EXPLANATION OF SIGNIFICANT DIFFERENCE
FORMER BROOKLYN BOROUGH GAS WORKS SITE

Coney Island / Kings County / Site No. 2-24-026 / February, 2012

Prepared by the New York State Department of Environmental Conservation
Division of Environmental Remediation

1.0 INTRODUCTION

The purpose of this notice is to describe the progress of the cleanup at the Former Brooklyn Borough Gas Works Site in Coney Island, New York, and to inform you about a change in the site remedy.

In 2001, the New York State Department of Environmental Conservation issued a Record of Decision which selected a remedy to cleanup the site. The remedy consists of 15 components, one of which is the on-site treatment of an estimated 72,000 gallons per day (gpd) of non-aqueous waste and groundwater in a system designed to reduce contaminant concentrations to non-detectable levels. Through this Explanation of Significant Difference document, the construction of the on-site treatment system has been deleted from the remedy. This requirement has been eliminated based on the results of the 12-month trial non-aqueous phase liquid (NAPL) pumping program implemented at the site. Observations recorded during the period of 12 months have demonstrated the absence of non-aqueous phase waste in the NAPL collection system. Consequently, the need for on-site treatment of the non-aqueous waste no longer exists. This Explanation of Significant Difference (ESD) will become part of the Administrative Record for this site. The information here is a summary of what can be found in greater detail in documents that have been placed in the following repositories:

Community Board 13
2900 W. 8th Street
Brooklyn, NY 11224

NYSDEC Region 2
61 Hunter's Point Plaza
47-40 21st Street
Long Island City 11101-5407

Although this is not a request for comments, interested persons are invited to contact the Department's Project Manager for this site to obtain more information or have questions answered.

2.0 SITE DESCRIPTION AND ORIGINAL REMEDY

2.1 Site History, Contamination, and Selected Remedy

The 2001 Record of Decision for Operable Unit 1: Plant Site - Former Brooklyn Borough Gas Works Site, Coney Island, Borough of Brooklyn, Kings County, New York, applies to a parcel of land located on 873 Neptune Avenue, Coney Island. This site is also known as the Coney Island Former MGP Site. The site is bordered by the right-of-way of the Shore Parkway and the New York Metropolitan Transit Authority (MTA) rail yard to the north and west, and Coney Island Creek to the south and east. The site is approximately 16.4 acres in size. The area surrounding the property is a relatively flat, densely populated commercial/residential zone. Except for an abandoned shed, there are no structures on the

site.

The former Brooklyn Borough Gas Works began construction of the first gas generator at the facility in 1908. On-site disposal of by-products such as coal tar, resulting from the operation of the plant, has resulted in the contamination of soil, groundwater and Coney Island Creek. This is attributed to a combination of leaks from storage facilities including gas holders, and direct discharge to the creek. In 1951, Brooklyn Borough Gas transformed its gas delivery operations to a natural gas-based system. Between 1952 and 1959, the Brooklyn Borough Gas Company operated the MGP for the purpose of meeting gas supplies during high demands. By 1966, the facility was almost completely decommissioned and demolished.

The soil at the site was contaminated with various chemical constituents related to the gas manufacturing processes. Most of the contaminants were detected at a depth of 4 to 12 feet below the ground surface and were observed across the entire site. Certain areas of the site contained coal tar and were considered "source areas". Coal tar is associated with high concentrations of polycyclic aromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene and xylenes (BTEX) and is the source of NAPL. Groundwater was shown to contain measurable levels of various chemical constituents due to the deposition of these chemicals at depth. Floating oils including NAPL were observed in wells and soil borings. Groundwater at this site flows generally towards the south and discharges to the Coney Island Creek. There is no evidence of off-site impact beyond the Coney Island Creek.

The main categories of contaminants which exceed standards, criteria and guidance values (SCGs) are PAHs, volatile organic compounds (VOCs), and inorganics (mainly heavy metals). The carcinogenic PAH contaminants of concern included chrysene, dibenzo(a,h)anthracene, benzo(b)fluoranthene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene. The VOC contaminants of concern include benzene, toluene, ethylbenzene and xylene (BTEX), and acetone. The inorganic contaminants of concern included arsenic, lead, manganese, nickel and zinc.

The site was the subject of a Remedial Investigation (RI) which was conducted in several phases: Phase I- Contaminant Investigation in 1989; Phase II - Geotechnical Investigation conducted in May 1993; Phase III- Geotechnical Investigation in July 1993; Phase IV - Geotechnical and Hydrogeological Investigation in August 1993; Phase V- Geotechnical and Hydrogeological Investigation in October 1993; and Phase VI - Supplemental Remediation Investigation in November 1997. A report entitled Remedial Investigation Report for the Brooklyn Borough Gas Works, dated November 1997, describes the field activities and findings of the Phase VI supplemental RI in detail and includes a summary of the investigation reports for Phases I through V. This report can be reviewed at the following document repositories:

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Based on the RI results, it was determined that, in comparison to the SCGs and potential public health and environmental exposure routes, certain areas and media of the site required remediation. Five remedial action alternatives were evaluated for their effectiveness and cost. The selected alternative was declared in the Record of Decision (ROD), dated March 2001. It required the following actions:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI or Feasibility Study (FS) will be

resolved.

2. Excavation of coal tar source areas to the groundwater table. Excavated material will be consolidated under temporary enclosures, as appropriate, and as described in more detail in section 3.8 and 4.2 of the Feasibility Study Report, to control releases of volatile emissions and odors. If coal tar source is visually observed beyond the excavation boundaries, the source will be removed to the extent feasible.
3. Off-site transport and recycling and/or disposal of source area materials.
4. Installation of a protective coffer dam along the Coney Island Creek perimeter to minimize potential releases from the site during creek bank excavation and restoration efforts.
5. Use of a temporary construction enclosure along the creek bank when trenching or excavation activities may release significant volatile emissions or odors into the atmosphere.
6. Installation of a subsurface steel sheet pile barrier wall (or other equivalent barrier wall) around the site to an approximate depth of 25 feet, to minimize the migration of NAPL from the site into the Coney Island Creek, while diverting upgradient groundwater around this site to the Coney Island Creek.
7. Removal of the existing wooden bulkhead and contaminated materials between the barrier wall and the coffer dam with subsequent construction of a stabilized creek bank.
8. Installation of a NAPL collection trench along the interior of the creek barrier wall section to capture migrating NAPL.
9. Treatment of approximately 72,000 gallons daily of non-aqueous waste and groundwater in a system designed to reduce contaminant concentrations such that treated effluent may be discharged to the Coney Island Creek. Contaminants in the water will be reduced to non-detectable levels. However, this element of the remedy has been eliminated by this ESD.
10. Installations of a multi-component cover system over the site to act as a low permeability barrier to minimize both infiltration and the potential for direct contact exposure of workers with residual contaminants. At least two feet of cover material is necessary for the protection of human health and the environment. The site will be graded to a common elevation prior to installation of the cover system.
11. Passive venting and control of vapors which may form under the cover system. Performance evaluation of the passive system will be used to assess the need, if any, for an active system.
12. Restoration of the Coney Island Creek bank to provide a 50-foot wide ecological buffer zone. Monitoring wells will be installed immediately outside of the barrier within the buffer zone to assess the long-term performance of the barrier wall.
13. Use of institutional controls including deed restrictions, fencing, a health and safety plan, a contingency plan and long-term monitoring after implementation of remedial actions to ensure continued adherence to the site's health and safety plan; continued treatment of collected groundwater, maintenance of the multi-component cover system; and to prohibit the use of the site for other than commercial and industrial purposes without permission from NYSDEC.
14. Since the selected remedy will result in untreated hazardous waste remaining at the site, a long-term monitoring program will be instituted. Monitoring wells will be installed across the site to monitor the effectiveness of the multi-layer cover system and overall remedial plan and will be a component of the operation and maintenance plan for the site. The effectiveness of the selected remedy will be evaluated at the end of a five-year monitoring period.
15. Any conceptual design for redevelopment, although not part of the remedy, must be evaluated by the NYSDEC and NYSDOH for potential impacts to the remedy. However accomplished, redevelopment cannot adversely affect, compromise the integrity of, disturb the site remedy or impact public health.

3.0 CURRENT STATUS

To date, remedial elements numbered 1 through 8 and 10 through 15 have been completed. These actions have resulted in the following:

• Installation of 3,718 linear feet of a steel sheet pile barrier wall, with sealed interlocks, around the perimeter of the site;
• Installation of piezometer pairs, one interior and one exterior of the wall, at upland locations along the barrier wall and five additional single piezometers along the interior of the creek side segment of the wall;
• Excavation of Coal Tar Source Area materials in the upland portions of the site and off-site disposal of 86,200 tons of impacted soil;
• Removal and proper disposal of the soil pile located on the lot occupied by the Metropolitan Transit Authority (MTA);
• Backfilling of the Coal Tar Source Area excavation areas with processed dredge materials (PDM), created by processing creek sediments dredged from the Coney Island Creek in a temporary on-site facility;
• Removal of 111,582 tons of contaminated materials from along the northerly bank of the Coney Island Creek to a minimum depth of three feet bgs, and backfilling with clean sediment quality soils to restore the bank;
• Establishment a 50-foot wide Ecological Buffer Zone, including appropriate plantings, providing a transition between the Coney Island Creek and the upland portions of the site;
• Construction of a Low Permeability Multi-Component Environmental Cap throughout the upland portions of the site to minimize exposure pathways and prevent rainwater infiltration;
• Installation of a gravel venting layer and vents for the passive venting of vapors that could potentially accumulate under the Low Permeability Multi-Component Environmental Cap;
• Installation of a NAPL collection trench up-gradient of Coney Island Creek and generally up-gradient of the OU-1 sheet pile barrier wall and Ecological Buffer Zone, to capture NAPL and associated groundwater;
• Installation of dense non-aqueous phase liquid (DNAPL) recovery wells along the NAPL collection trench to passively recover DNAPL; and
• The cleaning of existing rip-rap, retaining walls, and/or bulkheads determined to be impacted by MGP-related contaminants to the extent practical.

4.0 DESCRIPTION OF SIGNIFICANT DIFFERENCE

4.1 New Information

The Department's evaluation of the following information forms the basis for this ESD:

• NAPL was not detected during the 12-month trial pumping program completed in accordance with the approved Trial NAPL Pumping work plan. During this period, over 2 million gallons of groundwater were removed, treated, and discharged beneath the cap to induce increased hydraulic gradients across the site. The presence of NAPL was monitored within the NAPL trench, in the 62 groundwater monitoring wells and two sumps on 18 separate occasions throughout the year. The singular exception is the DNAPL that was found in well DRW-16 at the start of the trial pumping operation. This material was subsequently removed through pumping and did not re-enter the well despite increased hydraulic gradients toward the NAPL trench. Considering its relatively high viscosity, it is likely that this NAPL is immobile and was introduced into the well during installation. The absence of collectable NAPL after

12 months of pumping reflects the effectiveness of the Remedial Actions implemented at the site.

4.2 Comparison of Changes with Original Remedy

- A 12-month trial NAPL pumping program did not yield NAPL in the collection trench. This indicates that further groundwater pumping and the construction of a groundwater treatment plant are not necessary. Therefore, this ESD eliminates the ROD requirement to treat approximately 72,000 gallons daily of non-aqueous waste and groundwater. Consequently, the construction of an on-site groundwater treatment facility is no longer necessary. Since the performance of the remedy is unaltered by this ESD, the remedy will remain effective and be protective of public health and the environment.

5.0 SCHEDULE AND MORE INFORMATION

The construction of the remedy at the Former Brooklyn Borough Gas Works Site in Coney Island was completed in October 2008. The Site Management Plan was prepared and accepted by the NYSDEC and NYSDOH in August 2010.

The Final Engineering Report will be finalized in 2012, upon filing of an Environmental Notice. If you have questions or need additional information you may contact:

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2/22/12
Date — Lech Dolata, Project Manager

2/22/12
Date — Amen Omorogbe, P.E., Section Chief, Section D

2/29/12
Date — Michael J. Ryan, P.E., Director, Bureau C

2/29/2012
Date — Robert W. Schick, P.E., Acting Director
Division of Environmental Remediation