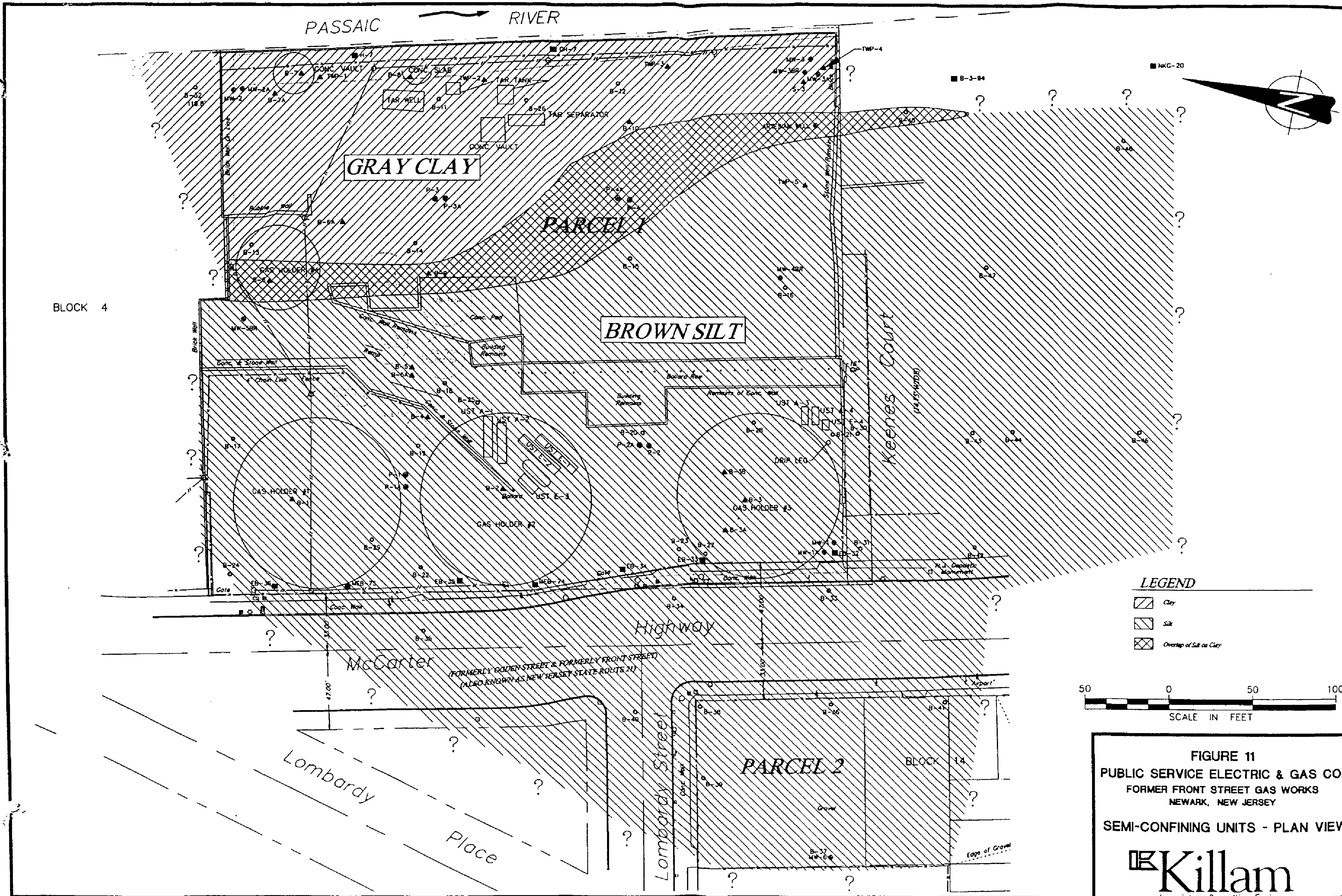
L:\263709\GROUNDWATER



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TIERRA-B-018149

PASSAIC RIVER

FLOW

Wooden Bulkhead Remains

6' Chain Link Fence

Gate

CONC. VAULT

CONC. SLAB

TT-1

TT-2

TT-3

TAR TANK

TT-14

TAR WELL

TT-4B

TAR SEPARATOR

TT-5A

TT-5B

CONC. VAULT

TT-6B

TT-6A

APPROXIMATE LOCATION OF 6,400 GALLON TAR WELL AND 4,000 GALLON LIQUOR WELL.

Brick Wall On Line

Stone Wall Remains

Block Wall

Conc. Wall

Rubble Wall

TT-7

TT-8

GAS HOLDER #4

OIL TANK 150,000 GAL.

TAR TANK

Conc. Pad

TT-9

Conc. Wall Remains

OIL TANK 50,000 GAL.

Ramp

Building Remains

Brick Wall

Conc. & Stone Wall

4' Chain Link Fence

AMMONIA TANK

Bollard Row

16" CIP

Building Remains

Remains of Conc. Wall

Keenes Court

(14.75' WIDE)

Conc. Wall

6' Chain Link Fence

VALVE HOUSE

Conc. & Stone Wall

UST A-1

UST A-2

UST E-1

UST E-2

TT-10

Bollard

UST E-3

UST A-3

UST A-4

UST E-4

TT-13A

DRIP LEG

Brick & Stone Wall

6' Chain Link Fence

No Name

TT-11B

GAS HOLDER #1

TT-11A

GAS HOLDER #2

GAS HOLDER #3

TT-12B

Conc. Wall On Line

Conc. Wall

Gate

Signal Box

6' Chain Link Fence

Gate

Conc. Walk

N.J. Geodetic Monument

Traffic Signal

Traffic Signal

Traffic Signal

33.00'

47.00'

Highway

McCarter

(FORMERLY OGDEN STREET & FORMERLY FRONT STREET)

(ALSO KNOWN AS NEW JERSEY STATE ROUTE 21)

Emergency Call Box

N.J. Geodetic Monument

Traffic Signal

Metal Lid (Typ.)

Drop Curb

'Airport'

Conc. Walk

'Airport'

Drop

LEGEND

- Fence
- Overhead Wire
- Curb Line
- Edge Of Pavement
- Gas Markup
- Water Markup
- Telephone Markup
- Electric Markup
- Right-Of-Way
- Centerline
- TEST TRENCH LOCATION
- MGP STRUCTURE NOT IDENTIFIED DURING REMEDIAL INVESTIGATION.
- Utility Pole
- Sign
- Manhole
- Round Grate Inlet
- Storm Inlet
- Water Valve
- Gas Valve
- Lamp Post
- Hydrant
- Guy Anchor
- Sanitary Clean Out

40 0 40 80

SCALE IN FEET

FIGURE 8

PUBLIC SERVICE ELECTRIC & GAS Co.
FORMER FRONT STREET GAS WORKS
NEWARK, NEW JERSEY

TEST TRENCH LOCATION MAP

Killam
Associates Consulting Engineers

TIERRA-B-018150

Killam — BORING LOG

LOG: B-11

DATE COMPLETED:	July 27, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	8.8 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			100/6	4	0	Fill; Concrete 0.5-1' (10 YR 4/2)	
-1-			6	8	0	f-m Sd; Fill (10 YR 2/2)	B-11 (1-1.5')
-2-			12				
-3-			9				
-4-			8	14	0	f-m Sd, l. Grv, t. Coal Fragments (10 YR 2/2)	
-5-			5				
-6-			3	10	0	f-m Sd, l. Grv, t. Coal Fragments (10 YR 2/2)	B-11 (5-5.5') Wet at 5.5 Feet
-7-			2				
-8-			2				
-9-			3				
-10-			3	9	0	Grv, s. m-c Sd (10 YR 2/2)	
-11-			2				
-12-			1			*FILL*	
-13-			1				
-14-			1	12	6.6	Grv, s. m-c Sd (10 YR 2/2)	Visible Product
-15-			1				
-16-			1				
-17-			2				B-11 (9.5-10')
-18-			1	12	6.3	Grv, s. m-c Sd (10 YR 2/2)	Visible Product
-19-			2				
-20-			1				
-21-			3				
-22-			2	16	2.7	9" 'Grv, s. m-c Sd (10 YR 2/2)	Visible Product
-23-			1		6.5	7" Paper-like material (10 YR 2/2)	
-24-			3				
-25-			7				
-26-			1	18	2.1	Cl (5 Y 4/1)	
-27-			1				
-28-			1				
-29-			1				
-30-			1	20	0	Cl (5 Y 4/1)	
-31-			1				
-32-			1				
-33-			1				
-34-	CL		N/R	N/R	N/R	Shelby; No Recovery	
-35-						*CLAY*	
-36-			6	N/R	N/R	No Recovery	
			8				
			6				
			8				
			WOH	18	0	2" f-m Sd (N2); 14" Cl (slightly organic) (5Y 4/1)	
			2			2" f-m Sd (N2)	
			1				
			2				
			5	16	1.8	9" f-m Sd (N2)	B-11 (24.5-25')
			6		0.4	9" f-m-c Sd (10 YR 4/2)	Visible Product
			6				
			5				
			5	16	0	f-m-c Sd (10 YR 4/2)	Visible Sheen
			6			(Till) f-m-c Sd (cl matrix) (5 YR 4/4)	
			6				
	SP-SC		9			*Poorly Graded SAND with CLAY*	
			16	9	0	(Till) f-m-c Sd, l. Grv (cl matrix) (5 YR 4/4)	
			13				
			14				
			21				
			21	14	0	f-m-c Sd, t. Weathered Siltstone (cl matrix) (5 YR 4/4)	B-11 (31.5-32')
			18				
			23				
			27				
			50/2	N/R	N/R	Bedrock	
						Bedrock - SILTSTONE	
						Bedrock at 32 feet Steel casing set into the clay at 17 Feet	

K:\ENG\263709\LOGS\B-11

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-12

DATE COMPLETED:	July 17, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	9.0 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			11	8	0	Fill	B-12 (0-0.5')
-1-			16				
			11				
			10				
-2-			10	18	15	f-m-c Sd, l. Slt (N2)	Visible Product; Strong Odor
-3-			12				
			7				
-4-			8				
			3	20	6.5	Cl, l. f-m Sd, t. Grv (N2)	
-5-			2				
			1				
-6-			3				B-12 (5.5-6')
			7	18	5.4	12" Cl, l. f-m Sd (N1)	Product;
-7-			4			6" f-m Sd, t. Grv, l. Slt	Wet at 6 Feet
			7				
-8-			10				
			7	18	6.3	f-m Sd, l. Slt, l. Grv (N1)	Product
-9-			10				
			14				
-10-			14				
			5	14	5	f-m Sd, l. Cl, t. Grv (5 YR 4/4)	Product
-11-			5			*FILL*	
			5				
-12-			6				
			8	18	4	15" f-m Sd, l. Slt (N1)	
-13-			9		0.5	3" f-m Sd, l. Slt (5 YR 4/4)	
			9				
-14-			11				
			4	2	6.1	Gravel (5 YR 3/2)	Product
-15-			3				
			4				
-16-			5				
			10	16	20	f-m Sd, l. Slt; wood in nose (N1)	Product
-17-			20				
			11				
-18-			10				
			9	12	25	f-m-c Sd a. Grv (N1)	Product
-19-			4				
			4				
-20-			3				B-12 (19.5-20')
			2	18	2.3	Cl, f-m Sd in bp of spoon (5 Y 4/1)	
-21-			1				
			3				
-22-			1				
	CL		3	11	5.4	Cl (5 Y 4/1)	
-23-			3			*CLAY*	
			2				
-24-			4				
			11	18	N/R	No Recovery	Shelby Sample to bottom of Clay
-25-			6				
			4				
-26-			3				
			11	2	4.2	Weathered Siltstone, l. Cl (matrix) (5 YR 4/4)	B-12 (27.5-28) Only VO+10 sample collected
-27-			16			*Weathered Bedrock*	
			28				
-28-			39				
			100/0	NR	NR	Bedrock	
-29-						*Bedrock - SILTSTONE*	
-30-							
						Bedrock at 28 feet	
-31-						Steel casing set into the clay at 20 Feet	
-32-							
-33-							
-34-							
-35-							
-36-							

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-13

DATE COMPLETED:	June 19, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	17.1 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			7	10	0	f-m Sd a. Slt, l. Grv (5 YR 3/4)	
			6				B-13 (0-0.5')
-1-			5				
			6				
-2-			6	N/R	0	Nose Plugged with Rock	
			5				
-3-			9				
			10				
-4-			5	10	0	f-m Sd, l. Slt, l. Grv, t. Coal Fragments (5 YR 3/4)	
			6				
-5-			4				
			5				
-6-			2	8	0	f-m-c Sd, t. Slt, t. Coal Fragments (10 YR 5/4)	
			3				
-7-			4				
			4			*FILL*	
-8-			50/4	4	0	Brick in Nose	
			50/2			f-m Sd (10 YR 8/2)	Wet
-9-							
-10-			6	3	0	f-m Sd a. Slt, t. c Sd (5 YR 4/4)	
			3				
-11-			2				
			2				
-12-			6	N/R	0	No Recovery	
			3				
-13-			4				
			4				
-14-			3	6	0	f-m Sd a. Slt, t. Cl, t. Grv (5 YR 4/4)	Wet at Tip
			3				
-15-			3				
			4				B-13 (15.5-16')
-16-			5	N/A	0	f-m Sd, l. Grv, t. Cl, Brick Fragments (5 YR 3/2)	Wet
			4				
-17-			5				
			5				
-18-			4	20	0	8" f-m-c Sd, l. Slt	
			3			12" Cl (5 Y 4/1)	B-13 (18.5-19')
-19-			4				
			3				
-20-			N/A	24	N/A	Shelby Tube: Triaxial Permeability	
	CL					*CLAY*	
-21-							
-22-			1	20	0	15" Cl, t. organic material (5 Y 4/1)	
			3		0	5" Cl, s. f-m Sd (5 Y 4/1)	
-23-			4				
			10				
-24-			10	20	0	f-m-c Sd a. Grv (5 YR 3/2)	Faint Odor
			14				
-25-			11				
			12				B-13 (25.5-26')
-26-			11	18	0	mottled, f-m Sd a. Grv (5 YR 3/2)	Faint Odor
			12				
-27-	SP-SC		16			*Poorly Graded SAND with GRAVEL and CLAY*	
			17				
-28-			23	12	0	f-m-c Sd a. Grv, s. Slt (5 YR 3/2)	
			22		0	Cl, l. f. Sd at tip of spoon (5 YR 5/6)	
-29-			16				
			17				
-30-			35	12	0	f-m-c Sd, l. s. Cl, l. Grv, very tightly packed (5 YR 4/4)	
			16				
-31-			20				
			11				
-32-			23	12	0	Cl a. f-m-c Sd, t. Grv (5 YR 4/4)	
			18				
-33-			17				
			16				
-34-			43	16	0	f-m-c Sd a. Grv, l. Slt, t. Cl (5 YR 4/4)	
			38				
-35-			28				
			33				

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SHEET 1 OF 2

Killam	BORING LOG (continued)	LOG: B-13

DATE COMPLETED:	June 19, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-36-			47	8	0	f-m-c Sd, l. Grv, l. Cl, t. Slt (5 YR 4/4)	
			50/2				
-37-							
-38-			32	16	0	f-m-c Sd, l. Weathered Bedrock (5 YR 4/4)	
			40				
-39-			50/3				
-40-			22	18	0	Weathered Siltstone (5 YR 4/4)	
			16			***Weathered Bedrock***	
-41-			47				
			28				
-42-			38	6	0	Weathered Siltstone Bedrock (5 YR 4/4)	
			50/2				B-13 (42.5-43')
-43-							
-44-						End of Boring at 44 Feet	
-45-							
-46-							
-47-							
-48-							

Killam — BORING LOG

LOG: B-14

DATE COMPLETED:	June 22, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	10.2 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			22	12	0	f-m-c Sd a. Grv, s. Slt (10 YR 2/2)	B-14 (0-0.5')
-1-			16				
			18				
-2-			18				
			3	12	0	f-m Sd a. Slt, l. Grv a. Brick Fragements (10 YR 2/2)	Moist
-3-			5				
			4				
-4-			3				
			3	14	0	f-m-c Sd, s. Slt, Wood Fragments (10 YR 2/2)	
-5-			2				B-14 (4.5-5')
			1				Wet at 5 Feet
-6-			1				
			3	N/R	N/A	No Recovery	
-7-			3			*FILL*	
			1				
-8-			1				
			2	10	6.4	Peat (10 YR 2/2)	
-9-			1				
			2				
-10-			2				B-14 (9.5-10')
			2	4	2.1	f-m Sd a. Slt a. Wood Fragments (5 YR 4/4)	
-11-			1				
			1				
-12-			1				
			1	N/R	N/A	No Recovery	
-13-			0				
			1				
-14-			0				
	CL		1	22	12.9	Cl, t. organic material , t. c Sd (5 Y 4/1)	
-15-			1			*CLAY*	
			1				
-16-			1				
			N/A	13	N/A	Shelby Tube: Triaxial Permeability	
-17-			10	6	10.7	f-m-c Sd a. Grv, l. Slt (5 YR 3/4)	
			8				B-14 (17.5-18')
-18-			8	7	8.6	f-m-c Sd l. Grv, l. Slt (5 YR 4/4)	
-19-			7				
			7				
-20-			4				
			3	10	0	Slt, l. Cl, t. f Sd (5 YR 4/4)	
-21-			4				
			4				
-22-			4				
			4	4	6.4	f-m Sd, l. Slt (5 YR 3/2)	
-23-			3				
			4				
-24-			4				
	SP-SC		4	16	0	f-m Sd a. Cl, t. c Sd (5 YR 5/6)	
-25-			5			*Poorly Graded SAND with CLAY and GRAVEL*	
			5				
-26-			17				
			8	3	0	f-m Sd a. Cl, t. c Sd (5 YR 5/6)	Tight
-27-			17	4	0	f-m-c Sd (5 YR 3/4)	Very Wet
			17	5	0	f-m Sd a. Cl (5 YR 5/6)	Tight
-28-			20				
			26	15	0	Lean Cl a. f-m Sd, l. c Sd, t. Siltstone Fragments (5 YR 4/4)	
-29-			41				
			50/5				
-30-			38	18	0	Lean Cl a. f-m Sd, l. c Sd, t. Siltstone Fragments (5 YR 4/4)	
-31-			48				
			50/4				
-32-			13	16	2.1	Weathered Siltstone, Cl, l. f-m Sd matrix (5 YR 4/4)	
-33-			16				
			32				
-34-			50/5			**Weathered Bedrock**	
			48	12	0	Weathred Siltstone, Cl, l. f-m Sd matrix(5 YR 4/4)	
-35-			50/3				
			36	9	0	Weathered Siltstone (5 YR 4/4)	
			100/4			mottled Cl, l. f Sd matrix (5 YR 4/4; 5 G 6/1)	B-14 (35.5-36')

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SHEET 1 OF 2

Killam

BORING LOG (continued)

LOG: B-14

DATE COMPLETED: June 22, 1998
DRILLER: Advanced Drilling Incoporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger

PROJECT: PSE&G Former Front Street Gas Works
LOCATION: Newark, New Jersey
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-36-			100/1	N/R	N/A	Bedrock at 36 Feet	
-37-						***Bedrock - SILTSTONE***	
-38-							
-39-						End of Boring at 38 Feet	
-40-							
-41-							
-42-							
-43-							
-44-							
-45-							
-46-							
-47-							
-48-							

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Killam — BORING LOG

LOG: B-15

DATE COMPLETED:	June 23, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G Former Front Street Gas Works
LOCATION:	Front Street
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	10.2 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-						Asphalt/Concrete	
-1-			9	18	0	f-m-c Sd, t. Cl, f. Slt, l. Grv (5 YR 4/4)	B-15 (1-1.5')
-2-			10				
			10				
-3-			9				
			12	N/R	N/A	No Recovery	
-4-			16			*FILL*	
			2	3	0	Grv (5 YR 4/2)	Wet at 4 Feet
-5-			4				
			7				
-6-			8				
			5	12	2.1	6" Peat (5 YR 3/4)	
-7-			7		0	6" f-m Sd, l. Slt (5 YR 3/4)	
			9				
-8-			9				
			9	20	2.1	f Sd a. Slt, l. c Sd (10 YR 2/2)	
-9-	SP-SM		8				
			9			*Poorly Graded SAND with SILT and GRAVEL*	
-10-			9				
			7	15	51	8" f-m Sd, l. Grv, s. Slt (N4)	Strong Odor,
-11-			16		0	7" f-m Sd a. Grv, t. Slt (5 YR 4/4)	Visible Product
			22				Sheen
-12-			20				
			16	24	153	f-m Sd a. Grv (N4)	Strong Odor,
-13-			22		4.4	f-m Sd (5 YR 4/4)	Visible Product
			32		0	Slt (5 YR 4/4)	Sheen
-14-			37				B-15 (12-12.5')
			13	15	4.3	Slt, t. Cl, t. Grv (5 YR 5/6)	Duplicate #2
-15-			16				
			16				
-16-			19				
			19	16	4.3	Slt, l. f-m Sd, t. Cl (5 YR 5/6)	
-17-	ML		20			*SILT WITH SAND*	
			22				
-18-			22				
	SM		23	12	4.3	6" f-m Sd, l. Slt (5 YR 5/6)	
-19-			39		0	6" Slt (5 YR 5/6)	
	ML		50/2			*SILT*	
-20-			22	10	8.6	Siltstone Fragments with Slt, l. f Sd matrix (5 YR 5/6)	
-21-			37				
			50/2				B-15 (21.5-22')
-22-			7	16	0	f-m-c Sd a. Slt, l. Grv (5 YR 5/6)	
-23-			10				
			10				
-24-			25				
			20	16	4.3	Cl, l. f-c Sd, l. Slt (5 YR 5/6)	
-25-			21			*GLACIAL TILL*	
			29				
-26-			23				
			39	6	0	Cl, s. m-c Sd, l. Siltstone Fragments (5 YR 5/6)	
-27-			50/2				
-28-			48	7	0	Weathered Siltstone a. Cl, l. f Sd matrix (5 YR 5/6)	
-29-			50/3				
-30-			30	12	0	Weathered Siltstone s. Cl, l. f Sd, t. c Sd (5 YR 5/6)	
-31-			50				
			50/2			*Weathered Bedrock*	
-32-			41	12	0	Weathered Siltstone l. Cl, l. f Sd matrix (5 YR 5/6)	
-33-			43				
			50/4				B-15 (33.5-34')
-34-			18	3	0	Siltstone (5 YR 5/6)	
-35-			50/1			Bedrock at 34.5 Feet	
						Bedrock - SILTSTONE	
-36-						End of Boring at 36 Feet	

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-16

DATE COMPLETED:	June 24, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL)	13.3 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			6	7	0	Grv, l. f-m-c Sd (5 YR 4/4)	B-16 (0-0.5')
			50/4				
-1-						*FILL*	
-2-			11	16	0	f Sd (5 YR 4/4)	
			8		2.1	Cl, t. Slt (5 YR 4/4)	
-3-			6				
-4-			3	18	2.1	f Sd a. Slt (5 YR 4/4)	B-16 (3.5-4')
			4		2.1	f-m Sd, t. Slt (5 YR 3/4)	
-5-			5				
-6-			4	16	2.1	f-m Sd, t. Slt (5 YR 3/4)	
			5				
-7-	SP-SM		5			*Poorly Graded SAND with SILT*	
			5				
-8-			8	22	2.1	f-m Sd, t. Slt (5 YR 3/4)	
			10				
-9-			13				
-10-			13				
			5	18	4.3	12" f Sd a. Slt (5 YR 3/4)	
-11-			8		0	6" Slt (5 YR 3/4)	B-16 (11-11.5')
			10				
-12-			10				
			15	15	2.1	Slt (5 YR 3/4)	
-13-	ML		17			*SILT*	
			18				
-14-			20				
			10	16		14" Slt (5 YR 4/4)	
-15-			21				
			30			2" f Sd a. Slt (5 YR 4/4)	
-16-			22				
			22	14	4.3	f Sd a. Slt (5 YR 4/4)	
-17-			28				B-16 (17-17.5')
			35				
-18-			40				
			13	16	0	f-m-c Sd, s. Grv, l. Slt, t. Cl (5 YR 4/4)	
-19-			25				
			45			*GLACIAL TILL*	
-20-			54				
			46	15	0	Till; Siltstone a. f-m-c Sd, t. Cl (5 YR 5/6)	
-21-			100/4				
-22-			15	9	2.1	f-m Sd, l. Cl, t. c Sd (5 YR 5/6)	
			50/3				
-23-							
-24-			26	6	2.1	Cl, l. m Sd, l. Weathered Siltstone (5 YR 5/6)	
			50/6				
-25-							
-26-			39	9	0	Weathered Siltstone; Cl, l. m Sd matrix (5 YR 4/4)	
			44				
-27-			46				
			50				
-28-			38	12	0	Weathered Siltstone; Cl, l. f-m Sd matrix (5 YR 4/4)	
			50/2				
-29-						*Weathered Bedrock*	
-30-			100/5	N/R	N/A	No Recovery, Siltstone in tip of spoon	B-16 (29.5-30')
-31-							
-32-			19	N/R	N/A	No Recovery	
			100/4				
-33-			100/0	N/R	N/A	Bedrock at 33 Feet	
						Bedrock - SILTSTONE	
-34-							
-35-							
-36-						End of Boring at 33 Feet	

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-17

DATE COMPLETED:	June 9, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	37.2 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			8	10	0	f-m Sd, l. Cl, l. Slt, l. Grv (5 YR 4/4)	B-17 (0-0.5')
			7				
-1-			6				
			6				
-2-			4	10	0	f-m Sd, l. Slt, l. Grv; Brick Fragments (5 YR 4/4)	
			3				
-3-			3				
			2				
-4-			4	7	0	f Sd a. Slt (5 YR 5/6)	
			3				
-5-			2				
			2				
-6-			3	4	0	f-m-c Sd, s. Slt, s. Grv; Glass (5 YR 4/4)	
			2				
-7-			2				
			2				
-8-			9	9	0	m-c Sd, l. Slt, cbls (5 YR 4/4)	
			8				
-9-			11			*FILL*	
			30				
-10-			18	12	0	m-c Sd, l. Cl, l. Slt, cbls (5 YR 4/4)	
			17				
-11-			26				
			47				
-12-			50/2	0	N/A	Refusal	
-13-							
-14-			23	14	0	m-c Sd, l. Slt, cbls (5 YR 4/4)	
			19				
-15-			13				
			22				
-16-			19	17	0	f Sd a. Slt (5 YR 4/4)	Moist
			9				
-17-			8				
			7				
-18-			8	22	0	f Sd a. Slt (5 YR 4/4)	Moist
			6				B-17 (18.5-19')
-19-			7				Wet
			17				
-20-			7	20	0	f. Sd a. Slt, t. Grv (5 YR 4/4)	Moist
			7				
-21-			8				
			8				
-22-			8	18	0	f. Sd (5 YR 4/4)	Moist
			9				
-23-	SW-SM		14			*Well Graded SAND with SILT*	
			17				
-24-			13	18	0	f. Sd, s. Slt (5 YR 4/4)	Moist
			14				B-17 (25.5-26')
-25-			9				
			14				
-26-			9	16	0	f. Sd, s. Slt (5 YR 4/4)	Wet
			10				
-27-			12				
			15				
-28-			8	16	0	f Sd a. Slt (5 YR 4/4)	Wet
			9				
-29-			12				
			14				
-30-			5	12	0	f Sd a. Slt (5 YR 4/4)	Wet
			6				
-31-			6				
			13				
-32-			6	16	0	f. Sd a. Slt (5 YR 4/4)	Wet
			12				
-33-			13				
			17				
-34-			27	16	0	f. Sd a. Slt (5 YR 4/4)	Wet
			38				
-35-			43				
			55				

BORING LOG (continued)

LOG: B-17

DATE COMPLETED:	June 9, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-36-			38	24	0	f. Sd a. Slt, t. Grv, Sandstone Pebbles (5 YR 4/4)	Wet
-37-	SW-SM		57 42 37			***Well Graded SAND with SILT***	
-38-	ML		17	22	0	Slt, s. Cl (5 YR 4/4)	Wet
-39-			28 44 48			***SILT***	
-40-			45	20	0	10" Slt, l. Cl; 10" f. Sd, s. Slt, s. Grv; Glacial Till (5 YR 4/4)	Wet
-41-			50/3				B-17 (41-41.5')
-42-			45	6	0	f Sd a. Grv (sub-angular 5YR 4/4 & 10YR 4/2),	Wet
-43-			50/2			s. Slt; Glacial Till	
-44-			37	14	0	Slt a. Grv, l. t. Sd; Glacial Till (5 YR 4/4)	Wet
-45-			45 50/3 14			***GLACIAL TILL***	
-46-			29	6	0	Slt a. Grv, l. f. Sd; Glacial Till (5 YR 4/4)	Wet
-47-			33 38 50/3				
-48-			42	10	0	First attempt: Break 2" spoon;	Wet
-49-			100/4			Second attempt: Glacial Till; Slt a. Grv (5 YR 4/4)	
-50-			27	22	0	Glacial Till; Slt a. Grv (10YR 4/2)	Wet
-51-			36 48 55				
-52-			47	10	0	Glacial Till; Slt a. Grv (10YR 4/2)	Wet
-53-			50/2				B-17 (53.5-54')
-54-			100/1	2	0	Slt s. Grv; Weathered Bedrock (5 YR 4/4)	Wet
-55-			50/0	0	N/A	Weathered Bedrock (5 YR 4/4)	
-56-						***Weathered Bedrock***	
-57-						End of Bonng at 57 Feet	
-58-							
-59-							
-60-							

Killam — BORING LOG

LOG: B-18

DATE COMPLETED:	June 30, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	32.1 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-						Asphalt and Concrete (0-1')	
-1-			10	10	0	f-m-c Sd a. Grv, l. Slt; Fill (5 YR 4/4)	B-18 (1-1.5')
-2-			9				
			5				
-3-			4				
			7	3	0	f-m-c Sd, l. Grv, l. Slt (5 YR 4/4)	
-4-			6				
			7	9	0	f-m-c Sd, l. Grv, l. Slt (5 YR 3/4)	
-5-			7			Asphalt in tip of spoon (N1)	
			8				
-6-			9				
			4	11	0	f-m-c Sd, l. Grv, t. Slt (5 YR 3/4)	
-7-			3				
			1			*FILL*	
-8-			2				
			3	13	0	f-m Sd, s. Grv, t. Slt (5 YR 3/4)	
-9-			2				
			1				
-10-			1				
			2	13	2.1	f-m Sd, t. coarse Sd, t. Grv (5 YR 3/4)	
-11-			2				
			3				
-12-			4				B-18 (11.5-12')
			9	18	0	11" f-m-c Sd a. Grv, t. Slt (5 YR 4/4)	
-13-			11				
			13			7" f Sd, l. Slt (5 YR 6/4)	
-14-			11				
			4	18	0	5" Slt, l. f Sd (5 YR 4/4)	
-15-			4			4" Slt (5 YR 4/4)	Moist;
			7			9" f Sd, l. Slt (5 YR 4/4)	holding water
-16-			11				
			13	18	0	7" f-m-c Sd a. Grv, t. Slt (5 YR 4/4)	
-17-			13			11" f Sd, t. Slt (5 YR 6/4)	
			12				
-18-			14				
			11	16	0	7" f Sd, l. Slt (5 YR 6/4)	
-19-			11			3" Slt (5 YR 4/4)	
			12			6" f Sd, l. Slt (5 YR 6/4)	
-20-			15				
			20	20	0	8" Slt, l. f Sd (5 YR 4/4)	
-21-			14			12" f Sd a. Slt (5 YR 4/4)	
			14				B-18 (21-21.5')
	SW-SM		13			*Well Graded SAND with SILT*	Wet at 21.5 Fee
-22-			4	20	0	18" f Sd, t. Slt (5 YR 3/4)	
-23-			4			2" Slt, t. f Sd (5 YR 3/4)	
			8				
-24-			9				
			10	14	0	Slt, t. f Sd (5 YR 4/4)	
-25-			17				
			17				
-26-			20				
			23	9	2.1	Slt, t. f Sd (5 YR 4/4)	
-27-			50/3				
-28-							
			16	20	0	8" Slt, l. f Sd (5 YR 4/4)	
-29-			23			12" f Sd, t. Slt (5 YR 3/4)	
			38				
-30-			48				
			38	7	2.1	f Sd, l. Slt (10 YR 4/2)	
-31-			50/4				
-32-							B-18 (31.5-32')
			58	12	0	Slt, t. f Sd (5 YR 4/4)	
-33-			50/4				
	ML					*SILT*	
-34-			32	13	0	Slt (5 YR 4/4)	
			34				
-35-			50/4				

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Killam

BORING LOG (continued)

LOG: B-18

DATE COMPLETED: June 30, 1998
DRILLER: Advanced Drilling Incoporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger

PROJECT: PSE&G: Former Front Street Gas Works
LOCATION: Newark, New Jersey
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-36-			16	14	0	Slt (5 YR 4/4)	
-37-	ML		32 50/5			***SILT***	
-38-			7	13	0	11" f Sd a. Slt (5 YR 4/4)	
-39-			33 50/5			2" Slt, t. f Sd (5 YR 4/4)	
-40-			37	6	0	Slt a. f-m-c Sd; Till (5 YR 4/4)	
-41-			50/1				
-42-			27	12	0	Cl matrix; f-m-c Sd (5 YR 5/6)	
-43-			34 50/6			***GLACIAL TILL***	
-44-			50/1	N/R	N/R	44-45' Boulder; No Recovery	
-45-							
-46-			46	11	0	f-m-c Sd, l. Slt, l. Cl (5 YR 4/4)	
-47-			50/6				
-48-			46	9	0.7	Weathered Siltstone s. Cl, l. Slt, l. f-m-c Sd matrix (5 YR 4/4)	
-49-			50/3				
-50-			100/6	11	0.4	Weathered Siltstone l. Cl, l. Slt matrix (5 YR 4/4)	
-51-						***Weathered Bedrock***	
-52-			25	12	0	Weathered Siltstone l. Cl matrix (5 YR 4/4)	
-53-			32 50/3				B-18 (52.5-53')
-54-			100/0	N/R	N/R	Bedrock at 54 Feet	
-55-						***Bedrock - SILTSTONE***	
-56-						End of Boring at 56 Feet	
-57-							
-58-							
-59-							
-60-							

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Killam — BORING LOG

LOG: B-19

DATE COMPLETED:	June 15, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	37.1 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							B-19 (0-0.5')
-1-			16	9	0	1" Asphalt sub-base (N2), 1" Brick (10 YR 4/0)	MGP Odor
			11		1.6	f-m Sd, s. Coal Fragments (5 YR 7/2)	
-2-			5	12	1.6	f-m Sd, l. Coal Fragments (5 YR 7/2)	
-3-			4				
			3			*FILL*	
-4-			3				
			4	9	1.6	f-m Sd, l. Slt, s. Coal Fragments (10 YR 6/2)	
-5-			3			Brick in nose of spoon (10 YR 5/4)	
			2				
-6-			12				
			5	6	1.6	f-m Sd, l. c Sd, s. Grv (5 YR 3/4)	
-7-			5				
			7				
-8-			7				
			8	12	1.6	Weathered Shale; f-m Sd a. Slt matrix (5 YR 3/4)	
-9-			7				
			8				
-10-			8				
			9	13	1.6	f-m Sd, l. c Sd, t. Grv (5 YR 3/4)	
-11-			8				
			7				
-12-			8				
			7	18	0	f-m Sd, t. Slt, t. Grv (5 YR 5/2)	
-13-			8				
			8				
-14-			9				
			8	16	1.6	f-m Sd, l. Slt, l. Grv (5 YR 5/2)	
-15-			9				
			11				
-16-			15				
			11	19	0	f-m-c Sd, s. Slt, s. Grv (5 YR 4/4)	
-17-			11				
			13				
	SP/SM		14			*Poorly Graded SAND with SILT*	
-18-			9	18	1.6	Slt l. f. Sd (5 YR 4/4)	
			6		27	f Sd a. Slt (N3)	
-19-			5				
			9				
-20-			5	15	1	6" f-m-c Sd, s. Grv (5 YR 4/4)	Moist
			11			9" f Sd, s. Slt (5 YR 4/4)	Moist
-21-			12				
			12				
-22-			13	20	0	f-m Sd, t. Slt (5 YR 4/4)	Moist
			19				
-23-			20				
			22				
-24-			14	15	50	f Sd, s. Slt (5 YR 4/4)	Moist
			17				
-25-			20				B-19 (25.5-26')
			21				
-26-			16	20	4	f Sd, s. Slt (5 YR 4/4)	Moist
			16				
-27-			13				
			17				B-19 (27.5-28')
-28-			15	24	16	f Sd, s. Slt (5 YR 4/4)	Wet
			16				
-29-	SW-SM		27			*Well Graded SAND with SILT*	
			29				
-30-			15	24	18	Slt, s. f. Sd (5 YR 4/4)	Wet
			16				
-31-			26				
			27				B-19 (31.5-32')
-32-			34	24	13	Slt, s. f. Sd (5 YR 4/4)	Wet
			56				
-33-			50/2				
-34-			22	20	1	f Sd, s. Slt, s. Grv, s. c Sd (5 YR 4/4)	Wet
			38				
-35-			50/2				

Killam — BORING LOG (continued)

LOG: B-19

DATE COMPLETED:	June 15, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A

DEPTH (FT.)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-36-			42	20	0	Slt, s. f. Sd (5 YR 4/4)	Wet
-37-	SW-SM		50/5			***WELL GRADED SAND WITH SILT***	
-38-			26	20	0	Slt, t. Cl (5 YR 4/4)	Wet
-39-	ML		29, 32, 30			***SILT***	
-40-			7	20	0	Slt, t. Cl, t. Grv; Glacial Till (5 YR 4/4)	Wet
-41-			9, 22, 32				
-42-			27	20	0	Slt, t. Grv; Glacial Till (5 YR 4/4)	Wet
-43-			38, 50/2				
-44-			22	8	0	Slt a. Grv; Glacial Till (5 YR 4/4)	Wet
-45-			27, 30, 33			***GLACIAL TILL***	
-46-			48	10	0	Slt a. Grv; Glacial Till (5 YR 4/4)	Wet
-47-			50/4				
-48-			100/6	6	0	Slt a. Grv; Glacial Till (5 YR 4/4)	Wet
-49-							
-50-			100/4	6	0	Slt a. Grv, s. Weathered Bedrock, s. Siltstone (5 YR 4/4)	Wet
-51-							
-52-			100/4	12	1	Slt a. Weathered Bedrock (5 YR 4/4)	Wet
-53-						***Weathered Bedrock***	
-54-			100/6	12	1	Slt a. Weathered Bedrock (5 YR 4/4)	Wet
-55-							
-56-			100/4	12	5	Slt a. Weathered Bedrock (5 YR 4/4)	Wet
-57-							B-19 (57.5-58')
-58-			100/1	2	0	Bedrock at 58 Feet	
-59-						***Bedrock - SILTSTONE***	
-60-						End of Boring at 58 Feet	

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Killam — BORING LOG

LOG: B-20

DATE COMPLETED:	June 11, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	39.5 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-			11	20	0	f-m-c Sd, s. Grv, l. Slt (5 YR 3/4)	Dry
			12				B-20 (1.5-2')
-2-			7	12	0	f-m-c Sd, s. Grv, l. Slt (5 YR 4/4)	Dry
			7				
-3-			8				
			11				
-4-			12	12	0	f-m-c Sd, s. Grv, large cobbles (5 YR 4/4)	Dry
			13				
-5-			12				
			12				
-6-			8	10	0	f-m-c Sd, s. Grv, large cobbles (5 YR 4/4)	Dry
			7				
-7-			10				
			8				
-8-			6	12	0	f-m-c Sd, s. Grv, l. Slt (5 YR 4/4)	Dry
			8			*FILL*	
-9-			6				
			10				
-10-			20	12	0	m-c Sd, s. Grv, l. Slt (5 YR 4/4)	Moist
			10				
-11-			6				
			5				
-12-			7	20	0	m-c Sd, s. Grv, l. Slt (5 YR 4/4)	Moist
			8				
-13-			7				
			7				
-14-			13	20	0	m-c Sd, s. Grv (5 YR 4/4)	Dry
			14				
-15-			10				
			8				
-16-			10	22	0	f-m Sd, s. Slt (5 YR 4/4)	Moist
			9				
-17-			8				
			9				
-18-			9	22	0	f-m Sd, l. Slt (5 YR 4/4)	Moist
			8				
-19-			7				
			8				B-20 (19.5-20
-20-			5	20	0	f-m Sd, s. Slt (5 YR 4/4)	Moist
			6				
-21-	SP-SM		6			*Poorly Graded SAND with SILT*	
			7				
-22-			7	22	0	f-m-c Sd, s. Grv, l. Slt (5 YR 4/4)	Moist
			6				
-23-			9				
			14				
-24-			5	20	0	f-m Sd, s. Slt (5 YR 4/4)	Moist
			6				
-25-			9				
			10				
-26-			16	22	0	f. Sd, l. Slt (5 YR 4/4)	Moist
			16				
-27-			17				
			28				
-28-			10	22	0	f. Sd, l. Slt (5 YR 4/4)	Very Moist
			9				
-29-	SW-SM		12			*Well Graded SAND with SILT*	
			14				B-20 (29.5-30
-30-			5	20	1	f-m Sd, l. Slt (5 YR 4/4)	Wet; MGP Oc
			5				
-31-			6				
			8				
-32-			6	24	1	f-m Sd, s. Slt (5 YR 4/4)	Wet; MGP Oc
			10				MGP Visible
-33-	SP-SM		15			*Poorly Graded SAND with SILT*	
			10				
-34-			10	22	1	f. Sd, l. Slt (5 YR 3/4)	Wet; MGP Oc
			13				
-35-	SW-SM		16			*Well Graded SAND with SILT*	
			22				

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Killam

BORING LOG (continued)

LOG: B-20

DATE COMPLETED: June 11, 1998
DRILLER: Advanced Drilling Incoporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger

PROJECT: PSE&G: Former Front Street Gas Works
LOCATION: Newark, New Jersey
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-36-	SW-SM		13	24	2	f. Sd, s. Slt, t. Cl (5 YR 3/4)	Wet; MGP Odor
-37-			25				
			28				
			33			***Well Graded SAND with SILT***	
-38-	ML		N/A	18	N/A	Shelby Tube; Slt in the nose of the tube	
-39-							
-40-			13	22	4	Slt, t. Cl (5 YR 4/4)	Wet
			11				
-41-			11			***SILT***	
			14				
-42-			13	24	1	Slt, t. Cl (5 YR 4/4)	B-20 (41.5-42') Wet
			13				
-43-			15				
			7				
-44-			25	20	0	Slt, t. Grv; Glacial Till (5 YR 4/4)	Wet
			38				
-45-			38				
			50/2				
-46-			42	20	0	Slt, s. Grv, s. c Sd; Glacial Till (5 YR 4/4)	Wet
			50/2				
-47-							
-48-			16	15	0	Slt, s. Grv, s. c Sd; Glacial Till (5 YR 4/4)	Wet
			23				
-49-			50/5			***GLACIAL TILL***	
-50-			23	15	1	Slt, s. c Sd (5 YR 4/4)	Wet
			45				
-51-			50/2				
-52-			51	8	0	Slt, l. c Sd, t. Cl	Wet
			50/2				
-53-							
-54-			42	15	1	Weathered Bedrock a. Slt, f. Sd matrix	B-20 (54.5-55')
			100/5			***Weathered Bedrock***	
-55-			50/0	N/R	N/A	Bedrock at 55'	
						Bedrock - SILTSTONE	
-56-							
-57-						End of Boring at 56 Feet	
-58-							
-59-							
-60-							

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SHEET 2 OF 2

Killam — BORING LOG

LOG: B-21

DATE COMPLETED:	June 18, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		ELEVATION:	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-						Crushed Stone (Backfill) from 0-7'	
-4-							
-5-							
-6-							
-7-			4	20	2.1	m-c Sd, s. Grv, t. Slt (5 YR 4/4)	Dry
			6				
-8-			6				
			5				B-21 (8.5-9')
-9-			7	8	2.1	m-c Sd, s. Grv, Cobbles (5 YR 4/4)	Dry
			7				
-10-			5				
			7				
-11-			8	15	2.1	m-c Sd, s. Grv, Cobbles, t. Slt (5 YR 4/4)	Dry
			10				
-12-			8				
			16				B-21 (12.5-13')
-13-			27	10	2.1	m-c Sd, s. Grv, s. grysh Cobbles (5 YR 4/4)	Dry
			30				
-14-			33				
			29				
-15-			48	8	2.1	m-c Sd, s. Grv, s. Cobbles (5 YR 4/4)	Dry
			50/2				
-16-							
-17-			36	10	2.1	m-c Sd, s. Grv, large Cobbles (5 YR 4/4)	Dry
			38				
-18-			45			*FILL*	
			55				
-19-			27	10	2.1	m-c Sd, s. Grv, large Cobbles (5 YR 4/4)	Dry
			39				
-20-			17				
			18				
-21-			29	12	2.1	m-c Sd, s. Grv, large Cobbles (5 YR 4/4)	Dry
			41				
-22-			14				
			14				
-23-			31	10	2.1	m-c Sd, s. Grv, Cobbles (5 YR 4/4)	Dry
			18				
-24-			27				
			21				
-25-			42	19	16	13" f Sd a. Slt (5 YR 4/4)	
			10		133	6" f Sd a. Slt (5 YR 3/4)	Moist
-26-			8				
			10				B-21 (26.5-27')
-27-			12	24	22	6" f Sd a. Slt (5 YR 3/4)	Wet
			18		153	6" f Sd s. Slt (5 YR 3/4)	Product Visible
-28-			22		140	12" f Sd s. Slt (5 YR 3/4)	
			29				
-29-			7	18	857	f Sd s. Slt (5 YR 3/4)	Product Visible
			9				
-30-	SW-SM		13			*Well Graded SAND with SILT*	
			14				B-21 (30-30.5')
-31-			5	22	33	f Sd s. Slt (5 YR 3/4)	
			5				
-32-			7				
			7				
-33-			4	12	605	f Sd s. Slt (5 YR 3/2)	
			4				
-34-			4				
			8				
-35-			8	11	758	3" f Sd s. Slt (5 YR 3/2)	
	ML		7		18	8" Slt (5 YR 4/4) *SILT*	

K:\ENG\263709\LOGS\B-21

Killam

BORING LOG (continued)

LOG: B-21

DATE COMPLETED: June 18, 1998
DRILLER: Advanced Drilling Incoporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger

PROJECT: PSE&G. Former Front Street Gas Works
LOCATION: Newark, New Jersey
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-36-	ML		5	16	4.1	Slt (5 YR 4/4) *SILT*	
			8				
-37-			10				
			11				
-38-			13				
			14				
-39-						End of Boring at 39 Feet	
-40-							
-41-							
-42-							
-43-							
-44-							

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Killam — BORING LOG

LOG: B-23

DATE COMPLETED:	June 16, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	38.9 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			2	2	0	Asphalt, Topsoil (5 YR 2/2)	Moist
-1-			3				
			4				
			5				
-2-			4	10	0	m-c Sd, s. Grv, t. Slt (5 YR 3/4)	Moist
-3-			5				
			5				B-23 (3.5-4')
-4-			4	10	0	m-c Sd, s. Grv, s. Asphalt (5 YR 3/4)	Moist
-5-			5				
			6				
			6				
-6-			8	8	0	m-c Sd, s. Grv, t. Asphalt (5 YR 4/4)	Moist
-7-			7				
			6				
			9				
-8-			6	6	0	m-c Sd, s. Grv (5 YR 4/4)	Moist
-9-			5				
			7			*FILL*	
			10				
-10-			5	12	0	m-c Sd, s. Grv, s. Shale, t. Slt (5 YR 4/4)	Moist
-11-			6				
			16				
			17				
-12-			14	10	0	m-c Sd, s. Grv, s. Shale (5 YR 4/4)	Moist
-13-			10				
			8				
			8				
-14-			6	12	0	m-c Sd, s. Grv, t. Shale (5 YR 4/4)	Moist
-15-			6				
			8				
			10				
-16-			10	8	0	m-c Sd, s. Grv (5 YR 4/4)	Dry
-17-			10				
			13				
			14				
-18-			11	10	0	m-c Sd, s. Grv (5 YR 4/4)	Dry
-19-			13				
			18				
			12				
-20-			7	20	0	f-m Sd, s. Slt (5 YR 4/4)	Moist
-21-			8				
			8				
			12				
-22-			14	22	0	f-m-c Sd, s. Grv, t. Slt (5 YR 4/4)	Moist
-23-			16				
			22				
			13				
-24-			8	20	34.4	f-m Sd, s. Slt (5 YR 4/4)	Moist
-25-			9				
			16				
			13				B-23 (25.5-26')
-26-			12	22	22.7	f-m Sd, s. Slt (5 YR 4/4)	Moist
-27-	SP-SM		13				
			17			*Poorly Graded SAND with SILT*	
			16				B-23 (27.5-28')
-28-			13	22	2.2	f-m Sd, s. Slt (5 YR 4/4)	Wet
-29-			13				
			17				
			18				
-30-			3	22	10.7	f-m Sd, s. Slt (5 YR 4/4)	Wet
-31-			6				Product Visible
			9				Sheen; Odor
			13				B-23 (31.5-32')
-32-			22	24	10.2	f-m Sd, s. Slt (5 YR 4/4)	Wet
-33-			24				No Product
			31				Sheen; Odor
			31				
-34-			15	20	0	Silt (5 YR 4/4)	Wet
-35-	ML		39			*SILT*	
			38				
			37				

K:\ENGA\263709\LOGS\B-23

SHEET 1 OF 2

Killam

BORING LOG (continued)

LOG: B-23

DATE COMPLETED: June 16, 1998
DRILLER: Advanced Drilling Incoporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger

PROJECT: PSE&G Former Front Street Gas Works
LOCATION: Newark, New Jersey
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-36-			53	12	1.1	Slt, t. Grv (5 YR 4/4)	Wet
-37-			50/3				
-38-			29	10	0	Slt, t. Cl (5 YR 4/4)	Wet
-39-	ML		35			*SILT*	
-40-			50/4	15	0	Slt (5 YR 4/4)	Wet
-41-			27				
-42-			38	15	0	f-m-c Sd, s. Slt, s. Grv; Glacial Till (5 YR 4/4)	Wet
-43-			50/5				
-44-			37	0	0	Boulder	
-45-			40				
-46-			50/3	20	0	*GLACIAL TILL*	
-47-			100/0			Slt, s. Grv; Glacial Till (5 YR 4/4)	Wet
-48-			16	24	0.1	m-c Sd, s. Slt; Glacial Till (5 YR 4/4)	Wet
-49-			23				
-50-			33	8	0	Slt, s. m-c Sd, s. Weathered Bedrock; Glacial Till (5 YR 4/4)	Wet
-51-			37				
-52-			39	2	0	Slt, s. Grv, cobbles, s. Weathered Bedrock (5 YR 4/4)	Wet
-53-			100/5				
-54-			100/6	10	0	*Weathered Bedrock*	
-55-			26			Slt, cobbles, s. Weathered Bedrock (5 YR 4/4)	Wet
-56-			38	12	0	Slt, Weathered Bedrock (5 YR 4/4)	Wet
-57-			50/2				B-23 (56.5-57')
-58-			31	N/R	N/A	Bedrock at 58 Feet, Refusal	
-59-			50/5			*Bedrock - SILTSTONE*	
-60-			100/1			End of Boring at 58 Feet	

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BORING LOG

LOG: B-24

DATE COMPLETED:	August 5, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	38.8 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-10-			12	7	0	f-m Sd, t. Grv, cobbles in nose (5 YR 6/4)	
			6				
-11-			6				
			11			*FILL*	
-12-							
-13-							
-14-							
-15-			15	14	0	f-m-c Sd a. Grv, l. Slt (5 YR 4/4)	
			15				
-16-			24				
	SP		25			*Poorly Graded SAND with GRAVEL*	
-17-							
-18-							
-19-							
-20-			7	18	0	11" f Sd, l. Slt (5 YR 4/4)	Dry
			5			2" Slt (5 YR 4/4)	Wet
-21-			4			2" Cl (5 YR 4/4)	Dry
			6			3" f Sd a. Slt (5 YR 4/4)	Dry
-22-			10	18	0	8" f Sd, t. Slt (5 YR 4/4)	Dry
			9			3" f Sd a. Slt (5 YR 4/4)	Wet
-23-			9			7" f Sd, t. Slt (5 YR 4/4)	Dry
			12				
-24-			7	12	0	6" Grv, s. f-m Sd (5 YR 4/4)	
			12			6" f Sd, t. Slt (5 YR 6/4)	
-25-			8				
			6				
-26-			12	12	0	f Sd, t. Slt (5 YR 4/4)	
			9				
-27-	SW-SM		9			*Well Graded SAND with SILT*	Wet at 27 Feet
			8				
-28-			6	16	0	f Sd a. Slt (5 YR 4/4)	Wet
			12				
-29-			16				
			22				B-24 (29.5-30')
-30-			48	3	0	f Sd a. Slt (5 YR 4/4)	Wet
			50/4				
-31-							
-32-			13	12	0	4" f Sd a. Slt (5 YR 4/4)	
			11			8" Slt (5 YR 4/4)	
-33-			10				
			11				
-34-			15	19	0	f Sd a. Slt (5 YR 4/4)	
			20				
-35-			28				
			32				
-36-			46	18	0	13" f Sd a. Slt (5 YR 4/4)	
			30				
-37-	ML		36			5" Slt (5 YR 4/4)	
			50/5			*SILT*	
-38-							
-39-						End of Boring at 38 Feet	
-40-							

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-25

DATE COMPLETED:	June 17, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	34.0 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-						6" Asphalt 1" Cement	
-1-							
			32	6	0	Asphalt, m-c Sd, s. Grv, Brick Fragments (5 YR 2/2)	Dry
-2-			11	8	0	Asphalt, m-c Sd, s. Grv, Brick Fragments (5 YR 2/2)	
			13				
-3-			13				
			11				
-4-			13	2	0	Large Cobbles (5 YR N8)	Dry
			12				
-5-			11			*FILL*	
			11				
-6-			12	2	0	Large Cobbles, f-m Sd, s. Grv (5 YR 4/4)	Dry
			11				
-7-			12				
			11				
-8-			15	2	0	Large Cobbles, f-m-c Sd (5 YR 4/4)	Dry
			12				
-9-			12				
			14				
-10-			8	20	0	f-m-c Sd, s. Cobbles (5 YR 4/4)	Dry
			18				
-11-			13				
			22				B-25 (11.5-12')
-12-						End of Boring at 12 Feet	
-13-							
-14-							
-15-							

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Killam — BORING LOG

LOG: B-26

DATE COMPLETED:	July 24, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			4	8	0	f-m-c Sd a. Grv, l. Slt; Fill (5 YR 3/2)	B-26 (0-0.5')
			3				
-1-			4				
			2				
-2-			2	7	0	f-m-c Sd a. Grv, l. Slt (5 YR 6/4)	
			2				
-3-			4				
			3				
-4-			7	10	2.1	5" Grv, l. f-m Sd, l. Slt (5 YR 5/6)	B-26 (3.5-4')
			12			5" f-m-c Sd, l. Grv, l. Slt (5 YR 3/2)	
-5-			17				Visible Product
			42				
-6-			13	10	120	Cl a. Grv, t. f Sd (5 YR 3/2)	Visible Product
			10				
-7-			17				
			9				
-8-			7	6	9	f-m Sd, l. Grv, l. Slt (5 Y 2/1)	B-26 (7.5-8')
			10				Product
-9-			8			*FILL*	
			10				
-10-			17	10	4.2	f-m Sd, l. Grv, l. Slt (5 Y 2/1)	Product
			14				
-11-			17				
			10				
-12-			12	14	2	f Sd a. Slt, t. Grv (5 Y 2/1)	Product
			10				
-13-			10				
			17				
-14-			17	20	1.8	f Sd a. Slt, s. Grv (5 Y 2/1)	Product
			20				
-15-			13				
			8				
-16-			7	16	12.9	10" Cl (N1)	
			4		0.4	6" Cl (5 Y 4/1)	
-17-			4				
			5				
-18-			2	20	0	Cl (5 Y 4/1)	
			1				
-19-			1				
	CH		2			*Fat CLAY*	
-20-							
-21-			N/A	24	0	23" Cl, slightly organic (5 Y4/1)	
						1" f-m Sd (5 Y 2/1)	
-22-							
-23-			3	14	0	13" Cl (5 Y 4/1)	
			2		4.3	1" Till; f-m-c Sd, l. Grv, Cl matrix (5 Y 2/1)	Odor; Insufficient Sample volumes
-24-			5				
			6				B-26 (24.5-25')
-25-			5	11	2.1	f-m-c Sd, l. Grv (5 Y 2/1)	
			6				
-26-			4			*GLACIAL TILL*	
			6				B-26 (26.5-27')
-27-			14	13	0	f-m-c Sd, l. Grv, Cl matrix (5 YR 4/4)	
			12				
-28-			32				
			37				
-29-			50	14	0	Weathered Siltstone, Cl matrix (5 YR 4/4)	
			51				
-30-			54				
			34				
-31-			47	6	0	Weathered Siltstone, Cl matrix (5 YR 4/4)	
			56			*Weathered Bedrock*	
-32-			47				
			48				
-33-			32	8	0	Weathered Siltstone, Cl matrix (5 YR 4/4)	
			50				
-34-			100/5			Bedrock at 34.5 Feet	B-26 (34-34.5')
						Bedrock - SILTSTONE	
-35-						End of Boring at 35 Feet	
-36-							

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-27

DATE COMPLETED:	July 10, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	39.5 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-			1	7	0		
			2			f-m Sd, l. Grv, t. Slt; Fill (5 YR 4/4)	
-1-			7				
			6				
-2-			4	10	2.1	f-m Sd, t. Grv, t. Slt (5 YR 4/4)	
			4				
-3-			4				
			4				
-4-			27	7	0	Weathered Concrete (N6)	
			6				
-5-			18				
			11				
-6-			9	10	2.1	f Sd, l. Slt, l. Grv (10 YR 4/2)	
			8				
-7-			5				
			5				
-8-			2	16	2.1	f Sd, l. Slt, l. Grv (10 YR 4/2)	Moist at 7.5' Wet
			1				
-9-			1				
			1				
-10-			17	9	2.1	f Sd a. Grv (5 Y 4/1)	
			27			*FILL*	
-11-			13				
			4				
-12-			1	24	0	f-m Sd, t. Grv; very loose material (5 YR 3/4)	
			1				
-13-			1				
			0				
-14-							
			1	18	0	f-m Sd, t. Grv, t. Slt; very loose material (5 YR 3/4)	
-15-			0				
			1				
-16-			0				
			1	10	0	f-m Sd, t. Grv, t. Slt, t. concrete fragments (5 YR 3/4)	
-17-			2				
			3				
-18-			3				
			5	12	0	11" f-m Sd, l. Slt (5 YR 3/4)	
-19-			6		2.1	1" f-m Sd, l. Slt (N1)	Oily Product
			2				
-20-			50/1				
-21-						End of Boring at 20 Feet	
-22-							
-23-							
-24-							
-25-							
-26-							
-27-							
-28-							
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-28

DATE COMPLETED:	July 15, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	37.8 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-						Asphalt, Fill	
-1-			9	18	0	f-m Sd, s. Slt (5 YR 5/6)	
-2-			9				
			10				
-3-			24				
			7	14	0	f-m-c Sd s. Slt (5 YR 4/4)	
-4-			5				
			5				
-5-			4				
			4	16	0	f-m-c Sd, l. Grv, s. Slt, t. coal fragments; Fill (5 YR 4/4)	
-6-			3				
			3				
-7-			4				
			4	N/R	N/R	No Recovery	
-8-			5				
			5				
-9-			4				
			2	11	0	f-m-c Sd, t. Grv, l. Slt (10 YR 4/2)	
-10-			1				
			1			*FILL*	Wet at 10 Feet
-11-			1				
			1	10	0	f-m Sd, t. Slt (5 YR 4/4)	
-12-			0				
			1				
-13-			0				
			WOH	1	0	f-m Sd, t. Slt (5 YR 4/4)	
-14-							
-15-							
			2	3	0	f-m Sd, t. Slt (5 YR 4/4)	
-16-			1				
			1				
-17-			1				
			1	8	0	f-m Sd, t. Slt (5 YR 4/4)	
			1	9	0	f-m-c Sd a. Grv, l. Slt, t. Cl (10 YR 4/2)	
-18-			1				
			1				
-19-			1	10	0	f-m Sd, t. Slt, t. Grv (5 YR 4/4)	
			1	2	0	Coal Ash (N1)	Bottom of Holder at 20'
-20-			1				
			REFUSAL				
-21-						End of Boring at 21 Feet	
-22-							
-23-							
-24-							
-25-							
-26-							
-27-							
-28-							
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

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SHEET 1 OF 1

TIERRA-B-018175

BORING LOG

LOG: B-29

DATE COMPLETED:	July 15, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-						Asphalt	
-1-			7	18	0	f-m Sd, l. Slt, t. Grv; Fill (5 YR 5/6)	
-2-			8				
			6				
-3-			9				
			12	12	0	f-m Sd a. Slt, Glass fragments (10 YR 4/2)	
-4-			11				
			11				
-5-			7				
			3	N/R	N/R	No Recovery	
-6-			2				
			3				
-7-			2			*FILL*	
			3	N/R	N/R	No Recovery	
-8-			4				
			5				
-9-			2				
			4	9	0	f-m-c Sd, s. Grv, s. Slt (5 YR 4/4)	
-10-			5	2		Concrete (N7)	
			7				
-11-			7				
			4	N/R	N/R	No Recovery	
-12-			4				
			4				
-13-			6				
						Refusal at 13 Feet	
-14-						End of Boring at 13 Feet	
-15-							
-16-							
-17-							
-18-							
-19-							
-20-							
-21-							
-22-							
-23-							
-24-							
-25-							
-26-							
-27-							
-28-							
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

Killam — BORING LOG

LOG: B-30

DATE COMPLETED:	August 6, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			3	10	0	f-m Sd, t. Grv (5 YR 6/4)	
-6-	SP		3				
-7-			3			*Poorly Graded SAND with GRAVEL*	
-8-			5				
-9-							
-10-			23	18	0	Angular Grv, l. f-m-c Sd, t. Slt (5 YR 6/4)	
-11-	GP		44				
-12-			51			*Poorly Graded GRAVEL*	
-13-			49				
-14-							
-15-							
-16-			17	12	0	4" Angular/sub-angular Grv, l. f-m-c Sd, t. Slt (5 YR 6/4)	
-17-			12			8" f Sd, t. Slt (5 YR 5/6)	
-18-			6				
-19-			6				
-20-							
-21-			12	11	0	f Sd, t. Slt (5 YR 5/6)	Moist at Tip
-22-			11				
-23-	SW-SM		9				
-24-			12				
-25-			5	17	138	f Sd, t. Slt (5 YR 4/4)	Strong Odor
-26-			10				
-27-			15				
-28-			25				
-29-			19	18	140	f Sd, t. Slt (5 YR 4/4)	Strong Odor
-30-			14				
-31-			14			*Well Graded SAND with SILT*	
-32-			16				
-33-			6	18	158	f Sd, t. Slt (5 YR 3/2)	Strong Odor; Wet
-34-			9				
-35-			8				
-36-			7				
-37-			5	12	152	f Sd, t. Slt (5 YR 3/2)	Visible Product
-38-			7				
-39-			8				
-40-			17				
			8	12	756	f Sd, t. Slt (5 YR 3/2)	Visible Product
			23				
			29				B-30 (29-29.5')
			29				
			10	18	23.8	9" f Sd a. Slt (5 YR 4/4)	
	ML		10		8.7	9" Slt (5 YR 4/4)	
			16			*SILT*	
			15				
						End of Boring at 32 Feet	

K:\ENG\263709\LOG\SHB-30

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-31

DATE COMPLETED:	August 7, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			5	10	0	f-m-c Sd, l. Grv, l. Slt; Fill (5 YR 6/4)	
-6-			5				
-7-			7				
-8-			6			*FILL*	
-9-							
-10-			8	16	0	f-m Sd a. Grv, t. Slt (5 YR 4/4)	
-11-	SP		10				
-12-			8				
-13-			7			*Poorly Graded SAND with GRAVEL*	
-14-							
-15-			12	16	0	f-m Sd a. Grv, t. Slt (5 YR 4/4)	
-16-			11				
-17-			18				
-18-			32				
-19-							
-20-			5	18	368	10" f-m Sd a. l. Slt (5 YR 4/4)	
-21-			5		290	4" Slt, t. f. Sd (5 GY 2/1)	Visible Product B-31 (21-21.5')
-22-			8		88	4" f Sd, l. Slt (5 YR 4/4)	
-23-			24				
-24-			10	16	10.8	f Sd, t. Slt (5 YR 4/4)	
-25-			6				
-26-			8				
-27-			8				
-28-			6	18	2.1	f Sd, t. Slt (5 YR 4/4)	
-29-			8				
-30-			9				
-31-			9				
-32-			5	19	192	f Sd, t. Slt (5 YR 4/4)	Strong Odor
-33-			6				
-34-			11				
-35-			11				
-36-	SW-SM		16	20	216	f Sd, t. Slt (5 YR 3/4)	Product; Strong Odor
-37-			10			*Well Graded SAND with SILT*	Wet at 29 Feet
-38-			11				
-39-			12				
-40-			7	18	144	f Sd, l. Slt (5 YR 4/4)	
			14				
			19				
			24				
			19	17	12.9	f Sd a. Slt (5 YR 4/4)	
			22				
			26				
			29				
			22	18	2.1	f Sd a. Slt (5 YR 4/4)	
			27				
			37				
			46				
			32	16	2.1	8" f Sd a. Slt (5 YR 4/4)	
	ML		50		0	8" Slt (5 YR 4/4)	
			52			*SILT*	
			61				
						End of Boring at 38 Feet	

K:\NEW\263709\LOGS\B-31

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-32

DATE COMPLETED:	August 14, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	37.6 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			4	10	0	Wood, s. f-m-c Sd a. Grv; Fill (5 YR 4/4)	
			4				
-6-			5				
			5				
-7-						*FILL*	
-8-							
-9-							
-10-			3	NR	NR	Rock in nose of spoon	Wet
			4				
-11-			5				
			5				
-12-			8	3	0	Grv	
			5				
-13-			6				
			6				
-14-	SP-SM		3	16	0	6" f-m-c Sd, l. Slt (5 YR 4/4) *Poorly Graded SAND with SILT*	
			2			10" Cl (5 G 4/1)	
-15-	CH		1			*Fat CLAY*	
			2				
-16-			5	20	0	f-m Sd	
			3				
-17-	SP		4			*Poorly Graded SAND*	
			3				
-18-			2	12	0	10" f-m Sd	Slight MGP Odor
			2			2" Cl (5 G 4/1)	
-19-	CH		3			*Fat CLAY*	B-32 (19-19.5')
			2				
-20-			2	12	0	f-m Sd	
			4				
-21-			4				
	SP		4			*Poorly Graded SAND*	
-22-			5	16	0	f-m Sd	
			5				
-23-			4				
			6				
-24-			3	6	0	f-m Sd a. Grv; Cl matrix; Till (5 YR 4/4)	
			8				
-25-			16			*GLACIAL TILL*	
			15				
-26-			11	12	0	f-m Sd a. Grv; Cl matrix; Till (5 YR 4/4)	
			10				
-27-			12				
			22				
-28-						End of Boring at 28 Feet	
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-33

DATE COMPLETED:	August 15, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	36.9 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-						Belgian Block	
-1-							
-2-						*FILL*	
-3-							
-4-							
-5-			19	12	0	f-m-c Sd, t. Grv, t. Slt (5 YR 4/4)	
-6-			14				
-7-			12				
-8-			11				
-9-							
-10-							
-11-			10	1	0	f-m Sd a. Grv, Cobbles in nose of spoon (5 YR 4/4)	
-12-			7				
-13-	SP		6			*Poorly Graded SAND with GRAVEL*	
-14-			6				
-15-							
-16-			5	11	0	f-m-c Sd a. Grv, t. Slt (5 YR 4/4)	
-17-			5				
-18-			5				
-19-			5				
-20-							
-21-			5	12	28	Grv a. f-m-c Sd, t. Slt (5 YR 3/4)	Odor
-22-			13				
-23-			9				
-24-			12				
-25-	SW-SM		14	16	49	13" f Sd, t. Slt (5 YR 6/4)	
-26-			12		28	3" Slt a. f Sd (5 YR 4/4)	
-27-			11				
-28-			11				
-29-			5	14	328	f Sd, t. Slt (5 YR 4/4)	Strong Odor; Drip oil
-30-			10				
-31-			16			*Well Graded SAND with SILT*	
-32-			14				
-33-			13	20	342	f Sd, t. Slt (5 YR 4/4)	Wet at 26 Feet; Visible Product; No samples collected
-34-			15				
-35-			12				
-36-			11				
			5	18	451	9" f Sd, l. Slt (5 YR 4/4)	
	ML		10		28	9" Slt (5 YR 4/4)	
			10			*SILT*	
			12				
						End of Boring at 30 Feet	

R:\ENG\263709\LOGS\B-33

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-34

DATE COMPLETED:	August 15, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	38.5 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-						Belgian Block	
-1-							
-2-							
-3-							
-4-						*FILL*	
-5-			2	9	0	Cl, l. f-m Sd; Fill (10 YR 6/6)	
-6-			5				
-7-			5				
-8-			5				
-9-							
-10-			5	17	0	f-m-c Sd, l. Grv (5 YR 4/4)	
-11-			4				
-12-			4				
-13-	SP		8			*Poorly Graded SAND with GRAVEL*	
-14-							
-15-			7	12	0	f-m-c Sd (5 YR 4/4)	
-16-			7				
-17-			8				
-18-			9				
-19-							
-20-			4	16	0	Grv, s. f-m-c Sd, t. Slt (5 YR 4/4)	
-21-	GP		14			*Poorly Graded GRAVEL*	
-22-			14				
-23-			15				
-24-							
-25-			9	20	0	f Sd, t. Slt (5 YR 4/4)	
-26-			10				
-27-	SW-SM		12			*Well Graded SAND with SILT*	Wet at 26.5 Feet
-28-			12				
-29-							
-30-			5	14	2.1	12" f Sd, t. Slt (5 YR 4/4)	MGP Odor
-31-	ML		6		0	2" Slt (5YR 4/4)	B-34 (31-31.5')
-32-			8			*SILT*	
-33-			8			End of Boring at 32 Feet	
-34-							
-35-							
-36-							

K:\ENG\263709\LOGS\B-34

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-35

DATE COMPLETED:	August 15, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	37.2 (Ground)

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-						Belgian Block	
-1-							
-2-							
-3-							
-4-						*FILL*	
-5-			6	5	0	f-m Sd, l. Slt (5 YR 4/4)	
-6-			11				
-7-			14				
-8-			16				
-9-							
-10-	SW-SM		8	15	0	f Sd a. Slt (5 YR 4/4)	
-11-			9			*Well Graded SAND with SILT*	
-12-			7				
-13-			5				
-14-							
-15-	GW		17	3	0	Grv a. f-m-c Sd (5 YR 4/4)	
-16-			18			*Well Graded GRAVEL with SAND*	
-17-			16				
-18-			18				
-19-							
-20-			6	11	9.6	f Sd a. Slt (5 YR 3/4)	Odor; Moist; Drip oil
-21-			8				
-22-			7				B-35 (21.5-22')
-23-			9	18	0	f Sd, t. Slt, t. Grv (5 YR 6/4)	
-24-			9				
-25-			10				
-26-	SW-SM						
-27-			3	17	0	f Sd, t. Slt (5 YR 4/4)	
-28-			5			*Well Graded SAND with SILT*	Wet at 26 Feet
-29-			6				
-30-			7				
-31-							
-32-			4	14	0	f Sd, l. Slt (5 YR 4/4)	
-33-	ML		6				
-34-			12				
-35-			13				
-36-			23	18	0	14" f Sd, l. Slt (5 YR 4/4)	
			34				
			50/5			4" Slt (5YR 4/4)	
						SILT	
						End of Boring at 34 Feet	

K:\ENG\263709\LOGS\B-35

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-36

DATE COMPLETED:	August 17, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-						FILL	
-5-			6	NR	NR	No Recovery	
-6-			5 4 4				
-7-							
-8-							
-9-							
-10-			5	9	0	f-m-c Sd a. Grv, l. Slt (5 YR 4/4)	
-11-			11 11 9				
-12-							
-13-							
-14-							
-15-			11	5	0	f-m-c Sd a. Grv, l. Slt (5 YR 4/4)	
-16-			11 12				
-17-	SP		12			*Poorly Graded SAND with GRAVEL*	
-18-							
-19-							
-20-			6	11	0	f-m-c Sd, l. Grv, l. Cl (5 YR 4/4)	
-21-			11 5 5				
-22-			N/A	N/A	190	(From Cuttings)	Strong Odor
-23-							
-24-							
-25-			5	19	178	f Sd, t. Slt (5 YR 4/4)	Strong odor, black staining
-26-			5 5 5				Slight sheen at 26'
-27-			5	12	411	f Sd, t. Slt (10 YR 4/2)	Strong odor, Free product
-28-	SW-SM		7 10 12			*Well Graded SAND with SILT*	
-29-							
-30-			7 9 11	12	437	f Sd, l. Slt (10 YR 4/2)	Strong odor, Free product
-31-			14	20	2,293	f Sd, l. Slt (5 YR 4/4)	Strong odor, Free product B-36 (32-32.5')
-32-			20 24 26				
-33-			14	18	216	15" f Sd, Slt (5 YR 4/4)	
-34-	ML		21 26 26			3" Slt, t f. Sd (5 YR 4/4) *SILT*	
-35-							
-36-						End of Boring at 35 Feet	

K:\ENG\263709\LOG\SEL36

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-37

DATE COMPLETED:	August 18, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			14	12	10	f-m-c Sd a. Grv, l. Slt; Fill (5 YR 4/4)	Slight Chemical odor
-6-			14				B-37 (6-6.5')
-7-			17				
-8-			21				
-9-							
-10-			10	10	4.3	Grv, l. f-m Sd, t. Slt (5 YR 4/4)	Slight odor
-11-			31				
-12-	SW		36			*Well Graded SAND with GRAVEL*	
-13-			50/3				
-14-							
-15-			14	16	0	f-m Sd, l. Grv, l. Slt (5 YR 4/4)	
-16-			17				
-17-			11				
-18-			8				
-19-							
-20-			6	17	0	f Sd, t. Slt (5 YR 4/4)	
-21-			6				
-22-			5				
-23-	SW		5			*Well Graded SAND*	
-24-							
-25-			6	20	0	f Sd, t. Slt (5 YR 4/4)	
-26-			7				
-27-			8				Wet at 26.5 Feet
-28-			10				
-29-	SW-SM					*Well Graded SAND with SILT*	
-30-			1	18	NA	12" f Sd, l. Slt (5 YR 4/4)	
-31-	ML		1			4" Slt, t. f Sd (5 YR 4/4) *SILT*	
-32-	CL		1			2" Cl (5 YR 4/6) *CLAY*	
-33-						End of Boring at 32 Feet	
-34-							
-35-							
-36-							

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SHEET 1 OF 1

TIERRA-B-018184

BORING LOG

LOG: B-38

DATE COMPLETED:	October 10, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			18	10	0	Fill (5YR 4/4)	
-6-			18				
			23				
			24				
-7-							
-8-							
-9-							
-10-			8	4	0	Fill (5YR 4/4)	
-11-			9				
			12				
			11				
-12-							
-13-							
-14-							
-15-			8	14	0	f-m Sd, l. Grv, l. Slt (5 YR 4/4)	
-16-			8				
			18				
			22				
-17-							
-18-							
-19-	SP					***Poorly Graded SAND and Gravel***	
-20-			11	15	0	f-m-c Sd, l. Grv, t. Slt (5 YR 4/4)	
-21-			9				
			9				
			12				
-22-							
-23-							
-24-							
-25-	CL		6	6	131	Cl (5 YR 3/2) ***CLAY***	Visible Product
-26-			8	6	8	f-m Sd, t. Slt (5 YR 4/4)	Strong Odor
			10				Wet
			13				
-27-			11	16	2.1	f Sd, a. Slt (5YR 4/4)	
-28-			8				
			10				
			9				
-29-			3	8	0	f Sd, l. Slt (5 YR 4/4)	
			3				
-30-	SW		5			***Well Graded SAND with Silt***	
			12				
-31-			11	20	6	14" f Sd, l. Slt (5 YR 4/4)	
			11		14	5" f Sd, a. Slt (5 YR 3/2)	Slight Odor
-32-			8				
			9				
-33-			3	10	92	f Sd, a. Slt (5 YR 3/2)	Sheen
			5				Strong Odor
-34-			6				
			9				
-35-							
-36-							

K:\ENG\263709\LOGS\B-38

Killam

BORING LOG
(continued)

LOG: B-38

DATE COMPLETED:	October 10, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-35-			6	24	902	f Sd, a. Slt (5 YR 3/2)	Strong Odor Product
			6				
-36-			7				
			7				
-37-			3	16	88	f-m Sd, a. Slt, l. Grv (5 YR 3/2)	
			4				
-38-			6				
			12				
-39-			19	18	0	Slt, t c. Sd (5 YR 4/4)	
			29				
-40-	ML		27			***SILT***	
			23				
-41-						End of Boring @ 41'	
-42-							
-43-							
-44-							
-45-							
-46-							
-47-							
-48-							
-49-							
-50-							
-51-							
-52-							
-53-							
-54-							
-55-							
-56-							
-57-							
-58-							
-59-							
-60-							
-61-							
-62-							
-63-							
-64-							
-65-							
-66-							
-67-							
-68-							
-69-							
-70-							
-71-							

K:\ENG\263709\LOGS\B-38

Killam — BORING LOG

LOG: B-39

DATE COMPLETED:	October 10, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			6	14	0	f-m-c Sd, l. Slt (Fill) (5 YR 5/6)	
-6-			12				
-7-			22				
-8-			25				
-9-							
-10-			11	20	0	f-m Sd, t. Slt, l. Grv (Fill) (5 YR 5/6)	
-11-			9				
-12-			6				
-13-			6				
-14-						*FILL*	
-15-			36	11	0	ang. Grv, l. f-m-c Sd, t. Slt (Fill) (5 YR 5/4)	
-16-			35				
-17-			25				
-18-			23				
-19-							
-20-	ML		5	6	0	Slt, t. Cl (5 YR 5/4) *SILT*	moist
-21-			19	4	6	f-m Sd, a. Grv, l. Slt (5 YR 5/4)	dry
-22-			26				
-23-	SP		21			*Poorly Graded SAND with Gravel*	
-24-							
-25-			4	19	0	f Sd, l. Slt (5 YR 6/4)	
-26-			3				
-27-			6				
-28-			7				
-29-							
-30-			5	20	0	v. f Sd, a. Slt (5 YR 6/4)	Wet
-31-	SW		4			*Well Graded SAND with Silt*	
-32-			5				Sample 31.5-32 ft.
-33-			5	18	0	f Sd, a. Slt (5 YR 6/4)	
-34-			7				
-35-			8				
-36-			9				

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Killam

BORING LOG
(continued)

LOG: B-39

DATE COMPLETED: October 10, 1998
DRILLER: Advanced Drilling Incoporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger

PROJECT: PSE&G: Former Front Street Gas Works
LOCATION: Newark, New Jersey
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A
LATITUDE/LONGITUDE:
SURVEYED ELEVATION (ft MSL):

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-35-			5	12	0	f Sd, a. Slt (5 YR 4/4)	
			5				
-36-			5				
			5				
-37-							
-38-							
-39-							
-40-			4	10	0	f Sd, a. Slt (5 YR 4/4)	
			8	6	0	Slt (10 YR 6/2)	
-41-	ML		11	4	0	Slt, l. Grv (5 YR 4/4) *SILT*	
			16				
-42-						End of Boring @ 42'	
-43-							
-44-							
-45-							
-46-							
-47-							
-48-							
-49-							
-50-							
-51-							
-52-							
-53-							
-54-							
-55-							
-56-							
-57-							
-58-							
-59-							
-60-							
-61-							
-62-							
-63-							
-64-							
-65-							
-66-							
-67-							
-68-							
-69-							
-70-							
-71-							

K:\ENG\263709\LOGS\B-39

Killam — BORING LOG

LOG: B-40

DATE COMPLETED:	October 17, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			9	16	0	f-m Sd, l. Slt, t. Grv (Fill) (5 YR 3/4)	
-6-			12				
-7-			18				
-8-			13				
-9-							
-10-			9	5	0	f-m Sd, l. Slt, t. Grv (Fill) (5 YR 3/4)	
-11-			8				
-12-			9				
-13-			6				
-14-						*FILL*	
-15-			14	17	0	f-m-c Sd, a. Grv, l. Slt (Quartzite Pebble) (Fill) (5 YR 3/4)	
-16-			25				
-17-			25				
-18-			32				
-19-							
-20-	CL		3	10	0	Cl, l. c. Sd (5 YR 4/4) *CLAY*	Moist
-21-			7	10	0	f Sd, l. Slt (5 YR 4/4)	
-22-			9				
-23-			8				
-24-							
-25-			4	12	0	f Sd, l. Slt (5 YR 6/4)	
-26-			7				
-27-			7				
-28-	SW					*Well Graded SAND and Silt*	
-29-							
-30-			1	19	0	f Sd, t. Slt (5 YR 4/4)	
-31-			2				Wet Sample 31.5-32 ft.
-32-			3				
-33-			5				
-34-							
-35-							
-36-							

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Killam

BORING LOG (continued)

LOG: B-40

DATE COMPLETED:	October 17, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-35-			1	24	0	f Sd, L Slt (5 YR 4/4)	Wet
-36-			2				
-37-			3				
-38-			5				
-39-							
-40-							
-41-	ML		48	6	0	Slt, L f Sd (5 YR 4/4)	Wet
-42-			50/4			*SILT*	
-43-						End of Boring @ 42'	
-44-							
-45-							
-46-							
-47-							
-48-							
-49-							
-50-							
-51-							
-52-							
-53-							
-54-							
-55-							
-56-							
-57-							
-58-							
-59-							
-60-							
-61-							
-62-							
-63-							
-64-							
-65-							
-66-							
-67-							
-68-							
-69-							
-70-							
-71-							

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BORING LOG

LOG: B-41

DATE COMPLETED:	October 17, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-							
-6-							
-7-							
-8-							
-9-							
-10-			13	11	0	f-m-c Sd, a Grv, l. Slt (Fill) (5 YR 3/4)	
-11-			7				
			7				
			8			***FILL***	
-12-							
-13-							
-14-							
-15-							
-16-							
-17-							
-18-							
-19-							
-20-			10	11	0	f-m-c Sd, a Grv, l. Slt (Fill) (5 YR 4/4)	
-21-			17	4	0	f Sd, l. Slt (5 YR 6/4)	
			16				
			13				
-22-							
-23-							
-24-							
-25-	SW		11	14	0	f Sd, s. Slt (5 YR 4/4)	Moist
			16			***Well Graded SAND and Silt***	
-26-			15				
			16				
-27-							
-28-							
-29-							
-30-			5	14	0	f Sd, s. Slt (5 YR 4/4)	Sample
			10	4	0	Slt (5 YR 4/4)	30-30.5 ft.
-31-	ML		17			***SILT***	
			27				
-32-						End of Boring @ 31'	
-33-							
-34-							
-35-							
-36-							

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-42

DATE COMPLETED:	November 7, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-5-			3, 3, 3, 2	2	0	f-m-c Sd, a. Grv, l. Slt (Fill) (5 YR 4/4)	
						FILL	
-10-			3, 2, 3, 4	10	0	brick & conc. fgmts (Fill) (10YR 6/2)	
-15-	ML		12, 10, 9, 9	7	0	Silt (5YR 5/6)	
						SILT	
-20-	SW		6, 13, 13, 12	4, 7	0, 0	f Sd, a. Slt (5YR 5/6); f-m-c Sd, l. Grv (5 YR 4/4)	Perched - Wet; Dry
	SP					***Poorly Graded SAND with Gravel***	
-25-	SW		6, 9, 11, 11	18	2.1	f Sd, l. Slt	Sample (26.5-27')
						Well Graded SAND and Silt	
-30-			16, 22, 30, 37	20	0	f Sd, a. Slt (5YR 4/4)	Wet
-35-	ML		15, 16, 43, 50/3	13, 4	0, 0	Silt (5YR 4/4); f-m-c Sd, a. Grv (Till) (5YR 4/4)	
						SILT ***Poorly Graded SAND and Gravel***	
-36-	SP					End of Boring @ 37'	

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-43

DATE COMPLETED:	November 7, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-5-			5 5 6 7	20	0	f Sd, t. Slt (5YR 6/4)	
-9-	SW					***Well Graded SAND and Silt***	
-10-			9 9 13 11	16	0	f Sd, t. Slt (5YR 4/4)	Wet @ 11.5'
-15-			13 15 17 20	18	8.6	f Sd, a. Slt (5YR 3/2)	Visible Product
-17-			18 23 26	21		f Sd a. Slt (5YR 4/4)	
-18-	ML		30	1		Slt, t. f Sd (5YR 4/6) ***SILT***	
-19-						End of Boring @ 19'	

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SHEET 1 OF 1

Killam

BORING LOG

LOG: B-44

DATE COMPLETED:	November 7, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			4	19	0	f Sd, t. Slt (5YR 6/4)	
-6-			5				
-7-			4				
-8-			4				
-9-	SW					***Well Graded SAND and Silt***	
-10-			7	17	0	f Sd, t. Slt (5YR 6/4)	
-11-			5				Wet @ 11'
-12-			4				
-13-			3				
-14-							
-15-			10	18	12.9	f Sd, l. Slt (5YR 4/4)	Sheen
-16-			13				
-17-			14				
-18-			16				
-19-			23	20	43	f Sd a. Slt (5YR 4/4)	Product
-20-			35				
-21-			40				
-22-			50/4				
-23-			33	8	8.6	shale fgmts - f-m Sd, a. Slt (Till)	
-24-	SP		50/4			***Poorly Graded SAND and Silt***	
-25-						End of Boring @ 20'	
-26-							
-27-							
-28-							
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

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SHEET 1 OF 1

Killam — BORING LOG

LOG: B-45

DATE COMPLETED:	November 7, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			3	2	0	f-m-c Sd, s. Grv (5Y 2/1) (Fill)	insufficient sample volume -strong MGP odor
-6-			3 5 6				
-7-			15	6	0	Wood/Bricks (5Y 2/1) (Fill)	slight odor
-8-			32 50/4	7	0	wthrd concrete (5YR 8/4) (Fill)	
-9-							
-10-							spoon refusal
-11-							Wet @ 11'
-12-							
-13-							
-14-							
-15-			5	6	2.1	f-m-c Sd, a. Grv, l. Slt (5YR 3/2) (Fill)	Wet - Odor Sample @ 16-16.5'
-16-			5 5 4				
-17-			3	10	0	f-m-c Sd, t. Grv, l. Slt (5YR 3/2) (Fill)	
-18-			3 4 3	8	0	Cl (slightly organic), t. m Sd (5GY 2/1)	
-19-	CL					***CLAY***	
-20-			19	6	0	CL (5GY 2,1)	
-21-			21 32 33	14	0	f-m-c Sd, a. Grv, l. Slt (5YR 4/4) (Till)	
-22-			23	9	4.3	f-m-c Sd, a. Grv, l. Slt, t. Cl (5YR 4/4) (Till)	
-23-	SP		50/4			***Poorly Graded SAND and Gravel***	
-24-							
-25-			34 50/2	5	2.1	wthrd siltstone, l. Cl (5YR 4/4)	
-26-						Bedrock @ 26' End of Boring @ 26'	
-27-							
-28-							
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

K:\ENG\263709\LOGS\B-45

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-46

DATE COMPLETED:	November 8, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-	SW					***Well Graded SAND and Silt***	
-4-							
-5-			4	14	0	f Sd, l. Slt (5YR 6/4), grading upward to m Sd, l. Slt	
-6-			5				
-7-	ML		7				
-8-			6	4	0	Slt, l. f Sd ***SILT with Sand***	
-9-							
-10-			8	9	0	f Sd, t. Slt (5YR 6/4)	
-11-			8				
-12-	SW		7	9	0	f Sd, t. Slt (5YR 4/4)	Wet @ 11'
-13-			7			***Well Graded SAND and Silt***	
-14-							
-15-			16	12	0	f Sd, a. Slt (5YR 4/4)	
-16-			21				Sample @ 16-16.5'
-17-	ML		23				
-18-			25	4	0	Slt (5YR 4/4) ***SILT***	
-19-						End of Boring @ 17'	
-20-							
-21-							
-22-							
-23-							
-24-							
-25-							
-26-							
-27-							
-28-							
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

K:\ENG\263709\LOGS\B-46

SHEET 1 OF 1

Killam — BORING LOG

LOG: B-47

DATE COMPLETED:	November 8, 1998
DRILLER:	Advanced Drilling Incoporated
INSPECTOR:	Jonathan B. Seckinger
DRILLING METHOD:	Hollow Stem Auger
PROJECT:	PSE&G: Former Front Street Gas Works
LOCATION:	Newark, New Jersey
KILLAM PROJECT NUMBER:	263709
STATE CASE NUMBER:	N/A
LATITUDE/LONGITUDE:	
SURVEYED ELEVATION (ft MSL):	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-						***FILL***	
-4-							
-5-			11	8	0	brick fgmts (10YR 4/6) (Fill)	
-6-			13				
-7-			7				
-8-			3				
-9-	SW					***Well Graded SAND***	
-10-			4	15	4.3	m Sd, t. Slt (5YR 3/2)	Strong MGP odor
-11-			3				
-12-			3				
-13-	SP		5	20	155	m-c Sd, t. Slt (5YR 3/2)	MGP Product
-14-			6			***Poorly Graded SAND***	
-15-	SW		5	7	198	m-c Sd, t. Slt (5YR 3/2)	Heavy Product
-16-			5			***Well Graded SAND and Silt***	
-17-	SP		12	12	31	f Sd, s. Slt (5YR 3/4)	no visible product
-18-			18	9	503	f-m Sd, t. Slt (5YR 3/2)	Heavy Product
-19-	ML		30			***Poorly Graded SAND***	
-20-			33	4	66	f-m Sd, t. Slt (5YR 3/2)	
-21-			50/5	10	10	Slt (5YR 4/4)	No Product
-22-						***Silt***	
-23-			10			End of Boring @ 20'	
-24-			27				
-25-			50/5				
-26-							
-27-							
-28-							
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

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SHEET 1 OF 1

Killam

BORING LOG

LOG: B-48

DATE COMPLETED:	November 8, 1998	PROJECT:	PSE&G: Former Front Street Gas Works
DRILLER:	Advanced Drilling Incoporated	LOCATION:	Newark, New Jersey
INSPECTOR:	Jonathan B. Seckinger	KILLAM PROJECT NUMBER:	263709
DRILLING METHOD:	Hollow Stem Auger	STATE CASE NUMBER:	N/A
		LATITUDE/LONGITUDE:	
		SURVEYED ELEVATION (ft MSL)	

DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING (ppm)	VISUAL DESCRIPTION	COMMENTS
-0-							
-1-							
-2-							
-3-							
-4-							
-5-			8	6	0	brick fgmts (10YR 4/6) (Fill)	
-6-			8				
-7-			7			*FILL*	
-8-			4				
-9-							Foundation
-10-			26	3	0	Gravel, l. Slt (5YR 3/4) (Fill)	
-11-			12				
-12-			7				
-13-	SP		5	17	0	f-m Sd, t. Slt (5YR 2/2)	
-14-			3			*Poorly Graded SAND*	
-15-	SW		3	17	2.1	f Sd, a. Slt (5YR 4/4)	
			4			*Well Graded SAND and Silt*	sample (15-15'5')
			7				
-16-	ML		8				
-17-			11				
-18-			16	1	0	Slt (5YR 4/4) *SILT*	
-19-						End of Boring @ 16'	
-20-							
-21-							
-22-							
-23-							
-24-							
-25-							
-26-							
-27-							
-28-							
-29-							
-30-							
-31-							
-32-							
-33-							
-34-							
-35-							
-36-							

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SHEET 1 OF 1

MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 0 1 3 - _
Owner's Well Number (As shown on the application or plans):	MW-1
Well Completion Date:	July 2, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.27'
Total Depth of Well to nearest 1/2 foot:	35'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	20'
Screen Length (or length of open hole) in feet:	15'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	29.08'
Yield (gallons per minute):	<1
Development Technique (specify)	Hand Bailed
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

NAME (TYPE OR PRINT)

SIGNATURE

TITLE

DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

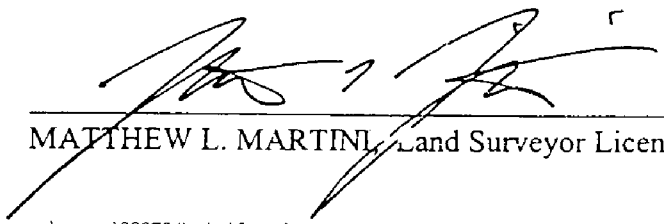
LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 1 3
Longitude (NAD '83):	West 74° 10' 00.42"
Latitude (NAD '83):	North 40° 44' 34.06"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	38.28'
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-1

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.



MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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Killam — DRILLING LOG

LOG: MW-1
PERMIT: 28-51013

DATE COMPLETED: July 2, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger
WELL DEVELOPMENT:
DATE: 8-12-98 YIELD: N/A
METHOD: Hand-bailing Cs: N/A
LENGTH OF TIME: 60 minutes
SCREEN: (15') 2"-ID Sch. 40 PVC, 10 slot
RISER: (20') 2"-ID Sch. 40 PVC
COMPLETION : Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft above MSL
TOP OF CASING: 38.28 GROUND SURFACE: 38.55
SCREEN DEPTH (TOC): 20' WELL DEPTH (TOC): 35'
WATER DEPTH/DATE: 29.08' / 9-16-98
WATER DEPTH/DATE: 29.10' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-			8	2	0	Cl, s. f-m-c Sd (5 YR 4/4); Insufficient Quantity for Sample	
	-1-			8				
				9				
	-2-			8				
				6	2	0	Grv, l. f-m Sd, t. Slt (5 YR 4/4); Insufficient Quantity for Sample	
	-3-			2				
				5			*FILL*	
	-4-			3				
				6	8	0	f-m Sd, l. Grv, l. Slt; Fill (5 YR 4/4)	MW-1 (4-4.5')
	-5-			8				
				20				
	-6-			10				
				10	15	0	f-m-c Sd a. Grv, t. Slt (5 YR 4/4)	
	-7-			13				
				18				
	-8-			18				
				6	18	0	f-m-c Sd a. Grv, t. Slt (5 YR 4/4)	
	-9-			5				
		SP-SM		10			*Poorly Graded SAND with GRAVEL and SILT*	
	-10-			11				
				6	9	0	f-m Sd, l. Grv, l. Slt (5 YR 4/4)	
	-11-			6				
				6				
	-12-			6				
				6	18	0	f-m Sd, l. Grv, l. Slt (5 YR 4/4)	
	-13-			7				
				10				
	-14-			12				
		ML		5	17	0	3" Slt, l. f Sd (5 YR 4/4) *SILT*	
	-15-			2			14" f-m Sd, t. Slt (5 YR 4/4)	
				3				
	-16-			4				
				6	15	0	f-m Sd, t. Slt (5 YR 4/4)	Moist
	-17-			4				
		SP-SM		3			*Poorly Graded SAND with SILT*	
	-18-			4				
				5	18	10	f-m Sd, t. Slt, t. Grv (5 YR 4/4)	Moist
	-19-			5				
				4				
	-20-			4				
				12	18	6	6" f Sd a. Slt (5 YR 4/4)	
	-21-			6		0	8" Grv, l. f-m Sd, t. Slt (5 YR 4/4)	
				11		21	4" f Sd a. Slt (10 YR 2/2)	
	-22-			30				
				18	16	0	10" m-c Sd a. Grv, l. Slt (10 YR 4/4)	
	-23-			17			6" f Sd a. Slt (10 YR 4/4)	
		SW-SM		15			*Well Graded SAND with SILT*	
	-24-			11				
				10	20	47	f Sd a. Slt (10 YR 4/4)	Odor
	-25-			8				

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Sheet 1 of 2

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DRILLING LOG

Killam

LOG: MW-1
PERMIT: 28-51013

DATE COMPLETED: July 2, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-25							
	-26			16 17				
	-27			11 9 13 16	20	84 38	11" f Sd a. Slt (5 YR 6/4) 9" f Sd a. Slt (5 YR 4/4)	Moist Wet MW-1 (26.5-27') MW-1 (27.5-28')
	-28			12 15	20	190	f Sd a. Slt (5 YR 3/2)	Wet
	-29	SW-SM		17 17			*Well Graded SAND with SILT*	
	-30			9 13	16	539	f Sd a. Slt (5 YR 3/4)	Visible Product
	-31			25 30				
	-32			19 26	13	702	f Sd a. Slt (5 YR 3/4)	Visible Product
	-33			30 38				MW-1 (33.5-34')
	-34			17 19	16	10.6	Slt, t. f Sd (5 YR 3/4)	
	-35	ML		26 50/5			*SILT*	
	-36						End of Boring at 36 Feet Bottom of Well at 35 Feet	
	-37							
	-38							
	-39							
	-40							
	-41							
	-42							
	-43							
	-44							
	-45							
	-46							
	-47							
	-48							
	-49							
	-50							
	-51							
	-52							
	-53							
	-54							
	-55							

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MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	26-510147-
Owner's Well Number (As shown on the application or plans):	MW-1A
Well Completion Date:	July 14, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.42'
Total Depth of Well to nearest 1/2 foot:	59'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	49'
Screen Length (or length of open hole) in feet:	10'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	34.56'
Yield (gallons per minute):	<1
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

NAME (TYPE OR PRINT)

SIGNATURE

TITLE

DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 1 4
Longitude (NAD '83):	West 74° 10' 00.51"
Latitude (NAD '83):	North 40° 44' 34.10"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	38.06'
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-1A

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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DRILLING LOG

LOG: MW-1A
PERMIT: 26-51014

DATE COMPLETED: July 14, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger
WELL DEVELOPMENT:
DATE: 7-23-98 YIELD: < 1 GPM
METHOD: Submersible Pump Cs: N/A
LENGTH OF TIME: 60 minutes
SCREEN: (10') 2"-ID Sch. 40 PVC, 10 slot
RISER: (49') 2"-ID Sch. 40 PVC, (37') 6"-ID Steel Casing
COMPLETION : Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A
LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft above MSL
TOP OF CASING: 38.06 GROUND SURFACE: 38.48
SCREEN DEPTH (TOC): 49' WELL DEPTH (TOC): 59'
WATER DEPTH/DATE: 34.56' / 9-16-98
WATER DEPTH/DATE: 30.87' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-			8	2	0	Cl, s. f-m-c Sd (5 YR 4/4)	Insufficient quantity for sample
	-1-			8				
				9				
	-2-			8				
				6	2	0	Grv, l. f-m Sd, t. Slt (5 YR 4/4)	Insufficient quantity for sample
	-3-			2				
				5			*FILL*	
	-4-			3				
				6	8	0	f-m Sd, l. Grv, l. Slt; Fill (5 YR 4/4)	
	-5-			8				
				20				
	-6-			10				
				10	15	0	f-m-c Sd a. Grv, t. Slt (5 YR 4/4)	
	-7-			13				
				18				
	-8-			18				
				6	18	0	f-m-c Sd a. Grv, t. Slt (5 YR 4/4)	
	-9-			5				
				10				
	-10-	SP-SM		11			*Poorly Graded SAND with GRAVEL and SILT*	
				6	9	0	f-m Sd, l. Grv, l. Slt (5 YR 4/4)	
	-11-			6				
				6				
	-12-			6				
				6	18	0	f-m Sd, l. Grv, l. Slt (5 YR 4/4)	
	-13-			7				
				10				
	-14-			12				
		ML		5	17	0	3" Slt, l. f Sd (5 YR 4/4) *SILT*	
	-15-			2			14" f-m Sd, t. Slt (5 YR 4/4)	
				3				
	-16-			4				
				6	15	0	f-m Sd, t. Slt (5 YR 4/4)	
	-17-			4				
		SP-SM		3			*Poorly Graded SAND with SILT*	
	-18-			4				
				5	18	10	f-m Sd, t. Slt, t. Grv (5 YR 4/4)	
	-19-			5				
				4				
	-20-			4				
				12	18	6	6" f Sd a. Slt (5 YR 4/4)	
	-21-			6		0	8" Grv, l. f-m Sd, t. Slt (5 YR 4/4)	
				11		21	4" f Sd a. Slt (10 YR 2/2)	
	-22-			30				
				18	16	0	10" m-c Sd a. Grv, t. Slt (10 YR 4/4)	
	-23-			17			6" f Sd a. Slt (10 YR 4/4)	
		SW-SM		15			*Well Graded SAND with SILT*	
	-24-			11				
				10	20	47	f Sd a. Slt (10 YR 4/4)	
	-25-			8				

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DRILLING LOG

Killam

LOG: MW-1A
PERMIT: 26-51014

DATE COMPLETED: July 14, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-25							
	-26-			16 17				
	-27-			11 9 13 16	20	84 38	11" f Sd a. Slt (5 YR 6/4) 9" f Sd a. Slt (5 YR 4/4)	
	-28-			8 9 14 19	11	803	f Sd a. Slt (5 YR 3/2)	Product
	-29-	SW-SM					***Well Graded SAND with SILT***	
	-30-			11 10 22 19	18	1,418	f Sd a. Slt (5 YR 2/2)	Heavy Product
	-31-							
	-32-			16 25 29 37	20	3,779	f Sd a. Slt (5 YR 2/2)	Heavy Product
	-33-							
	-34-			12 16 23 30	16	34	Slt a. f Sd (5 YR 4/4)	
	-35-	SM					***Silty SAND***	
	-36-			28 30 38 46	18	2.1	Slt a. f Sd (5 YR 4/4)	
	-37-							
	-38-			9 20 17 12	18	1.3	Cl a. Slt (5 YR 5/6)	
	-39-							
	-40-			13 19 32 39	18	0.5	6" Cl a. Slt (5 YR 5/6) 12" Slt a. f-m-c Sd; Till (5 YR 5/6)	
	-41-							
	-42-			18 42 21 15	12	0	f-m Sd a. Grv, Cl matrix (5 YR 5/6)	MW-1A (41.5-42')
	-43-							
	-44-						***GLACIAL TILL***	
	-45-			15 27 28 42	13	0	f-m Sd a. Grv, Cl matrix (5 YR 4/4)	
	-46-							
	-47-			9 21 43 100	8	0	f-m Sd a. Grv, Cl matrix (5 YR 4/4)	
	-48-							
	-49-			32 22 72 74	10	0	f-m Sd a. Grv, Cl matrix (5 YR 4/4)	
	-50-			N/R	N/R	N/R	Boulder (50-50.5')	
	-51-			100/5	5	0	f-m Sd a. Grv, t. Weathered Siltstone, Cl matrix (5 YR 4/4)	
	-52-							
	-53-			38 79 97 100/4	18	0	f-m Sd, l. Grv, l. Weathered Siltstone, Cl matrix (5 YR 4/4)	
	-54-						***Weathered Bedrock***	
	-55-			54 100/5	11	0	f-m Sd, l. Grv, s. Weathered Siltstone (5 YR 4/4)	
				39	14	0	f-m Sd a. Grv, s. Weathered Siltstone, Cl matrix (5 YR 4/4)	

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DRILLING LOG

LOG: MW-1A
PERMIT: 26-51014

DATE COMPLETED: July 14, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-54			54	11	0	f-m Sd, l. Grv, s. Weathered Siltstone (5 YR 4/4)	
	-55-			100/5				
				39	14	0	f-m Sd a. Grv, s. Weathered Siltstone, Cl matrix (5 YR 4/4)	
	-56-			62			*Weathered Bedrock*	
				100/5				
	-57-			50	13	0	Weathered Siltstone, l. f-m Sd, l. Grv, Cl matrix (5 YR 4/4)	
				94				
	-58-			100/4				
				27	7	0	Weathered Siltstone (5 YR 4/4)	MW-1A (58-58.5')
	-59-			100/3			*Bedrock - SILTSTONE*	
	-60-						End of Boring at 59 Feet Bottom of Well at 59 Feet	
	-61-							
	-62-							
	-63-							
	-64-							
	-65-							
	-66-							
	-67-							
	-68-							
	-69-							
	-70-							
	-71-							
	-72-							
	-73-							
	-74-							
	-75-							
	-76-							
	-77-							
	-78-							
	-79-							
	-80-							
	-81-							
	-82-							
	-83-							

MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 0 1 5 - _
Owner's Well Number (As shown on the application or plans):	MW-2
Well Completion Date:	July 1, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.37'
Total Depth of Well to nearest 1/2 foot:	15.5'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	2.5'
Screen Length (or length of open hole) in feet:	13'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	6.90 '
Yield (gallons per minute):	≈1
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

_____
CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

_____
NAME (TYPE OR PRINT)

_____
SIGNATURE

_____
TITLE

_____
DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 1 5
Longitude (NAD '83):	West 74° 09' 57.99"
Latitude (NAD '83):	North 40° 44' 38.03"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	9.51'
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-2

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

AUTHENTICATION

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MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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DRILLING LOG

LOG: MW-2
PERMIT: 26-51015

DATE COMPLETED: July 1, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger
WELL DEVELOPMENT:
DATE: 7-23-98 YIELD: ~ 1 GPM
METHOD: Submersible Pump Cs: N/A
LENGTH OF TIME: 60 minutes

SCREEN: (13') 2"-ID Sch. 40 PVC, 10 slot
RISER: (2.5') 2"-ID Sch. 40 PVC
COMPLETION : Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft above MSL
TOP OF CASING: 9.51 GROUND SURFACE: 9.88
SCREEN DEPTH (TOC): 2.5' WELL DEPTH (TOC): 15.5'
WATER DEPTH/DATE: 6.90' / 9-16-98
WATER DEPTH/DATE: 9.01' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-							
	-1-			11	12	0	Fill	MW-2 (1-1.5')
	-2-			6				
	-3-			5				
				4				
	-4-			6	N/R	N/R	No Recovery	
	-5-			5				
				3	11	0	Fill; f-m Sd a. Slt, s. concrete fragments (5 YR 3/4)	
	-6-			3				
				3				
	-7-			4			*FILL*	MW-2 (5.5-6')
				5	3	0	f-m-c Sd l. Slt (5 YR 3/4)	Wet
	-8-			3				
				4				
	-9-			3				
				3	9	0	f-m-c Sd l. Slt; brick pieces; Fill (5 YR 3/4)	
	-10-			2				
				4				
	-11-			8				
		SP-SM		2	10	0	f-m-c Sd s. Slt (10 YR 2/2)	
	-12-			1				
				2			*Poorly Graded SAND with SILT*	
	-13-			3				
				2	3	0	Grv, l. f-m Sd,l. Slt (5 YR 3/2)	
	-14-	GP		5				
				3			*Poorly Graded GRAVEL*	
	-15-			2				
		SP-SM		3	12	0	8" f-m-c Sd, t. Slt (5 YR 3/4)	
				3				
	-16-	CL		2			4" Cl (5 G 4/1)	
				1			*CLAY*	MW-2 (15-15.5')
	-17-			N/A	24	N/A	Shelby Tube from 16-18'	
	-18-							
	-19-						End of Boring at 18 Feet	
	-20-						Bottom of Well at 15.5 Feet	
	-21-							
	-22-							
	-23-							
	-24-							
	-25-							

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SHEET 1 OF 1

MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 0 1 6 - _
Owner's Well Number (As shown on the application or plans):	MW-2A
Well Completion Date:	July 28, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.28'
Total Depth of Well to nearest 1/2 foot:	34'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	24'
Screen Length (or length of open hole) in feet:	10'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	7.02'
Yield (gallons per minute):	≈2
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

_____
CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

_____
NAME (TYPE OR PRINT)

_____
SIGNATURE

_____
TITLE

_____
DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 1 6
Longitude (NAD '83):	West 74° 09' 57.97"
Latitude (NAD '83):	North 40° 44' 37.98"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	9.58'
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-2A

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

AUTHENTICATION

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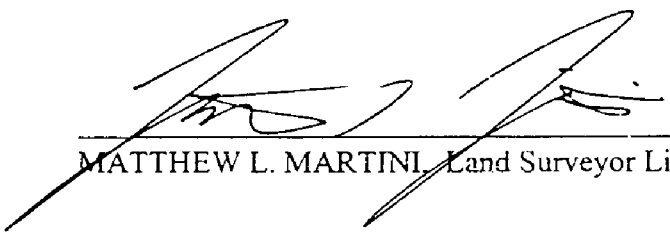

MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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DRILLING LOG

LOG: MW-2A
PERMIT: 26-51016

DATE COMPLETED: July 28, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger
WELL DEVELOPMENT:
DATE: 8-12-98 YIELD: ~2 gpm
METHOD: Submersible Pump Cs: N/A
LENGTH OF TIME: 60 minutes
SCREEN: (10') 2"-ID Sch. 40 PVC, 10 slot
RISER: (24') 2"-ID Sch. 40 PVC
COMPLETION : Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A
LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft MSL
TOP OF CASING: 9.58 GROUND SURFACE: 9.86
SCREEN DEPTH (TOC): 24' WELL DEPTH (TOC): 34'
WATER DEPTH/DATE: 7.02' / 9-16-98
WATER DEPTH/DATE: 9.22' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-							
	-1-			11	12	0	Fill	
	-2-			6				
	-3-			5				
				4				
	-4-			6	N/R	N/R	No Recovery	
				5				
	-5-			3	11	0	Fill; f-m Sd a. Slt, s. concrete fragments (5 YR 3/4)	
				3				
	-6-			3			*FILL*	
				4				
	-7-			5	3	0	f-m-c Sd l. Slt (5 YR 3/4)	
				3				
	-8-			4				
				3				
	-9-			3	9	0	f-m-c Sd l. Slt; brick pieces; Fill (5 YR 3/4)	
				2				
	-10-			4				
				8				
	-11-	SP-SM		2	10	0	f-m-c Sd s. Slt (10 YR 2/2)	
				1				
	-12-			2			*Poorly Graded SAND with SILT*	
				3				
	-13-	GP		2	3	0	Grv, l. f-m Sd,l. Slt (5 YR 3/2)	
				5				
	-14-			3			*Poorly Graded GRAVEL*	
				2				
	-15-	SP-SM					*Poorly Graded SAND with SILT*	
				5	18	0	9" f-m-c Sd, t. Slt (5 YR 3/4)	
	-16-			7				
				2			9" Cl, t. organic (5 Y 4/1)	
	-17-	CL		2			*CLAY*	
	-18-							
				100	20	0	Cl a. Grv; v. loose; f-m-c Sd in tip of spoon (5 Y 4/1)	
	-19-			5				
		CL		6			*CLAY with GRAVEL*	
	-20-			11				
				3	8	0	f-m-c Sd (N2)	
	-21-	SP		6				
				5			*Poorly Graded SAND*	
	-22-			5				
				4	8	0	Cl (N3)	
	-23-	CL		3				
				2			*CLAY*	
	-24-			2				
				5	17	0	f-m-c Sd, t. Slt (5 Y 2/1)	
	-25-	SP-SM		5			*Poorly Graded SAND with SILT*	

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Sheet 1 of 2

Killam — DRILLING LOG

LOG: MW-2A
PERMIT: 26-51016

DATE COMPLETED: July 28, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-25							
	-26-			6 9			***Poorly Graded SAND with SILT***	
	-27-	SP-SM		9 7 9 9	NR	NR	No Recovery	
	-28-			9 5 20 26	18	0.3	17" f-m-c Sd (N2) ***Poorly Graded SAND***	Visible Product; Strong Odor
	-29-	SP						
	-30-			10 9 15 19	2	0	1" Till; f-m-c Sd; Cl matrix (10 YR 4/2) f-m-c Sd a. Grv; Cl matrix (10 YR 4/2)	**MW-2A (29.5-30')** Product
	-31-							
	-32-			32 39 46 50	12	0	Till; f-m-c Sd; Cl matrix (5 YR 4/4) ***GLACIAL TILL***	No Product
	-33-							
	-34-			16 49 51 56	12	0	Till; f-m-c Sd s. Weathered Siltstone; Cl matrix (5 YR 4/4)	No Product
	-35-							
	-36-			47 85 69 100/2	11	0	Till; Weathered Siltstone; l. f-m-c Sd; Cl matrix (5 YR 4/4)	No Product
	-37-							
	-38-			32 26 52 100/2	14	0	Weathered Bedrock (5 YR 4/4) ***Weathered Bedrock***	**MW-2A (39-39.5')** Bedrock at 39.5 Feet
	-39-							
	-40-						End of Boring at 40 Feet Bottom of Well at 34 Feet	
	-41-							
	-42-							
	-43-							
	-44-							
	-45-							
	-46-							
	-47-							
	-48-							
	-49-							
	-50-							
	-51-							
	-52-							
	-53-							
	-54-							
	-55-							

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MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 0 1 7 - _
Owner's Well Number (As shown on the application or plans):	MW-3
Well Completion Date:	June 30, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.39'
Total Depth of Well to nearest 1/2 foot:	14'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	3'
Screen Length (or length of open hole) in feet:	11'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	6.15'
Yield (gallons per minute):	≈1
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

NAME (TYPE OR PRINT)

SIGNATURE

TITLE

DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 1 7
Longitude (NAD '83):	West 74° 09' 56.86"
Latitude (NAD '83):	North 40° 44' 34.76"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	8.74'
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-3

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

AUTHENTICATION

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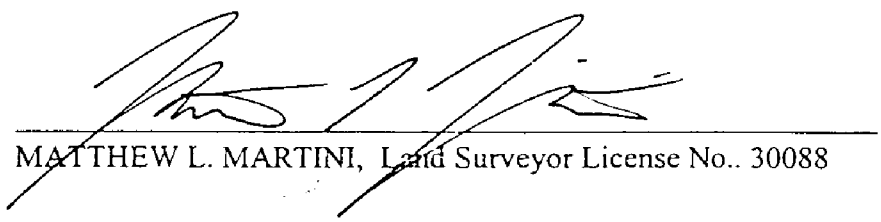

MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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Killam — DRILLING LOG

LOG: MW-3
PERMIT: 26-51017

DATE COMPLETED: June 30, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger
WELL DEVELOPMENT:
DATE: 7-23-98 YIELD: ~ GPM
METHOD: Submersible Pump Cs: N/A
LENGTH OF TIME: 60 minutes

SCREEN: (11') 2"-ID Sch. 40 PVC, 10 slot
RISER: (3') 2"-ID Sch. 40 PVC
COMPLETION : Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft above MSL
TOP OF CASING: 8.74 GROUND SURFACE: 9.13
SCREEN DEPTH (TOC): 3' WELL DEPTH (TOC): 14'
WATER DEPTH/DATE: 6.15' / 9-16-98
WATER DEPTH/DATE: 8.04' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	0							
	1			4	8	0	Fill; Shale	MW-3 (0-0.5')
				5				
	2			9				
				4				
	3			4	8	0	f-m-c Sd, l. Slt (5 YR 3/4)	
				3				
	4			3				
				4				MW-3 (3.5-4')
	5			2	10	0	f-m-c Sd, l. Slt (5 YR 3/4)	
				1				
				1			*FILL*	Wet at 5 Feet
	6			1				
	7			4	11	0	f-m-c Sd, l. Grv, l. Slt (5 YR 3/4)	
				3				
				3				
	8			2				
				4	20	0	14" f-m Sd a. Grv, v. loose formation (5 YR 3/4)	
	9			3			6" f-m-c Sd a. Grv, l. Slt; wood in tip of spoon (5 YR 3/4)	
				2				
	10			3				
		SP-SM		2	22	0	f-m-c Sd, l. Slt (5 YR 3/4)	
				3				
	11			3			*Poorly Graded SAND with SILT*	
				3				
	12			3	8	0	7.5" f-m-c Sd (5 YR 3/4)	
				2			0.5" Cl (5 Y 4/1)	
	13			2				
		CL		2			*CLAY*	MW-3 (13.5-14')
	14			WOH	12	0	Cl (5 Y 4/1)	
				WOH				
	15			N/A	24	N/A	Shelby Tube from 15-17'	
	16							
	17							
	18						End of Boring at 17 Feet	
							Bottom of Well at 14 Feet	
	19							
	20							
	21							
	22							
	23							
	24							
	25							

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SHEET 1 OF 1

MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 0 1 8 - _
Owner's Well Number (As shown on the application or plans):	MW-3A
Well Completion Date:	July 16, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.44'
Total Depth of Well to nearest 1/2 foot:	29'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	24'
Screen Length (or length of open hole) in feet:	5'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	2.65'
Yield (gallons per minute):	≈1
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

_____
CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

_____
NAME (TYPE OR PRINT)

_____
SIGNATURE

_____
TITLE

_____
DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

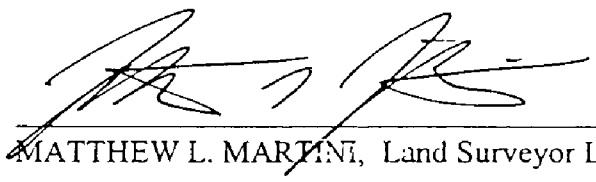
LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 1 8
Longitude (NAD '83):	West 74° 09' 56.96"
Latitude (NAD '83):	North 40° 44' 34.70"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	8.38'
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-3A

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.



MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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Killam — DRILLING LOG

LOG: MW-3A
PERMIT: 26-51018

DATE COMPLETED: July 16, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger
WELL DEVELOPMENT:
DATE: 7-23-98 YIELD: ~ 1 GPM
METHOD: Submersible Pump Cs: N/A
LENGTH OF TIME: 50 minutes

SCREEN: (5') 2"-ID Sch. 40 PVC, 10 slot
RISER: (24') 2"-ID Sch. 40 PVC, (15.5') 6"-ID Steel Casing
COMPLETION : Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft above MSL
TOP OF CASING: 8.38 GROUND SURFACE: 8.82
SCREEN DEPTH (TOC): 24' WELL DEPTH (TOC): 29'
WATER DEPTH/DATE: 2.65' / 9-16-98
WATER DEPTH/DATE: 2.43' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-							
	-1-			4 5 9 4	8	0	Fill; Shale	
	-2-			4 3 3 4	8	0	f-m-c Sd, l. Slt (5 YR 3/4)	
	-3-							
	-4-			2 1 1 1	10	0	f-m-c Sd, l. Slt (5 YR 3/4) *FILL*	
	-5-							
	-6-			4 3 3 2	11	0	f-m-c Sd, l. Grv, l. Slt (5 YR 3/4)	
	-7-							
	-8-			4 3 2 3	14 6	0 0	f-m Sd a. Grv, v. loose formation (5 YR 3/4) f-m-c Sd a. Grv, t. Slt; wood in tip of spoon (5 YR 3/4)	
	-9-							
	-10-							
	-11-	SP-SM		2 3 3 3	22	0	f-m-c Sd, l. Slt (5 YR 3/4) ***Poorly Graded SAND with SILT***	
	-12-							
	-13-			3 2 2 2	8	0	7.5" f-m-c Sd (5 YR 3/4) 0.5" Cl (5 Y 4/1)	
	-14-							
	-15-			1 1 1 1	7	0	Slightly Organic Cl (5 Y 4/1)	
	-16-							
	-17-			2 2 1 1	4	0	Slightly Organic Cl (5 Y 4/1) *CLAY*	
	-18-	CL						
	-19-							
	-20-			N/A	24	0	Slightly Organic Cl (5 Y 4/1)	
	-21-							
	-22-			N/A	24	0	Slightly Organic Cl (5 Y 4/1)	
	-23-							
	-24-			N/A	24	0	15" Slightly Organic Cl (5 Y 4/1)	
	-25-						9" f-m-c Sd a. Grv, l. Slt; Till (5 YR 4/4) *GLACIAL TILL*	

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DRILLING LOG

LOG: MW-3A
PERMIT: 26-51018

DATE COMPLETED: July 16, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-25-							
	-26-			N/A	16	0	f-m-c Sd a. Grv, t. Weathered Siltstone, Cl matrix (5 YR 5/6)	
	-27-						***GLACIAL TILL***	MW-3A (26.5-27')
	-28-			100/6	2	0	Weathered Siltstone, t. f-m Sd, Cl matrix (5 YR 5/6)	Insufficient Recovery
	-29-							
	-30-			100/0	N/R	N/R	Bedrock	
	-31-						***Bedrock - SILTSTONE***	
	-32-						End of Boring at 31 Feet	
	-33-						Bottom of Well at 29 Feet	
	-34-							
	-35-							
	-36-							
	-37-							
	-38-							
	-39-							
	-40-							
	-41-							
	-42-							
	-43-							
	-44-							
	-45-							
	-46-							
	-47-							
	-48-							
	-49-							
	-50-							
	-51-							
	-52-							
	-53-							
	-54-							
	-55-							

MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 0 1 9 -
Owner's Well Number (As shown on the application or plans):	MW-3BR
Well Completion Date:	July 31, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.25'
Total Depth of Well to nearest 1/2 foot:	55'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	35'
Screen Length (or length of open hole) in feet:	20'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	4.05'
Yield (gallons per minute):	≈2
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

_____
CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

_____
NAME (TYPE OR PRINT)

_____
SIGNATURE

_____
TITLE

_____
DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 1 9
Longitude (NAD '83):	West 74° 09' 56.97"
Latitude (NAD '83):	North 40° 44' 34.77"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-3BR

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

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MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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DRILLING LOG

LOG: MW-3BR
PERMIT: 26-51019

DATE COMPLETED: July 31, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Mud Rotary
WELL DEVELOPMENT:
DATE: 8-18-98 YIELD: ~ 2 GPM
METHOD: Submersible Pump Cs: N/A
LENGTH OF TIME: 60 minutes
SCREEN: (20') 2"-ID Sch. 40 PVC, 10 slot
RISER: (35') 2"-ID Sch. 40 PVC, (33') 6"-ID Steel Casing
COMPLETION: Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft MSL
TOP OF CASING: 8.81 GROUND SURFACE: 9.04
SCREEN DEPTH (TOC): 35' WELL DEPTH (TOC): 55'
WATER DEPTH/DATE: 4.05' / 9-16-98
WATER DEPTH/DATE: 8.14' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-			4	8	0	Fill; Shale	
	-1-			5				
	-2-			9				
				4				
	-3-			4	8	0	f-m-c Sd, l. Slt (5 YR 3/4)	
	-4-			3				
				3				
	-5-			4				
				2	10	0	f--m-c Sd, l. Slt (5 YR 3/4)	
	-6-			1				
				1			*FILL*	
	-7-			1				
				4	11	0	f-m-c Sd, l. Grv, l. Slt (5 YR 3/4)	
	-8-			3				
				3				
	-9-			2				
				4	14	0	f-m Sd a. Grv, v. loose formation (5 YR 3/4)	
	-10-			3	6	0	f-m-c Sd a. Grv, t. Slt; wood in tip of spoon (5 YR 3/4)	
				2				
	-11-			3				
		SP-SM		2	22	0	f-m-c Sd, l. Slt (5 YR 3/4)	
	-12-			3				
				3			*Poorly Graded SAND with SILT*	
	-13-			3	8	0	7.5 "f-m-c Sd (5 YR 3/4)	
				2			0.5 "Cl (5 Y 4/1)	
	-14-	CL		2			*CLAY*	
				2				
	-15-			WOH	12	0	Cl (5 Y 4/1)	
	-16-							
	-17-							
	-18-							
	-19-							
	-20-							
	-21-							
	-22-							
	-23-							
	-24-							
	-25-							

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DRILLING LOG

Killam

LOG: MW-3BR
PERMIT: 26-51019

DATE COMPLETED: July 31, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RQD	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-25							
	-26-							
	-27-							
	-28-						Bedrock at 28 Feet	
	-29-							
	-30-							
	-31-							
	-32-							
	-33-							
	-34-				44%		(5 YR 3/4) Shale Siltstone	
	-35-							
	-36-						Horizontally fractured @ 36' (~45° angle), not significantly weathered in Shale/Mudstone (5GY 6/1), moderate weathering	
	-37-				29%		(5 YR 3/4) f. grained Sandstone; non-distinct contact between shale and sandstone;	pore spaces secondarily mineralized with 5YR 8/1
	-38-						sandstone moderately porous (1/16") to (3/16")	calcite to 5GY6/1 chloride
	-39-				64%		~ 45° angle @ 38.8' ; no weathering	numerous horz. fractures
	-40-						(5 YR 3/4) Siltstone horizontally fractured; no significant weathering	
	-41-						– 45° fracture @ 41'; no weathering	coal tar product in fracture
	-42-						horizontal fracture @ approximately 43'	
	-43-						v. porous f-m grained friable Sandstone Horizontal fracture from 43.3-43.8'; no weathering	
	-44-				56%		(5 YR 3/4) f-m grained Sandstone; friable; v. porous	
	-45-						75° fracture @ 44.5'; black staining; no noticeable weathering 75° fracture @ 45'; black staining; no noticeable weathering	
	-46-							
	-47-							
	-48-						75° fracture @ 47.6'; black staining; no noticeable weathering – 75° fracture @ 48.5'	@ ~ 48.5' tar globs (1/16" - 2/16")
	-49-				55%		49-52' (5 YR 3/4) f-m grained Sandstone; friable; v. porous	
	-50-							
	-51-						@ 51' highly fractured; broken up zones	
	-52-						two weathered fractures at 52 & 52.5'	
	-53-						52-54' (5 YR 3/4) Siltstone; 8 horizontal fractures	sheens observed in most fractures
	-54-						(see next page for description of 54' to 59' interval)	
	-55-							

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Killam

DRILLING LOG

LOG: MW-3BR
PERMIT: 26-51019

DATE COMPLETED: July 31, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RQD	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-54-							
	-55-				98%		(5 YR 3/4) Siltstone	
	-56-						~ 75° fracture @ 56'; little/no evidence of weathering;	
	-57-						57-58.5' verticle fracture; no weathering	
	-58-						@ 58.5' sheen in horizontal fracture	
	-59-				0%		(5 YR 3/4) Siltstone; highly fractured; horizontal fractures	
	-60-				45%		(5 YR 3/4) Siltstone; slight sheen @ horizontal fractures;	
	-61-						@ 60-61.5' weathered fractures	
	-62-							
	-63-							
	-64-				69%		(5 YR 3/4) Siltstone	sheen in horizontal fractures; slight odor
	-65-						@ 65-65.5' highly fractured; weathered	
	-66-							
	-67-							
	-68-							
	-69-				97%		(5 YR 3/4) Siltstone; few non-weathered horizontal fractures;	
	-70-						calcite deposits	Sheen @ 71.6' horizontal fracture
	-71-							
	-72-							
	-73-							
	-74-				85%		(5 YR 3/4) Siltstone; occasional chlorite clasts;	
	-75-						~ 45° fractures @ 74.8 & 75'; non-weathered;	
	-76-						slightly weathered horizontal fracture @ 75.2';	
	-77-						~ 25° fracture @ 75.5'; non-weathered	
	-78-							
	-79-				83%		(5 YR 3/4) Siltstone	
	-80-						vertical fracture @ 79.1-79.5'; calcite deposits	
	-81-						horizontal, weathered fracture @ 79.5'	
	-82-							
	-83-							

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Killam — DRILLING LOG

LOG: MW-3BR
PERMIT: 26-51019

DATE COMPLETED: July 31, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RQD	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-84-				75%		(5 YR 3/4) Siltstone; occasional chlorite clasts;	
	-85-						~ 20° fracture @ 84.6'; no weathering	
	-86-						~ 60° non-uniform fracture @ 86.4-86.7'	
	-87-						two perpendicular 45° fractures @ 87' and 87.5'	
	-88-						88-89' well weathered vuggy siltstone;	
	-89-				73%		vugs filled with calcite/chlorite (5 YR 3/4) Siltstone	
	-90-						89-89.5' vuggy Silstone	
	-91-						weathered horizontal fracture @ 91.8'	
	-92-						92-93' crossbedding in Siltstone 92.6' fractured zone	heavy sheen on rock
	-93-						93.1' weathered fracture	heavy sheen (2.1 ppm)
	-94-				54%		(5 YR 3/4) Siltstone	
	-95-						94.5-95.8' heavily fractured, slightly weathered	visible product, heavy sheen, strong odor
	-96-							
	-97-							
	-98-							
	-99-				76%		(5 YR 3/4) Siltstone	While drilling 99-104' heavy product found in drilling fluid
	-100						99.5' horizontal fracture; heavy sheen; strong MGP odor;	
	-101						~ 45° fracture @ 101'; calcite deposits	
	-102-							
	-103						@ 103' Siltstone grades into f. grained Sandstone	
	-104-				60%		(5 YR 3/4) f. grained Sandstone grades into Siltstone at approxim	
	-105-							
	-106-						@ 106.5' Siltstone grades into f. grained Sandstone	
	-107-						vertical fracture @ 107'; calcite crystaline deposits	heavy product
	-108							
	-109-				59%		(5 YR 3/4) Siltstone; numerous horizontal fractures;	
	-110-						@ 109.1' vertical fracture from 106.5 ends	
	-111						~ 46° fracture @ 111', slightly weathered ~ 25° fracture @ 111.5'	tar has smeared down into core sample
	-112							
	-113							

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DRILLING LOG

LOG: MW-3BR
PERMIT: 26-51019

DATE COMPLETED: July 31, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RQD	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-11				95%		(5 YR 3/4) Siltstone interbedded with fine grained sandstone; 3 horizontal fractures	sheen observed on outside of core
	-11 5-							
	-11 6-							
	-11 7-							
	-11 8-							
	-11 9-				75%		(5 YR 3/4) Siltstone with 7 horizontal fractures vertical fracture @ 123.6'	little staining and MGP odor
	-12 0-							
	-12 1-							
	-12 2-							
	-123-							
	-124						End of Boring at 124 Feet Bottom of Well at 55 Feet	
	-125-							
	-126							
	-127-							
	-128							
	-129-							
	-130-							
	-131-							
	-132-							
	-133-							
	-134-							
	-135-							
	-136-							
	-137-							
	-138-							
	-139-							
	-140-							
	-141-							
	-142							
	-143-							

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MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 0 2 0 -
Owner's Well Number (As shown on the application or plans):	MW-4BR
Well Completion Date:	August 11, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.25'
Total Depth of Well to nearest 1/2 foot:	62'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	42'
Screen Length (or length of open hole) in feet:	20'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	7.65'
Yield (gallons per minute):	≈2
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

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Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

Jonathan B. Seckinger
SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

NAME (TYPE OR PRINT)

SIGNATURE

TITLE

DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 2 0
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Latitude (NAD '83):	North 40° 44' 34.67"
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Owner's Well Number (as shown on application or plans):	MW-4BR

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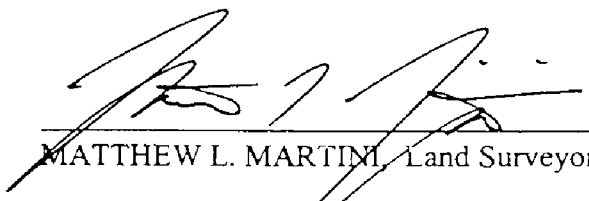
AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.



MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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Killam

DRILLING LOG

LOG: MW-4BR
PERMIT: 26-51020

DATE COMPLETED: August 11, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Mud Rotary
WELL DEVELOPMENT:
DATE: 8-17-98 YIELD: 2 GPM
METHOD: Submersible Pump Cs: N/A
LENGTH OF TIME: 60 minutes

SCREEN: (20') 2"-ID Sch. 40 PVC, 10 slot
RISER: (42') 2"-ID Sch. 40 PVC, (37') 6"-ID Steel Casing
COMPLETION : Flushmount

PROJECT: PSE&G; Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft MSL
TOP OF CASING: 13.28 GROUND SURFACE: 13.53
SCREEN DEPTH (TOC): 42' WELL DEPTH (TOC): 62'
WATER DEPTH/DATE: 7.65' / 9-16-98
WATER DEPTH/DATE: 8.14' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-							Split-spoon samples not collected in overburden deposits
	-1-							
	-2-							
	-3-							
	-4-							
	-5-							
	-6-							
	-7-							
	-8-							
	-9-							
	-10-							
	-11-							
	-12-							
	-13-							
	-14-							
	-15-							
	-16-							
	-17-							
	-18-							
	-19-							
	-20-							
	-21-							
	-22-							
	-23-							
	-24-							
	-25-							

DRILLING LOG

Killam

LOG: MW-4BR
PERMIT: 26-51020

DATE COMPLETED: August 11, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RQD	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-25							
	-26-							
	-27-							
	-28-							
	-29-							
	-30-							
	-31-							
	-32-						Bedrock at 32 Feet	
	-33-							
	-34-							
	-35-							
	-36-							
	-37-				0%		(5 YR 3/4) Siltstone	strong MGP odor, sheen oil nodules very poor recovery
	-38-							
	-39-							
	-40-							
	-41-							
	-42-				37%		(5 YR 3/4) Siltstone; numerous horizontal fractures	sheen
	-43-							
	-44-							oil nodules in fractures at 44'
	-45-							
	-46-				0%		Weathered (5 YR 3/4) Siltstone with horizontal unweathered fractures, fracture zone @ 46'	
	-47-							
	-48-				66%		(5 YR 3/4) Siltstone fractured rock @ 47-47.8' (numerous fractures, varying angles) highly weathered horizontal fracture @ 49.3' – 75° fracture @ 49.7-50.3' (Siltstone appears gray around fracture)	
	-49-							
	-50-							
	-51-							
	-52-				53%		(5 YR 3/4) Siltstone fracture zone @ 52' (numerous horizontal fractures throughout interval) vertical fracture @ 54.3-54.6' slightly weathered horizontal fracture @ 55.6'	MGP Odor
	-53-							
	-54-							
	-55-							

Killam — DRILLING LOG

LOG: MW-4BR
PERMIT: 26-51020

DATE COMPLETED: August 11, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RQD	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-54						(see previous page for description of 52-57' interval)	
	-55-							
	-56-							
	-57-				54%		(5 YR 3/4) Siltstone from 57-59'	
	-58-						well weathered horizontal fracture @ 57.8'	
	-59-						numerous horizontal fractures from 57.8-59'	
	-60-						well weathered fracture @ 59'	
	-61-						@ 59-62' grades into f-m grained Sandstone	
	-62-							
	-63-						End of Boring at 62 Feet	
	-64-						Bottom of Well at 62 Feet	
	-65-							
	-66-							
	-67-							
	-68-							
	-69-							
	-70-							
	-71-							
	-72-							
	-73-							
	-74-							
	-75-							
	-76-							
	-77-							
	-78-							
	-79-							
	-80-							
	-81-							
	-82-							
	-83-							

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MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 0 2 1 - _
Owner's Well Number (As shown on the application or plans):	MW-5BR
Well Completion Date:	August 11, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.02'
Total Depth of Well to nearest 1/2 foot:	72'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	52'
Screen Length (or length of open hole) in feet:	20'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	14.55'
Yield (gallons per minute):	< 1
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

_____
CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

_____
NAME (TYPE OR PRINT)

_____
SIGNATURE

_____
TITLE

_____
DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 0 2 1
Longitude (NAD '83):	West 74° 09' 59.68"
Latitude (NAD '83):	North 40° 44' 37.71"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	19.22'
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-5BR

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

MATTHEW L. MARTIN, Land Surveyor License No.. 30088 SEAL

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Killam — DRILLING LOG

LOG: MW-5BR
PERMIT: 26-51021

DATE COMPLETED: August 10, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Mud Rotary
WELL DEVELOPMENT:
DATE: 8-12-98 YIELD: < 1 GPM
METHOD: Submersible Pump Cs: N/A
LENGTH OF TIME: 60 minutes
SCREEN: (20') 2"-ID Sch. 40 PVC, 10 slot
RISER: (52') 2"-ID Sch. 40 PVC, (47') 6"-ID Steel Casing
COMPLETION : Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A

LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft MSL
TOP OF CASING: 19.22 GROUND SURFACE: 19.24
SCREEN DEPTH (TOC): 52' WELL DEPTH (TOC): 72'
WATER DEPTH/DATE: 14.55' / 9-16-98
WATER DEPTH/DATE: 14.60' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-							
	-1-							
	-2-							
	-3-							
	-4-							
	-5-							
	-6-							
	-7-							
	-8-							
	-9-							
	-10-							
	-11-							
	-12-							
	-13-							
	-14-							
	-15-							
	-16-							
	-17-							
	-18-							
	-19-							
	-20-	SW-SM		7	12	0	f-m Sd, l. Slt	Slight MGP odor; some staining
	-21-			15				
	-22-			14				
				14				
				13	18	0	f Sd, l. Slt	Slight MGP odor
	-23-			10				
				14			***Well Graded SAND with SILT***	
	-24-			15				
				12	16	0	f Sd, l. Slt	Slight MGP odor
	-25-			15				

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DRILLING LOG

Killam

LOG: MW-5BR
PERMIT: 26-51021

DATE COMPLETED: August 10, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RQD	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-25							
	-26			16				
				16				
	-27	CL		16	6	0	Brn Cl, t. Slt	
				17			*CLAY*	
	-28			20				
				14				
	-29							
	-30							
	-31							
	-32							
	-33							
	-34							
	-35							
	-36							
	-37							
	-38							
	-39							
	-40							
	-41							
	-42						Bedrock at 42 Feet	
	-43							
	-44							
	-45							
	-46							
	-47				11%		(5 YR 3/4) highly horizontally fractured Siltstone	No MGP odors or sheen
	-48							
	-49							
	-50							
	-51							
	-52				0%		(5 YR 3/4) highly horizontally fractured Siltstone;	
	-53							
	-54							
	-55						@ 55.5' thin Shale interbedded with Siltstone; good weathering at this interval	

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DRILLING LOG

LOG: MW-5BR
PERMIT: 26-51021

DATE COMPLETED: August 10, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS.	SAMPLES	BLOW COUNTS	RQD	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-54							
	-55-							
	-56-							
	-57-				23%		(5 YR 3/4) highly horizontally fractured Siltstone; @ approximately 60' well weathered horizontal fracture; @ 61.1-61.3' vertical fracture; no significant weathering	While coring 57-62' blackish substance entering tub; no MGP odor; smells like grease or oil
	-58-							
	-59-							
	-60-							
	-61-							
	-62-				35%		(5 YR 3/4) highly horizontally fractured Siltstone; @ 62-62.5' vuggy Siltstone; @ 65' v. fractured (horizontal & vertical) zone	
	-63-							
	-64-							
	-65-							
	-66-							
	-67-				0%		(5 YR 3/4) highly horizontally fractured Siltstone; vuggy fractures @ 69.2', 70.2', 71.3' & 71.5'	
	-68-							
	-69-							
	-70-							
	-71-							
	-72-						End of Boring at 72 Feet Bottom of Well at 72 Feet	
	-73-							
	-74-							
	-75-							
	-76-							
	-77-							
	-78-							
	-79-							
	-80-							
	-81-							
	-82-							
	-83-							

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MONITORING WELL CERTIFICATION - FORM A AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: Public Service Electric & Gas
Name of Facility: Former Front Street Gas Works
Location: McCarter Highway, Newark, NJ
NJPDES Permit No.: _____

CERTIFICATION

Well Permit Number:	2 6 - 5 1 6 9 4 - _
Owner's Well Number (As shown on the application or plans):	MW-6
Well Completion Date:	August 29, 1998
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	0.32'
Total Depth of Well to nearest 1/2 foot:	32'
Depth to Top of Screen (or Top of Open Hole) From Top of Casing (one-hundredth of a foot):	17'
Screen Length (or length of open hole) in feet:	15'
Screen or Slot Size:	0.010
Screen or Slot Material:	PVC Sch. 40
Casing Material (PVC, Steel or Other-Specify):	PVC Sch. 40
Casing Diameter (inches):	2"
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	27.95'
Yield (gallons per minute):	< 1
Development Technique (specify)	Submersible Pump
Length of Time Well is Developed/Pumped or Bailed:	1 hour
Lithologic Log:	Attached

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Jonathan B. Seckinger, P.G.
NAME (TYPE OR PRINT)

SIGNATURE

Pennsylvania Professional Geologist #PG-003258-E
CERTIFICATION OR LICENSE NUMBER

SEAL

CERTIFICATION BY EXECUTIVE OFFICER OR DULY AUTHORIZED REPRESENTATIVE

NAME (TYPE OR PRINT)

SIGNATURE

TITLE

DATE

MONITORING WELL CERTIFICATION FORM B-LOCATION CERTIFICATION

THIS FORM MUST BE COMPLETED BY THE PERMITTEE AND/OR SURVEYOR

Name of Permittee: PSE&G
Name of Facility: MGP-017 - Front Street
Location: McCarter Highway, Newark, New Jersey

LAND SURVEYOR'S CERTIFICATION

Well Permit Number: (This number must be permanently affixed to the well casing.)	2 6 - 5 1 6 9 4
Longitude (NAD '83):	West 74° 10' 02.79"
Latitude (NAD '83):	North 40° 44' 33.79"
Elevation of Top of Inner Casing (cap off) (one-hundredth of a foot.) (NAVD '88):	38.39'
Source of elevation datum (benchmark, etc.) and elevation. (If an alternate datum has been approved by the Department, identify here and give approximated elevation):	Source: Newark City GPS Mon #89-28 Elev.: 8.11'
Owner's Well Number (as shown on application or plans):	MW-6

Elevations are to be determined by double run, three wire leveling methods using balance sights, commencing form a well marked and described point. This beginning point shall either be derived from Federal or State benchmarks if not more than 1000 feet from the site or, if the Department has approved an alternate datum, based on an assumed datum of 100. Tolerances should meet third order standards, which are 0.05 ft. x (mile) ½. For sections less than 0.1 mile, let miles = 0.1.

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MATTHEW L. MARTINI, Land Surveyor License No.. 30088 SEAL

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Killam — DRILLING LOG

LOG: MW-6
PERMIT: 26-51694

DATE COMPLETED: August 29, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger
DRILLING METHOD: Hollow Stem Auger
WELL DEVELOPMENT:
DATE: 8-29-98 YIELD: N/A
METHOD: Hand-Bailing Cs: N/A
LENGTH OF TIME: 95 minutes
SCREEN: (15') 2"-ID Sch. 40 PVC, 10 slot
RISER: (17') 2"-ID Sch. 40 PVC
COMPLETION : Flushmount

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709
STATE CASE NUMBER: N/A
LAT./LONG:
SURVEYED ELEVATIONS: DATUM: ft above MSL
TOP OF CASING: 38.11 GROUND SURFACE: 38.43
SCREEN DEPTH (TOC): 17' WELL DEPTH (TOC): 32'
WATER DEPTH/DATE: NA / 9-16-98
WATER DEPTH/DATE: 27.95' / 10-14-98

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-0-							
	-1-							
	-2-							
	-3-							
	-4-							
	-5-			14	12	10	f-m-c Sd a. Grv, l. Slt; Fill (5 YR 4/4)	Slight Chemical odor
	-6-			14				
	-7-			17				
	-8-			21			***FILL***	
	-9-							
	-10-							
	-11-	GP		10	10	4.3	Grv, l. f-m Sd, t. Slt (5 YR 4/4)	Slight odor
	-12-			31				
	-13-			36			***Poorly Graded GRAVEL***	
	-14-			50/3				
	-15-							
	-16-	SW-SM		14	16	0	f-m Sd, l. Grv, l. Slt (5 YR 4/4)	
	-17-			17				
	-18-			11			***Well Graded SAND with SILT***	
	-19-			8				
	-20-							
	-21-	SW		6	17	0	f Sd, t. Slt (5 YR 4/4)	
	-22-			6				
	-23-			5			***Well Graded SAND***	
	-24-			5				
	-25-							

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Killam — DRILLING LOG

LOG: MW-6
PERMIT: 26-51694

DATE COMPLETED: August 29, 1998
DRILLER: Advanced Drilling Incorporated
INSPECTOR: Jonathan B. Seckinger

PROJECT: PSE&G, Former Front Street Gas Works
LOCATION: Front Street, Newark
KILLAM PROJECT NUMBER: 263709

WELL CONSTRUCTION	DEPTH (FT)	SOIL CLASS	SAMPLES	BLOW COUNTS	RECOVERY (IN.)	FIELD SCREENING	VISUAL DESCRIPTION	COMMENTS
	-25							
	-26-			8	20	0	f Sd, t. Slt (5 YR 4/4)	
	-27-			7				
				8				
				10				Wet at 26.5'
	-28-	SW					***Well Graded SAND***	
	-29-							
	-30-							
				1	18		12" f Sd, l. Slt (5 YR 4/4)	
	-31-			1				
		ML		1			4" Slt, t. f Sd (5 YR 4/4)	
	-32-	CL		1			2" Cl (5 YR 4/4)	
	-33-						End of Boring at 32 Feet Bottom of Well at 32 Feet	
	-34-							
	-35-							
	-36-							
	-37-							
	-38-							
	-39-							
	-40-							
	-41-							
	-42-							
	-43-							
	-44-							
	-45-							
	-46-							
	-47-							
	-48-							
	-49-							
	-50-							
	-51-							
	-52-							
	-53-							
	-54-							
	-55-							

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1. PROJECT: PASSIAC RIVER BANK RESTORATION, NEWARK	10. SIZE AND TYPE OF BIT: 5" AUGER & 3 1/8" R8
2. LOCATION (Coordinates or Station): SEE SITE PLAN	11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):
3. DRILLING AGENCY: MOBILE DISTRICT	12. MANUFACTORER'S DESIGNATION OF DRILL: FAILING 314
4. HOLE NO. (As shown on drawing title and file number): H-6	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8; UNDISTURBED 0
5. NAME OF DRILLER: MOON	14. TOTAL NUMBER CORE BOXES:
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUNDWATER: ~
7. THICKNESS OF OVERBURDEN: 16.0	16. DATE HOLE: 6-20-94 to 6-20-94
8. DEPTH DRILLED INTO ROCK: 0.0	17. ELEVATION TOP OF HOLE:
9. TOTAL DEPTH OF HOLE: 16.0	18. TOTAL CORE RECOVERY FOR BORING: N/A
	19. SIGNATURE OF INSPECTOR: M. ROGALSKI

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/FT
			(SP) POORLY GRADED SAND W/ GRAVEL & CONCRETE FRAG. (FILL)		JAR #1	4-17-12-12
	3.0		SAME		JAR #2	WATER LEVEL d. 3.5 10-15-50÷-50÷
			SAME		JAR #3	4-50÷-50÷-5
	6.0		SAME		JAR #4	VOA 7.5 - 8.0 1-1-5-6
	9.0		(GP) BROWN SANDY GRAVEL		JAR #5	4-7-6-5
			SAME W/ WOOD FRAG.		JAR #6	5-3-2-2
	12.0		SAME		JAR #7	3-8-9-7
	15.0		SAME		JAR #8	5-12-17-21
	16.0		BOTTOM OF BORING 16.0			HOLE GOUTED W/ 1 BAG GROUT
	18.0					
	21.0					

TIERRA-B-018243

DRILLING LOG | DIVISION ORD | OF 3 SHEETS

1. PROJECT: NEWARK STREAMBANK REST. PROJ., NEWARK, NJ
2. LOCATION (Coordinates or Station): -PSE&G: McCARTER HWY., NEWARK, NJ
3. DRILLING AGENCY: USCE-C; MOBILE
4. HOLE NO. (As shown on drawing title and file number): H-7
5. NAME OF DRILLER: CHARLIE BROWN
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 40.0'
8. DEPTH DRILLED INTO ROCK: 5.0'
9. TOTAL DEPTH OF HOLE: 45.0'
10. SIZE AND TYPE OF BIT: 2"ø SPTSPN; 3" AUGER
11. DATUM FOR ELEVATION SHOWN (MSL, USL, OR NGVD):
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 314
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUNDWATER:
16. DATE HOLE: 11-30-94 | 12-3-94
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING:
19. SIGNATURE OF INSPECTOR: LESLIE

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR R.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/FT
	0.8		(ML) FILL, SILT-LOW PLASTIC, BROWN, DRY, SANDY	HP	6 SAMPLES	2"ø SPT. SPN. REC. 0.8 28-50+ DRL & CD- 0.8 PID- 8 PPM 5" AUGER DRL & CD- 2.0
	2.0		(GM) FILL, GRAVEL-FINE GRAINED, ANGULAR, LOOSE, DAMP, BLACK, SILTY, W/WOOD FRAGMENTS.	HP		2"ø SPT. SPN. REC. 2.0 PID- 21 PPM DRL & CD- 4.0 10-6-6-7
	4.0		(GM), WET, CONT.	HP		2"ø SPT. SPN. REC. 2.0 PID- 42 PPM DRL & CD- 6.0 13-8-3-15
	6.0		(GM) (SM), CONT.	HP		2"ø SPT. SPN. REC. 2.0 PID- 58 PPM VOA SAMPLE DRL & CD- 8.0 13-8-3-15
	8.0					
	9.0		(SM) SAND, MED. GRAINED, ANGULAR, LOOSE, WET, BLACK, GRAVELLY, SANDY	HP	12 SAMPLES	END OF 1ST. COMPOSITE 2"ø SPT. SPN. REC. 1.0 PID- 60 PPM DRL & CD- 10.0 6-4-7-3
	10.0		(SM), CONT.	HP		REC. 2.0 PID- 130 PPM VOA SAMPLE DRL & CD- 12.0 5-5-5-6
	12.0		(SM), SAT., CONT.	HP		REC. 0.5 PID- 70 PPM DRL & CD- 14.0 5-3-7-6
	14.0		(SM), CONT. W/SML. CL AT BOTTOM OF SHOE	HP		REC. 2.0 PID- 100 PPM 12-2-94 DRL & CD- 16.0 13-7-3-5
	15.0					
	16.0		(CL) CLAY, LOW PLASTIC, GRAY, SLIGHTLY DAMP, MEDIUM, SLIGHTLY GRAVELLY	HP	6 SAMPLES D. 16.0 TO D. 24.0	END OF 2ND. COMPOSITE 2"ø SPT. SPN. REC. 1.5 PID- 0.0 PPM DRL & CD- 18.0 9-3-3-4
	18.0		(CL), CONT.	HP		REC. 1.0 PID- 0.0 PPM DRL & CD- 20.0 2-2-2-3
	20.0			HP		REC. 1.0

1. PROJECT: NEWARK STREAMBANK REST. PROJ., NEWARK, NJ
2. LOCATION (Coordinates or Station): PSE&G: McCARTER HWY., NEWARK, NJ
3. DRILLING AGENCY: USCE-C; MOBILE
4. HOLE NO. (As shown on drawing title and file number): H-7
5. NAME OF DRILLER: CHARLIE BROWN
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 40.0'
8. DEPTH DRILLED INTO ROCK: 5.0'
9. TOTAL DEPTH OF HOLE: 45.0'
10. SIZE AND TYPE OF BIT: 2"ø SPTSPN; 3" AUGER
11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):
12. MANUFACTORER'S DESIGNATION OF DRILL: FAILING 314
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUNDWATER:
16. DATE HOLE: 11-30-94 to 12-3-94
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING:
19. SIGNATURE OF INSPECTOR: LESLIE

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g — SPT BLOWS/FT
	21.9				6 SAMPLES O. 16.0 TO O. 24.0	DRL & CD- 22.0 9-8-9-5
	22.0		(SP) SAND, MEDIUM GRAINED, SUBANGULAR, WET, GRAY, LOOSE, SLIGHTLY SILTY.	HP		REC. 1.0 PID- 0.0 PPM
	23.8		(CL), CONT. AS ABOVE.			DRL & CD- 24.0 3-1-2-3
	24.0		(SP), CONT. AS ABOVE.	HP	6 SAMPLES O. 24.0 TO O. 30.9±	END OF 3RD. COMPOSITE 2"ø SPT. SPN. REC. 1.0 PID- 0.0 PPM DRL & CD- 26.0 2-2-4-8
	26.0		(SP) SAND, VERY FINE GRAINED, ROUND, GRAY, LOOSE, SLIGHTLY SILTY, WET.	HP		REC. 2.0 PID- 0.0 PPM
	27.0					DRL & CD- 28.0 4-4-6-7
	28.0		(ML) SILT, BLACK, SLIGHTLY DAMP, STIFF, SANDY.	HP		REC. 1.0 PID- 0.0 PPM
	29.3					DRL & CD- 30.0 18-21-13-34
	30.0		(ML) SILT, RED, HARD, DRY, GRAVELLY, SHALE FRAGMENTS, POSSIBLY INTENSELY WEATHERED SHALE ROCK.			REC. 1.0 VOA SAMPLE PID- 0.0 PPM
	30.9				1 SAMPLE	DRL & CD- 32.0 40-30-39-50+
	31.8					END OF 4TH. COMPOSITE 3" RRB
	32.0					END HTRW SAMPLING
	33.0					
	35.0					
	35.5		(ML) SILT, RED, DRY, HARD, SHALE FRAGMENTS, INTENSELY WEATHERED SHALE	HP		2"ø SPT. SPN.
	36.0				JAR 1 OF 2	REC. 1.0
	36.5					DRL & CD- 36.5 14-16-22
	39.0					3" RRB
	40.0		TOP OF ROCK- 40.0			
	40.2		SHALE, RED, MICACEOUS, SOFT, W/BR-RED CLAY	HP	1 SAMPLE O. 40.0 TO O. 45.0	2"ø SPT. SPN. 50+ REC. 0.2 JAR 2 OF 2
	41.0					

1. PROJECT: NEWARK STREAMBANK REST. PROJ., NEWARK, NJ	10. SIZE AND TYPE OF BIT: 2"ø SPTSPN; 3" AUGER
2. LOCATION (Coordinates or Station): PSE&G: McCARTER HWY., NEWARK, NJ	11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):
3. DRILLING AGENCY: USCE–C; MOBILE	12. MANUFACTORER'S DESIGNATION OF DRILL: FAILING 314
4. HOLE NO. (As shown on drawing title and file number): H–7	13. TOTAL NO. OF OVER–BURDEN SAMPLES TAKEN: DISTURBED 2; UNDISTURBED 0
5. NAME OF DRILLER: CHARLIE BROWN	14. TOTAL NUMBER CORE BOXES:
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUNDWATER:
7. THICKNESS OF OVERBURDEN: 40.0'	16. DATE HOLE: 11–30–94 / 12–3–94
8. DEPTH DRILLED INTO ROCK: 5.0'	17. ELEVATION TOP OF HOLE:
9. TOTAL DEPTH OF HOLE: 45.0'	18. TOTAL CORE RECOVERY FOR BORING:
	19. SIGNATURE OF INSPECTOR: LESLIE

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR R.Q.D. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/FT
	41.5					DRL & CD– 41.5 3" RRB
	44.0		REFUSAL			
			BOTTOM OF HOLE– 45.0			12–3–94 GROUT 0–45.0'
	47.0					
	50.0					
	53.0					
	56.0					
	59.0					
	62.0					

[PROJECT] [HOLE NO.]

TIERRA-B-018246

1. PROJECT: PASSIAC RIVER BANK RESTORATION, NEWARK	10. SIZE AND TYPE OF BIT: 5" AUGER & 3 1/8" RB
2. LOCATION (Coordinates or Station): SEE SITE PLAN	11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):
DRILLING AGENCY: MOBILE DISTRICT	12. MANUFACTORER'S DESIGNATION OF DRILL: FAILING 314
4. HOLE NO. (As shown on drawing title and file number): H-8.	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8 / UNDISTURBED 0
5. NAME OF DRILLER: MOON	14. TOTAL NUMBER CORE BOXES:
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUNDWATER:
	16. DATE HOLE: 6-20-94 / 6-20-94
7. THICKNESS OF OVERBURDEN: 16.0	17. ELEVATION TOP OF HOLE:
8. DEPTH DRILLED INTO ROCK: 0.0	18. TOTAL CORE RECOVERY FOR BORING: N/A
9. TOTAL DEPTH OF HOLE: 16.0	19. SIGNATURE OF INSPECTOR: M. ROGALSKI

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	SPT BLOWS/FT
			(SM) SILTY SAND W/ GYPSUM		JAR #1	VOA 0.0 PPM	2-7-7-6
	3.0		(SP) BLACK POORLY GRADED SAND W/ GRAVEL & ASPHALT FRAG.		JAR #2	VOA 0.0 PPM WATER LEVEL d. 3.5	7-7-8-8
			SAME		JAR #3	VOA 0.0 PPM	2-1-1-1
	6.0		(SP) BROWN POORLY GRADED W/ GRAVEL & ORGANICS		JAR #4	VOA 0.0 PPM	1-1-1-1
	9.0		(SM) BROWN & BLACK SILTY SAND W/ GRAVEL & ORGANICS		JAR #5		5-3-3-2
			SAME		JAR #6		1-1-1-2
	12.0		(SM/CL) BROWN SILTY SAND W/ CLAY & ORGANICS		JAR #7		1-1-1-1
	15.0		SAME		JAR #8	VOA 15.5 - 16.0	1-1-2-3
			BOTTOM OF BORING 16.0			HOLE GOUTED W/ 1 BAG GROUT	
	18.0						
	21.0						

DRILLING LOG	CENAD	CENAN-PR	OF 2 SHEETS

1. PROJECT PASSIAC RIVER BANK RESTORATION, NEWARK	10. SIZE AND TYPE OF BIT 5" AUGER & 3 1/8" RB
2. LOCATION (Coordinates or Station) SEE SITE PLAN	11. DATUM FOR ELEVATION SHOWN (TBM, MSL, OR NGVD)
3. DRILLING AGENCY MOBILE DISTRICT	12. MANUFACTORER'S DESIGNATION OF DRILL FAILING 314
4. HOLE NO. (As shown on drawing title and file number) B-3-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 8 — UNDISTURBED 0
5. NAME OF DRILLER MOON	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE [✓ VERTICAL] INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUNDWATER
	16. DATE HOLE 6-20-94 6-20-94
7. THICKNESS OF OVERBURDEN 16.0	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK 0.0	18. TOTAL CORE RECOVERY FOR BORING N/A
9. TOTAL DEPTH OF HOLE 16.0	19. SIGNATURE OF INSPECTOR M. ROGALSKI

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g — SPT BLOWS/FT
			BLACK ASPHALT PAVEMENT			
			(SM) REDDISH BROWN SILTY SAND W/ GRAVEL		JAR #1	PID READING 0.0 PPM 3-5-9-6
	3.0		SAME		JAR #2	PID READING 0.0 PPM 3-10-7-3
			(SM) REDDISH BROWN SILTY SAND W/ GRAVEL & ROCK FRAG.		JAR #3	PID READING 0.0 PPM 3-9-6-22
	6.0		SAME		JAR #4	PID READING 0.0 PPM 20-9-23-18
	9.0		SAME		JAR #5	PID READING 0.0 PPM WATER ENCOUNTERED @ d. 10.5' 11-30-50
			SAME		JAR #6	▼ PID READING 0.0 PPM 8-5-10-9
	12.0		SAME		JAR #7	PID READING 0.0 PPM 2-3-2-5
	15.0		SAME W/ TR. WOOD FRAG.		JAR #8	PID READING 0.0 PPM 4-4-5-9
			BOTTOM OF BORING 16.0			HOLE GOUTED W/ 1 BAG GROUT 2" PVC MONITORING WELL SET @ d. 15.0
	18.0					

DRILLING LOG	DIVISION CENAD	INSTALLATION CENAN-PR	OF 2 SHEETS

1. PROJECT: PASSIAC RIVER BANK RESTORATION, NEWARK	10. SIZE AND TYPE OF BIT: 5" AUGER & 3 1/8" RB
2. LOCATION (Coordinates or Station): SEE SITE PLAN	11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):
3. DRILLING AGENCY: MOBILE DISTRICT	12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 314
4. HOLE NO. (As shown on drawing title and file number): B-3-94	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8; UNDISTURBED 0
5. NAME OF DRILLER: MOON	14. TOTAL NUMBER CORE BOXES:
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUNDWATER:
	16. DATE HOLE: 6-20-94 to 6-20-94
7. THICKNESS OF OVERBURDEN: 16.0	17. ELEVATION TOP OF HOLE:
8. DEPTH DRILLED INTO ROCK: 0.0	18. TOTAL CORE RECOVERY FOR BORING: N/A
9. TOTAL DEPTH OF HOLE: 16.0	19. SIGNATURE OF INSPECTOR: M. ROGALSKI

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. f	BOX OR SAMPLE NO. g	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) h SPT BLOWS/FT

AIR MON. READINGS

	PID	CGI O_2	CGI LEL
d.	Below Ground Breathing Zone	Breathing Zone	Breathing Zone
0.0	0 ppm	20.9	0
2.0	10 ppm 0 ppm		
4.0	10 ppm 0 ppm		
6.0	10 ppm 0 ppm	20.9	0
8.0	10 ppm 0 ppm	20.9	0
10.0	10 ppm 0 ppm		
12.0	10 ppm 0 ppm	20.9	0
14.0	10 ppm 0 ppm	20.9	0
16.0	10 ppm 0 ppm		

SOIL SAMPLES MAILED TO NED LABS 7-19-94 @ 1630 HRS.

0.0-8.0'

#1 - 2-40 ML - VOA
#2 - 1-8 OZ - SEMI-VOL
#3 - 1-8 OZ - TAL METALS
#4 - 1-8 OZ - TRPH

8.0-16.0'

#5 - 2-40 ML - VOA
#6 - 1-8 OZ - SEMI-VOL
#7 - 1-8 OZ - TAL METALS
#8 - 1-8 OZ - TRPH
#9 - 1-40 ML - TRIP BLANK

DRILLING LOG	DIVISION CENAD	INSTALLATION CENAN–PR	SHEET 1 OF 1 SHEETS
1. PROJECT PASSIAC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT 5" AUGER & 3 1/8" RB	
2. LOCATION (Coordinates or Station) SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD)	
3. DRILLING AGENCY MOBILE DISTRICT		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 314–C	
4. HOLE NO. (As shown on drawing title and file number) NKG–20		13. TOTAL NO. OF OVER–BURDEN SAMPLES TAKEN: DISTURBED 10	UNDISTURBED 0
5. NAME OF DRILLER J. BUSH		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUNDWATER	
		16. DATE HOLE: 4–7–94	4–7–94
7. THICKNESS OF OVERBURDEN 15.0		17. ELEVATION TOP OF HOLE 14.9 ±	
8. DEPTH DRILLED INTO ROCK 0.0		18. TOTAL CORE RECOVERY FOR BORING N/A	
9. TOTAL DEPTH OF HOLE 15.0		19. SIGNATURE OF INSPECTOR K. HOLOWAY	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g	SPT BLOWS/FT
			0.1' ASPHALT OVER (ML) SILT W/ SAND, GRAVEL & BRICK FRAG.	1.0	JAR #1		4–7–12
	3.0		(ML) REDDISH BROWN SILT W/ SAND, GRAVEL, & BRICK FRAG. (FILL)	0.8	JAR #2		18–14–7
			SAME	0.9	JAR #3		11–8–14
	6.0		SAME	0.4	JAR #4		5–6–5
			SAME REDDISH BR.	0.8	JAR #5		3–8–14
			SAME	1.0	JAR #6		7–14–23
	9.0		SAME	1.0	JAR #7		4–8–7
			SAME	0.5	JAR #8	OIL ON SPLITSPOON W/ STRONG ODOR	3–4–5
	12.0		SAME P.P.=0.3 TSF	0.5	JAR #9		3–1–9
			SAME	0.6	JAR #10		4–3–7
	15.0		BOTTOM OF BORING 15.0			HOLE GOUTED W/ 1 BAG GROUT	
	18.0						
	21.0						

TABLE B-1 (39)

Hole No. WT-9

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 2 SHEETS
1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 4" NOM. WATER ROTARY	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL. OR NGVD):	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO (As shown on drawing title and file number): WT-9		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 15	UNDISTURBED 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		15. ELEVATION N/A	
		16. DATE HOLE: 1-24-95	1-25-95
7. THICKNESS OF OVERBURDEN: >30 FT.		17. ELEVATION TOP OF MUDLINE: -2.5 FT±	
8. DEPTH DRILLED INTO ROCK: 0.0 FT.		18. TOTAL CORE RECOVERY FOR BORING: N/A	
9. TOTAL DEPTH OF HOLE: 30 FT.		19. INSPECTOR(S): D. MAZUJIAN/M. TORSIELLO	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			(OH) DARK OLIVE GRAY/BLACK ORGANIC CLAY, WET, VERY SOFT, STRONG PHC ODOR, FREQUENTLY STAINED BLACK		S-1	OVM SCREEN OF SS = 6.1, 1.4, 1.9 ppm WOR/2 FT
					S-2	OVM SCREEN OF SS = BDL WOR/2 FT
	4.0				S-3	OVM SCREEN OF SS = 0.5, 0.0, 0.5, 0.0 ppm WOR/2 FT
			GRADING WITH LITTLE CINDERS AND BROWN SLAG		S-4	OVM SCREEN OF SS = 1.4, 2.4, 2.3 ppm WOR/2 FT
	8.0		GRADING WITHOUT CINDERS AND SLAG		S-5	OVM SCREEN OF SS = 1.9, 2.9, 5.8 ppm WOR/2 FT
			GRADING WITH OCCASIONAL PARTINGS CINDERS AND SLAG		S-6	OVM SCREEN OF SS = 3.8, 2.3, 2.3, 2.8 ppm WOR/2 FT
	12.0		GRADING WITH FREQUENT DECOMPOSED SHELL		S-7	OVM SCREEN OF SS = 3.8, 5.7, 9.9, 2.3 ppm WOR/2 FT
			GRADING WITH OCCASIONAL LAYERS, 3" TO 6" THICK OF COARSE TO FINE SAND, TRACE FINE GRAVEL		S-8	OVM SCREEN OF SS = 1.8, 1.4, 1.4 ppm WOR/1 FT-2-2
	16.0		(SP) DARK GRAY COARSE TO FINE SAND, TRACE FINE GRAVEL TRACE SILT, WET, LOOSE		S-9	OVM SCREEN OF SS = BDL 2-2-3-4
			GRADING WITH SOME COARSE TO FINE GRAVEL DENSE		S-10	OVM SCREEN OF SS = BDL 16-15-17-14
	20.0		GRADING WITH LITTLE COARSE TO FINE GRAVEL, MEDIUM DENSE		S-11	OVM SCREEN OF SS = BDL 19-15-14-12
			GRADING TO YELLOWISH RED AND MEDIUM DENSE		S-12	OVM SCREEN OF SS = BDL 5-5-5-8
	24.0		GRADING TO FINE SAND, LITTLE SILT, WITHOUT GRAVEL		S-13	OVM SCREEN OF SS = BDL 7-7-8-9
	28.0		(ML) YELLOWISH RED SILT AND FINE SAND, WET, VERY STIFF		S-14	OVM SCREEN OF SS = BDL 5-5-8-8

Hole No WT-9

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 2 OF 2 SHEETS

1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 4" NOM WATER ROTARY	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL OR NGVD):	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO (As shown on drawing title and file number): WT-9		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 15 / UNDISTURBED: 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		15. ELEVATION: N/A	
		16. DATE HOLE	1-24-95 / 1-25-95
7. THICKNESS OF OVERBURDEN: >30 FT.		17. ELEVATION TOP OF MUDLINE: -2.5 FT±	
8. DEPTH DRILLED INTO ROCK: 0.0 FT.		18. TOTAL CORE RECOVERY FOR BORING: N/A	
9. TOTAL DEPTH OF HOLE: 30 FT.		19. SIGNATURE OF INSPECTOR(S): D. MAZUJIAN/M. TORSIELLO	

ELEVATION c	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			(SEE ABOVE)		S-15	
			(SM) YELLOWISH RED FINE SAND AND SILT, WET, DENSE			8-10-19-25
	32.0		NOTES: 1. BORING TERMINATED AT THE DEPTH OF 30.0 FEET BML ON 1-25-95. 2. SURFACE WATER THICKNESS VARIED WITH TIDE BETWEEN 1.7 FT AND 6.5 FT DURING DRILLING. 3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.			
	36.0					
	40.0					
	44.0					
	48.0					
	52.0					
	56.0					

ENG FORM 1836 | PROJECT | HOLE NO

Hole No. WTH-9

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 1 SHEET

1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 4" NOMS WATER ROTARY NX CORE	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD)	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO. (As shown on drawing title and hole number): WTH-9		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 10 / UNDISTURBED: 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		15. ELEVATION: N/A	
		16. DATE HOLE: 1-19-95	1-23-95
7. THICKNESS OF OVERBURDEN: 18.5 FT.		17. ELEVATION TOP OF MUDLINE: -6.0 FT±	
8. DEPTH DRILLED INTO ROCK: 5.0 FT.		18. TOTAL CORE RECOVERY FOR BORING: 41 IN.	
9. TOTAL DEPTH OF HOLE: 23.5 FT.		19. INSPECTOR(S): D. MAZUJIAN	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g — SPT BLOWS/6 IN
	4.0		(OH) BLACK ORGANIC CLAY, OCCASIONAL LAYERS OF BROWN FINE SAND, 1/2 TO 4 INCH THICK, WET, VERY SOFT, PHC ODOR, STAINED BLACK		S-1	OVM SCREEN OF SS = BDL — WOR/2 FT
					S-2	OVM SCRREEN OF SS = 1.7, 3.2, 2.2 ppm — WOR/2 FT
					S-3	OVM SCREEN OF SS = 1.8, 2.7, 2.9, 3.8 ppm — WOH/18"-2
	8.0		GRADING TO ORGANIC SILTY CLAY TRACE FINE SAND		S-4	OVM SCREEN OF SS = BDL — 1/1FT-1/1FT
					S-5	OVM SCREEN OF SS = 1.7, 1.2, 1.7, BDL ppm — 3-5-15-25
			(SM) YELLOWISH RED COARSE TO FINE SAND, LITTLE MEDIUM FINE GRAVEL, LITTLE SILT, WET, MEDIUM DENSE, WEAK PHC ODOR		S-6	OVM SCREEN OF SS = BDL — 7-12-15-17
	12.0		GRADING WITH OCCASIONAL LENSES OF SILTY CLAY		S-7	27-30-35-40
			GRADING TO VERY DENSE, WITHOUT PHC ODOR		S-8	11-20-100/6"
	16.0				S-9	11-5-100/5"
			GRADING WITH SOME MEDIUM FINE GRAVEL		S-10	100/5"
	20.0		REDDISH BROWN SHALE BEDROCK, MODERATELY TO SLIGHTLY WEATHERED, VERY STRONG, WIDELY FRACTURED, VERY THICKLY BEDDED, DISTURBED BEDDING 19-20 FEET, FREQUENT CALCITE FILLED 1/8-1/2 INCH VUGS, FREQUENT BLACK INTRUSIONS, FROM 18.7 TO 19.2 FEET	86.7	R-1	CORE RUN R-1 FROM 18.5 FT TO 21 FT REC=26", %REC=86.7 >OR=4"=13", ROD=43.3
				50.0	R-2	CORE RUN R-2 FROM 21 FT TO 23.5 FT REC=15", %REC=50 >OR=4"=13", ROD=43.3
	24.0					
	28.0					

NOTES

1. BORING TERMINATED AT THE DEPTH OF ABOUT 23.5 FT ON 1/23/95.
2. SURFACE WATER THICKNESS VARIED WITH TIDE BETWEEN 4.8 FT AND 7.55 FT DURING DRILLING.
3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE ON 1/23/95.
4. ENVIRONMENTAL SAMPLES COLLECTED AS FOLLOWS.
   c) WTH-9A, 0-6', COMPOSTIE
   d) WTH-9A, 5-6', DISCRETE

NOTES (CONT'D)

c) WTH-9B, 6-12', COMPOSITE
d) WTH-9B, 8-9', DISCRETE

Hole No WTH-9A

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 1 SHEET
1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 4" NOM. WATER ROTARY	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO (As shown on drawing title and file number): WTH-9A		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 0	UNDISTURBED 1
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		15. ELEVATION N/A	
		16. DATE HOLE: 1-23-95	1-23-95
7. THICKNESS OF OVERBURDEN: >7.5 FT.		17. ELEVATION TOP OF MUDLINE: -6.0 FT±	
8. DEPTH DRILLED INTO ROCK: 0.0 FT.		18. TOTAL CORE RECOVERY FOR BORING: N/A	
9. TOTAL DEPTH OF HOLE: 7.5 FT.		19. INSPECTOR(S): D. MAZUJIAN/M. TORSIELLO	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
	4.0		(OH) BLACK ORGANIC CLAY, WET, VERY SOFT, PHC ODOR, STAINED BLACK			
			GRADING WITH LITTLE MEDIUM TO FINE GRAVEL. FREQUENT LENSES OF YELLOWISH RED CLAYEY SILT		U-1	OSTERBERG SAMPLE, 3" O.D. TUBE. 5.5-7.5 FT. 21" RECOVERY
	8.0					
	12.0					
	16.0					
	20.0					
	24.0					
	28.0					

NOTES:
1. BORING TERMINATED AT THE DEPTH OF ABOUT 7.5 FEET ON 1-23-95.
2. SURFACE WATER THICKNESS APPROXIMATELY 8.3 FT. DURING DRILLING.
2. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.

Hole No WT-10

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV	INSTALLATION	SHEET 1 OF 2 SHEETS
1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 4" NOM WATER ROTARY	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO (As shown on drawing title and file number): WT-10		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 15	UNDISTURBED 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES	
		15. ELEVATION N/A	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		16. DATE HOLE: 1-17-95	1-18-95
		17. ELEVATION TOP OF MUDLINE: -3.3 FT±	
7. THICKNESS OF OVERBURDEN: >31 FT.		18. TOTAL CORE RECOVERY FOR BORING: N/A	
8. DEPTH DRILLED INTO ROCK: 0.0 FT.		19. INSPECTOR(S): D. MAZUJIAN	
9. TOTAL DEPTH OF HOLE: 31 FT.			

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			(OH) OLIVE GRAY ORGANIC CLAY, WET. VERY SOFT. FREQUENTLY STAINED BLACK. WEAK PHC ODOR		S-1	OVM SCREEN OF SS = 1.1, 1.1 ppm WOR/2.5 FT
			GRADING TO SOFT WITH SOME ORGANICS AND DECOMPOSED ORGANIC MATTER		S-2	OVM SCREEN OF SS = BDL 1/1 FT-2-2
	4.0				S-3	OVM SCREEN OF SS = BDL WOH/2 FT
					S-4	OVM SCREEN OF SS = BDL 1-1-1-1
	8.0				S-5	OVM SCREEN OF SS = BDL 1-1-1-2
			GRADING WITH LITTLE FINE SAND		S-6	OVM SCREEN OF SS = 1.9, 2.7, 4.2 ppm 1-1-1-1
	12.0		GRADING TO BLACK, WITH TRACE FINE GRAVEL, STRONG, PHC ODOR STAINED BLACK.		S-7	OVM SCREEN OF SS = 3.4, 5.0, 1.9, 3.6 ppm WOR-WOH-1/1 FT
			GRADING WITH LITTLE YELLOWISH RED COARSE TO FINE GRAVEL (SILT STONE) AND OCCASIONAL FRAGMENTS OF SHELLS TO VERY STIFF		S-8	OVM SCREEN OF SS = 3.2, 12.7, 8.8, 4.6 ppm WOH/2 FT
	16.0				S-9	OVM SCREEN OF SS = 9.6,3.4 ppm 6-9-14-25
			(GP) REDDISH BROWN-DARK GRAY COARSE TO FINE GRAVEL (SILT STONE). SOME COARSE TO FINE SAND. LITTLE SILT. WET. DENSE. FREQUENT BOULDERS AND COBBLES		S-10	OVM SCREEN OF SS = BDL 19-20-21-34
	20.0				S-11	21-20-9-13
			(ML) YELLOWISH RED SILT. SOME FINE SAND. WET. VERY STIFF		S-12	17-18-29-29
	24.0		(SM) YELLOWISH RED FINE SAND. SOME SILT. WET. VERY DENSE		S-13	23-49-40-26
			(ML) YELLOWISH RED CLAYEY SILT. TRACE FINE SAND. WET. VERY STIFF. FREQUENT CLAY LAMINAE			
	28.0					

Hole No. WT-10

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 2 OF 2 SHEETS

1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK	10. SIZE AND TYPE OF BIT: 4" NOM WATER ROTARY
2. LOCATION (Coordinates or Station): SEE SITE PLAN	11. DATUM FOR ELEVATION SHOWN (TBM,MSL OR NGVD):
3. DRILLING AGENCY: WARREN GEORGE, INC.	12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)
4. HOLE NO (As shown on drawing title and file number): WT-10	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 15; UNDISTURBED 0
5. NAME OF DRILLER: J. GORMAN	14. TOTAL NUMBER CORE BOXES:
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION N/A
	16. DATE HOLE: 1-17-95 to 1-18-95
7. THICKNESS OF OVERBURDEN: >31 FT.	17. ELEVATION TOP OF MUDLINE: -3.3 FT±
8. DEPTH DRILLED INTO ROCK: 0.0 FT.	18. TOTAL CORE RECOVERY FOR BORING: N/A
9. TOTAL DEPTH OF HOLE: 31 FT.	19. SIGNATURE OF INSPECTOR(S): D. MAZUJIAN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			GRADING WITH LAMINATED CLAY, OCCASIONAL FRAGMENTS OF SHALE TO HARD		S-14	OVM SCREEN OF SS = BDL 6-9-13-19
					S-15	OVM SCREEN OF SS = BDL 14-25-35-35
	32.0					
	36.0					
	40.0					
	44.0					
	48.0					
	52.0					
	56.0					

NOTES:
1. BORING TERMINATED AT THE DEPTH OF 31 FEET BML ON 1-18-95.
2. SURFACE WATER THICKNESS VARIED WITH TIDE BETWEEN 2.5 FT AND 8.8 FT DURING DRILLING.
3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.

Hole No. WT-10A

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 1 SHEET

1. PROJECT	PASSAIC RIVER BANK RESTORATION, NEWARK	10. SIZE AND TYPE OF BIT	4" NOM WATER ROTARY
2. LOCATION (Coordinates or Station)	SEE SITE PLAN	11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD)	
3. DRILLING AGENCY	WARREN GEORGE, INC.	12. MANUFACTORER'S DESIGNATION OF DRILL	MOBILE B-61 (SKID RIG ON BARGE)
4. HOLE NO (As shown on drawing title and file number)	WT-10A	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 0 / UNDISTURBED 2
5. NAME OF DRILLER	J. GORMAN	14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.	15. ELEVATION N/A	
		16. DATE HOLE	1-18-95 / 1-18-95
7. THICKNESS OF OVERBURDEN	>14 FT.	17. ELEVATION TOP OF MUDLINE	-2.5 FT±
8. DEPTH DRILLED INTO ROCK	0.0 FT.	18. TOTAL CORE RECOVERY FOR BORING	N/A
9. TOTAL DEPTH OF HOLE	14 FT.	19. INSPECTOR(S)	D. MAZUJIAN

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT: BLOWS/6 IN
	4.0		(OH) DARK OLIVE GRAY ORGANIC CLAY, WET, VERY SOFT, FREQUENTLY STAINED BLACK, STRONG PHC ODOR			
	8.0		GRADING WITH SOME ORGANICS, DECOMPOSED ORGANIC MATTER, TRACE FRAGMENTS OF SLAG, STAINED BLACK			
			PP=0.16 TSF TOR=0.13 TSF		U-1	OSTERBERG SAMPLE, 3" O.D. TUBE, 10-12 FT, 24" RECOVERY
	12.0		PP=0.266 TSF TOR=0.4 TSF		U-2	OSTERBERG SAMPLE, 3" O.D. TUBE, 12-14 FT, 24" RECOVERY
	16.0		NOTES 1. BORING TERMINATED AT THE DEPTH OF ABOUT 14 FEET ON 1-18-95. 2 SURFACE WATER THICKNESS APPROXIMATELY 7.5 FT DURING DRILLING 3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.			
	20.0					
	24.0					
	28.0					

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 2 SHEETS
1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 4" NOM WATER ROTARY NX CORE	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL OR NGVD):	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO. (As shown on drawing title and file number): WT-10 (WHT-10)		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9	UNDISTURBED 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES: <1	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		15. ELEVATION: N/A	
		16. DATE HOLE: 1-23-95	1-24-95
7. THICKNESS OF OVERBURDEN: 14.0 FT.		17. ELEVATION TOP OF MUDLINE: -9.0 FT±	
8. DEPTH DRILLED INTO ROCK: 12.25 FT.		18. TOTAL CORE RECOVERY FOR BORING: 43 IN.	
9. TOTAL DEPTH OF HOLE: 26.25 FT.		19. INSPECTOR(S): D. MAZUJIAN/M. TORSIELLO	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			(OH) DARK OLIVE GRAY ORGANIC CLAY, WET, VERY SOFT, FREQUENTLY STAINED BLACK, STRONG PHC ODOR		S-1	NO RECOVERY WOR/2 FT
					S-2	OVM SCREEN OF SS = BDL, 1.2, 0.4 ppm WOR/2 FT
	4.0				S-3	OVM SCREEN OF SS = BDL, 0.8, 1.2 ppm WOR/2 FT
			GRADING WITH TRACE DECOMPOSED ORGANIC MATTER		S-4	OVM SCREEN OF SS = 1.6, 3.6, 6.1 ppm WOR/2 FT
	8.0				S-5	OVM SCREEN OF SS = 2.8, 2.8, 38.0 ppm WOR/18"-WOH
					S-6	OVM SCREEN OF SS = 0.8, 18.8, 10.4 ppm WOR/2 FT
	12.0		(SC) YELLOWISH RED SILTY CLAY AND COARSE TO FINE SAND, LITTLE FINE GRAVEL, WET, VERY DENSE, OCCASIONAL BOULDERS (SHALE)		S-7	OVM SCREEN OF SS = BDL 17-35-100/6"
			YELLOWISH RED-REDDISH BROWN SHALE BEDROCK, COMPLETELY WEATHERED TO RESIDUAL SOIL, MODERATELY WEAK TO WEAK TO MODERATELY STRONG		R-1	CORE RUN R-1: FROM 13.75 FT TO 16.25 FT REC=0", %REC=0 >OR=4"=0, ROD=0
	16.0				S-8	OVM SCREEN OF SS = 100/5"
					S-9	BDL (S-8) OVM SCREEN OF SS = 100/3" BDL (S-9)
	20.0				R-2	CORE RUN R-2: FROM 18.5 FT TO 23 FT REC=9", %REC=16.7 >OR=4"=0, ROD=0
			GRADING TO REDDISH BROWN, MODERATELY WEATHERED, STRONG, THICKLY BEDDED, WIDELY FRACTURED AND JOINTED WITH COMPLETELY WEATHERED SEAMS, FREQUENT VUGS 1/8-1 INCH, FREQUENT BLACK INSTRUSTIONS AND GREENISH MOTTLING AT FRACTURES EVIDENT		R-3	CORE RUN R-3: FROM 23 FT TO 26.25 FT REC=34", %REC=87 >OR=4"=10", ROD=26
	24.0					
			NOTES CONT'D ON NEXT PAGE.			
	28.0					

DRILLING LOG | DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV. | INSTALLATION | SHEET 2 OF 2 SHEETS

1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK
2. LOCATION (Coordinates or Station): SEE SITE PLAN
3. DRILLING AGENCY: WARREN GEORGE, INC.
4. HOLE NO. (As shown on drawing title and file number): WTH-10
5. NAME OF DRILLER: J. GORMAN
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: >14.0 FT.
8. DEPTH DRILLED INTO ROCK: 12.25 FT.
9. TOTAL DEPTH OF HOLE: 26.25 FT.
10. SIZE AND TYPE OF BIT: 4" NOM WATER ROTARY NX CORE
11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):
12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9 | UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION N/A:
16. DATE HOLE: 1-23-95 | 1-24-95
17. ELEVATION TOP OF MUDLINE: -9.0 FT±
18. TOTAL CORE RECOVERY FOR BORING: 43 IN
19. SIGNATURE OF INSPECTOR(S): D. MAZUJIAN/M. TORSIELLO

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
	32.0		NOTES: 1. BORING TERMINATED AT THE DEPTH OF ABOUT 26.25 FEET BML ON 1-24-95. 2. SURFACE WATER THICKNESS VARIED WITH TIDE BETWEEN 9.3 FT AND 11.5 FT DURING DRILLING. 3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT. 4. ENVIRONMENTAL SAMPLES COLLECTED AS FOLLOWS: a) WTH-10A, 0-6', COMPOSITE b) WTH-10A, 3-4' DISCRETE c) WTH-10B, 6-12', COMPOSITE c) WTH-10B, 9-10', DISCRETE			
	36.0					
	40.0					
	44.0					
	48.0					
	52.0					
	56.0					

Hole No WTH-10A

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 1 SHEET

1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 4" NOM WATER ROTARY	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL OR NGVD)	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO (As shown on drawing title and file number): WTH-10A		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 0 / UNDISTURBED: 2
5. NAME OF DRILLER: J. STEVENSON		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		15. ELEVATION N/A	
		16. DATE HOLE	1-27-95 / 1-27-95
7. THICKNESS OF OVERBURDEN: >10 FT.		17. ELEVATION TOP OF MUDLINE: -8.8 FT±	
8. DEPTH DRILLED INTO ROCK: 0.0 FT.		18. TOTAL CORE RECOVERY FOR BORING: N/A	
9. TOTAL DEPTH OF HOLE: 10 FT.		19. INSPECTOR(S): D. MAZUJIAN/M. TORSIELLO	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
	4.0		(OH) DARK OLIVE GRAY ORGANIC CLAY WET, VERY SOFT, FREQUENTLY STAINED BLACK, STRONG PHC ODOR			
	8.0		GRADING WITH FREQUENT POCKETS OF OLIVE GRAY COARSE TO FINE SAND, FREQUENT FRAGMENTS OF SHELL		U-1	OSTERBERG SAMPLE, 3" O.D. TUBE, 6-8 FT, 21" RECOVERY
			GRADING WITH SOME COARSE TO FINE GRAVEL		U-2	OSTERBERG SAMPLE, 3" O.D. TUBE, 8-10 FT, 20" RECOVERY
	12.0		NOTES: 1. BORING TERMINATED AT THE DEPTH OF ABOUT 10 FEET ON 1-27-95. 2. SURFACE WATER THICKNESS APPROXIMATELY 7.5 FT DURING DRILLING. 2. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.			
	16.0					
	20.0					
	24.0					
	28.0					

Hole No. WT-11

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 1 SHEET

1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 8" NOM O.D. HSA	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO (As shown on drawing title and file number): WT-11		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 6	UNDISTURBED 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES:	
		15. ELEVATION: N/A	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		16. DATE HOLE: 1-13-95	1-16-95
17. THICKNESS OF OVERBURDEN: >10.9 FT.		17. ELEVATION TOP OF MUDLINE: -4.1 FT±	
18. DEPTH DRILLED INTO ROCK: 0.0 FT.		18. TOTAL CORE RECOVERY FOR BORING: N/A	
19. TOTAL DEPTH OF HOLE: 10.9 FT		19. INSPECTOR(S): D. MAZUJIAN	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			(OH) OLIVE GRAY-BLACK ORGANIC CLAY, TRACE FINE GRAVEL, WET, SOFT, STAINED BLACK STRONG PHC ODOR		S-1	OVM SCREEN OF SS = 4.4 ppm 1-2-2-2
			GRADING WITH BROWN LAMINAE		S-2	OVM SCREEN OF SS = BDL 1/18"-2
	4.0		(SP) BLACK MEDIUM TO FINE SAND, TRACE SILT, WET, LOOSE, STAINED BLACK, STRONG PHC ODOR, SHEEN ON SAMPLE		S-3	OVM SCREEN OF SS = 6.0, 12.0 ppm 2-3-5-7
			GRADING TO VERY DENSE WITH COARSE TO FINE SAND, LITTLE FINE GRAVEL, OCCASIONAL FRAGMENTS OF WOOD, FREQUENT FRAGMENTS OF COAL		S-4	OVM SCREEN OF SS = 27.7, 31.0, 31.5 ppm 12-25-100/6"
	8.0		GRADING TO LOOSE SILT, WITH TRACE ORGANICS		S-5	1-2-7-39
			GRADING WITH OCCASIONAL FRAGMENTS OF CINDERS TO VERY DENSE		S-6	30-100/5"
	12.0		NOTES: 1. BORING TERMINATED AT THE DEPTH OF ABOUT 10.9 FT ON 1-16-95 DUE TO WOODEN OBSTRUCTION ENCOUNTERED AT APPROXIMATELY 9.5 FT. 2. SURFACE WATER THICKNESS VARIED WITH TIDE BETWEEN 4.0 FT AND 10.0 FT DURING DRILLING. 3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.			
	16.0					
	20.0					
	24.0					
	28.0					

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV	INSTALLATION	SHEET 1 OF 1 SHEET

1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 4" NOM WATER ROTARY, NX CORE	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD):	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO (As shown on drawing title and file number): WT-11A		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 1	UNDISTURBED 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES:	
		15. ELEVATION: N/A	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		16. DATE HOLE: 1-16-95	1-17-95
		17. ELEVATION TOP OF MUDLINE: -3.1 FT±	
7. THICKNESS OF OVERBURDEN: 12.0 FT.		18. TOTAL CORE RECOVERY FOR BORING: 56 IN.	N/A
8. DEPTH DRILLED INTO ROCK: 6.8 FT.		19. INSPECTOR(S): D. MAZUJIAN	
9. TOTAL DEPTH OF HOLE: 18.8 FT.			

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN:
	4.0		REFER TO BORING WT-11 FOR STRATA DESCRIPTION TO ±12 FT			
	8.0					
	12.0				S-8	80/3"
			REDDISH BROWN FINE SANDSTONE, STRONG, MODERATELY TO SLIGHTLY WEATHERED, BLACK DISCOLORATION EVIDENT IN NATURAL FRACTURES, VERY THICKLY BEDDED, WIDELY FRACTURED, FREQUENT VUGS (FINES WASHED AWAY) 1/16" TO 3/8" DIA.	93.3	R-1	CORE RUN R-1. FROM 13.8 FT TO 18.8 FT REC=56" % REC=93.3 >OR=4"=45". ROD=75%
	16.0					
	20.0		NOTES 1. BORING TERMINATED AT THE DEPTH OF ABOUT 18.8 FT ON 1/17/95. 2. SURFACE WATER THICKNESS VARIED WITH TIDE BETWEEN 3.2 FT AND 7.3 FT DURING DRILLING. 3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.			
	24.0					
	28.0					

Hole No WT-12

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 2 SHEETS
1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 8" NOM O.D. HSA, 4" NOM WATER ROTARY, NX CORE	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL OR NGVD)	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO (As shown on drawing title and file number): WT-12		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 13	UNDISTURBED 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		15. ELEVATION N/A	
		16. DATE HOLE: 1-12-95	1-13-95
7. THICKNESS OF OVERBURDEN: 23.5 FT.		17. ELEVATION TOP OF MUDLINE: -3.2 FT±	
8. DEPTH DRILLED INTO ROCK: 4.5 FT.		18. TOTAL CORE RECOVERY FOR BORING: 26.5 IN	
9. TOTAL DEPTH OF HOLE: 29 FT.		19. INSPECTOR(S): D. MAZUJIAN	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			(OH) OLIVE GRAY ORGANIC CLAY, WET, VERY SOFT, FREQUENTLY STAINED BLACK, STRONG PHC ODOR		S-1	WOH/2 FT
					S-2	WOH/18"-3
	4.0		(SM) BLACK MEDIUM TO FINE SAND, AND CLAYEY SILT, TRACE MEDIUM TO FINE GRAVEL, WET, VERY LOOSE, STAINED BLACK, STRONG PHC ODOR		S-3	WOR/2 FT
			(SP) BLACK MEDIUM TO FINE SAND, TRACE SILT, WET, MEDIUM DENSE, STAINED BLACK, STRONG PHC ODOR, OCCASIONAL WOOD FRAGMENTS		S-4	38-9-5-4
	8.0		GRADING TO COARSE TO FINE SAND WITH TRACE FINE GRAVEL, TRACE SILT		S-5	2-4-7-15
					S-6	6-11-10-11
	12.0		GRADING TO DARK BROWN, LITTLE SILT, WITH TRACE ORGANICS		S-7	3-6-6-7
					S-8	6-9-13-16
	16.0				S-9	6-6-9-12
			(GP) DARK BROWN COARSE TO FINE GRAVEL, SOME COARSE TO FINE SAND, TRACE SILT, FREQUENT COBBLES, WET VERY, DENSE OCCASIONAL FRAGMENTS STAINED BLACK, STRONG PHC ODOR		S-10	17-39-57-80
	20.0				S-11	34-60-100/3"
			(GC) REDDISH BROWN COARSE TO FINE GRAVEL, (SHALE), SOME SILTY CLAY, TRACE COARSE TO FINE SAND, WET HARD, WEAK PHC ODOR, (GLACIAL TILL)		S-12	90-100/6"
					S-13	85-100/4"
	24.0		REDDISH BROWN SHALE BEDROCK, SLIGHTLY WEATHERED TO RESIDUAL SOIL, VERY STRONG TO WEAK, CLOSELY TO VERY CLOSELY JOINTED, ROD=0%	43.8	R-1	CORE RUN R-1, FROM 25 FT TO 27 FT REC=10.5", %REC=43.8 >OR=4"=0, ROD=0
			GRADING TO VERY STRONG TO STRONG, SLIGHTLY TO MODERATELY, WEATHERED	66.7	R-2	
	28.0					

Hole No WT-12

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 2 OF 2 SHEETS

1. PROJECT: PASSAIC RIVER BANK RESTORATION, NEWARK		10. SIZE AND TYPE OF BIT: 8" NOM O.D. HSA, 4" NOM. WATER ROTARY, NX CORE	
2. LOCATION (Coordinates or Station): SEE SITE PLAN		11. DATUM FOR ELEVATION SHOWN (TBM,MSL OR NGVD)	
3. DRILLING AGENCY: WARREN GEORGE, INC.		12. MANUFACTORER'S DESIGNATION OF DRILL: MOBILE B-61 (SKID RIG ON BARGE)	
4. HOLE NO. (As shown on drawing title and file number): WT-12		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 13 / UNDISTURBED: 0
5. NAME OF DRILLER: J. GORMAN		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED _____ DEG. FROM VERT.		15. ELEVATION N/A	
		16. DATE HOLE	1-12-95 / 1-13-95
7. THICKNESS OF OVERBURDEN: 23.5 FT.		17. ELEVATION TOP OF MUDLINE: -3.2 FT±	
8. DEPTH DRILLED INTO ROCK: 4.5 FT.		18. TOTAL CORE RECOVERY FOR BORING: 26.5 IN	
9. TOTAL DEPTH OF HOLE: 29 FT.		19. SIGNATURE OF INSPECTOR(S): D. MAZUJIAN	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			SEE ABOVE			CORE RUN R-2: FROM 27 FT TO 29 FT REC=16", %REC=66.7 >OR=4"=8.5", RQD=35.4%
	32.0		NOTES: 1. BORING TERMINATED AT THE DEPTH OF 29 FEET BML ON 1-13-95. 2. SURFACE WATER THICKNESS VARIED WITH TIDE BETWEEN 3.3 FT AND 6.6 FT. DURING DRILLING. 3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.			
	36.0					
	40.0					
	44.0					
	48.0					
	52.0					
	56.0					

Hole No WT-13

DRILLING LOG	DIVISION NEW YORK DISTRICT PASSAIC RIVER DIV.	INSTALLATION	SHEET 1 OF 1 SHEET

1. PROJECT	PASSAIC RIVER BANK RESTORATION, NEWARK	10. SIZE AND TYPE OF BIT	8" NOM. O.D. HSA
2. LOCATION (Coordinates or Station)	SEE SITE PLAN	11. DATUM FOR ELEVATION SHOWN (TBM,MSL, OR NGVD)	
3. DRILLING AGENCY	WARREN GEORGE, INC.	12. MANUFACTORER'S DESIGNATION OF DRILL	MOBILE B-61 (SKID RIG ON BARGE)
4. HOLE NO (As shown on drawing title and file number)	WT-13	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 5 / UNDISTURBED 0
5. NAME OF DRILLER	J. GORMAN	14. TOTAL NUMBER CORE BOXES	
		15. ELEVATION	N/A
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.	16. DATE HOLE	1-11-95 / 1-11-95
		17. ELEVATION TOP OF MUDLINE	-15.8 FT±
7. THICKNESS OF OVERBURDEN	5.5 FT.	18. TOTAL CORE RECOVERY FOR BORING	N/A
8. DEPTH DRILLED INTO ROCK	2.5 FT.	19. INSPECTOR(S)	D. MAZUJIAN/M. TORSIELLO
9. TOTAL DEPTH OF HOLE	8.0 FT.		

ELEVATION c	DEPTH b	LEGEND c	CLASSIFICATION (Description) d	% CORE RECOVERY OR W.C. e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g SPT BLOWS/6 IN
			(OH) BLACK/DARK BROWN ORGANIC SILTY CLAY, WET, SOFT TO MEDIUM STIFF FREQUENT DECOMPOSED ORGANIC MATTER, PHC ODOR, STAINED BLACK		S-1	4-17-35-72
					S-2	72-150/5"
	4.0		(GP) YELLOWISH RED COARSE TO FINE GRAVEL, (SANDSTONE & SILTSTONE), LITTLE COARSE TO FINE SAND, TRACE SILT, PHC ODOR		S-3	15-16-100/2"
					S-4	55-100/5"
			SHALE BEDROCK, REDDISH BROWN SHALE, MODERATELY WEAK TO WEAK, COMPLETELY WEATHERED TO RESIDUAL SOIL		S-5	34-58-100/3"
	8.0					
	12.0					
	16.0					
	20.0					
	24.0					
	28.0					

NOTES:
1. BORING TERMINATED AT THE DEPTH OF ABOUT 8 FT ON 1/11/95.
2. SURFACE WATER THICKNESS VARIED WITH TIDE BETWEEN 16 FT AND 17 FT DURING DRILLING.
3. BORING TREMIE GROUTED WITH CEMENT/BENTONITE GROUT.

Block 3 Lot 13

Route 21 (5)	Drilling Co.:Summit Drilling	BOREHOLE No: EB-32
START DATE: 10/25/95	END DATE: 10/25/95	Project No: 95-1340-0189
Sunny, windy, warm, 65	STATION: - OFFSET: -	ELEVATION: 0.000 (ft)

SAMPLE TYPE ■ Shelby Tube ⁄ Split Spoon ⊠ Roller Bit ▤ Button Bit ▥ Hollow Stem ▥ HQ Coring

▲ Recovery (0–100%) ▲
◆ Penetration (0–100) ◆
● PID Readings (0–2000 ppm) ●

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	Soil Description	Field Data	ELEVATION (ft)
0.0			ASPHALT & Subbase		0.0
			0.5–6.0'–FILL MATERIAL–		
		S1	0.0–0.3' Black;loose;coal fragments;dry	PID = 0.0 ppm	
			Fine to coarse sand;dry;loose;red–brown;	Sampled @1040 1.5–2.0'	
2.0			w/some rock fragments; trace of silt		2.0
		S2	w/some red brick fragments	PID = 0.0 ppm	
4.0					4.0
		S3		PID = 0.0 ppm	
			6.0–16.0' SAND–w/some silt; moist to wet;		6.0
		S4	red–brown;loose	PID = 0.0 ppm	▼
			8.0–16.0'SAME, but saturated, mushy		8.0
		S5		PID = 0.0 ppm	
10.0					10.0
		S6		PID = 0.0 ppm	
					12.0
		S7		PID = 0.0 ppm	
					14.0
		S8		PID = 0.0 ppm	
			Bottom of boring@16.0'		16.0
					18.0
					20.0

L. ROBERT KIMBALL & ASSOCIATES
Ebensburg, Pennsylvania

LOGGED BY: BY	COMPLETION DEPTH: 16.0 ft
REVIEWED BY: JWD	COMPLETE: 10/25/95
Fig. No:	Page 1 of 1

Block 3 Lot 13

Route 21 (5)	Drilling Co.:Summit Drilling	BOREHOLE No: EB-33
START DATE: 10/25/95	END DATE: 10/25/95	Project No: 95-1340-0189
Sunny, windy, warm, 65	STATION: - OFFSET: -	ELEVATION: 0.000 (ft)

SAMPLE TYPE: Shelby Tube; Split Spoon; Roller Bit; Button Bit; Hollow Stem; HQ Coring

▲ Recovery (0-100%) ▲
◆ Penetration (0-100) ◆
● PID Readings (0-2000 ppm) ●

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	Soil Description	Field Data
0.0			ASPHALT & Subbase	
		S1	0.5-1.0'-FILL MATERIAL-	PID = 0.0 ppm
2.0			0.0-0.3' Coal fragments	
		S2	0.3-0.4' Sand and silt stained black;dry; loose	PID = 0.0 ppm
4.0			1.0-10.0' SAND-w/some gravel and rock fragments;red-brown;loose;dry;w/some shale fragments	
		S3		PID = 0.0 ppm
6.0				
		S4		PID = 0.0 ppm Sampled @1125 7.5-8.0'
8.0 ▼			8.0-10.0'Saturated	
		S5		PID = 0.0 ppm
10.0			Bottom of boring@10.0'	
12.0				
14.0				
16.0				
18.0				
20.0				

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LOGGED BY: BY	COMPLETION DEPTH: 10.0 ft
REVIEWED BY: JWD	COMPLETE: 10/25/95
Fig. No:	Page 1 of 1

TIERRA-B-018267

Block 3 Lot 13

Route 21 (5)	Drilling Co.:Summit Drilling	BOREHOLE No: EB-34
START DATE: 10/25/95	END DATE: 10/25/95	Project No: 95-1340-0189
Sunny, windy, warm, 65	STATION: - OFFSET: -	ELEVATION: 0.000 (ft)

SAMPLE TYPE: Shelby Tube | Split Spoon | Roller Bit | Button Bit | Hollow Stem | HQ Coring

▲ Recovery (0-100%) ▲
◆ Penetration (0-100) ◆
● PID Readings (0-2000 ppm) ●

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	Soil Description	Field Data	ELEVATION (ft)
0			ASPHALT & Subbase		0.0
		S1	0.5-14.0' FILL MATERIAL- Fine to medium sand;damp;loose;w/rock fragments and coal fragments;red-brown w/some silt;Lt. brown and black	PID = 0.0 ppm	
2.0		S2		PID = 0.0 ppm	2.0
4.0		S3	4.0-14.0' No coal fragments	PID = 0.0 ppm	4.0
6.0		S4		PID = 0.0 ppm	6.0
8.0		S5		PID = 0.0 ppm	8.0
10.0		S6	10.0-14.0' w/concrete fragments	PID = 0.0 ppm	10.0
12.0		S7		PID = 0.0 ppm	12.0
14.0			Bottom of boring@14.0'	Auger refusal @14.0' Did not collect sample from this boring due to sample recoveries in spoons.	14.0
16.0					16.0
18.0					18.0
20.0					20.0

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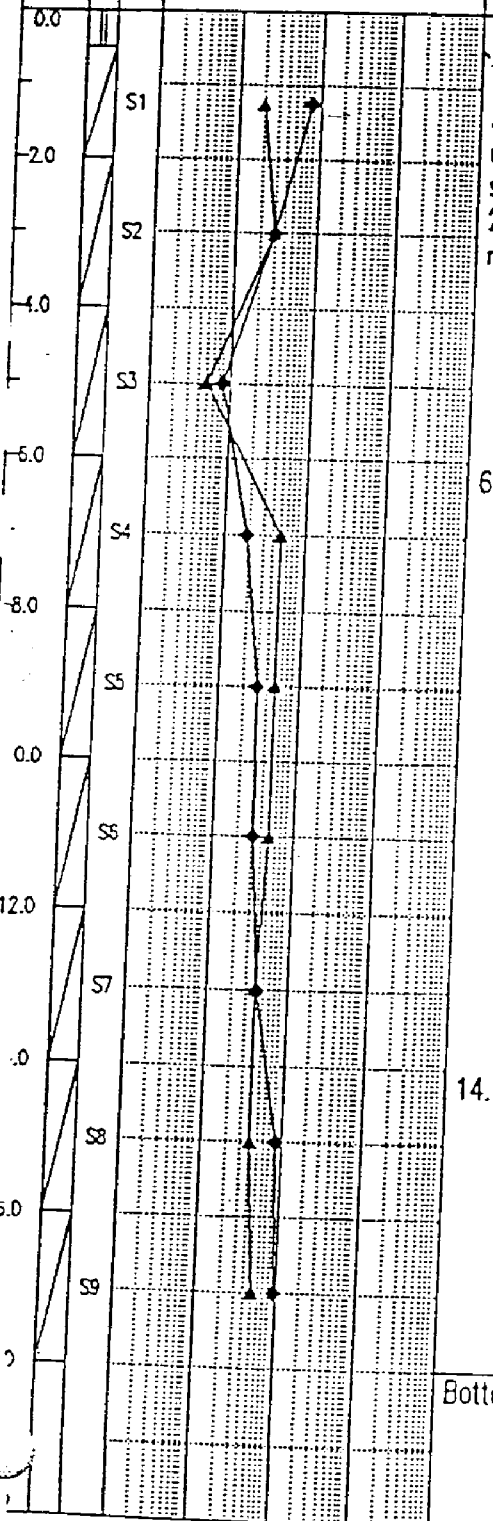
LOGGED BY: BY	COMPLETION DEPTH: 14.0 ft
REVIEWED BY: JWD	COMPLETE: 10/25/95
Fig. No:	Page 1 of 1

Block 3 Lot 13

Route 21 (5)	Drilling Co.:Summit Drilling	BOREHOLE No: EB-35
START DATE: 10/25/95	END DATE: 10/25/95	Project No: 95-1340-0189
Sunny, windy, warm, 65	STATION: - OFFSET: -	ELEVATION: 0.000 (ft)

SAMPLE TYPE: Shelby Tube; Split Spoon; Roller Bit; Button Bit; Hollow Stem; HQ Coring

▲ Recovery (0-100%) ▲
◆ Penetration (0-100) ◆
● PID Readings (0-2000 ppm) ●



Soil Description	Field Data
ASPHALT & Subbase 0.5-2.0' FILL MATERIAL- Fine to medium sand;loose;dry;red-brown and black;w/some rock fragments;trace of silt	PID = 0.0 ppm
2.0-18.0' SAND-w/some gravel; trace silt; red-brown;dry;loose;w/some rock fragments	PID = 0.0 ppm
	PID = 0.0 ppm
6.0-8.0' Larger gravel	PID = 0.0 ppm
	PID = 0.0 ppm
	PID = 0.0 ppm
	PID = 0.0 ppm Sampled @1450 13.5-14.0'
14.0-18.0'Less sand;more gravel(sandstone)	PID = 0.0 ppm
	PID = 0.0 ppm
Bottom of Boring@ 18.0'	

ELEVATION (ft): 0.0, -2.0, -4.0, -6.0, -8.0, -10.0, -12.0, -14.0, -16.0, -18.0, -20.0

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Ebensburg, Pennsylvania

LOGGED BY: BY	COMPLETION DEPTH: 18.0 ft
REVIEWED BY: JWD	COMPLETE: 10/25/95
Fig. No:	Page 1 of 1

TIERRA-B-018269

Route 21 (5)	Drilling Co.:Summit Drilling	BOREHOLE No: EB-36
START DATE: 10/25/95	END DATE: 10/25/95	Project No: 95-1340-0189
Sunny, windy, warm, 65	STATION: - OFFSET: -	ELEVATION: 0.000 (ft)

SAMPLE TYPE: Shelby Tube | Split Spoon | Roller Bit | Button Bit | Hollow Stem | HQ Coring

▲ Recovery (0-100%) ▲
◆ Penetration (0-100) ◆
● PID Readings (0-2000 ppm) ●

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	Soil Description	Field Data
0.0			ASPHALT & Subbase	
		S1	0.5-2.0' FILL MATERIAL- Sandy;w/some rock fragments;black and Dk. brown;loose;dry;w/some coal fragments	PID = 0.0 ppm Sampled @1522 1.50-2.0'
2.0		S2	2.0-10.0' SAND-w/some gravel;sandstone rock fragments;damp;loose;and shale fragments;fine sand	PID = 0.0 ppm
4.0		S3		PID = 0.0 ppm
6.0		S4		PID = 0.0 ppm
8.0		S5		PID = 0.0 ppm
10.0			Bottom of boring @10.0'	
12.0				
14.0				
16.0				
18.0				
20.0				

ELEVATION (ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, -20.0

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Ebensburg, Pennsylvania

LOGGED BY: BY	COMPLETION DEPTH: 10.0 ft
REVIEWED BY: JWD	COMPLETE: 10/25/95
Fig. No:	Page 1 of 1

Drilling Co.: Summit Drilling	START DATE: 11/12/96	BOREHOLE No: MED-74
Driller: Jim Burton	END DATE: 11/12/96	Project No: 95-1340-0189
	Clear skies-32	ELEVATION: 0.000 (ft)

SAMPLE TYPE: Shelby Tube | Split Spoon | Hand Auger | Drilled Casing | Hollow Stem | Core

▲ Recovery (0-100%) ▲ 20 40 60 80
◆ Penetration (0-100) ◆ 20 40 60 80
● PID Readings (0-2000 ppm) ● 400 800 1200 1600

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	COMMENTS	WELL INSTALLATION	ELEVATION (ft)
0.0			Asphalt	PID Malfunctioning		0.0
		S1	SILTY SAND; dk brown to black, w/ Gravel, dry			
		S2	SILTY SAND; brown, w/ some Gravel, dry	Sampled @ 13:18, 2.5-3.0 Ft for BN, TPH, TCLP		
5.0		S3	SILTY SAND; brown, w/ Gravel & sandstone frags, dry			5.0
		S4	SILTY SAND; brown, w/ some Concrete & few sandstone frags, dry to damp	Sampled @ 13:25, 6.0 - 6.5 FT for BN, TPH, RCRA Metals		
		S5	SANDSTONE & CONCRETE FRAGS; brown/red, & some Silty Sand, brown			
10.0		S6	SILTY SAND; brown, med., w/ few Sandstone frags, dry			10.0
		S7	SILTY SAND; brown/grey, f-med., w/ some Gravel, wet	Sampled @ 13:35, 12.5-13.0 Ft for BN, TPH, TCLP		
15.0		S8	SILTY SAND; brown, f-med., w/ Sandstone gravel & some concrete frags, dry			15.0
			End of Boring @ 16.0 Ft			
20.0						-20.0

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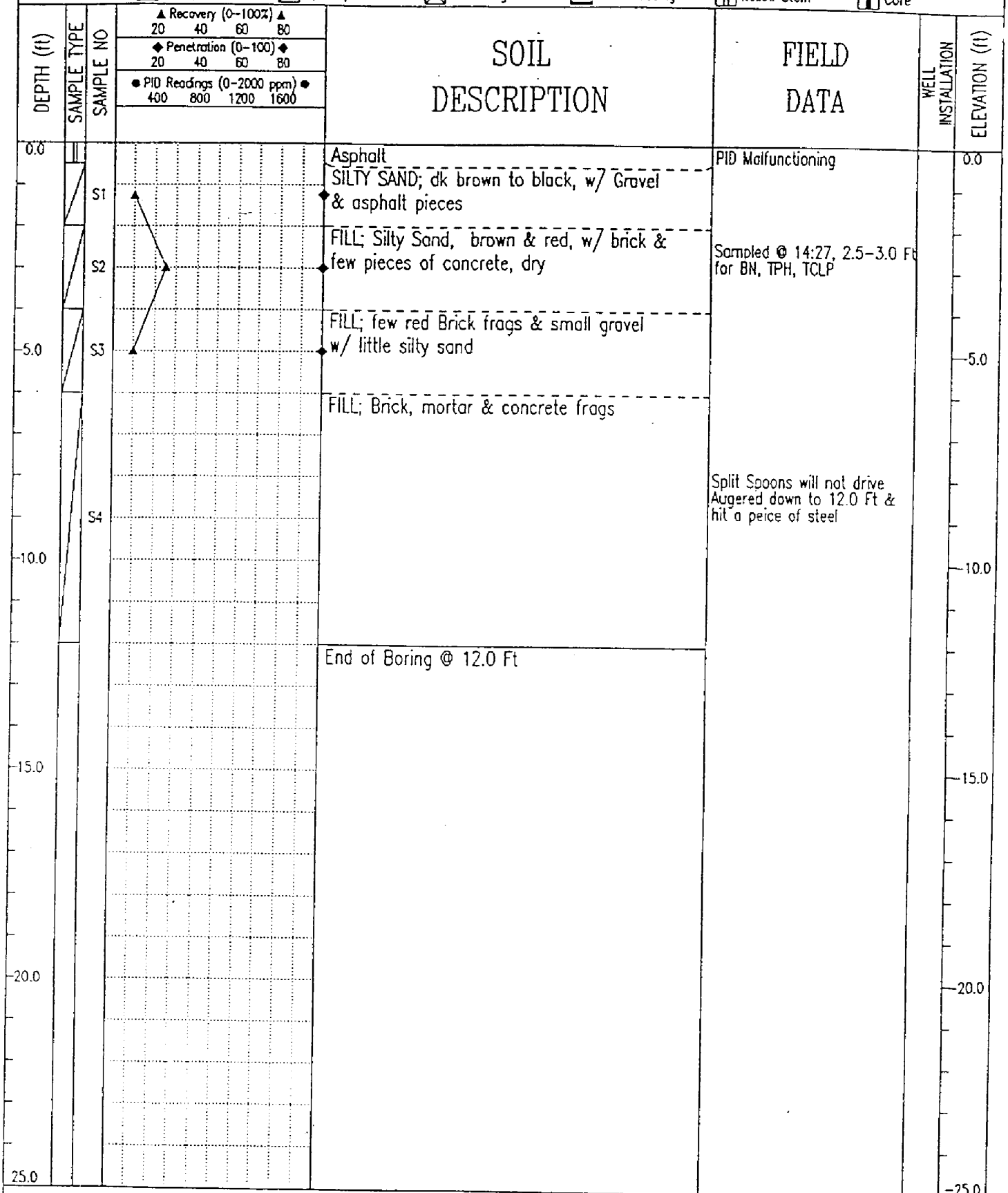
Ebensburg, Pennsylvania

LOGGED BY: MDB	COMPLETION DEPTH: 16.0 ft
REVIEWED BY: JWD	COMPLETE: 11/12/96
Fig. No:	Page 1 of 1

Drilling Co.: Summit Drilling	END DATE: 11/12/96	BOREHOLE No: MEB-75A
Driller: Jim Burton	Clear skies-32	Project No: 95-1340-0189
SAMPLE TYPE ■ Shelby Tube ⧄ Split Spoon ⊠ Hand Auger ▤ Drilled Casing ▥ Hollow Stem ▯▯ Core		ELEVATION: 0.000 (ft)



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	REVIEWED BY: JWD	COMPLETE: 11/12/96
	Fig. No:	Page 1 of 1

Route 21 (5) Viaduct	START DATE: 11/12/96	BOREHOLE No: MEB-75B
Drilling Co.: Summit Drilling	END DATE: 11/12/96	Project No: 95-1340-0189
Driller: Jim Burton	Clear skies-32	ELEVATION: 0.000 (ft)

SAMPLE TYPE: Shelby Tube | Split Spoon | Hand Auger | Drilled Casing | Hollow Stem | Core

▲ Recovery (0-100%) ▲ 20 40 60 80
◆ Penetration (0-100) ◆ 20 40 60 80
● PID Readings (0-2000 ppm) ● 400 800 1200 1600

DEPTH (ft)	SAMPLE TYPE	SAMPLE NO	SOIL DESCRIPTION	FIELD DATA	WELL INSTALLATION	ELEVATION (ft)
0.0			Asphalt	PID Malfunctioning		0.0
		S1	SAND; lt brown to brown, w/ some Silt & gravel, dry			
			End of boring @ 2.0 Ft	Auger Refusal @ 2.0 Ft		
5.0						5.0
10.0						10.0
15.0						15.0
20.0						20.0
25.0						-25.0

L. ROBERT KIMBALL & ASSOCIATES
Ebensburg, Pennsylvania

LOGGED BY: MDB	COMPLETION DEPTH: 2.0 ft
REVIEWED BY: JWD	COMPLETE: 11/12/96
Fig. No:	Page 1 of 1

TIERRA-B-018273

Langan
Engineering and Environmental Services, Inc.

LOG OF BORING S-3 SHEET 1 OF 3

PROJECT PSE&G FRONT STREET SITE		PROJECT NO. 1406602	
LOCATION NEWARK, NEW JERSEY		ELEVATION AND DATUM	
DRILLING AGENCY JERSEY DRILLING & BORING		DATE STARTED 2 SEPTEMBER 1997	DATE FINISHED 2 SEPTEMBER 1997
DRILLING EQUIPMENT ACKER AD-2		COMPLETION DEPTH 39.5 FT.	ROCK DEPTH 29.5 FT.
SIZE AND TYPE OF BIT 2 15/16 & 3 7/8 IN. TRICONE ROLLER BITS		NO. SAMPLES DIST. 15	UNDIST. — CORE 10 FT.
CASING 4 INCH FLUSH STEEL CASING		WATER LEVEL FIRST ~5FT	COMPL — 24 HR. —
CASING HAMMER WEIGHT 140 lbs	DROP 30 in.	FOREMAN DOMINIC PEPE	
SAMPLER 2 INCH O.D. SPLIT SPOON/NX CORE BARREL		INSPECTOR ED ZOFCHAK	
SAMPLER HAMMER WEIGHT 140 lbs	DROP 30 in.		

SOIL CHANGE	SAMPLE DESCRIPTION	DEPTH SCALE	SAMPLES NO./LOC.	SAMPLES TYPE	SAMPLES RECOV./(in)	SAMPLES PENETR. RESIST BLOWS/6 IN.	REMARKS (DRILLING FLUID, DEPTH OF CASING, CASING BLOWS, FLUID LOSS, ETC.)
	FILL: dry to moist Dark Brown f-c SAND, trace silt Crushed coal fragments Brick fragment	1	1	SS	10	6 3 4 1	Hnu Background = 1ppm start 8:39 2inch brick fragment Occasional cinders and slag
	Medium Gray Brown f-c SAND, trace silt, trace f. gravel	2					Hnu = 0ppm
	FILL: moist Brown Gray f-c SAND, trace silt, trace fine gravel Wood fragment	3	2	SS	3	3 1 4 5	8:41 Occasional pieces of slag and brick 3/4 in. piece of wood timber in sampler nose
	Dk Gray/Black cinder layer Wood fragment	4					Hnu = 0ppm
	FILL: moist to wet Dark Brown Gray f-c SAND, trace to some silt, trace fine gravel	5	3	SS	8	4 4 3 2	9:02 Occasional brick and rock fragments; crushed cinders and concrete fragments
	Orange Brown f-c SAND, some silt	6					Hnu = 0ppm
	FILL: wet Medium to Dark Brown Gray f-c SAND, some f-m gravel, trace silt.	7	4	SS	15	4 4 8 7	Hnu = 0ppm
	FILL: wet Brown Gray f-c SAND, trace to some silt, trace f-m gravel	8					9:21
	Red Brown c-f SAND, tr. silt, tr. f. gravel (wet)	9	5	SS	5	7 7 3 3	Hnu = 0ppm
	Dark Reddish Brown f-c SAND, trace to some silt, trace clay & trace f-m gravel (wet)	10					Occasional rock fragments; pockets of clay Light oil sheen observed in sample
		11	6	SS	9	3 2 3 2	Hnu = 0ppm
	Red Brown f-c SAND, some silt, trace clay (wet)	12					9:35
		13	7	SS	6	9 5 6 3	Light oily sheen observed in sample
	Possible SILT or CLAY Layer	14					Hnu = .1ppm

JOB NO. 1406602
DATE 2 SEPTEMBER 1997

LOG OF BORING NO. S-3

SHEET 2 OF 3

CASING	SAMPLE DESCRIPTION	DEPTH SCALE	SAMPLES NO. LOC.	SAMPLES TYPE	SAMPLES RECOV. IN	SAMPLES PENETR. RESIST BLOWS	REMARKS (DRILLING FLUID, DEPTH OF CASING, CASING BLOWS, FLUID LOSS, ETC.)
	Possible SILT or CLAY Layer	15	8	SS	14/24	1 WR 1 1	
		16					
	Dark Brown f-c SAND, trace to some silt, trace fine gravel (wet)	17	9	SS	6	6 4 2 1	Hdspace=0ppm
	Reddish Brown and Gray f-c SAND, some silt, trace f. gravel	18	10A	SS	12	1 WH WH	
		19	10B			WH	
	Brownish Gray organic clayey SILT, trace fine sand, trace organic particles	20					Hdspace=0ppm
	Medium Gray finely laminated organic clayey SILT, trace fine sand, trace fine organic particles (moist to wet)	21	11	SS	24	WH 1 0	10:20 Slight organic odor
		22				1	Hdspace=0ppm
	Medium Brownish Gray finely laminated organic clayey SILT, trace fine sand (moist)	23	12	SS	20	1 6 5	10:23 Slight organic odor
		24				8	Hdspace=0ppm
	GLACIAL TILL: moist to wet Red Brown f-c SAND, trace to some silt	25	13	SS	19	21 17 32	Vertical/near vertical piece of timber with creosote odor Half of split spoon (vertical) contained timber, with glacial till material in other half of sampler.
	TIMBER →	26				67	Hdspace=0ppm
	DECOMPOSED SILTSTONE BEDROCK: dry Red Brown c-f SAND, some m-f gravel, trace to some clayey silt	27	14	SS	10	75 57 100/2"	Black oily product observed within fissile rock fragments Hdspace=4ppm
		28					Roller bit to 28 FT depth
	DECOMPOSED SILTSTONE BEDROCK: wet Red Brown fine GRAVEL and c-f SAND, trace silt	29	15	SS	12	44 100 50/3"	
	TOP OF BEDROCK						
	SEE ATTACHED PAGE 3 FOR LOG OF BEDROCK CORE						

Langan
Engineering and Environmental Services, Inc.

JOB NO. 1406602

DATE 2 SEPTEMBER 1997

LOG OF BORING NO. S-3

SHEET 3 OF 3

SAMPLE DESCRIPTION	PIEZOMETER	DEPTH SCALE	SAMPLES: NO. LOC.	SAMPLES: TYPE	SAMPLES: RECOV. FT	SAMPLES: PENETR. RESIST. BL/6 IN	ROCK CORE: RQD %	ROCK CORE: BEDDING	ROCK CORE: FRACTURES SKETCH	ROCK CORE: FRACTURES COND.	ROCK CORE: WEATHERING	RATE (MIN/FT)	REMARKS
DECOMPOSED SILSTONE BEDROCK													
SILTSTONE; fine-grained with occasional very fine to medium grained layers/lenses; grains are rounded to subrounded where visible to the eye; rock is generally homogeneous blocky to finely laminated siltstone interbedded with 1/4 to 1 inch thick shaly and fine to medium-grained sandstone layers. At least part of the rock matrix is composed of calcite cement. Occasional to frequent light gray to greenish gray carbonate nodules and oblong chips observed down length of recovered core, along with infrequent 1/4 to 1/2 inch thick layers. Minor hydrous copper mineralization observed at top of RUN #1 and sporatically through RUN #2. Rock exhibits moderate to occasionally low hardness; is moderately strong, with slight to moderate overall weathering. Planar bedding planes dip at 10 to 12°. Bedding observed to be thin (2 in. to 2 ft.) with occasional isolated thinly laminated (0.1 in) along the core. Core is closely fractured (1 to 6 in.) with isolated thin intensely fractured (0.5 to 1 inch) areas (shaly) which parallel bedding. Fracture fit is generally slight to occasionally good and/is poor.		30	RUN #1	NX CORE	REC = 57.25 IN ÷ 60 IN x 100% = 95.4%		RQD = 10 IN ÷ 60 IN x 100% = 16.6%	10° to 12°		CP		7:30	Carbonate zone w/ minor copper mineralization & 4-in sandy stringers 30.5 to 30.9 ft.
		31								CP	Carb CW	9:30	
										CS			
		32								CS-G		18:00	
		33								CS to CP	Carb	5:00	Rubbly shaly zone 33 ft to 33.9 ft spotty carbonate
		34								CG		15:00	Thinly laminated siltstone
									N	C	R		No fit between runs
		35	RUN #2	NX CORE	REC = 54 IN ÷ 60 IN x 100% = 90%		RQD = 28.5 IN ÷ 60 IN x 100% = 47.5%	10° to 12°		CS		7:00	Shaly laminations at ~35.1 ft depth
		36								CP to CG		9:00	Sandy zones at 35.9 and 36.1 ft. depths Minor copper/carbonate zone at 37.7 ft.
		37								CG		10:00	Frequent spotty light gray carbonate nodules
										C		11:00	
		38											
		39										7:00	Thin sandy layers at ~38.8 ft. depth minor carbonate nodules
									N	C	R		
BOTTOM OF BORING 39.5 Ft													SD/ 14:07

ENVIRONMENTAL NOTES:

Moth ball-like naphthalene odor detected in fracture zones in recovered core. Hnu readings in Run #1 ranged between 15 and 18 ppm and between 15 and 20 ppm, with a jump up to 50 ppm in one area near the bottom of the core, in Run #2. Odor dissipated quickly when core exposed to the air and Hnu readings dropped to background levels. Hnu readings were primarily observed in the sandy or shaly zones within the siltstone bedrock and in areas with more concentrated carbonate / hydrous copper.

NOTE:

BORING S-3 COMPLETED AS PART OF A SERIES OF GEOTECHNICAL BORINGS COMPLETED BY GANNETT FLEMING, INC FOR THE ARMY CORPS. OF ENGINEERS RELATING TO PROPOSED

LOG OF BORING NO: B-1

Sheet 1 of

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	37.09
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/23/97 / 9/23/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	26 ft / Not Encountered
Casing	- - -		
Casing Hammer Weight	- - - Drop - - -	Water Level	Not Encountered
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight	140 lb Drop 30"	Inspector	Ed Zofchak

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 8:30
1	S-1	SS	0.8	14	Red brown m-f SAND, trace-some silt, trace	Auger through asphalt
				10	c sand and m-f gravel, occasional coal and	FID = 0.1 ppm
2				16	concrete fragments [FILL] (dry)	
				9	Red brown m-f SAND, trace-some silt, trace	
3	S-2	SS	1.0	8	c sand and m-f gravel, occasional coal, rock	FID = 0.2 ppm
				8	and ceramic fragments [FILL] (dry)	
4				15	Red brown c-f SAND, trace silt and m-f	Rock fragment in tip of spoon
				20	gravel, occasional rock fragments	Auger to 4 feet
5	S-3	SS	0.7	14	[FILL] (dry-moist)	Auger grinding at 4 feet
				10	Red brown c-f SAND, trace-some silt and	FID = .4 ppm
6				9	c-f gravel [FILL] (dry-moist)	
				55	Brown - Gray - Yellow c-f SAND, trace silt	
7	S-4	SS	0.8	100/4"	and f gravel, occas. pebbles and cinders	
					Pulverized CONCRETE [FILL] (dry)	
8					Lt. Gray - Gray m-f SAND, tr. silt and c sand	Auger to 8 feet
				11	Gray - Red brown c-m GRAVEL, some c	
9	S-5	SS	0.6	62	sand and f gravel, tr.-some m-f sand, tr. silt	
				36	ASPHALT	
10				17	Red brown m-f SAND, trace-some silt, trace	Rock in tip of spoon
				100/3"	c sand and f gravel	Auger to 10 feet
11	S-6	SS	0.3			
					BOULDERS/COBBLES	Auger grinding
12					[FILL] (dry)	Auger to 12 feet
				100/4"	Gray - Red brown m-f SAND, trace-some c	FID = 0.3-3 ppm
13	S-7	SS	0.3		sand and f gravel, trace silt	
					BASALT COBBLES/BOULDERS	Auger grinding from 12 to 14 feet
14					[FILL] (dry)	Auger to 14 feet
				14	Red brown c-f SAND, some c-f gravel, trace	
15	S-8	SS	1.1	42	silt, occasional rock fragments	FID = 0.5 ppm
				40	[FILL] (dry)	
16				25		
				15	Red brown c-f SAND and GRAVEL, trace	
17	S-9	SS	1.0	26	silt, occasional rock and concrete fragments	FID = 0.3 ppm
				35	[FILL] (dry)	
18				30		Auger to 18 feet
				76	Red brown c-f SAND and GRAVEL, trace	
19	S-10	SS	0.5	46	silt, occasional rock fragments	FID = 0 ppm
				35	[FILL] (dry)	
20				60		Auger to 20 feet

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started 9/23/97	Date Finished 9/23/97
Drilling Company	CT&E Environmental Services, Inc.		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
21	S-11	SS	1.3	WR WR	Red brown f SAND, trace-some silt [SM] (dry-wet)	FID = 0.3 ppm
22				9 14	Clayey SILT [ML] Red brown m-f SAND, trace-some silt, trace c sand and f gravel [SM-SP]	
23	S-12	SS	1.3	35 27 15	Red brown c-f SAND, trace silt and f gravel [SP] (moist)	FID = 0 ppm
24				21	Red brown m-f SAND, trace silt [SP]	Auger to 24 feet
25	S-13	SS	1.5	11 11 13	Red brown m-f SAND, trace silt and c sand [SP] (moist)	FID = 0 ppm
26				17		
27					Boring completed at 26 feet	End 11:07
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: B-2

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	36.09
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/25/97	Date Finished: 9/25/97
Drilling Equipment	Mobile Drill B-80	Completion Depth: 28 ft	Rock Depth: Not Encountered
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger		
Casing	---	Water Level	~ 27 ft
Casing Hammer Weight	--- Drop ---	Driller	K. Mike Millican
Sampler	2" O.D. Split Spoon	Inspector	Elana Seelman
Sampler Hammer Weight	140 lb Drop 30"		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 7:45
1	S-1	SS	0.5	3	Brown f sandy SILT, trace clay and f gravel	Auger through asphalt
				6	Reddish brown silty f SAND, trace f gravel	FID = 0 ppm
2				12	[FILL] (moist)	
				10	Reddish brown silty f SAND, trace clay and	
3	S-2	SS	0.8	7	c-f gravel, occasional brick fragments and	FID = 0 ppm
				5	coal tar	
4				8	[FILL] (moist)	Brick in tip of spoon
				25		Auger to 4 feet
5	S-3	SS	NR	100/5"		Refusal
						Concrete fragments in tip of spoon
6						Auger to 6 feet
				15	Reddish brown silty f SAND, trace c-f gravel	
7	S-4	SS	0.1	20	[FILL] (moist)	FID = 0 ppm
				10		
8				12		
				11		Brick and concrete fragments and
9	S-5	SS	NR	41		coal tar in tip of spoon
				15		
10				15		Auger to 10 feet
				19	Reddish brown m-f SAND, some silt, trace	
11	S-6	SS	0.2	10	clay, occasional concrete fragments	FID = 4 ppm
				12	[FILL] (moist)	
12				10		
				100/3"	Black c GRAVEL	FID = 35 ppm
13	S-7	SS	0.1		[FILL] (moist)	Concrete in tip of spoon
						Auger grinding from 12 to 13 feet
14						Auger to 14 feet
				15	Reddish brown m-f SAND, trace silt and c-f	
15	S-8	SS	1.1	18	gravel, occasional brick fragments	FID = 2.5 ppm
				22	[FILL] (dry)	
16				22		
				21	Reddish brown m-f SAND, trace silt and c-f	
17	S-9	SS	1.3	22	gravel, occasional brick fragments	FID = 0 ppm
				33	[FILL] (dry)	
18				22	Reddish brown silty f SAND, pockets of clay	Auger to 18 feet
				9	Reddish brown silty f SAND	
19	S-	SS	1.5	10	[SM] (moist-wet)	FID = 15 ppm
	10			8	Black silty f SAND	
20				6	Reddish brown silty f SAND	FID = 150 ppm

*Standard Penetration Test N-Value

LOG OF BORING NO: B-2

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Date Started	Date Finished
Drilling Company	CT&E Environmental Services, Inc.	9/25/97	9/25/97

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
21	S-11	SS	0.6	22 100/2"	Reddish brown silty f SAND, occasional rock fragments [SM] (moist)	Auger to 20 feet FID = 0 ppm
22				---	Lens of Reddish brown silty CLAY [CL]	Auger to 22 feet
23	S-12	SS	1.6	12 28 45 60	Reddish brown silty f SAND [SM] (dry-moist)	FID = 0 ppm
24						Auger to 24 feet
25	S-13	SS	2.0	25 31 32 28	Reddish brown silty f SAND, pockets of clay [SM] (dry-moist)	FID = 0-4 ppm
26						
27	S-14	SS	1.4	20 25 31 30	Reddish brown silty f SAND, pockets of clay [SM] (dry-moist) Reddish brown f SAND, trace silt [SP] (wet)	FID = 0 ppm
28						
29					Boring completed at 28 feet	End 9:20
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						

Standard Penetration Test N-Value

LOG OF BORING NO: B-3 Sheet 1 of 1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	38.40
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/25/97 / 9/25/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	18 ft / Not Encountered
Casing	- - -		
Casing Hammer Weight	- - - Drop - - -	Water Level	Not Encountered
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight	140 lb Drop 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				—	ASPHALT	Start 9:50
1	S-1	SS	1.1	13	Reddish brown f SAND, some silt, trace f	Auger through asphalt
				40	gravel, Lens of CONCRETE and ASPHALT	FID = 0 ppm
2				27	Yellow brown f sandy SILT [FILL] (dry-moist)	
				10	Yellow brown silty f SAND, trace f gravel,	
3	S-2	SS	1.2	15	occasional concrete, brick and asphalt	FID = 0 ppm
				20	fragments	
4				18	[FILL] (moist)	Auger to 4 feet
				6	Yellow brown clayey SILT, some f sand,	
5	S-3	SS	1.5	4	occasional concrete fragments	FID = 0 ppm
				6	Rock fragments [FILL] (moist)	
6				4	Brown m-f SAND, some silt	
				24	Reddish brown silty f SAND, trace f gravel,	
7	S-4	SS	0.5	22	occasional porcelain and brick fragments	FID = 0 ppm
				15	and coal ash	
8				13	[FILL] (moist)	Brick in nose
				8	Greenish brown silty f SAND, trace clay and	Auger to 8 feet
9	S-5	SS	1.3	5	f gravel [FILL] (moist)	FID = 1 ppm
				5	Reddish brown m-f SAND, trace-some silt,	
10				6	trace f gravel, pockets of clay	Auger to 10 feet
				4	Reddish brown m-f SAND, trace silt and f	
11	S-6	SS	1.0	5	gravel, pockets of clay	FID = 0 ppm
				4	[FILL] (moist)	
12				3		
				3	Reddish brown f SAND, trace silt and f	
13	S-7	SS	0.2	3	gravel	FID = 0.1 ppm
				3	[FILL] (moist-wet)	
14				3		Auger to 14 feet
				1	Brown SILT, trace clay, f sand and f gravel	
15	S-8	SS	0.1	1	[FILL] (moist)	FID = 1.5 ppm
				6		
16				5		
				4	Brown silty m-f SAND, trace clay	FID = 30 ppm
17	S-9	SS	0.7	5		Spoon at 17.5 feet with 300 lb
				6	[FILL] (moist)	hammer Refusal
18				100/2"	Black COAL ASH	Auger refusal
19					Boring completed at 18 feet	End 10:50
20						

*Standard Penetration Test N-Value

LOG OF BORING NO: B-3A Sheet 1 of 1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	38.40
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/25/97 / 9/25/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	17.5 ft / Not Encountered
Casing	---		
Casing Hammer Weight ---	Drop ---	Water Level	Not Encountered
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight	140 lb / Drop 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 11:45
1	S-1	SS	1.1	6	Orangish brown silty m-f SAND, occasional	Auger through asphalt
				32	brick, concrete and rock fragments	FID = 0 ppm
2				28	[FILL] (moist-dry)	
				21	Orangish brown f SAND, some silt, trace f	
3	S-2	SS	0.8	20	gravel	FID = 0 ppm
				19	[FILL] (dry-moist)	
4				18	Orangish brown silty CLAY	Auger to 4 feet
				11		
5	S-3	SS	NR	10		
				8		
6				9		Concrete in tip of spoon
				25	Orangish brown silty f SAND, occasional	
7	S-4	SS	0.1	100/4"	brick fragments	FID = 0 ppm
					[FILL] (moist)	Concrete in tip of spoon
8						Auger to 8 feet
				80	Brown silty f SAND, trace f gravel	Auger grinding from 7 to 8 feet
9	S-5	SS	0.7	18	Lens of Fractured BRICK [FILL] (moist)	FID = 0 ppm
				10	Brown f SAND, some silt, trace f gravel,	
10				25	pockets of clay, occas. concrete fragments	Auger to 10 feet
				7	Brown m-f SAND, trace silt, pockets of clay	
11	S-6	SS	1.0	4	[FILL] (moist-wet)	FID = 0 ppm
				3	Lens of Greenish brown silty CLAY	
12				2	Brown m-f SAND, trace silt, pockets of clay	Rock fragment in tip of spoon
				WH	Brown m-f SAND, trace f gravel, occasional	
13	S-7	SS	1.0	↓	brick fragments	FID = 0 ppm
					[FILL] (wet)	Perched water
14						Auger to 14 feet
				2		
15	S-8	SS	NR	5		
				4		
16				2		
				100/3"	Black COAL ASH	Refusal FID = 30 ppm
17	S-9	SS	0.1		[FILL] (wet)	Brick fragments in tip of spoon
				100/5"		Auger to 17 feet
18	S-10	SS	NR			Spoon with 300 lb hammer
						Refusal
19						Auger refusal
20					Boring completed at 17.5 feet	End 12:55

Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	38.45
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/25/97	Date Finished: 9/25/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 17.5 ft	Rock Depth: Not Encountered
Casing	---		
Casing Hammer Weight ---	Drop ---	Water Level	Not Encountered
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight 300 lb	Drop 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1					ASPHALT	Start 16:05 Auger through asphalt Auger to 20 feet Drill cuttings: Reddish brown silty SAND, trace f gravel
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8						Drill cuttings: Dark brown silty SAND
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*Standard Penetration Test N-Value

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started 9/25/97	Date Finished 9/25/97
Drilling Company	CT&E Environmental Services, Inc.		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
21	S-1	SS	NR	100/0"		Spoon bouncing Auger refusal
22						
23					Boring completed at 20 feet	End 16:40
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Standard Penetration Test N-Value

LOG OF BORING NO: B-4

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	35.91
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/23/97	Date Finished: 9/23/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 10 ft	Rock Depth: Not Encountered
Casing	- - -		
Casing Hammer Weight: - - -	Drop: - - -	Water Level	Not Encountered
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight: 140 lb	Drop: 30"	Inspector	Ed Zofchak

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1	S-1	SS	0.3	---	ASPHALT	Start 11:45
				20	Dark gray - Black c-f SAND, some c-f gravel,	FID = 2-5 ppm
2				75	trace silt	Slight naphthalene odor
				41	[FILL] (dry)	
3	S-2	SS	1.0	40	Red brown c-f SAND, trace silt, trace f gravel	
				29	gravel, occ. cinders, coal and brick frags	FID = 0.1 ppm
4				18	BRICK [FILL] (dry)	
				9	Red brown c-f SAND, trace silt, trace f gravel	Auger to 4 feet
5	S-3	SS	0.3	2	Brown m-f SAND, trace-some silt, trace c	
				1	sand and f gravel, occasional woody roots	FID = 0.3-0.4 ppm
6				1	and brick fragments	
				1	[FILL] (dry)	
7	S-4	SS	1.3	8	Brown c-f SAND, trace silt and f gravel,	FID = 0.1-0.2 ppm
				5	occasional cinders, brick and coal frags	
8				9	Dark grayish brown c-f SAND, trace-some	
				10	silt, trace m-f gravel [FILL] (dry)	Auger to 8 feet
9	S-5	SS	1.4	8		
				5	Crushed COAL [FILL]	FID = 0.1-0.2 ppm
10				5	Dark gray - Reddish brown m-f SAND, trace-	
				6	some silt, trace c sand and f gravel (dry)	
11					Boring completed at 10 feet	End 12:12
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*Standard Penetration Test N-Value

LOG OF BORING NO: B-5

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	7.16
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/23/97 / 9/23/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	4 ft / Not Encountered
Casing	---		
Casing Hammer Weight / Drop	--- / ---	Water Level	Not Encountered
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight / Drop	140 lb / 30"	Inspector	Ed Zofchak

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 13:00
1	S-1	SS	0.5	28	Dark gray - Brown c-f SAND, trace silt and f	Auger through asphalt
				30	gravel, occasional coal, cinder, brick and	FID = 0 ppm
2				39	concrete fragments [FILL] (dry)	
				22	Dark brown - Gray c-f SAND, trace silt and f	
3	S-2	SS	0.8	10	gravel, occasional coal, cinder, brick and	FID = 0 ppm
				29	rock fragments	Auger to 4 feet
4				40	[FILL] (dry)	Auger refusal at 4 feet
5					Boring completed at 4 feet	End 13:25
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*Standard Penetration Test N-Value

LOG OF BORING NO: B-5A

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	29.44
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/25/97	Date Finished: 9/25/97
Drilling Equipment	Mobile Drill B-80	Completion Depth: 27.5 ft	Rock Depth: Not Encountered
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Water Level	~ 21.5 ft
Casing	---	Driller	K. Mike Millican
Casing Hammer Weight	--- Drop ---	Inspector	Elana Seelman
Sampler	2" O.D. Split Spoon		
Sampler Hammer Weight	140 lb Drop 30"		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 13:35
1	S-1	SS	0.2	5	Black silty f SAND, trace f gravel, occasional	Auger through asphalt
				12	concrete fragments	FID = 0 ppm
2				55	[FILL] (moist)	
				32	Dark gray f SAND, some silt, occasional	
3	S-2	SS	0.8	8	concrete fragments	FID = 0 ppm
				7	BRICK fragments [FILL]	
4				6	Black f gravelly SAND (moist)	Auger to 4 feet
				8	Brown silty f SAND, trace c-f gravel,	Auger grinding
5	S-3	SS	0.2	6	occasional brick fragments	FID = 0 ppm
				5	[FILL] (moist-dry)	
6				7		
				10		
7	S-4	SS	NR	10		
				7		Concrete and brick fragments in
8				8		tip of spoon
				20	Brown m-f SAND, trace silt and f gravel,	Auger to 8 feet
9	S-5	SS	0.6	67	occasional brick and concrete fragments	FID = 5 ppm
				85	[FILL] (dry)	
10				15		Auger to 10 feet
				28	Brown m-f SAND, trace silt and f gravel,	
11	S-6	SS	0.1	20	occasional concrete fragments	FID =0.1 ppm
				11	[FILL] (moist)	
12				12		Concrete in tip of spoon
				30	Reddish brown silty f SAND, trace f gravel	
13	S-7	SS	0.6	23		FID = 0.3 ppm
				14	Reddish brown silty f SAND	
14				13	[FILL] (moist)	Auger to 14 feet
				80	Light brown m-f SAND, some f gravel,	
15	S-8	SS	0.9	41	occasional concrete and brick fragments	FID =1.5 ppm
				26	[FILL] (dry)	
16				30		
				100/2"		Refusal
17	S-9	SS	NR			
18						Auger to 18 feet
				27	Light brown f SAND, trace silt	
19	S-	SS	1.4	34	[SP]	FID = 2.5 ppm
	10			25	Light brown silty f SAND	
20				24	[SM] (dry-moist)	Auger to 20 feet

*Standard Penetration Test N-Value

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Date Started	Date Finished
Drilling Company	CT&E Environmental Services, Inc.	9/25/97	9/25/97

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
21	S-11	SS	1.4	12 10 10 11	Brown m-f SAND [SP] (moist-wet)	FID = 8 ppm
23	S-12	SS	1.6	15 17 21 30	Brown m-f SAND [SP] Brown silty f SAND [SM] (wet)	FID = 20 ppm Auger to 24 feet
25	S-13	SS	1.7	34 36 40 62	Dark brown silty f SAND [SM] (wet)	FID = 15 ppm
27	S-14	SS	1.3	28 75 100/5"	Dark brown silty f SAND [SM] (wet)	FID = 0.1 ppm Refusal
29					Boring completed at 27.5 feet	End 15:40
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*Standard Penetration Test N-Value

LOG OF BORING NO: B-6

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	16.29
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/24/97	Date Finished: 9/24/97
Drilling Equipment	Mobile Drill B-80	Completion Depth: 9.5 ft	Rock Depth: Not Encountered
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Water Level	Not Encountered
Casing	---	Driller	K. Mike Millican
Casing Hammer Weight: ---	Drop: ---	Inspector	Elana Seelman
Sampler	2" O.D. Split Spoon		
Sampler Hammer Weight: 140 lb	Drop: 30"		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1	S-1	SS	NR	---	ASPHALT	Start 11:45
				100/1"		Auger through asphalt
2						Refusal
						Auger to 2 feet
						Auger grinding
3	S-2	SS	0.5	14	Reddish brown silty f SAND, trace c-f gravel,	FID = 30 ppm
				10	pockets of clay, occasional brick fragments	
				11	[FILL] (dry)	
4				12	Reddish brown SILT, trace f gravel,	Auger to 4 feet
				9	occasional brick and concrete fragments	
5	S-3	SS	1.2	7	[FILL] (dry)	FID = 0 ppm
				5	Reddish brown silty f SAND, trace f gravel	
6				6	[FILL] (dry)	Rock fragments in tip of spoon
				10	Reddish brown m-f SAND, some silt,	
7	S-4	SS	0.3	13	occasional rock fragments	FID = 0 ppm
				10	[FILL] (dry)	
8				8		Auger to 8 feet
				20	Reddish brown silty f SAND, trace f gravel	
9	S-5	SS	0.8	22	Yellow brown f SAND, some silt and c-f	FID = 1.5 ppm
				100/1"	gravel, occasional concrete fragments	Refusal
10					[FILL] (dry)	Auger to 10 feet
11					Boring completed at 9.5 feet	Augering at 9 feet with 1,200 lbs of down pressure - no movement
						Auger refusal
12						End 12:25
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*Standard Penetration Test N-Value

LOG OF BORING NO: B-6A

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	12.03
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/24/97	Date Finished: 9/24/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 18 ft	Rock Depth: Not Encountered
Casing	---		
Casing Hammer Weight: ---	Drop: ---	Water Level	~ 12 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight: 140 lb	Drop: 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 13:55
1	S-1	SS	0.6	7	Reddish brown silty f SAND, trace c-f gravel,	Auger through asphalt
				24	occasional coal and glass fragments	PID = 0.1 ppm
2				26	[FILL] (moist)	
3	S-2	SS	0.5	21	Reddish brown f SAND, trace-some silt,	
				27	trace f gravel	PID = 0.1 ppm
4				24	[FILL] (dry-moist)	
				26		Auger to 4 feet
5	S-3	SS	0.4	75	Reddish brown f SAND, trace-some silt,	
				55	trace f gravel [FILL]	PID = 6 ppm
6				22	Lens of COAL TAR (moist)	
				20	Black - Yellow silty f SAND	Brick fragment in tip of spoon
7	S-4	SS	1.2	15	Yellow m-f SAND, trace silt, occ. rock frag.	
				9	Reddish brown silty f SAND, trace f gravel,	PID = 0.5 ppm
8				18	occasional coal fragments [FILL] (moist-wet)	
				20	Mottled m-f SAND, some silt, trace f gravel	Auger to 8 feet
9	S-5	SS	1.0	29	Reddish brown m-f SAND, some silt, trace	
				24	c-f gravel	PID = 55 ppm
10				19	[SM] (moist-wet)	
				14		Auger to 10 feet
11			1.3	8	Reddish brown silty m-f SAND, trace clay	
				8	and c-f gravel [SM] (moist-wet)	PID = 65 ppm
12				12	Brown SILT, some f sand [ML]	
				19	Light brown m-f SAND, trace silt and c-f	
13			NR	20	gravel [SP]	
				12		
14				14		
				10		Rock in tip of spoon
15			0.8	2	Light brown m-f SAND, some silt, trace clay	Auger to 14 feet
				2	and f gravel	PID = 2 ppm
16				3	[SM] (wet)	
				4		
17			1.9	4	Greenish gray silty CLAY	
				5	[CL] (moist)	PID = 0.5 ppm
18				6		
				5		
19					Boring completed at 18 feet	End 14:40
20						

Standard Penetration Test N-Value

LOG OF BORING NO: B-7

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	7.16
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/24/97	Date Finished: 9/24/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 2.5 ft	Rock Depth: Not Encountered
Casing	---		
Casing Hammer Weight: ---	Drop: ---	Water Level	Not Encountered
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight: 140 lb	Drop: 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1					Gray f GRAVEL	Start 9:05
2						Auger through gravel to 2 feet
3	S-1	SS	NR	100/2"		Drill cuttings: Black silty SAND, wood
4						Refusal - CONCRETE
5					Boring completed at 2.5 feet	Jackhammer through concrete
6						Red brick wall beneath concrete
7						End 10:30
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*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: B-7A Sheet 1 of 1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	9.13
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/24/97 / 9/24/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	18 ft / Not Encountered
Casing	---		
Casing Hammer Weight / Drop	--- / ---	Water Level	~ 7.5 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight / Drop	140 lb / 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				23	VEGETATION	Start 12:35
1	S-1	SS	0.7	9	Light brown f SAND, some silt, trace c-f gravel, occasional concrete and brick	FID = 0 ppm
2				7 10	fragments [FILL] (dry-moist)	
3	S-2	SS	0.5	22 24	BRICK fragments	FID = 0 ppm
4				100/4"	Black COAL ASH [FILL] (dry)	Refusal Auger to 4 feet
5	S-3	SS	0.3	8 10	Brown - Black f sandy SILT, trace f gravel, occasional brick and concrete fragments	FID = 0 ppm
6				6 4	[FILL] (dry)	
7	S-4	SS	0.3	4 5	Reddish brown m-f SAND, some silt, trace clay and f gravel	FID = 0 ppm
8				2 1	[FILL] (moist-wet)	Auger to 8 feet
9	S-5	SS	0.7	8 5	Brown c-f SAND, trace silt, occasional brick fragments	PID = 0.1 ppm
10				7 4	[FILL] (wet)	Brick in tip of spoon Auger to 10 feet
11	S-6	SS	0.7	5 8	Brown silty f SAND Brown c-f gravelly SAND	PID = 0 ppm
12				4 6	[FILL] (wet)	
13	S-7	SS	NR	4 6		
14				5 7		Rock in tip of spoon Auger to 14 feet
15	S-8	SS	0.1	5 1	Brown silty m-f SAND, trace clay, occasional wood	PID = 0 ppm
16				1 2	[SM] (wet)	
17	S-9	SS	0.5	1 1	Greenish gray silty CLAY, trace f sand and f gravel	PID = 0.1 ppm
18				3 2	[CL] (moist)	
19					Boring completed at 18 feet	End 13:25
20						

*Standard Penetration Test N Value

LOG OF BORING NO: B-8

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	7.15
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/23/97	Date Finished: 9/23/97
Drilling Equipment	Mobile Drill B-80	Completion Depth: 20 ft	Rock Depth: Not Encountered
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger		
Casing	- - -	Water Level	~ 7 ft
Casing Hammer Weight	- - - Drop - - -	Driller	K. Mike Millican
Sampler	2" O.D. Split Spoon	Inspector	Ed Zofchak
Sampler Hammer Weight	140 lb Drop 30"		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1	S-1	SS	0.4	8 100/1"	Dark brownish gray f SAND, trace-some silt, trace c-m sand and f gravel	Start 13:50 Refusal
2					CONCRETE [FILL] (dry)	FID = 0 ppm
3	S-2	SS	0.7	46 100/3"	Brown - Gray c-f SAND, trace-some silt, trace f gravel	Jackhammer through concrete Auger to 2 feet
4					COAL/Crushed CINDERS [FILL] (dry)	FID = 0 ppm Refusal Auger to 4 feet
5	S-3	SS	1.1	8 2	Brown - Dark gray c-m GRAVEL, some c-f sand, trace silt, occasional cement fragment	FID = 0.1 ppm
6				3 4	[FILL] (dry)	
7	S-4	SS	1.2	2 1	CONCRETE and BRICK layers	FID = 8-10 ppm
8				3 1	Dark gray - Dark brown c-f SAND, trace-some silt, trace f gravel [FILL] (moist-wet)	Slight petroleum odor Sheen on water with free product
9	S-5	SS		2 2	Dark gray c-f SAND, trace-some silt, trace f gravel	Auger to 8 feet FID = 30-50 ppm
10				2 2	[FILL] (wet)	Stained with petroleum odor Pockets of free product
11	S-6	SS	1.2	2 4	Dark gray - Black c-f SAND, trace-some silt, trace f gravel, occasional brick fragments	Auger to 10 feet FID = 70-80 ppm
12				5 6	[FILL] (wet)	Petrolem - Naphthalene Odor Free product
13	S-7	SS	1.0	2 3	Dark gray - Black - Brown c-f SAND, trace-some silt, trace c-f gravel	FID = 30-100 ppm
14				4 3	[FILL] (wet)	Petroleum Odor Free product
15	S-8	SS	NR	1 WH		Auger to 14 feet
16				WH WH		
17	S-9	SS	0.8	2 1	Dark gray - Black organic SILT, trace f sand [OL] (wet)	Petroleum Odor
18				1 2		Free product Auger to 18 feet
19	S-10	SS	0.7	5 7	Dark gray - Black organic SILT, trace m-f sand [OL] (wet)	Petroleum Odor
20				7 5	TIMBER Dk. gry-Blk c-f SAND, tr.-sm silt, tr. m-f gravel	Free product FID = 500 ppm
					Boring completed at 20 feet	End 15:00

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: B-9

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	9.74
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/24/97 / 9/24/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	14 ft / Not Encountered
Casing	---		
Casing Hammer Weight / Drop	--- / ---	Water Level	~ 5.5 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight / Drop	140 lb / 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* -b/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 7:55
1	S-1	SS	1.0	5	Black silty f SAND, trace c-f gravel,	Auger through asphalt
				9	occasional brick fragments	FID = 0 ppm
2				8	[FILL] (dry)	
				10	Brown m-f SAND, trace silt and clay and f	
3	S-2	SS	0.5	5	gravel	FID = 0 ppm
				7	[FILL] (moist)	
4				8		Auger to 4 feet
				6	Dark gray silty f SAND [FILL]	
5	S-3	SS	1.8	6	Lt. brown m-f SAND, some silt, trace f gravel	FID = 0 ppm
				6	Brownish gray silty f SAND, occasional	
6				9	brick fragments and wood (moist-wet)	
				8	Grayish brown silty m-f SAND, some c-f	
7	S-4	SS	0.9	6	gravel	FID = 0 ppm
				6	[FILL] (wet)	
8				8		Auger to 8 feet
				7	Reddish brown m-f SAND, some silt, trace	FID = 0 ppm
9	S-5	SS	1.0	4	clay and f gravel [FILL] (wet)	
				4	Black SILT, some f sand, occasional wood	FID = 4 ppm
10				11	Reddish brown silty f SAND, trace f gravel	Auger to 10 feet
				20	Grayish brown c-f SAND, some silt, trace	
11	S-6	SS	0.2	35	f gravel	FID = 10 ppm
				8	[FILL] (wet)	
12				10		Brick in tip of spoon
				10	Grayish brown silty f SAND, trace clay,	
13	S-7	SS	1.0	6	occasional cinders [FILL]	FID = 10 ppm
				6	Grayish brown fibrous silty CLAY	
14				6	[CL] (moist)	
15					Boring completed at 14 feet	End 8:35
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Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: B-10 Sheet 1 of 1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	8.62
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/22/97	Date Finished: 9/22/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 18 ft	Rock Depth: Not Encountered
Casing	---		
Casing Hammer Weight	--- Drop ---	Water Level	~ 6 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight	140 lb Drop 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 14:25
1	S-1	SS	0.4	41	Black - Gray silty f SAND, trace c-f gravel,	Auger through asphalt
				33	occasional brick and glass fragments	PID = 0 ppm
2				10	[FILL] (dry)	Auger grinding at 1 foot
				17	Black - Gray silty f SAND, trace c-f gravel,	
3	S-2	SS	0.2	13	occasional brick and glass fragments	PID = 1.5 ppm
				6	[FILL] (moist)	
4				2	Brown CLAY, trace f sand	Auger to 4 feet
				3	Brown clayey SILT, trace c-f sand and f	
5	S-3	SS	1.5	2	gravel, occasional brick fragments	PID = 0 ppm
				2	[FILL] (moist-wet)	
6				2		
				4	Brown clayey SILT, trace c-f sand and f	
7	S-4	SS	1.4	6	gravel, occasional brick fragments	PID = 0 ppm
				5	Brown c-f gravelly SAND, trace silt and clay	
8				4	Brown m-f SAND, some silty clay, trace f	Auger to 8 feet
				2	gravel [FILL] (wet-moist)	
9	S-5	SS	1.4	3		PID = 0 ppm
				4	Reddish brown silty f SAND, trace f gravel	
10				16	[FILL] (wet)	Auger to 10 feet
				10	Brown - Dark gray silty c-f SAND, trace f	
11	S-6	SS	1.5	22	gravel	PID = 100 ppm
				19	[FILL] (wet)	Sheen on water
12				22	Reddish brown silty f SAND, trace f gravel	
				20	Black c-f gravelly SAND, trace silt	
13	S-7	SS	0.5	13	[FILL] (wet)	PID = 17 ppm
				16		Sheen on water
14				18		
				19	Black c-f gravelly SAND, occasional brick	
15	S-8	SS	0.7	10	fragments	PID = 10 ppm
				7	[FILL] (wet)	Sheen on water
16				22		
				25	Black c-f gravelly SAND, trace silt	
17	S-9	SS	1.3	29	[FILL] (wet)	PID = 50 ppm
				6	Grayish brown silty CLAY	Sheen on water
18				5	[CL] (moist)	
19					Boring completed at 18 feet	End 15:25
20						

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: P-1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	36.14
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/5/97	Date Finished: 9/5/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 43 ft	Rock Depth: Not Encountered
Casing	- - -		
Casing Hammer Weight	- - - Drop - - -	Water Level	~ 29 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight	140 lb Drop 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				--	ASPHALT	Start 11:20
1	S-1	SS	0.7	10	Reddish brown - Black f SAND, trace-some	Auger through asphalt
				15	silt, trace f gravel, occasional coal, brick,	PID = 0 ppm
2				12	concrete fragments [FILL] (dry)	
				11	Reddish brown f SAND, trace silt and f	
3	S-2	SS	1.0	7	gravel, occasional brick fragments	PID = 0 ppm
				11	[FILL] (dry)	
4				9		
				6	Reddish brown f SAND, trace silt and clay	
5	S-3	SS	0.4	5	and f gravel, occasional asphalt fragments	PID = 0 ppm
				4	and vegetation	
6				2	[FILL] (moist)	Auger to 6 feet
				9		
7	S-4	SS	NR	7		
				5		
8				5		Auger to 8 feet
				15	Brown f SAND, trace silt and clay and c-f	
9	S-5	SS	0.6	8	gravel, occasional brick fragments [FILL]	PID = 0.5 ppm
				10	Brown m-f SAND, trace silt and f gravel,	
10				4	occasional brick fragments (moist)	Decomposed brick in tip of spoon
				14	Brown f SAND, trace silt and f gravel	Auger to 10 feet
11	S-6	SS	0.9	5	[FILL] (dry)	PID = 0.5 ppm
				5	BRICK fragments	
12				5	Brown m-f SAND, trace clay and c-f gravel	Rock fragments in tip of spoon
				35	Brown f SAND, trace silt and clay and c-f	
13	S-7	SS	1.6	11	gravel [FILL] (dry)	PID = 0.1 ppm
				10	BRICK fragments	
14				16	Brown - White m-f SAND, trace f gravel	Auger to 14 feet
				36	ROCK fragments	
15	S-8	SS	0.8	38	Brown f SAND, trace-some silt, trace clay	PID= 0 ppm
				35	and f gravel, occasional brick fragments	
16				42	[FILL] (dry)	Rock fragments in tip of spoon
				41	Brown m-f SAND, some silt, trace clay	Auger to 16 feet
17	S-9	SS	1.3	43		PID = 0.1 ppm
				24	Reddish brown silty m-f SAND, trace f gravel	
18				21	[SM] (dry)	
				45	Brown f SAND, some silt, trace c sand and f	
19	S-	SS	0.4	33	gravel	PID = 0 ppm
	10			32	[SM] (dry-moist)	
20				27		Auger to 20 feet

*Standard Penetration Test N-Value

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started 9/5/97	Date Finished 9/5/97
Drilling Company	CT&E Environmental Services, Inc.		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				12	Brown silty f SAND, trace f gravel [SM]	PID = 0 ppm
21	S-11	SS	1.6	8	Brown SILT [ML]	
				16	Grayish brown f SAND, trace f gravel	PID = 100 ppm
22				25	[SP] (dry-moist)	Odor
				18	Light brown f SAND	Auger to 22 feet
23	S-12	SS	1.6	21	[SP] (dry-moist)	PID = 105 ppm
				20		
24				19		PID = 1 ppm
				16	Light brown f SAND	Auger to 24 feet
25	S-13	SS	1.7	16	[SP] (dry)	PID = 0.5 ppm
				20		
26				25		
				53	Brown f SAND, trace clay	
27	S-14	SS	1.5	25	[SP]	PID = 1 ppm
				33	Grayish brown f SAND, some silt	
28				35	[SM] (moist)	PID = 40 ppm
				23	Brown - Dark brown m-f SAND, trace silt and	Auger to 28 feet
29	S-15	SS	1.4	25	f gravel	PID = 55 ppm
				17	[SP] (moist-wet)	Odor
30				19		
				20	Brown silty f SAND	
31	S-16	SS	1.8	50	[SM] (wet)	PID = 200 ppm
				50/3"		Tight soil
32						Auger to 32 feet
				50	Brown silty f SAND	
33	S-17	SS	1.1	50/3"	[SM] (wet)	PID = 90 ppm
						Tight soil
34						Auger to 34 feet
				47	Brown silty f SAND	
35	S-18	SS	1.1	50/3"	[SM] (wet)	PID = 20 pppm
						Tight soil
36						Auger to 36 feet
				40	Brown silty f SAND, trace clay [SM]	PID = 50 ppm
37	S-19	SS	1.0	50/3"	Brown silty f SAND	PID = 12 ppm
					[SM] (wet)	Tight soil
38						Auger to 38 feet
				50	Brown silty f SAND	
39	S-20	SS	1.0	50/4"	[SM] (wet-moist)	PID = 1 ppm
						Tight soil
40						Auger to 40 feet
				43	Brown clayey SILT	
41	S-21	SS	0.9	50/4"	[ML] (moist)	PID = 0.1 ppm
						Tight soil
42						Auger to 42 feet

*Standard Penetration Test N-Value

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started	Date Finished
Drilling Company	CT&E Environmental Services, Inc.	9/5/97	9/5/97

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
43	S-22	SS	0.7	45 50/4"	Brown silty CLAY [CL] (moist-dry)	Tight soil PID = 1.5 feet Auger to 43 feet Install piezometer at 43 feet
44						
45					Boring completed at 43 feet	End 14:50
46						
47						
48						
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63						
64						

*Standard Penetration Test N-Value

LOG OF BORING NO: P-1A

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	36.46
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/10/97 / 9/16/97
Drilling Equipment	Mobile Drill B-80 and Mobile Drill B-61		
Size and Type of Bit	3-7/8" Roller Cone, 4-1/4" & 8-1/4" I.D. Hollow Stem Augers, 5-7/8" Roller Bit	Completion Depth / Rock Depth	58 ft / 58 ft
Casing	- - -		
Casing Hammer Weight / Drop	- - - / - - -	Water Level	~ 29 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight / Drop	140 lb / 30"	Inspector	Elana Seelman/Ed Zofchak

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1					See Boring P-1 Log of Boring	Start 8:00 Auger through asphalt Drill to 14 feet with 3-7/8" Roller Cone Bit
2						
3						
4						
5						
6						
7						Losing water at a rate of ~ 50 gallons per 10 feet
8						
9						
10						
11						
12						
13						
14						Lost circulation at 14 feet Hole closed at 14 feet End 9:40 Start 9/11/97 15:00 Auger to 34 feet with 4-1/4" I.D. Hollow Stem Auger
15						
16						
17						
18						
19						
20						

*Standard Penetration Test N-Value

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started 9/10/97	Date Finished 9/16/97
Drilling Company	CT&E Environmental Services, Inc.		

Depth (ft)	S	Type	Recov. (ft)	SPT bl/6"	DESCRIPTION	REMARKS
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35	S-1	SS	1.5	14 28 44	Brown silty f SAND [SM] (moist)	FID = 0 ppm
36				60		Auger to 36 feet
37	S-2	SS	1.5	10 26 43	Brown silty f SAND [SM] (wet)	FID = 0 ppm
38				50/4"		
39	S-3	SS	1.5	21 25 35	Brown silty f SAND [SM] Brown clayey SILT [ML] (dry-moist)	FID = 0 ppm
40				30		Auger to 40 feet
41	S-4	SS	1.1	13 31 42	Brown silty CLAY [CL] (dry-moist)	FID = 0 ppm
42				50/3"		Auger to 42 feet
						End 16:15

Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: P-1A

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Date Started	Date Finished
Drilling Company	CT&E Environmental Services, Inc.	9/10/97	9/16/97

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
43	S-5	SS	1.3	30 32 55 60	Red brown c-f SAND, some silty clay, trace-some m-f gravel [SC] – (moist)	Start 9/12/97 7:40 Remove 4-1/4" I.D. Hollow Stem Auger PID = 2-3 ppm Odor Auger to 42 feet with 8-1/4" I.D. Hollow Stem Auger PID = 2-3 ppm Install 8" Steel Casing through center of augers to 42 feet Tremie grout annular space between casing and borehole with portland cement/bentonite while removing augers Rock PID = 2 ppm End 12:30 fragment Start 9/16/97 9:40 in tip of spoon PID = 8-12 ppm Refusal PID = 20 ppm Drill with 5-7/8" Drill to 50 feet Roller bit PID = 15-20 ppm Odor Frequent red brown siltstone/ sandstone rock fragments Drill to 52 feet Refusal Refusal PID = 3 ppm Drill to 54 feet Frequent siltstone/sandstone rock fragments Refusal Drill to 56 feet Siltstone rock fragment in tip of spoon Drill to 58 feet Install piezometer at 58 feet End 12:52
44						
45	S-6	SS	0.8	30 50/4"	Red brown c-f SAND and SILT, trace-some clay, trace f gravel [SM-ML] (moist)	
46						
47	S-7	SS	0.8	35 100/4"	Red brown c-f SAND, some silty clay, trace-some m-f gravel [SC] (moist)	
48						
49	S-8	SS	0.8	60 100/3"	Red brown c-f SAND, some silty clay, trace f gravel [SC]	
50					Red brown c-f SAND, trace-some silt, trace m-f gravel [SM] (moist)	
51	S-9	SS	0.9	75 100/5"	Red brown c-f SAND, some silt, trace clay and f gravel [SM] (dry-moist)	
52						
53	S-10	SS	0.4	100/5"	Red brown c-f SAND, trace-some silt and clay, trace m-f gravel [SM-SC] (moist)	
54						
55	S-11	SS	1.1	48 70 100/4"	Red brown c-f SAND, some silt, trace-some clay, trace f gravel [SM-SC] (moist-wet)	
56						
57	S-12	SS	0.3	100/5"	Red brown c-f SAND and m-f GRAVEL, trace silt [SP-GP] (wet)	
58	S-13	SS	0.04	100/0"		
59					Boring completed at 58 feet	
60						
61						
62						
63						
64						

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: P-2 Sheet 1 of 3

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	38.09
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/8/97 / 9/8/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	44 ft / Not Encountered
Casing	---		
Casing Hammer Weight ---	Drop ---	Water Level	~ 30.5 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight 140 lb	Drop 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	ASPHALT	Start 8:40
1	S-1	SS	0.6	---	COBBLES	Auger through asphalt
				10	Brown f SAND, some silt, trace f gravel,	Jackhammer through cobbles
2				10	occasional brick fragments [FILL] (dry)	FID = 0 ppm
				15	Reddish brown silty f SAND, trace c-f gravel,	
3	S-2	SS	0.8	9	occasional brick fragments	FID = 0 ppm
				14	[FILL] (dry)	
4				17		Auger to 4 feet
				18	Brown - Reddish brown silty f SAND	
5	S-3	SS	1.7	20	[FILL] (dry)	FID = 0 ppm
				23	Reddish brown m-f SAND, trace f gravel,	
6				17	occasional brick fragments [FILL]	
				19	Reddish brown f SAND	
7	S-4	SS	1.1	19	[FILL] (dry)	FID = 0 ppm
				30	Reddish brown silty f SAND, trace clay	
8				50/3"	Reddish brown f SAND, some silt, trace c-f	Auger to 8 feet
				26	gravel, occasional brick fragments	
9	S-5	SS	0.7	22	[FILL] (dry)	FID = 0 ppm
				44		
10				50/4"		Refusal
				26	Reddish brown SILT, some f sand, trace f	Auger to 10 feet
11	S-6	SS	1.2	25	gravel [FILL] (dry)	FID = 0 ppm
				21	Reddish brown c-f SAND, trace silt and f	
12				26	gravel, occasional brick fragments	
				12	Reddish brown c-f SAND, trace silt and c-f	
13	S-7	SS	1.1	19	occasional brick fragments	FID = 0 ppm
				24	[FILL] (dry)	
14				25		Auger to 14 feet
				20	Reddish brown c-f SAND, trace c-f gravel,	
15	S-8	SS	0.6	38	occasional brick fragments	FID = 0 ppm
				50/5"	[FILL] (dry-moist)	Refusal
16						Auger to 16 feet
				18	Reddish brown f SAND, some silt, trace c-f	
17	S-9	SS	0.6	18	gravel, occasional clay pockets	FID = 0 ppm
				20	[SM] (dry-moist)	
18				20		
				13	Brown silty f SAND, occasional clay pockets	
19	S-10	SS	1.7	13	[SM] (dry-moist)	FID = 0 ppm
				12		
20				13		Auger to 20 feet

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: P-2

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Date Started	9/8/97
Drilling Company	CT&E Environmental Services, Inc.	Date Finished	9/8/97

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				10	Brown silty f SAND [SM]	
21	S-11	SS	1.7	9	Lens of CLAY [CL]	FID = 0 ppm
				15	Brown silty f SAND	
22				16	[SM] (dry-moist)	
				20	Brown silty f SAND, trace c-f gravel [SM]	
23	S-12	SS	1.1	40	Brown silty f SAND (dry-moist)	FID = 0 ppm
				41	Lens of CLAY [CL]	Tight soil
24				50/3"	Brown silty f SAND, trace c-f gravel [SM]	Auger to 24 feet
				30	Brown silty f SAND, occasional pockets of	
25	S-13	SS	2.0	23	clay [SM]	FID = 0 ppm
				29	Brown f sandy SILT, trace clay and f gravel	
26				41	Brown silty f SAND [SM] (dry-moist)	
				41	Brown silty f SAND, occasional pockets of	FID = 0 ppm
27	S-14	SS	0.9	50/5"	clay	Refusal
					[SM] (dry-moist)	
28						Auger to 28 feet
				26	Brown silty f SAND	
29	S-15	SS	1.9	28	[SM] (dry-moist)	FID = 0 ppm
				32		
30				29		Auger to 30 feet
				WR	Brown silty f SAND [SM]	
31	S-16	SS	1.5	12	Brown m-f SAND, trace f gravel	FID = 10 ppm
				20	[SP] (moist-wet)	Odor
32				19		
				22	Brown - Dark brown m-f SAND [SP]	
33	S-17	SS	0.8	50/3"	Brown silty f SAND [SM] (wet)	FID = 2 ppm
						Tight soil
34						Auger to 34 feet
				10	Brown clayey SILT	
35	S-18	SS	2.0	8	[ML] (wet)	FID = 1 ppm
				6		
36				15		
				18	Brown SILT	
37	S-19	SS	1.5	22	[ML] (wet)	FID = 5 ppm
				32	Brown f sandy SILT, trace clay [ML]	Tight soil
38				50/3"	Brown silty f SAND [SM]	Auger to 38 feet
				32	Brown silty f SAND	
39	S-20	SS	0.8	50/4"	[SM] (wet)	FID = 5 ppm
						Tight soil
40						Auger to 40 feet
				WR	Brown silty f SAND	
41	S-21	SS	1.5	25	[SM] (wet)	FID = 0 ppm
				50/5"	Brown f sandy SILT	Tight soil
42					[ML] (moist)	Auger to 42 feet

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started 9/8/97	Date Finished 9/8/97
Drilling Company	CT&E Environmental Services, Inc.		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
43	S-22	SS	2.0	WR 55 42 46	Brown f sandy SILT [ML] Brown silty CLAY- [CL] (moist-dry)	FID = 0 ppm Auger to 44 feet Install piezometer at 44 feet
44					Boring completed at 44 feet	End 13:00
45						
46						
47						
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64						

Standard Penetration Test N-Value

LOG OF BORING NO: P-2A

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	38.41
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/11/97	Date Finished: 9/15/97
Drilling Equipment	Mobile Drill B-80 and Mobile Drill B-61		
Size and Type of Bit	4-1/4" and 8-1/4" I.D. Hollow Stem Augers, 5-7/8" Roller Bit	Completion Depth: 70 ft	Rock Depth: 70 ft
Casing	- - -		
Casing Hammer Weight	- - - Drop - - -	Water Level	~ 30.5 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight	140 lb Drop 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1					See Boring P-2 Log of Boring	Start 8:10 Auger through asphalt Jackhammer through cobbles Auger to 36 feet with 4-1/4" I.D. Hollow Stem Auger
2						
3						
4						
5						
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8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Date Started	Date Finished
Drilling Company	CT&E Environmental Services, Inc.	9/11/97	9/15/97

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37	S-1	SS	2.0	10 7 28 17	Brown silty f SAND, trace f gravel [SM] (wet)	FID = 0 ppm
38						
39	S-2	SS	0.4	19 50/4"	Brown silty f SAND, trace f gravel [SM] (wet)	FID = 0 ppm
40						Auger to 40 feet
41	S-3	SS	1.9	27 30 36 29	Brown silty f SAND, trace f gravel [SM] Brown silty CLAY [CL] (moist)	FID = 0 ppm
42						

*Standard Penetration Test N-Value

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started 9/11/97	Date Finished 9/15/97
Drilling Company	CT&E Environmental Services, Inc.		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
43	S-4	SS	1.1	18 30 33 36	Brown silty CLAY [CL] (moist)	FID = 0 ppm Auger to 44 feet Install 8" Steel Casing through center of augers to 44 feet
44					–	
45	S-5	SS	0.8	43 43 50/3"	Brown m-f SAND and CLAY, trace silt and c-f gravel [SC-CL] (moist)	Tremie grout annular space between casing and borehole w/ portland cement/bentonite while removing augers FID = 0.2 ppm
46						
47	S-6	SS	0.4	50 50/4"	Brown gravelly c-f SAND, trace silt [SP] (wet)	Start 9/15/97 8:05 Drill to 46 feet Drill with 5-7/8" Roller Bit FID = 0 ppm Drill to 48 feet
48						
49	S-7	SS	0.4	75/5"	Brown c-f SAND, trace-some silt and clay, trace f gravel [SM-SC] (dry-moist)	FID = 0 ppm
50						Drill to 50 feet
51	S-8	SS	0.1	58 75/2"	Brown c-f SAND, trace-some silt and clay, trace f gravel [SM-SC] (dry-moist)	FID = 0 ppm Rock in tip of spoon
52						Drill to 52 feet
53	S-9	SS	0.7	75 100/3"	Brown m-f sandy SILT, trace clay [ML] (dry-moist)	FID = 0 ppm
54						Drill to 54 feet
55	S-10	SS	0.2	85 100/1"	Brown c-f SAND, trace-some silt, trace f gravel [SM-SP] (dry-moist)	FID = 0 ppm
56						Drill to 56 feet
57	S-11	SS	0.3	100/5"	Brown c-f SAND, trace-some silt, trace c-f gravel [SM-SP] (dry-moist)	FID = 0 ppm
58						Drill to 58 feet
59	S-12	SS	0.7	53 100/4"	Brown c-f SAND, trace-some silt, trace c-f gravel [SM-SP] (dry-moist)	FID = 0 ppm
60						Drill to 60 feet
61	S-13	SS	1.3	50 77 100/5"	Brown c-f SAND, trace-some silt, trace c-f gravel [SM-SP] (dry-moist)	FID = 0 ppm
62						Drill to 62 feet
63	S-14	SS	0.2	83 100/5"	Brown c-f SAND, trace-some silt, trace c-f gravel [SM-SP] (dry-moist)	FID = 0 ppm Rock fragments in tip of spoon
64						Drill to 64 feet

*Standard Penetration Test N-Value

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started	Date Finished
Drilling Company	CT&E Environmental Services, Inc.	9/11/97	9/15/97

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
65	S-15	SS	0.4	100/5"	Brown c-f SAND, trace-some silt, trace c-f gravel [SM-SP] – (dry-moist)	Pockets of clay FID = 0 ppm Drill to 66 feet
66						
67	S-16	SS	0.2	100/3"	Brown silty f SAND, trace clay, occasional rock fragments [SM]	FID = 0 ppm
68						Drill to 68 feet Spoon bouncing
69	S-17	SS	0.1	150/1"	Brown silty f SAND, occasional rock fragments [SM]	PID = 0 ppm
70						Drill to 70 feet Spoon bouncing
71	S-18	SS	NR	100/0"		Install piezometer at 70 feet
72						
73					Boring completed at 70 feet	End13:50
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75						
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82						
83						
84						
85						
86						

*Standard Penetration Test N-Value

LOG OF BORING NO: P-3 Sheet 1 of 1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	8.88
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/8/97 / 9/9/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	18 ft / Not Encountered
Casing	---		
Casing Hammer Weight	--- Drop ---	Water Level	~ 5.5 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight	140 lb Drop 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	CONCRETE	Start 15:30
1	S-1	SS	0.5	10	Brown - Dark gray silty f SAND, trace c-f	Auger and jackhammer through
				29	gravel, occasional concrete fragments	concrete FID = 0 ppm
2				10	[FILL] (moist-dry)	Stop 15:40
				15	Light gray silty f SAND, trace c-f gravel,	Start 9/9/97 7:30
3	S-2	SS	0.3	17	occasional concrete fragments	FID = 0 ppm
				11	[FILL] (dry)	
4				18		Auger to 4 feet
				14	Light brown - Black silty f SAND, trace c-f	
5	S-3	SS	1.1	12	gravel, occasional brick fragments (wet)	FID = 0 ppm
				8	Orangish brown - Brown m-f SAND, trace	
6				9	silt and f gravel, occasional glass fragments	
				8	Dark gray gravelly c SAND	
7	S-4	SS	1.1	6	[FILL] (wet)	FID = 35 ppm
				4	Yellow brown - Dark gray c-f SAND, some f	Sheen on water
8				4	gravel, trace silt, occasional cinders	Auger to 8 feet
				5	Dark gray c SAND, some f gravel, trace silt	
9	S-5	SS	1.2	3		FID = 400 ppm
				3	Dark brown silty c-f SAND, trace clay	Sheen on water
10				2	[FILL] (wet)	Auger to 10 feet
				2	Dark brown c-f SAND, some silt and f gravel,	
11	S-6	SS	1.1	1	trace clay [FILL] (wet)	FID = 100 ppm
				1	Dark brown c-f SAND, trace silt and clay and	
12				1	c-f gravel, occasional pockets of clay	
				6	[FILL] (wet)	
13	S-7	SS	1.0	4	Orangish brown silty f SAND, occasional	FID = 600 ppm
				3	cinders	
14				4	Dark gray fibrous clayey SILT [ML]	Auger to 14 feet
				1	Grayish brown clayey SILT	
15	S-8	SS	1.7	1	[ML] (moist)	FID = 200 ppm
				1		
16				1		
				2	Grayish brown silty CLAY	
17	S-9	SS	1.9	2	[CL] (moist)	FID = 70 ppm
				2		Auger to 18 feet
18				2		Install piezometer at 18 feet
19					Boring completed at 18 feet	End 8:35
20						

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.

River Drive Center 1 Elmwood Park NJ 07407

TIERRA-B-018309

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	9.06
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/10/97 / 9/17/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	6-5/8" I.D. Hollow Stem Auger, 5-7/8" Roller Bit	Completion Depth / Rock Depth	30 ft / 30 ft
Casing	---		
Casing Hammer Weight / Drop	--- / ---	Water Level	~ 5.5 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight / Drop	140 lb / 30"	Inspector	Elana Seelman/Ed Zofchak

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1					CONCRETE	Start 10:40
2						Jackhammer through concrete
3						Auger to 10 feet
4					See Boring P-3	Auger grinding at 1 foot
5					Log of Boring	
6						
7						
8						
9						
10						
11	S-1	SS	0.3	4 4 4 5	Brown m-f SAND, trace clay and silt and f gravel, occasional glass fragments [FILL] (wet)	FID = 150 ppm
12						
13	S-2	SS	1.5	4 6 7 5	Brown - Reddish brown c-f SAND, trace clay and silt and f gravel, occasional cinders, fibers and coal fragments [FILL] (wet)	FID = 500 ppm
14						Auger to 14 feet
15	S-3	SS	1.5	6 2 2 3	Brown silty CLAY [CL] (moist)	FID = 100 ppm
16						FID = 50 ppm
17	S-4	SS	NR	2 3 2 3		Auger to 16 feet End 11:40 FID = 2-3 ppm Install 8" Steel Casing through center of augers to 16 feet Tremie grout annular space between casing and borehole with portland cement/bentonite while removing augers
18						
19	S-5	SS	2.0	5 6 6 6	Dark gray organic SILT, some clay, trace f sand and f organic material [OL] (moist)	Start 9/17/97 9:05 FID = 100-120 ppm Organic odor
20						

Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: P-3A

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Date Started	Date Finished
Drilling Company	CT&E Environmental Services, Inc.	9/10/97	9/17/97

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
21	S-6	SS	1.3	1 1 1 1	Dark brownish gray organic clayey SILT, trace f sand and f organic material [OL] – (moist)	Drill with 5-7/8" Roller Bit FID = 20-30 ppm
23	S-7	SS	2.0	3 2 3 4	Dark brownish gray organic finely laminated silty CLAY, trace c-f sand and f organic material [OH] (moist) TIMBER	FID = 8-10 ppm Slight to moderate organic odor FID = 10-20 ppm
25	S-8	SS	0.5	20 16 25 33	Gray - Red brown m-f SAND, some silt, trace-some f gravel [SM] (moist-wet)	Drill to 24 feet Sandstone rock fragment in tip of spoon
27	S-9	SS	0.9	37 60 100/5"	Gray - Red brown c-f SAND, some clayey silt, trace f gravel [SM] (dry-moist)	FID = 1-2 ppm Refusal Drill to 28 feet FID = 1-2 ppm
29 30	S-10	SS	0.5	77 100/5"	Red brown c-f SAND and GRAVEL, trace-some silt [SP-GP] (moist-wet)	Refusal Drill to 30 feet Install piezometer at 30 feet
31 32	S-11	SS	NR	100/2"		
33 34 35 36 37 38 39 40 41 42					Boring completed at 30 feet	End 10:35

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: P-4

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	9.25
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/9/97	Date Finished: 9/9/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 18 ft	Rock Depth: Not Encountered
Casing	---		
Casing Hammer Weight: ---	Drop: ---	Water Level	~ 6 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight: 140 lb	Drop: 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				---	CONCRETE	Start 10:05
1	S-1	SS	0.7	25	Light brown m-f SAND, trace silt and f gravel,	Auger through concrete
				50/4"	occasional concrete fragments	FID = 0 ppm Refusal
2					Purplish brown - Yellow silty f SAND, trace	Brick in tip of spoon
				5	c-f gravel [FILL] (dry)	Auger to 2 feet
3	S-2	SS	0.5	50/3"	Reddish brown c-f SAND, some silt, trace c-f	FID = 0 ppm Refusal
					gravel [FILL] (dry)	Auger to 4 feet
4					Pinkish brown m-f SAND, some silt, trace f	Auger grinding
				50/4"	gravel, occasional brick and concrete frags	Refusal
5	S-3	SS	0.3		Reddish brown - Brown silty f SAND,	Rock in tip of spoon
					occasional brick and concrete fragments	FID = 0 ppm
6					[FILL] (dry)	Auger to 6 feet
				2	Brown gravelly c-f SAND, occasional	
7	S-4	SS	0.2	5	pockets of clay and brick fragments	FID = 9 ppm
				13	[FILL] (wet)	
8				14		
				8	Reddish brown gravelly c-f SAND, some silt,	
9	S-5	SS	1.1	9	trace clay	FID = 5 ppm
				19	Dark gray gravelly c-f SAND, trace silt	
10				14	[FILL] (wet)	Auger to 10 feet
				11	Brown gravelly c-f SAND	FID = 5 ppm
11	S-6	SS	0.7	7	[FILL] (wet)	Sheen on water
				9		
12				17		FID = 200 ppm
				6		
13	S-7	SS	NR	3		Sheen on water
				2		Brick in tip of spoon
14				↓		Auger to 14 feet
				14	Brown silty CLAY	
15	S-8	SS	1.0	9	[CL] (moist)	FID = 30 ppm
				2		Sheen on water
16				2		
				9	Brown silty CLAY	FID = 50 ppm
17	S-9	SS	2.0	8	[CL] (moist)	Sheen on water
				5	Reddish brown silty f SAND [SM]	FID = 900 ppm
18				8	Brownish gray silty c-f SAND, some clay	Auger to 18 feet
					Boring completed at 18 feet	Grout to 16 feet with bentonite
19						slurry
						Install piezometer at 16 feet
20						End 11:20

Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	9.63
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/10/97 / 9/17/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" & 6-5/8" I.D. Hollow Stem Auger, 5-7/8" Roller Bit	Completion Depth / Rock Depth	26 ft / 26 ft
Casing	- - -		
Casing Hammer Weight / Drop	- - - / - - -	Water Level	~ 6 ft
Sampler	2" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight / Drop	140 lb / 30"	Inspector	Elana Seelman/Ed Zofchak

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1					CONCRETE	Start 10:40
2						Jackhammer through concrete
3						Auger to 10 feet
4					See Boring P-4 Log of Boring	Auger grinding at 1 foot
5						
6						
7						
8						
9						
10						
11	S-1	SS	1.0	18 11	Brown m-f SAND, some f gravel, trace clay and silt	FID = 80 ppm
12				5 17	[SP] (wet)	
13	S-2	SS	0.8	7 5	Brown m-f SAND and GRAVEL, trace clay [SP-GP] (wet)	FID = 15 ppm
14				3 2	Black c-f GRAVEL [GP] Dark gray silty CLAY [CL] (wet)	Auger to 14 feet
15	S-3	SS	0.5	3 2	Brown silty CLAY [CL] (moist)	FID = 15 ppm
16				3 2		Auger to 16 feet
17	S-4	SS	1.9	4 4	Dark brownish gray organic clayey SILT, trace m-f sand and organic material [OL]	End 16:00 FID = 10-20 ppm Install 8" Steel Casing through
18				11 16	Mottled Dark gray - Red brown organic silty c-f SAND, trace-some clay, trace m-f gravel	center of augers to 16 feet FID = 100-300 ppm
19	S-5	SS	1.0	17 25	Gray - Red brown c-f SAND, trace-some silt, trace m-f gravel	Tremie grout annular space Odor between casing and borehole
20				42 57	[SM-SP] (dry)	with portland cement/bentonite while removing augers Clots of Tar FID = 300-600 ppm Stained soil

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

Project Name	PSE&G Former Front Street Gas Works Site	Project No. 1406602	
Boring Location	Newark, New Jersey	Date Started	Date Finished
Drilling Company	CT&E Environmental Services, Inc.	9/10/97	9/17/97

Depth (ft)	S	Type	Recov. (ft)	SPT bl/6"	DESCRIPTION	REMARKS
21	S-6	SS	1.1	33 20	Red brown m-f SAND, trace-some silt, trace c sand and m-f gravel [SM-SP]	Drill with 5-7/8" Roller Bit FID = 100 ppm
22				40 12	Red brown m-f SAND, some silty clay, trace c sand and f gravel [SC] (moist)	Naphthalene Odor
23	S-7	SS	1.0	10 28	Red brown silty c-f SAND, trace-some clay, trace m-f gravel	FID = 20-30 ppm Naphthalene Odor
24				25 28	[SM] (moist-wet)	Black free product Oily surface sheen
25	S-8	SS	1.3	24 25	Red brown c-f SAND, some silt, trace-some clay, trace m-f gravel	Drill to 24 feet Naphthalene Odor
26				26 100/5"	[SM] (moist-wet)	Surface sheen FID = 30-50 ppm Refusal
27	S-9	SS	NR	100/0"		Heavy grinding at 26 feet Refusal Drill to 26 feet
28						Install piezometer at 26 feet
29					Boring completed at 26 feet	End 15:00
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Standard Penetration Test N-Value

LOG OF BORING NO: TWP-1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	6.84
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/22/97	Date Finished: 9/22/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 8 ft	Rock Depth: Not Encountered
Casing	---		
Casing Hammer Weight: ---	Drop: ---	Water Level	~ 5.5 ft
Sampler	3" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight: 300 lb	Drop: 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				5	VEGETATION and GRAVEL	Start 11:10
1	S-1	SS	0.7	5	Dark brown silty f SAND, occasional brick,	FID = 0.1 ppm
2				5 7	glass, coal, and concrete fragments and rebar [FILL] (dry)	
3	S-2	SS	0.2	3 4	Dark brown silty f SAND, trace f gravel, occasional brick, glass, coal, and concrete	FID = 0 ppm
4				2 2	fragments [FILL] (dry-moist)	Concrete in tip of spoon
5	S-3	SS	1.0	2 2	Dark brown silty f SAND, trace f gravel, occasional brick fragments (moist-wet)	FID = 0 ppm
6				2 4	Brown c-f SAND, trace silt and clay and f gravel, occasional brick fragments [FILL]	Brick in tip of spoon
7	S-4	SS	0.7	2 4	Reddish brown - Dark brown c-f SAND, trace silt and clay and f gravel	FID = 0 ppm
8				4 7	[FILL] (wet)	Auger to 8 feet due to hole closing Install temporary well point at 8 feet
9					Boring completed at 8 feet	End 11:25
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*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: TWP-2 Sheet 1 of 1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	7.48
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/22/97	Date Finished: 9/22/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth: 8 ft	Rock Depth: Not Encountered
Casing	---		
Casing Hammer Weight: ---	Drop: ---	Water Level	~ 5.5 ft
Sampler	3" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight: 300 lb	Drop: 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT bl/6"	DESCRIPTION	REMARKS
				15	VEGETATION	Start 10:30
1	S-1	SS	1.1	15	CONCRETE fragments [FILL] (dry-moist)	FID = 0.1-20 ppm
				20	Light brown - Light gray c-f SAND, trace silt	
2				37	and c-f gravel, occ. coal and brick fragments	Auger to 2 feet
				5	Brown - Black c-f SAND, some silt, trace c-f	
3	S-2	SS	0.7	3	gravel, occasional coal fragments	FID = 0 ppm
				3	[FILL] (moist)	
4				2		
				2	Brown - Black c-f SAND, some silt, trace c-f	
5	S-3	SS	0.9	2	gravel, occasional coal fragments	FID = 0 ppm
				3	[FILL] (moist-wet)	
6				3		
				8	Brown c-f gravelly SAND, trace silt and clay	
7	S-4	SS	0.6	4	[FILL] (wet)	FID = 0 ppm
				2		Auger to 8 feet due to hole closing
8				3		Install temporary well point at 8 feet
9					Boring completed at 8 feet	End 10:45
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20						

LOG OF BORING NO: TWP-3 Sheet 1 of 1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	8.03
Drilling Company	CT&E Environmental Services, Inc.	Date Started: 9/22/97	Date Finished: 9/22/97
Drilling Equipment	Mobile Drill B-80	Completion Depth: 8 ft	Rock Depth: Not Encountered
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger		
Casing	---	Water Level	~ 6 ft
Casing Hammer Weight	--- Drop ---	Driller	K. Mike Millican
Sampler	3" O.D. Split Spoon	Inspector	Elana Seelman
Sampler Hammer Weight	300 lb Drop 30"		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
				6	VEGETATION	Start 9:40
1	S-1	SS	1.1	8	Brown silty m-f SAND, trace f gravel [FILL]	FID = 0 ppm
				8	Black - Reddish brown c-f SAND, trace-	
2				7	silt and c-f gravel, occ. brick and coal frags	
				5	Brown silty f SAND, trace clay and f gravel	
3	S-2	SS	0.8	8	Lens of COAL TAR	FID = 0 ppm
				4	Brown silty f SAND, trace f gravel	
4				6	[FILL] (moist)	
				4	Light brown silty f SAND, trace c-f gravel	
5	S-3	SS	0.9	8	[FILL] (moist)	FID = 0 ppm
				5		
6				11		
				9	Brown m-f SAND, trace clay and silt and c-f	
7	S-4	SS	0.7	4	gravel	FID = 0 ppm
				4	[FILL] (wet)	Auger to 8 feet due to hole closing
8				5		Install temporary well point at 8 feet
9					Boring completed at 8 feet	End 10:00
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*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: TWP-4 Sheet 1 of 1

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	8.21
Drilling Company	CT&E Environmental Services, Inc.	Date Started / Date Finished	9/22/97 / 9/22/97
Drilling Equipment	Mobile Drill B-80		
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger	Completion Depth / Rock Depth	8 ft / Not Encountered
Casing	- - -		
Casing Hammer Weight / Drop	- - - / - - -	Water Level	~ 5 ft
Sampler	3" O.D. Split Spoon	Driller	K. Mike Millican
Sampler Hammer Weight / Drop	300 lb / 30"	Inspector	Elana Seelman

Depth (ft)	S	Type	Recov. (ft)	SPT* blt/6"	DESCRIPTION	REMARKS
1	S-1	SS	0.2	2 3 2 2	VEGETATION Black c-f SAND, trace-some c-f gravel, trace silt [FILL] (dry)	Start 8:30 FID = 0 ppm
3	S-2	SS	0.4	2 4 4 4	Black c-f SAND, trace silt and c-f gravel [FILL] (dry)	FID = 0 ppm
5	S-3	SS	0.4	7 6 7 5	ROCK fragments (dry-wet) Brown c-f SAND, trace silt and f gravel, occasional pockets of clay [FILL]	FID = 0 ppm
7	S-4	SS	0.6	4 4 3 3	Brown c-f SAND, trace silt and f gravel, occasional pockets of clay, timber and coal fragments [FILL] (wet)	FID = 0 ppm Auger to 8 feet due to hole closing Install temporary well point at 8 feet
9					Boring completed at 8 feet	End 8:50
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15						
16						
17						
18						
19						
20						

*Standard Penetration Test N-Value

LANGAN Engineering and Environmental Services, Inc.
River Drive Center 1, Elmwood Park, NJ 07407

LOG OF BORING NO: TWP-5

Project Name	PSE&G Former Front Street Gas Works Site	Project No.	1406602
Boring Location	Newark, New Jersey	Elevation and Datum	8.91
Drilling Company	CT&E Environmental Services, Inc.	Date Started 9/22/97	Date Finished 9/22/97
Drilling Equipment	Mobile Drill B-80	Completion Depth 10 ft	Rock Depth Not Encountered
Size and Type of Bit	4-1/4" I.D. Hollow Stem Auger		
Casing	---	Water Level	~ 7 ft
Casing Hammer Weight	--- Drop ---	Driller	K. Mike Millican
Sampler	3" O.D. Split Spoon	Inspector	Elana Seelman
Sampler Hammer Weight	300 lb Drop 30"		

Depth (ft)	S	Type	Recov. (ft)	SPT* bl/6"	DESCRIPTION	REMARKS
1	S-1	SS	1.2	6	VEGETATION	Start 11:55
				7	Light brown silty f SAND, occasional wood,	FID = 1.5 ppm
2				9	brick and concrete fragments [FILL] (dry)	
				12	Dark brown silty f SAND, trace f gravel,	
3	S-2	SS	0.8	10	occasional concrete, brick and ceramic frag	
				8	Reddish brown - Yellow brown silty f SAND,	FID = 0 ppm
4				12	trace c-f gravel, occasional brick fragments	
				13	[FILL] (moist)	
5	S-3	SS	1.2	10	Dark brown silty f SAND, trace f gravel,	
				8	occasional pockets of clay, brick and coal	FID = 0 ppm
6				4	fragments	
				4	[FILL] (moist)	
7	S-4	SS	1.2	8	Dark brown - Reddish brown - Black silty f	
				7	SAND, trace clay and f gravel and organic	FID = 40 ppm
8				9	material, occasional concrete and coal	
				8	fragments [FILL] (moist-wet)	
9	S-5	SS	1.2	11	Reddish brown m-f SAND, some silt, trace	
				12	clay and c-f gravel [FILL]	FID = 300 ppm
10				10	Dark gray m-f SAND, some silt, trace f	Auger to 10 feet due to hole closing
				9	gravel, occasional brick fragments (wet)	Install temporary well point at 10 ft
11					Boring completed at 10 feet	End 12:20
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