Consolidated Edison Company
of New York, Inc.
31-01 20th Avenue
Long Island City NY 11105-2048
www.conEd.com

September 12, 2018

Mr. Douglas MacNeal
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-1011

RE: Consolidated Edison Company of New York, Inc.
W42 St MGP Site- Site Management Plan
VCA no. D2-003-02-08; Site ID no. V00531

Dear Mr. MacNeal:

The enclosed revised Site Management Plan has been prepared under Con Edison's VCA no. D2-003-02-08 for the W42 St MGP Site in accordance with NYSDEC's comments dated July 11, 2018.

Please feel free to contact me at 718-204-4288 should you have any questions on this submittal.

Sincerely,

Richard Rienzo

Richard Rienzo
Project Manager
EH&S, Remediation
Consolidated Edison Company of NY, Inc.

Attachments: SMP

cc: Cristina Lombardi, Director EHS Remediation
Kenneth Kaiser, PE, BCEE, Department Manager EHS Remediation
Justin Deming, NYSDOH
Correspondence File

SITE MANAGEMENT PLAN
FORMER WEST 42nd STREET MGP
MANHATTAN, NEW YORK
VCA NUMBER D2-003-02-08
SITE ID NO. V00531

CONSOLIDATED EDISON CO. OF NEW YORK, INC.
31-01 20th Avenue
Long Island City, NY 11105

Prepared by:

Arcadis of New York, Inc.
27-01 Queens Plaza North, Suite 800
Long Island City, New York 11101
August 2017
Revision 1 – September 2018

FORMER WEST 42ND STREET MGP
NEW YORK COUNTY MANHATTAN,
NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: V00531

Prepared for:

CONSOLIDATED EDISON CO. OF NEW YORK, INC.

31-01 20TH Avenue

Long Island City, NY 11105

Prepared by:

ARCADIS OF NEW YORK, INC.

27-01 Queens Plaza North, Long Island City, NY 11101

REVISIONS TO FINAL APPROVED SITE MANAGEMENT PLAN

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date
1	September 12, 2018	Incorporate NYSDEC Comments	July 11, 2018

AUGUST 2017
Revision 1 – September 2017

CERTIFICATION STATEMENT

I JASON BRIEN certify that I am currently a NYS registered professional engineer as in defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

JASON D. BRIEN, P.E.
NYS P.E. LICENSE NO. 084067

SEPTEMBER 12, 2018

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APPENDICES

ACRONYMS AND ABBREVIATIONS

ASP	Analytical Services Protocol
Arcadis	Arcadis of New York, Inc.
BCA	Brownfield Cleanup Agreement
bgs	below ground surface
bss	below sediment surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAMP	Community Air Monitoring Plan
C/D	construction/demolition
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
Con Edison	Consolidated Edison Company of New York, Inc.
CCR	Construction Completion Report
COC	Certificate of Completion
D&B	Dvirka & Bartilucci Consulting Engineers
DER	Division of Environmental Remediation
ELAP	Environmental Laboratory Approval Program
ER-L	effects range-low
ER-M	effects range-median
ESA	environmental site assessment
EWP	Excavation Work Plan
GA criteria	NYSDEC groundwater criteria class GA
HASP	Health and Safety Plan
IC	Institutional Control
Langan	Langan Engineering and Environmental Services, P.C.
LEL	lowest effect level
MGP	manufactured gas plant
mg/kg	milligrams per kilogram
msl	mean sea level
MTA	Metropolitan Transit Authority

NAPL	non-aqueous phase liquid
NIOSH	National Institute of Occupational Safety and Health
NYC	New York City
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
NYCRR	New York Codes, Rules and Regulations
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
PRR	Periodic Review Report
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
PAH	polycyclic aromatic hydrocarbon
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RIR	Remedial Investigation Report
ROD	Record of Decision
RP	Remedial Party
SCO	Soil Cleanup Objective
SEL	severe effect level
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SVI	soil vapor intrusion
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
TMP	Transportation Management Plan

USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
ug/L	micrograms per liter
VCA	Voluntary Cleanup Agreement
VOC	volatile organic compound

EXECUTIVE SUMMARY

The following is a brief summary of the controls implemented for a portion of the former West 42nd Street manufactured gas plant (MGP) site and off-site areas referred to herein as the Site Management Plan (SMP) area, as well as the inspections, monitoring and reporting activities required by this Site Management Plan. The former MGP site location is shown on Figure 1 and the site plan, including the SMP area, is shown on Figure 2.

Site Identification: Site ID No. V00531, Former West 42nd Street MGP

Institutional Controls:	1. The SMP area is subject to institutional control measures in accordance with the Environmental Notices	
Inspections: Site-wide Inspection		Frequency: Annual
Reporting:		
Inspections		Annually
Certification/Periodic Review Report (PRR)		Every 1 year
Final Construction Report		Upon completion of soil management

Further descriptions of the above requirements are provided in detail in the subsequent sections of this Site Management Plan.

1 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Former West 42nd Street MGP located in Manhattan, New York County, New York (hereinafter referred to as the "site"). See Figure 1. The site is currently in the New York State (NYS) Voluntary Cleanup Program (VCP), Site No. V00531, which is administered by New York State Department of Environmental Conservation (NYSDEC).

Consolidated Edison Corporation of New York, Inc. (Con Edison) entered into a Voluntary Cleanup Agreement (VCA) in January 2000 with the NYSDEC to remediate the site. In addition to the VCA, two Brownfield Cleanup Agreements (BCAs) were entered into as follows:

- River Place I, LLC and Con Edison as Volunteer and Participant, respectively, entered into a BCA with NYSDEC for River Place I (Tax Block 1089 Lot 1) in December 2004 (BCA Number W2-1017-04-09, Site Identification Number C231024).
- River Place II, LLC and Con Edison as Volunteer and Participant, respectively, entered into a BCA with NYSDEC for River Place II (Tax Block 1089 Lot 3) in January 2005 (BCA Number W2-1018-04-09, Site Identification Number C231012).

The BCAs cover the portion of the site, which lies between West 41st Street and West 42nd Street, and 11th Avenue and NYS Route 9A (12th Avenue/West Side Highway), respectively. After the execution of these BCAs, the site was divided into the BCA portion (River Place I and II) and the VCA portion (the remainder of the site within Tax Block 1107), and a portion of the Hudson River as well as off-site areas adjacent to the site). Tax Block 1089 Lots 1 and 3 were revised to Lots 1, 3-C and 5. Tax Block 1107 was revised to Tax Block 1868-C Lot 1 and the Hudson River Greenway. The BCA portions of the site have been investigated and remediated as summarized in the Final Engineering Report (Langan Engineering and Environmental Services, P.C. [Langan] 2007). A summary of the BCA Remedial Actions is provided in Section 2.3.

A figure showing the site location and boundaries of the SMP area is provided on Figure 2. Note the SMP area includes a portion of the VCA portion of the site as well as off-site areas adjacent to the site.

Contamination related to the former MGP operations remains beneath the surface in and adjacent to the site, which is hereafter referred to as "remaining contamination". Institutional control (IC) measures have been incorporated into the site remedy to control exposure to remaining MGP-related contamination to ensure protection of public health and the environment. Environmental Notices for the SMP area properties will be executed by the NYSDEC, and recorded with the New York City Registrar and provided to entities responsible for the SMP area properties (i.e. owners, operators, and /or representatives) with a copy of the SMP. The Environmental Notices require compliance with this SMP and all IC measures placed on the site.

This SMP was prepared to manage remaining MGP-related contamination at the SMP area properties until each Environmental Notice is extinguished in accordance with ECL Article 71, Title 36. This plan has

been approved by the NYSDEC, and compliance with this plan is required by NYSDEC, the executer of the Environmental Notice and its successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Notices. Failure by SMP area Owners and SMP entities to properly implement the SMP is a violation of the Environmental Notices and Environmental Conservation Law, 6 New York Codes, Rules, and Regulations (NYCRR) Part 375, and thereby subject to applicable penalties;
- Failure by Con Edison to comply with the inspection and reporting requirements of this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375, and the VCA (Index #D2-003-02-08; Site ID #V00531) for the site, and thereby subject to applicable penalties and/or grounds for revocation of the Certificate of Completion (COC), release or closure letter.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Table A1, below.

This SMP was prepared by Arcadis of New York, Inc. (Arcadis), on behalf of Con Edison, in accordance with the requirements of the NYSDEC's Division of Environmental Remediation (DER)-10 ("Technical Guidance for Site Investigation and Remediation"), dated 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the IC measures that are required by the Environmental Notices for the SMP area properties in accordance with NYSDEC's DER-33 ("Institutional Controls: A Guide to Drafting and Recording Institutional Controls").

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. In accordance with the Environmental Notices for the SMP area properties, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner and/or SMP Entity to Con Edison and the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- Written 60-day advance notice of any proposed changes in SMP area properties use that are required under the terms of the VCA, 6NYCRR Part 375 and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- Written 30-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan (EWP).

This 30-day notification period does not apply to emergency situations where advance notification is not practicable (e.g., power/utility outages, emergency repairs, etc.).

Any change in the ownership of the SMP area properties or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the VCA, and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the SMP area properties, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table A1 below includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information.

Table A1: Notifications*

Name	Contact Information
NYSDEC Project Manager: Douglas MacNeal	Phone: (518) 402-9662 Email: Douglas.MacNeal@dec.ny.gov
Remedial Party: Con Edison	Phone: 877.602.6633

* Note: Notifications are subject to change and will be updated as necessary.

1.4 Emergency Telephone Numbers

In the event of any environmental-related situation or unplanned occurrence requiring assistance, the SMP area properties owners, operators, representatives, or SMP Entity (i.e. Environmental Consultant) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. These emergency contact lists must be maintained in an easily accessible location at the site.

Table A2: Emergency Telephone Numbers

Organization	Contact
Medical, Fire, and Police	911
One Call Center	(800) 272-4480 (3-day notice required for utility mark-out)
Poison Control Center	(800) 222-1222
Pollution Toxic Chemical Oil Spills	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

2 SUMMARY OF PREVIOUS REMEDIAL INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Former West 42nd Street MGP is located in Manhattan, New York County, New York. This SMP area encompasses the following as identified on the New York City (NYC) Tax Map (Figure 2):

- 42nd Street, bounded by the northern sidewalk of 42nd Street to the north, the western pedestrian crossing of 11th Avenue to the east, Tax Block 1089 to the South, and NYS Route 9A to the west.
    - Hudson River Park, Hudson River Greenway and NYS Route 9A, including the eastern sidewalk of NYS Route 9A, bounded by West 42nd Street to the north, Tax Block 1089 and Metropolitan Transit Authority (MTA) Bus Depot to the east, West 40th street to the south including a continuation of the northern sidewalk, and the Hudson River to the west.
- The MTA Bus Depot property in Tax Block 1088 and West 41st Street, including the northern and southern sidewalks, bounded by Tax Block 1089 to the North, the western sidewalk of 11th Avenue to the east, West 40th Street to the south including the northern sidewalk of West 40th Street, and NYS Route 9A to the west.

The owners/operators of the SMP area parcel(s) at the time of issuance of this SMP is/are:

NYC – West 41st Street, West 42nd Street

Hudson River Park Trust (partnership of NYC and NYS) - Hudson River Park/ Hudson River Greenway

NYS – Route 9A (12th Avenue/West Side Highway)

MTA – Bus Depot comprising Block 1088

2.2 Physical Setting

2.2.1 Land Use

The SMP area consists of the following: a public park, a NYS highway, public roadways, sidewalks, and a bus depot. The SMP area is zoned as manufacturing and is currently utilized for municipal uses. SMP area occupants include the MTA.

The properties adjoining the SMP area and in the neighborhood surrounding the SMP area primarily include mixed-use residential and commercial, commercial, diplomatic [commercial, residential, etc.], municipal and public properties. The properties immediately south of the SMP area include commercial properties; the properties immediately north of the SMP area include mixed used residential-commercial properties and diplomatic properties; the properties immediately east of the SMP area include commercial and municipal properties; and the properties to the west of the SMP area include commercial and public properties.

The SMP area consists of the following: a public park, a NYS highway, public roadways, sidewalks, and a bus depot. The SMP area is zoned as manufacturing and is currently utilized for municipal uses. SMP area occupants include the MTA.

The properties adjoining the SMP area and in the neighborhood surrounding the SMP area primarily include mixed-use residential and commercial, commercial, diplomatic [commercial, residential, etc.], municipal and public properties. The properties immediately south of the SMP area include commercial properties; the properties immediately north of the SMP area include mixed used residential-commercial properties and diplomatic properties; the properties immediately east of the SMP area include commercial and municipal properties; and the properties to the west of the SMP area include commercial and public properties.

2.2.2 Geology and Hydrogeology

The site stratigraphy is divided into the following geologic units:

- Fill;
- Silty Clay;
- Lower sand/weathered bedrock; and
- Bedrock.

Two east-west cross sections of the site are shown on Figures 3 and 4 (cross section A-A' and B-B', respectively), and a north-south cross section is shown on Figure 5 (cross section C-C'). The fill is present throughout the site and consists of a silty to gravelly sand containing anthropogenic materials such as brick, wood, concrete, metal shavings, ash-like materials, coal fragments, cinders, asphalt, construction debris, cobbles, and blocks. The fill thickness ranges from approximately 13 to 17 feet along West 42nd Street and 13.8 to 29 feet along West 41st Street. Farther west, the fill thickness ranges from 22 to 32 feet along NYS Route 9A and 21 to 40 feet along the Hudson River. Overall, the fill thickens to the west toward the river. This is consistent with the history of filling the river and adjacent tidal wetlands in the mid-1800s.

Below the fill and upper sand lies a silty clay unit. The clay consists of dense organic silty clay, containing peat and wood in some areas. This unit likely represents former river areas and adjacent tidal wetland areas prior to filling. The silty clay unit contains occasional silty sand lenses which are likely associated with former wetland drainage channels and tidal creeks. The silty clay thickness ranges from approximately 3 to 27 feet along West 42nd Street and 4 to 22.8 feet along West 41st Street. Farther west, the silty clay thickness ranges from 6 to 32.5 feet east of NYS Route 9A and 20 to 38 feet along the Hudson River. Overall, the silty clay thickens to the west toward the river. Based on the thickness, continuity, and field observations, the silty clay unit likely serves to retard flow.

A discontinuous sand unit is present in portions of the site below the silty clay unit and above bedrock. This sand unit generally contains weathered bedrock fragments and likely represents a weathered bedrock zone above more competent bedrock. The sand is generally coarse to fine grained with silts and gravels. The sand thickness ranges from approximately 3 to 7 feet along West 42nd Street and 2 to 13 feet along West 41st Street. Farther west, the sand thickness ranges from 0 to 9 feet along NYS Route 9A and 0 to 18 feet along the Hudson River.

Underlying all the unconsolidated geologic units discussed above is a crystalline mica schist of the Manhattan Schist Formation. The depth to bedrock ranges from approximately 19 to 51 feet along West 42nd Street and 31.8 to 49 feet along West 41st Street. Farther west, the depth to bedrock is approximately 54 feet along NYS Route 9A and ranges from 66 to 78 feet along the Hudson River. The depth to bedrock increases primarily toward the Hudson River. The bedrock surface generally dips west toward the Hudson River.

Groundwater is first encountered in the fill unit at approximately 6 to 7 feet below ground surface (bgs). Localized groundwater flow patterns have been observed due to:

- Variable permeabilities and hydraulic conductivities of the fill materials;
- Former tidal channels and creeks that may act as preferential pathways;
- Storm sewers and utility conduits that may serve as groundwater "drains";
- Ongoing "dewatering" of basements, subway tunnels, or other structures in the vicinity of the site; and
- Tidal influences.

Based on groundwater level measurements in wells MW-07 to MW-10, tidal influences on groundwater levels were observed in wells MW-09 and MW-10 along the Hudson River but not at wells MW-07 and MW-08 farther east along the east side of NYS Route 9A.

Invert elevations of the storm sewer along West 42nd Street range from approximately 0.2 foot above mean sea level (msl) at 11th Avenue to -3 feet msl at NYS Route 9A to -3.5/-4 feet msl at the eastern edge of Pier 83. Along the south side of West 42nd Street and Pier 83, two overflow sewers discharge to the Hudson River at an invert elevation of approximately -0.6 feet msl, per the New York City Environmental Protection Administration sewer map. Groundwater elevations are generally near the sewer elevations. As such, there is a potential that groundwater could intersect the storm sewer and then migrate preferentially within the sewer (depending on the condition of the sewer) and/or within the backfill of the sewer along West 42nd Street.

Geologic cross sections are shown on Figures 3, 4, and 5. A groundwater contour map is shown on Figure 6. Site specific boring logs and well construction logs are provided in Appendix A. Wells MW-07 to MW-11 will be abandoned in accordance with the plan provided in Appendix B.

2.3 Investigation and Remedial History

Previous investigations conducted at and near the former West 42nd Street MGP site include historical research to determine ownership, occupancy and usage over time (including pre-MGP use, use during MGP operation and post-MGP operation use), as well as several environmental site assessments (ESAs) and field investigations completed prior to the Remedial Investigation (RI). For additional reference, a more detailed summary of site investigations that occurred prior to April 2004, and the results of the investigations, are summarized in the Site Characterization Report (Dvirka & Bartilucci Consulting Engineers (D&B) 2004).

Remedial actions have been completed in the BCA portion of the site prior to the construction of the River Place I and River Place II developments, as documented in the following reports:

- Underground Storage Tank (UST) Closure Report (Woodward-Clyde 1995) describes activities related to the removal of three separate UST systems consisting of 18 individual USTs located on Tax Block 1089 Lot 3.
- Final Engineering Report for West 42nd Street Former MGP Site (Langan 2007) documents the remedial actions at Tax Block 1089 including the excavation and removal of impacted soil to approximately 20 feet bgs in former Lot 3 (current Lot 3-C and Lot 5) and a portion of former Lot 1, installation of a sheet pile containment wall around the excavation area (both for excavation support and contaminant migration mitigation), excavation and removal of subsurface former MGP structures (four gas holder and purifier house foundations), and the establishment of institutional and engineering controls. This report also documents additional remedial activities conducted during the construction of the Silver Towers at River Place II to accommodate the final building design including additional soil excavation and sealing a gap in the sheeting along West 42nd Street to stop an area of tar seepage. The excavation limits for the remedial action was approximately 64,000 square feet in area, encompassing all of current Tax Block 1089 Lot 3-C and Lot 5, and 80,557 tons of MGP-impacted material were removed and disposed of off-site.

Arcadis conducted field investigations in accordance with the NYSDEC-approved Supplemental Remedial Investigation Work Plan (ARCADIS BBL 2007b). During these investigations, soil, groundwater, sediment and surface water were collected for laboratory analysis. Additional boring and monitoring well locations were installed to delineate the extent of MGP impacts. Table 1 provides a summary of the samples submitted for laboratory analysis during the RI activities and all sampling locations are shown on Figure 7. Arcadis submitted a Remedial Investigation Report ([RIR] Arcadis 2016) summarizing the results of the RI to NYSDEC, which was approved on May 12, 2016. The RIR prepared by Arcadis uses certain previous investigation results primarily from the Site Characterization Report (D&B 2004), the Remedial Investigation Data Summary Report (D&B 2005), and the Data Report Transformer Vault Area (ARCADIS BBL 2007a).

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Remedial Action Work Plan (RAWP), dated January 2017, are as follows.

2.4.1 Groundwater

RAOs for Public Health Protection:

- Prevent ingestion of groundwater with site-related constituent levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from site-related constituents in groundwater.

RAOs for Environmental Protection:

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Prevent the discharge of site-related constituents to surface water.

2.4.2 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact with site-related constituents in soil.
- Prevent inhalation of or exposure from site-related constituents in soil.

RAOs for Environmental Protection:

Prevent migration of site-related constituents that would result in groundwater or surface water contamination.

2.5 Remaining Contamination

The BCA portion of the site was remediated prior to the construction of River Place I and II facilities, as previously discussed in Section 2.3. The objectives of the supplemental investigation activities were to delineate the extent of any remaining upland MGP-related impacts and to determine the presence, and if present to delineate the extent, of MGP-related impacts within the Hudson River. The following subsections summarize the results of the RI activities and the remaining contamination.

2.5.1 NAPL

The presence of coal-tar non-aqueous phase liquids (NAPLs) and purifier waste was evaluated by visual review of subsurface soil samples from 27 borings and five wells completed in support of the RI and related activities. Figure 8 presents the distribution of NAPL, staining, and sheens as observed in soil at RI boring and monitoring well locations. NAPL was observed in five of the 27 soil borings, and sheen and/or staining were observed in 12 of the 27 soil borings.

As shown on Figure 8, no NAPLs or staining were observed along West 42nd Street except at boring SB-48, north of the former seepage area along the northern sheeting installed during the remediation at River Place II. However, no visible impacts were observed at the two borings directly north of SB-48 on the northern side of West 42nd Street (SB-50 and SB-51). Therefore, the northern extent of NAPL has been delineated.

No NAPLs, staining, or sheens were observed along West 41st Street adjacent to River Place II. Staining and sheens were observed at soil borings SB-20 to SB-22 and SB-30, and trace NAPL blebs were observed in SB-20 along River Place I. No NAPL was observed in the soil boring for MW-11 installed south of SB-20. Therefore, the southern extent of NAPL has been delineated. Further, visual/olfactory (beyond slight odors) observations of potential contamination are at and generally deeper than 8 feet.

As depicted on Figure 8, tar-like NAPLs were observed at soil borings SB-24 and SB-23 but not at SB-31 to the north where no NAPLs, staining, nor sheens were observed. South of SB-23, staining and sheens were observed at soil borings SB-30 and SB-49, and NAPL blebs were observed in SB-46. Therefore, the west- southwestern NAPL extent has been delineated. Further, visual/olfactory (beyond slight odors) observations of potential contamination are at and generally deeper than 10 feet.

2.5.2 Soil

Soil analytical results from 51 samples from the RI and from previous investigations are presented in Tables 2, 3 and 4. As shown in these tables, analytical soil results were compared to NYSDEC screening levels including Unrestricted Residential Use, Restricted Commercial Use, and Restricted Residential Soil Cleanup Objectives ([SCOs] NYSDEC 2006). The unrestricted SCOs are initially used to screen the data followed by the restricted SCOs. The restricted SCOs are consistent with the restricted residential use of the River Place I and II properties. Thus, the restricted SCOs are used to evaluate the horizontal and vertical extent of site-related constituents. The subsequent sections describe the results for the volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and cyanide in soil. Figure 9 shows the distribution of total benzene, toluene, ethylbenzene, and xylenes (total BTEX) and total polycyclic aromatic hydrocarbons (PAHs) for the RI soil locations.

The primary MGP-related constituents in the soil were BTEX and PAHs. Other constituents were detected that may be site-related, but these compounds are co-located with the BTEX and PAHs at a lower frequency of detection. For example, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were co-located with relatively higher concentrations of BTEX, and dibenzofuran and 4-methylphenol were co-located with PAHs. Therefore, the delineation of MGP-related constituents was based on BTEX and PAHs.

Volatile Organic Compounds

As shown in Table 2, 51 RI soil samples were analyzed for Target Compound List (TCL) VOCs. The following VOCs were detected at concentrations higher than the Unrestricted Residential Use SCOs:

- acetone
- 2-butanone
- benzene
- dichloromethane
- ethylbenzene
- n-propylbenzene
- toluene
- 1,3,5-trimethylbenzene
- 1,2,4-trimethylbenzene
- xylenes

Acetone, 2-butanone, n- propylbenzene, and dichloromethane were not detected at concentrations above the Restricted Commercial Use and Restricted Residential Use SCOs (collectively referred to as the restricted SCOs).

BTEX compounds, and two trimethybenzenes, were detected at concentrations above their respective restricted SCOs in one or more samples. 1,2,4-Trimethylbenzene and 1,3,5-trimethylbenzene were only detected at concentrations above their respected restricted SCOs in four and three samples, respectively, from borings SB-23, SB-24, and SB-38 in the same intervals with relatively higher BTEX concentrations.

BTEX compounds were detected in 42 of the 51 RI samples at concentrations above unrestricted SCOs and in 9 of 51 RI samples (8 locations) at concentrations above restricted SCOs. BTEX compounds were detected at concentrations above restricted SCOs generally where NAPLs were observed at SB-23, SB-24, SB-46, and SB-48; and where heavy staining and/or sheens were observed at SB-30, SB-38, and SB-39. In these borings, the vertical extent of BTEX was delineated at SB-23, SB-48, SB-30, SB-38, and SB-39. Given the correlation of BTEX concentrations with the presence of NAPLs and staining, the vertical extent would be expected to be similar. The overall horizontal extent of BTEX in subsurface soils is

defined by absence of these compounds or, if present at concentrations below the Restricted Commercial Use and Restricted Residential Use SCOs, at the following locations:

- Along West 42nd Street (North of River Places I and II) – SB-31, SB-25, SB-50 and SB-51
- At and West of NYS Route 9A (West of River Places I and II) – SB-47, SB-32, SB-33, SB-34, and SB-49
- Along West 41st Street (South of River Places I and II) – SB-22, SB-21 SB-20, SB-09, and SB-41 to SB-44

Semivolatile Organic Compounds

As shown in Table 3, 51 RI soil samples were analyzed for TCL SVOCs. The following SVOCs were detected at concentrations higher than the Unrestricted Residential Use SCOs:

- PAHs:
  - acenaphthene
  - acenaphthylene
  - anthracene
  - benzo(a)anthracene
  - benzo(b)fluoranthene
  - benzo(k)fluoranthene
  - benzo(a)pyrene
  - benzo(g,h,i)perylene
  - chrysene
  - dibenzo(a,h)anthracene
  - fluorene
  - fluoranthene
  - indeno(1,2,3-cd)pyrene
  - naphthalene
  - phenanthrene
  - pyrene
- dibenzofuran
- 2-methylphenol
- 4-methyl phenol
- phenol

2-Methylphenol and phenol were not detected at concentrations above the restricted SCOs. PAHs, dibenzofuran, and 4-methyl phenol were detected at concentrations above their respective restricted SCOs. 4-Methylphenol was only detected above its restricted SCOs in three samples, in borings SB-38 and SB-39, in the same intervals with relatively higher PAH concentrations.

PAH compound concentrations above restricted SCOs were observed at most sampling locations. At least one PAH compound and/or dibenzofuran were detected in 31 of the 51 RI samples (20 locations) at concentrations above unrestricted SCOs and in 31 of 51 samples (20 locations) at concentrations above restricted SCOs. PAHs were not detected at concentrations above unrestricted SCOs in soil samples from SB-09, SB-41, SB-42, SB-44, SB-50, and SB-51. The highest concentrations of PAHs (Total PAH [for purposes of the RI the sum of the 17 TCL PAHs] > 1,000 milligrams per kilogram [mg/kg]) were generally observed where the highest BTEX concentrations (above SCOs) were observed; where NAPLs

were observed at SB-23, SB-24, and SB-46; and where heavy staining and/or sheens were observed at SB-30, SB-38, SB-39, and SB-26. In addition, relatively higher PAH concentrations (Total PAHs > 1,000 mg/kg) were also observed at SB-34 and SB-49, where BTEX concentrations were not elevated, and only sheens and staining were observed. In these locations of relatively elevated PAHs, the vertical extent was defined at SB-34, SB-38, SB-30, and SB-49. The vertical extent of PAHs was delineated except at borings SB-26 to the north and SB-23, SB-24, SB-39, SB-40, and SB-46 to the west, where NAPLs and staining were observed. The overall extent of PAHs and dibenzofuran in subsurface soils is defined by absence of these compounds and if present concentrations below the Restricted Commercial Use and Restricted Residential Use SCOs at the following locations:

- Along West 42nd Street (North of River Places I and II) – SB-50 and SB-51
- Along West 41st Street (South of River Places I and II) – SB-09, SB-41 SB-43, and SB-44

The horizontal extent of PAHs along NYS Route 9A has not been delineated with respect to the restricted SCOs in soil. However, PAHs were only detected in low concentrations in the sediments, which would not exceed the restricted SCOs.

Metals and Cyanide

As shown in Table 4, at least one metal was detected at concentrations above unrestricted SCOs in 28 of the 51 RI samples including arsenic, cadmium, copper, lead, mercury, nickel, selenium, silver, and zinc. Cyanide was not detected at concentrations above SCOs. Only sporadic detections of arsenic (three samples), cadmium (two samples), lead (three samples), and mercury (eight samples) were observed at concentrations greater than their respective restricted SCOs. Although the aforementioned metals were observed in concentrations exceeding their respective SCOs, these metals are not attributed to the site due to their limited detection, and they were generally detected at concentrations within, or near background ranges for eastern USA or New York State soils (NYSDEC).

2.5.3 Groundwater

Well construction details are provided in Table 5. Groundwater analytical results for the RI are presented in Tables 6, 7, and 8. Nine groundwater samples were reviewed for the RI, from sample locations outside of the River Place I and II BCA areas. Results used for the RI evaluation are from groundwater samples collected by Arcadis in 2010 and 2011 and by D&B in 2005. The subsequent sections describe the groundwater results for VOCs, SVOCs, metals and cyanide for the RI. Figure 10 shows the distribution of total BTEX and total PAHs in groundwater for the RI locations.

The primary MGP-related constituents detected in the groundwater were BTEX and PAHs. Other constituents were detected that may be site-related, but these compounds are co-located with the BTEX and PAHs at a lower frequency of detection. For example, cumene was co-located with relatively higher concentrations of BTEX, and 2,4-dimethyl phenol was co-located with PAHs. Therefore, the delineation of MGP-related constituents will be based on BTEX and PAHs.

Volatile Organic Compounds

As shown in Table 6, nine RI groundwater samples were analyzed for TCL VOCs. The following VOCs were detected at concentrations higher than the NYSDEC groundwater criteria class GA (GA criteria, NYSDEC 1998):

- benzene
- cumene
- ethylbenzene
- tert butylbenzene
- toluene
- n- propylbenzene
- 1,2,4 trimethylbenzene
- 1,3,5 trimethylbenzene
- xylene

Cumene was only detected at concentrations above its GA criteria in two samples (from monitoring wells MW-07 and MW-09 in 2005). Cumene was not analyzed for in the 2011 samples from these two monitoring wells. Tertbutylbenzene and n-propylbenzene were only detected in the MW-09 groundwater samples from 2005. The two trimethylbenzenes were detected in the MW-07, MW-09, and MW-10 groundwater samples from 2005. These constituents were not analyzed for in 2011.

VOCs were not detected at concentrations above GA criteria at MW-08 and MW-11, which are located to the north of River Place I and south of River Place II, respectively. The highest BTEX concentrations were detected at the three locations closest to the river west of River Place I (MW-07, MW-09, and MW-10).

The overall horizontal extent of BTEX in groundwater is defined by absence of these compounds or, if present, at concentrations below the GA class groundwater criteria. The extent of BTEX is bounded to the south by monitoring well MW-11, to the north by monitoring well MW-08, and to the west by surface water samples in the Hudson River, where no BTEX was observed.

Semivolatile Organic Compounds

As shown in Table 7, nine RI groundwater samples were analyzed for TCL SVOCs. The following SVOCs were detected at concentrations higher than GA criteria:

- PAHs:
  - acenaphthene
  - benzo(a)anthracene
  - benzo(a)pyrene
  - benzo(b)fluoranthene
  - chrysene
  - naphthalene
  - phenanthrene
- 2-methyl phenol
- 4-methyl phenol (p-cresol)
- 2,4-dimethyl phenol
- phenol

2-Methyl phenol was only detected at concentrations above its respective GA criteria in one sample from MW-07 in 2005. Phenol was detected at concentrations above its respective GA criteria in one sample from MW-09 in 2005. 4-Methyl phenol was detected at concentrations above its respective GA criteria in two samples MW-07 and MW-09 in 2005. 2,4-Dimethyl phenol was detected at concentrations above its respective GA criteria in four samples MW-07 and MW-10 in 2005 and MW-09 in 2005 and 2011. PAH compounds were detected in six of the nine RI groundwater samples at concentrations above GA criteria. PAHs were not detected at concentrations above GA criteria in groundwater samples from MW-08 and MW-11. The highest concentrations of PAHs (Total PAH [for purposes of the RI the sum of the 17 TCL PAHs] > 4 micrograms per liter [µg/L]) were generally observed where the highest BTEX concentrations (above GA criteria) were observed (MW-07, MW-09, and MW-10).

The overall horizontal extent of PAHs in groundwater is defined by absence of these compounds or, if present, at concentrations below the GA criteria. The extent of PAHs is bounded to the north by MW-08, to the south by monitoring well MW-11, and to the west by surface water samples in the Hudson River, where no PAHs were observed.

Metals and Cyanide

As shown in Table 8, there were sporadic detections of a few total metals above GA criteria including antimony (1 sample), lead (2 samples), manganese (2 samples), and selenium (1 sample). In addition, iron, magnesium, and sodium were detected above the GA criteria. Antimony was detected above criteria in all of the filtered ground water samples obtained in 2005.

Cyanide was detected above GA criteria in one sample collected at MW-08 in 2005. Due to the limited detection of metals and cyanide; metals and cyanide are not attributed to the site.

2.5.4 Sediment

Sediment analytical results from eleven samples from the RI are presented in Tables 9, 10, and 11. As shown in these tables sediment analytical results were compared to NYSDEC sediment screening values (NYSDEC 1999). The subsequent sections describe the results for the VOCs, SVOCs, metals, cyanide, and ancillary parameters in sediment for the RI.

Figure 11 shows the distribution of total BTEX and total PAHs for the sediment RI locations.

No NAPL, staining, or sheens were observed in any of the seven sediment cores. Accordingly, minimal MGP-related impacts were observed in sediment. The primary MGP-related constituents in the sediment were PAHs. BTEX compounds were detected in two samples. Other constituents were detected that may be site-related but these compounds were co-located with BTEX and PAHs. For example, carbazole, dibenzofuran, and phenol were also detected in the one sample with detectable BTEX concentrations and relatively higher PAH concentrations. Therefore, the delineation of MGP-related constituents will be based on BTEX and PAHs.

Volatile Organic Compounds

Eleven sediment samples were analyzed for TCL VOCs (Table 9). The following VOCs were infrequently detected at low concentrations (<0.1 mg/kg):

- 2-butanone (one sample)
- acetone (five samples)
- benzene (one sample)
- carbon disulfide (three samples)
- ethylbenzene (one sample)
- xylenes (two samples)

BTEX compounds were only detected in one of the eleven sediment samples, SD-02 (6 to 9.5 feet below sediment surface [bss]), which is located along the shoreline near probe location PSL-11, where a slight sheen was observed during probing. The total BTEX concentration detected in the sediment sample from SD-02 was 0.029 mg/kg. Total xylenes were also detected at a low concentration (0.0056J) at SD-03 (0-0.5 feet bss). Although there are no effects range-low (ER-L) and effects range-median (ER-M) screening values for BTEX compounds, there are carbon-normalized screening levels related to benthic aquatic life (NYSDEC 1999); the BTEX compound concentrations did not exceed these screening levels. (Note: The sediment screening values are relevant to the biologically active zone, generally the upper 6 inches of sediment, and not necessarily relevant to deeper sediments. The screening levels are used herein to assess relative levels of contamination).

There are no ER-L and ER-M screening values or other NYSDEC screening levels for VOCs. Given the low detections, the infrequent observations, and the lack of upland detections at concentrations above SCOs, the other VOCs are not considered site-related.

Semivolatile Organic Compounds

Eleven sediment samples were analyzed for TCL SVOCs (Table 10). The following SVOCs were detected in the sediments (generally at low concentrations [<1 mg/kg]):

- bis (2-ethylhexyl) phthalate
- butylbenzyl phthalate
- carbazole
- p-chloroaniline
- 1,4 dichlorobenzene
- di-n-butyl phthalate
- 4 methylphenyl
- dibenzofuran
- phenol
- PAHs:
  - acenaphthene
  - acenaphthylene
  - anthracene
  - benzo(a)anthracene
  - benzo(a)pyrene
  - benzo(b)fluoranthene
  - benzo(g,h,i)perylene
  - benzo(k)fluoranthene
  - chrysene
  - dibenzo(a,h)anthracene
  - fluoranthene
  - fluorene
  - indeno(1,2,3-cd)pyrene
  - 2-methylnaphthalene
  - naphthalene
  - phenanthrene
  - pyrene

When detected, most individual PAH concentrations are higher than their respective individual ER-L but lower than their ER-Ms except at sample SD-2 (6-9.5 feet bss), and dibenzo (a,h) anthracene in 10 of 12 sediment samples. Total PAH concentrations in surface sediments (0-0.5 feet bss) ranged from 5.65 to 11.3 mg/kg in eight surface samples which are slightly higher than the ER-L of 4 mg/kg, well below the ER-M of 44.8 mg/kg, and within the PAH concentrations observed in urban sections of the Hudson River. For example, the Hudson River Foundation documented total PAHs (14 PAHs) levels ranging from 4.1 to 17.4 mg/kg at River Mile 3 (Keane and Bopp 1999) and the United States Geological Survey (USGS) documented total PAHs (16 PAHs) concentrations ranging from ND to 11.8 mg/kg in the Hudson River and ND to 54 mg/kg in the Hudson River Basin (USGS 1998). Subsurface Total PAH concentrations ranged from 6.75 to 8.19 mg/kg in three of four subsurface sediment samples which are slightly higher than the ER-L of 4 mg/kg, well below the ER-M of 44.8 mg/kg, and within Hudson River PAH concentrations. In one of the subsurface sediment samples (SD-02 [6-9.5 feet bss]) the Total PAH concentration was 172.8 mg/kg, which is above the ER-M. SD-02 is located along the shoreline and near probe location PSL-11, where a slight sheen was observed. The extent of MGP-related constituents is limited to SD-02 at depth (i.e., below 6 feet).

There are no ER-L and ER-M screening values or other NYSDEC screening levels for other SVOCs. Phthalates, chlorobenzenes, and chloroanilines are not typically related to MGP sites. Given these constituents were not detected in the upland soils at concentrations above SCOs, phthalates, chlorobenzene, and chloroaniline are not considered site-related. Carbazole, dibenzofuran, and the phenols were only detected in one sample at low concentrations in the one sample with relatively higher PAH concentrations (SD-2 [6 to 9.5 feet bss]) and may be site-related.

Metals and Cyanide

The sediment samples were analyzed for metals and all samples had at least one metal concentration detected that exceeded its respective lowest effect level (LEL) (Table 11). Cyanide was not detected in the sediment samples. Metals detected at concentrations above their respective LELs include: arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc. Only cadmium and manganese concentrations did not exceed the severe effect levels (SELs). Although the aforementioned metals were observed in concentrations exceeding their respective sediment screening levels, these metals are not attributed to the site because they were not detected in the upland soils at concentrations above SCOs, and they were generally detected at concentrations within Hudson River Basin concentrations (USGS 1998).

2.5.5 Surface Water

Surface water analytical results from five RI samples are presented in Table 12 through 14 for VOCs, SVOCs and metals and cyanide, respectively. Figure 7 shows the surface water sampling locations. No VOCs, SVOCs, metals, or cyanide were detected at concentrations above NYSDEC surface water standards except for iron, magnesium, sodium, and thallium. These metals are not considered site-related.

3 INSTITUTIONAL CONTROL PLAN

3.1 General

Since remaining contamination exists from former MGP operations beneath areas at and adjacent to the site, Institutional Controls (ICs) measures are required to protect human health and the environment. This IC Plan describes the procedures for the implementation and management of all IC measures at the SMP area. The IC Plan is one component of the SMP and is subject to revision by the NYSDEC.

This IC measures plan provides:

- A description of all IC measures to be implemented in the SMP area (Figure 2);
- The basic implementation and intended role of each IC measures;
- A description of the key components of the ICs set forth in the planned Environmental Notices;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC measures, such as the implementation of the Excavation Work Plan (EWP) as provided in Appendix C for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and

Any other provisions necessary to identify or establish methods for implementing the IC measures required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of IC measures for the SMP area (Figure 2) will be implemented to: (1) prevent future exposure to remaining contamination; and, (2) limit the use and development of the site to commercial uses only. Adherence to these ICs on the site is required by Environmental Notices and will be implemented under this SMP. ICs identified in the Environmental Notices may not be discontinued without an amendment to or extinguishment of the Environmental Notices. The IC boundaries are shown on Figure 2. These IC measures are in accordance with the Environmental Notice form referenced in DER-33:

- The remedy was selected for commercial use and any change must be approved by NYSDEC;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the New York State Department of Health (NYSDOH) or the New York County (Manhattan) Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- There shall be no disturbance or excavation of the property that results in threat of harm or damage as a result of exposure unless approved by NYSDEC. All future activities that will disturb remaining MGP-contaminated material must be conducted in accordance with this SMP;

3.3 Site Wide Inspection

SMP area inspections will be performed at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Inspections will also be performed after all severe weather conditions that may affect the remaining contamination at the site. A comprehensive SMP area inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report.

During an inspection, an inspection form will be completed as provided in Appendix F– Site Management Forms. The inspections will determine and document the following:

- Compliance with all IC measures, including land usage;
- General conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Notices;
- If site records are complete and up to date.

Reporting requirements are outlined in Section 5.0 of this plan.

Inspections will also be performed in the event of an emergency. An inspection of the SMP area will be conducted within 5 days of the event, or as appropriate considering safety conditions, to verify the effectiveness of the IC measures implemented at the SMP area by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the inspection that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4 PERIODIC ASSESSMENTS/EVALUATIONS

4.1 Soil Vapor Intrusion Evaluation

A soil vapor intrusion (SVI) evaluation must be performed upon a change in use of the property that will result in occupancy of a previously unoccupied building or initial occupancy of a new building. The breadth of this evaluation will be determined based upon discussion with the NYSDEC Project manager and NYSDOH. Based upon these discussion and agency requirements, a work plan may need to be developed that requires that sampling be performed. At a minimum, an SVI sampling work plan would include the following information:

- Figure showing the soil vapor intrusion sample locations;
- Discussion of the depths of the soil vapor samples;
- Sampling methodologies, procedures, and protocols;
- Required analytical parameters with minimum reporting limits to be achieved by the NYS Environmental Laboratory Approval Program (ELAP)-certified laboratory; and
- Reporting requirements.

Upon completion of the evaluation, if an action is required, any actions taken or to be taken must be reflected in an updated SMP.

5 REPORTING REQUIREMENTS

5.1 Site Management Reports

All site management inspection events will be recorded on the appropriate site management forms provided in Appendix F. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table A3 and summarized in the Periodic Review Report.

Table A3: Schedule of Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Annual

*The frequency of events will be conducted as specified until otherwise modified by the NYSDEC.

All inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Non-routine event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and

5.2 Periodic Review Report

The Periodic Review Report (PRR) will consist only of the certification as specified in Section 5.2.1 except in the event where there have been changes to the site or data gathered during the certifying period. Given such an event, the submittal of a comprehensive PRR will be necessary, as specified below.

A PRR will be submitted to the Department beginning 30 days after the initial certifying period. This initial certifying period commences upon issuance of the No Further Action Letter. After submittal of the initial

PRR, the next PRR shall be submitted annually to the Department or at another frequency as may be subsequently required by the Department. A single PRR will be prepared that addresses the SMP area. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the PRR. The report will include:

- Identification, assessment and certification of all IC measures required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the SMP area during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any data and/or information generated during the reporting period, with comments and conclusions, if any
- A SMP area evaluation, which includes the following:
    - The compliance of the remedy with the requirements of the site-specific RAWP, Record of Decision (ROD) or Decision Document;
    - Any new conclusions or observations regarding site contamination based on inspections or data generated;
    - Recommendations regarding any necessary changes to the remedy; and
    - The overall performance and effectiveness of the remedy.

5.2.1 Certification of Institutional Controls

Within 30 days after the end of each certifying period, as determined by the NYSDEC, the following certification will be provided to the Department:

"*For each institutional control identified for the site, I certify that all of the following statements are true:*

- *The institutional control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the Environmental Notice.*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name, title, Professional License Number (if applicable)], of [business name and address], am certifying as [Owner or Owner's Designated Site Representative] [and I have been authorized and designated by all site owners to sign this certification] for the site."

The Certification Statement will be qualified to the extent that Con Edison, or Con Edison's representatives, are only present at the site on an intermittent basis.

The signed certification will be included in the PRR, if such report is required for the period. Otherwise, the Certification will be submitted as a stand-alone document.

The PRR/Certification will be submitted, in electronic format, to the NYSDEC Central Office, the NYSDEC Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report/Certification may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

5.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC. Upon completion of the Corrective Measure, a signed certification form must be submitted to the Department.

6 REFERENCES

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Keane, Dennis P. and Richard F. Bopp. 1999. Chronologies of PAH Levels in Hudson Sediments. Hudson River Foundation Grant No. 001/95A. June 14, 1999.

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TABLES

Table 1
Sample Summary

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID	Sample ID	Date Collected	Coordinates X	Coordinates Y	Ground Elevation [1] (feet)	Sample Depth (feet)	Sampled by?
Sediment Samples							
SD-01	SD-01 (0-0.5')	02/27/08	983707.4000	216995.1000	0.10	0-0.5	ARCADIS
SD-02	SD-02 (0-0.5')	02/29/08	983688.7000	216910.9000	-1.90	0-0.5	ARCADIS
SD-02	SD-02 (6-9.5')	02/29/08	983688.7000	216910.9000	-1.90	6-9.5	ARCADIS
SD-02A	SD-02A (0-0.5')	02/29/08	983668.7000	216926.8000	-1.90	0-0.5	ARCADIS
SD-02A	SD-02A (5-6')	02/29/08	983668.7000	216926.8000	-1.90	5-6	ARCADIS
SD-02A	SD-02A (10-11')	02/29/08	983668.7000	216926.8000	-1.90	10-11	ARCADIS
SD-03	SD-03 (0-0.5')	03/03/08	983647.0000	216907.5000	-1.90	0-0.5	ARCADIS
SD-03	SD-03 (8-12')	03/03/08	983647.0000	216907.5000	-1.90	8-12	ARCADIS
SD-04	SD-04 (0-0.5')	02/28/08	983422.9000	217005.6000	-1.50	0-0.5	ARCADIS
SD-05	SD-05 (0-0.5')	02/28/08	983329.6000	217173.9000	-2.20	0-0.5	ARCADIS
SD-06	SD-06 (0-0.5')	02/28/08	983199.2000	217127.2000	-2.20	0-0.5	ARCADIS
SD-06-DUP	SD-DUP-01	02/28/08	983199.2000	217127.2000	-2.20	0-0.5	ARCADIS
Surface-Water Samples							
SW-01	SW-01	03/04/08	983699.6000	217005.3000	0.60	NA	ARCADIS
SW-02	SW-02	03/04/08	983691.2000	216952.5000	0.30	NA	ARCADIS
SW-03	SW-03	03/04/08	983658.5000	216934.1000	0.50	NA	ARCADIS
SW-04	SW-04	03/04/08	983427.6000	217049.0000	-1.10	NA	ARCADIS
SW-05	SW-05	03/04/08	983198.5000	217147.0000	-0.90	NA	ARCADIS
Soil Samples							
SB-09	SB-09 (11-15)	9/5/2003	984368.8149	216376.6343	9.55	11-15	D&B
SB-09	SB-09 (31-33.5)	9/5/2003	984368.8149	216376.6343	9.55	31-33.5	D&B
SB-20	SB-20 (12-16)	10/2/2003	984278.3228	216417.2634	7.88	12-16	D&B
SB-20	SB-20 (16-20)	10/2/2003	984278.3228	216417.2634	7.88	16-20	D&B
SB-21	SB-21 (12-16)	9/30/2003	984203.5283	216464.8179	7.14	12-16	D&B
SB-21	SB-21 (36-38.9)	9/30/2003	984203.5283	216464.8179	7.14	36-38.9	D&B
SB-22	SB-22 (12-16)	9/29/2003	984022.0823	216583.0117	4.67	12-16	D&B
SB-22	SB-22 (36-44)	9/29/2003	984022.0823	216583.0117	4.67	36-44	D&B
SB-23	SB-23 (20-24)	9/30/2003	983871.1082	216700.7438	3.04	20-24	D&B
SB-23	SB-23 (52-54.5)	9/30/2003	983871.1082	216700.7438	3.04	52-54.5	D&B
SB-24	SB-24 (30-32)	10/3/2003	983931.3598	216782.8758	3.04	30-32	D&B
SB-24	SB-24 (34-36)	10/3/2003	983931.3598	216782.8758	3.04	34-36	D&B
SB-24	SB-24 (36-38)	10/2/2003	983931.3598	216782.8758	3.04	36-38	D&B
SB-25	SB-25 (12-16)	10/1/2003	984191.9859	216683.6611	6.18	12-16	D&B
SB-25	SB-25 (24-28)	10/1/2003	984191.9859	216683.6611	6.18	24-28	D&B
SB-26	SB-26 (9-13)	9/29/03	984334.6495	216614.8687	7.09	9-13	D&B
SB-26	SB-26 (16-19)	10/1/03	984334.6495	216614.8687	7.09	16-19	D&B
SB-30	SB-30 (10-14)	2/20/2005	983844.7916	216653.1893	2.03	10-14	D&B
SB-30	SB-30 (34-36)	2/20/2005	983844.7916	216653.1893	2.03	34-36	D&B
SB-31	SB-31 (7-11)	3/6/2005	983999.4593	216818.4760	2.20	7-11	D&B
SB-32	SB-32 (9-11)	3/2/2005	983753.8378	216896.5023	2.23	9-11	D&B
SB-32	SB-32 (35-39)	3/2/2005	983753.8378	216896.5023	2.23	35-39	D&B
SB-33	SB-33 (5-7)	2/27/2005	983733.5232	216855.8732	2.29	5-7	D&B
SB-34	SB-34 (13-17)	2/23/2005	983722.4425	216836.0204	2.23	13-17	D&B
SB-34	SB-34 (37-39)	2/24/2005	983722.4425	216836.0204	2.23	37-39	D&B
SB-38	SB-38 (25-27)	2/22/2005	983697.5110	216792.6211	2.10	25-27	D&B
SB-38	SB-38 (43-45)	2/22/2005	983697.5110	216792.6211	2.10	43-45	D&B

Table 1
Sample Summary

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID	Sample ID	Date Collected	Coordinates		Ground Elevation [1] (feet)	Sample Depth (feet)	Sampled by?
			X	Y			
Soil Samples (cont'd)							
SB-39	SB-39 (45-47)	3/10/2005	983650.4182	216722.4435	1.62	45-47	D&B
SB-39	SB-39 (65-67)	3/12/2005	983650.4182	216722.4435	1.62	65-67	D&B
SB-40	SB-40 (28-30)	4/5/2005	983630.5653	216670.2720	1.53	28-30	D&B
SB-40	SB-40 (46-48)	4/5/2005	983630.5653	216670.2720	1.53	46-48	D&B
SB-41	SB-41(13-14)	12/06/06	984386.7067	216354.2468	NM	13-14	ARCADIS
SB-41	SB-41(24-25)	12/06/06	984386.7067	216354.2468	NM	24-25	ARCADIS
SB-42	SB-42(13-14)	12/06/06	984404.8872	216344.8037	NM	13-14	ARCADIS
SB-42	SB-42(24-25)	12/06/06	984404.8872	216344.8037	NM	24-25	ARCADIS
SB-42	SB-42(27-28)	12/06/06	984404.8872	216344.8037	NM	27-28	ARCADIS
SB-43	SB-43(16-17)	12/05/06	984431.0870	216329.2169	NM	16-17	ARCADIS
SB-43	SB-43(28-29)	12/05/06	984431.0870	216329.2169	NM	28-29	ARCADIS
SB-44	SB-44(14-15)	12/05/06	984455.6590	216315.3269	NM	14-15	ARCADIS
SB-44	SB-44(19-20)	12/05/06	984455.6590	216315.3269	NM	19-20	ARCADIS
SB-44	SB-44(21-22)	12/05/06	984455.6590	216315.3269	NM	21-22	ARCADIS
SB-44-DUP	DUP120506	12/05/06	984455.6590	216315.3269	NM	21-22	ARCADIS
SB-45	SB-45(3-10)	12/05/06	984425.0988	216332.8379	NM	3-10	ARCADIS
SB-46	SB-46(25-28)	06/12/08	983825.8807	216576.1800	6.94	25-28	ARCADIS
SB-46	SB-46(28-30)	06/12/08	983825.8807	216576.1800	6.94	28-30	ARCADIS
SB-47	SB-47 (5-7)	03/26/08	983775.0346	216945.0555	6.55	5-7	ARCADIS
SB-47	SB-47 (23)	03/26/08	983775.0346	216945.0555	6.55	23	ARCADIS
SB-48	SB-48 (12)	07/24/10	984399.3286	216599.0899	11.79	12	ARCADIS
SB-48	SB-48 (18.5-19)	07/24/10	984399.3286	216599.0899	11.79	18.5-19	ARCADIS
SB-48-DUP	DUP-SB01	07/24/10	984399.3286	216599.0899	11.79	18.5-19	ARCADIS
SB-49	SB-49 (9.5)	07/25/10	983736.3425	216427.3836	5.83	9.5	ARCADIS
SB-49	SB-49 (12)	07/25/10	983736.3425	216427.3836	5.83	12	ARCADIS
SB-50	SB-50 (9)	02/26/11	984383.1921	216693.9377	11.42	9	ARCADIS
SB-51	SB-51 (14.5)	02/27/11	984444.0885	216659.9887	11.73	14.5	ARCADIS
SB-51-DUP	DUP022711	02/27/11	984444.0885	216659.9887	11.73	14.5	ARCADIS
Groundwater Samples							
MW-07	MW-07	3/7/2011	983848.9468	216648.1107	2.03	NA	ARCADIS
MW-08	MW-08	3/5/2011	983996.2274	216821.2461	2.15	NA	ARCADIS
MW-09	MW-09	3/1/2011	983720.1341	216832.7885	2.20	NA	ARCADIS
MW-10	MW-10	3/1/2011	983695.6642	216787.5424	2.08	NA	ARCADIS
MW-11	MW-11	7/29/2010	984317.9365	216339.5511	13.28	NA	ARCADIS

Notes:

1. 2003 and 2005 sample elevations in NGVD 1929; 2006, 2008, 2010 and 2011 sample elevations in NAVD 1988.
2. Elevations provided are the following:
   Sediment - elevation of the top of sediment at the core location
   Surface Water - elevation at which surface water sample was collected
   Soil - elevation of the top of ground at the boring location
   Groundwater - elevation of the top of ground at the well location
3. Elevations refer to NAVD 88 vertical datum as derived from GPS.

NA = Not applicable
NM = Not measured
D&B = Dvirka & Bartilucci Consulting Engineers

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO – Unrestricted Use (shade)	Units	SB-09 11-15 9/5/2003 SB-09	SB-09 31-33.5 9/5/2003 SB-09	SB-20 12-16 10/2/2003 SB-20	SB-20 16-20 10/2/2003 SB-20	SB-21 12-16 9/30/2003 SB-21	SB-21 36-38.9 9/30/2003 SB-21	SB-22 12-16 9/29/2003 SB-22	SB-22 36-44 9/29/2003 SB-22	SB-23 20-24 9/30/2003 SB-23	SB-23 52-54.5 9/30/2003 SB-23	SB-24 30-32 10/3/2003 SB-24	SB-24 34-36 10/3/2003 SB-24	SB-24 36-38 10/2/2003 SB-24	SB-25 12-16 10/1/2003 SB-25
Acetone (2- propanone, dimethyl ketone)	100	500	0.05	mg/kg	0.049	0.025	0.03	0.49	U	0.019	U	0.36	U	0.55	U	U	U	U
Benzene	4.8	44	0.06	mg/kg	0.002 J	0.07	U	U	U	0.004 J	2.4 J	U	***50 J***	U	***320 J***	U	***490 J***	0.61 J
Bromobenzene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromochloromethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	- -	- -	- -	mg/kg	U	U	U	U	U	0	U	U	U	U	U	U	U	U
Bromomethane/ methyl bromide	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2- butanone (methyl ethyl ketone)	100	500	0.12	mg/kg	U	U	U	0.64	U	U	U	0.49	U	0.68	U	U	U	U
n- butylbenzene	100	500	12	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
sec- butylbenzene	100	500	11	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
tert- butylbenzene	100	500	5.9	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon disulfide	- -	- -	- -	mg/kg	U	0.002 J	U	U	U	U	U	U	U	U	U	U	U	U
Carbon tetrachloride	2.4	22	0.76	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	100	500	1.1	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorodibromomethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	49	350	0.37	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloromethane (methyl chloride)	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2- chlorotoluene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4- chlorotoluene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cumene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2- dibromo- 3- chloropropane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2- dibromoethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromomethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis- 1,3- dichloro, 1- propene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2- dichlorobenzene	100	500	1.1	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3- dichlorobenzene	49	280	2.4	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,4- dichlorobenzene	13	130	1.8	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1- dichloroethane	26	240	0.27	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2- dichloroethane	3.1	30	0.02	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis- 1,2- dichloroethene	100	500	0.25	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans- 1,2- dichloroethene	100	500	0.19	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1- dichloroethylene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dichloromethane	100	500	0.05	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2- dichloropropane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,3- dichloropropane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO – Unrestricted Use (shade)	Units	SB-09 11-15 9/5/2003 SB-09	SB-09 31-33.5 9/5/2003 SB-09	SB-20 12-16 10/2/2003 SB-20	SB-20 16-20 10/2/2003 SB-20	SB-21 12-16 9/30/2003 SB-21	SB-21 36-38.9 9/30/2003 SB-21	SB-22 12-16 9/29/2003 SB-22	SB-22 36-44 9/29/2003 SB-22	SB-23 20-24 9/30/2003 SB-23	SB-23 52-54.5 9/30/2003 SB-23	SB-24 30-32 10/3/2003 SB-24	SB-24 34-36 10/3/2003 SB-24	SB-24 36-38 10/2/2003 SB-24	SB-25 12-16 10/1/2003 SB-25
2,2- dichloropropane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
cis- 1,3- dichloropropane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1- dichloropropene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
trans- 1,3- dichloropropene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	41	390	1	mg/kg	U	0.003 J	U	0.78	0.063	0.007	2.9 J	0.12 J	**81 J**	0.075 J	***540 J***	11 J	***790 J***	1.9 J
Ethylene dibromide	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freon 12	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2- hexanone	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Iodomethane (methyl iodide)	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Isopropylbenzene	- -	- -	- -	mg/kg	U	0.002 J	U	0.12 J	U	0.003 J	U	U	U	U	U	U	U	U
4- isopropyltoluene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4- methyl- 2- pentanone	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methyl isobutyl ketone	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	100	500	0.93	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene bromide	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	- -	- -	- -	mg/kg	0.002 J	0.002 J	0.022 B	0.095 J	U	0.002 J	U	0.081 J	U	0.069 J	160 J	U	190 JB	U
2,2- oxyblis (1-chloropropane)	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n- propylbenzene	100	500	3.9	mg/kg	U	U	U	0.083 J	U	U	U	U	U	U	U	U	U	U
Styrene	- -	- -	- -	mg/kg	U	U	U	U	U	0	U	U	U	U	U	U	U	U
Tetrachloroethylene	19	150	1.3	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1,2- tetrachloroethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2- tetrachloroethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	100	500	0.7	mg/kg	U	U	U	U	U	U	U	U	**130**	U	***750***	12 J	***1200***	U
1,2,3- trichlorobenzene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4- trichlorobenzene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1- trichloroethane (methyl chloroform)	100	500	0.68	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2- trichloroethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene (trichloroethylene)	21	200	0.47	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichlorofluoromethane (freon 11)	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,3 - trichloropropane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2,4- trimethylbenzene	52	190	3.6	mg/kg	U	U	U	0.42	U	0.005 J	4.4 J	0.084 J	**68 J**	0.062 J	***530 J***	14 J	***760 J***	1.3 J
1,3,5- trimethylbenzene	52	190	8.4	mg/kg	U	U	U	0.14 J	U	0.002 J	2.1 J	U	29 J	U	***230 J***	5.8 J	***320 J***	U
Vinyl acetate	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl chloride (chloroethene)	0.9	13	0.02	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Total xylenes	100	500	0.26	mg/kg	U	U	U	0.55	U	0.005 J	6.8	0.087 J	**221**	U	***1490***	33.6	***2180***	3.33
Total BTEX	- -	- -	- -	mg/kg	0.002	0.073	ND	1.330	0.063	0.016	12.100	0.207	482.000	0.075	3100.000	56.600	4660.000	5.840
Total VOCs	- -	- -	- -	mg/kg	0.051	0.102	0.03	3.223	0.063	0.045	18.6	1.141	579	1.367	3860	76.4	5740	7.14

See notes on page 9.

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO – Unrestricted Use (shade)	Units	SB-25 24-28 10/1/2003 SB-25	SB-26 9-13 9/29/2003 SB-26	SB-26 16-19 10/1/2003 SB-26	SB-30 10 - 14 02/20/05 SB-30	SB-30 34 - 36 02/20/05 SB-30	SB-31 7 - 11 03/06/05 SB-31	SB-32 9 - 11 03/02/05 SB-32	SB-32 9 - 11 03/02/05 SB-32 DL	SB-32 35 - 39 03/02/05 SB-32	SB-33 5 - 7 02/27/05 SB-33	SB-34 13 - 17 02/23/05 SB-34	SB-34 37 - 39 02/24/05 SB-34	SB-38 25 - 27 02/22/05 SB-38
Acetone (2- propanone, dimethyl ketone)	100	500	0.05	mg/kg	U	U	U	7.6 U	0.068	0.009	0.027	0.006 U	0.015	0.013	0.06	0.023	8 U
Benzene	4.8	44	0.06	mg/kg	U	U	1.5 J	**8.1**	0.039 U	0.006 U	0.003 J	0.003 J	0.008 U	0.008 U	0.012 J	0.003 J	***120***
Bromobenzene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Bromochloromethane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Bromodichloromethane	- -	- -	- -	mg/kg	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Bromomethane/ methyl bromide	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
2- butanone (methyl ethyl ketone)	100	500	0.12	mg/kg	0.78 J	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
n- butylbenzene	100	500	12	mg/kg	U	U	U	2.2 J	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.12	0.008 U	6.1 J
sec- butylbenzene	100	500	11	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.16	0.008 U	8 U
tert- butylbenzene	100	500	5.9	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Carbon disulfide	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.02 J	0.002 J	0.003 J	0.002 J	0.008 U	0.008 U	0.011 J	0.008 U	8 U
Carbon tetrachloride	2.4	22	0.76	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Chlorobenzene	100	500	1.1	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Chlorodibromomethane	- -	- -	- -	mg/kg	NA	NA	NA	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Chloroethane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Chloroform	49	350	0.37	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Chloromethane (methyl chloride)	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
2- chlorotoluene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
4- chlorotoluene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Cumene	- -	- -	- -	mg/kg	NA	NA	NA	5.7 J	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.2	0.008 U	3.6 J
1,2- dibromo- 3- chloropropane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Dibromochloromethane	- -	- -	- -	mg/kg	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2- dibromoethane	- -	- -	- -	mg/kg	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromomethane	- -	- -	- -	mg/kg	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis- 1,3- dichloro, 1- propene	- -	- -	- -	mg/kg	NA	NA	NA	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,2- dichlorobenzene	100	500	1.1	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,3- dichlorobenzene	49	280	2.4	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,4- dichlorobenzene	13	130	1.8	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Dichlorobromomethane	- -	- -	- -	mg/kg	NA	NA	NA	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Dichlorodifluoromethane	- -	- -	- -	mg/kg	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1- dichloroethane	26	240	0.27	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,2- dichloroethane	3.1	30	0.02	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
cis- 1,2- dichloroethene	100	500	0.25	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
trans- 1,2- dichloroethene	100	500	0.19	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,1- dichloroethylene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Dichloromethane	100	500	0.05	mg/kg	NA	NA	NA	7.6 U	0.039 U	0.002 JB	0.006 U	0.002 JB	0.001 J	0.003 JB	0.04 U	0.008 U	8 U
1,2- dichloropropane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,3- dichloropropane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO – Unrestricted Use (shade)	Units	SB-25 24-28 10/1/2003 SB-25	SB-26 9-13 9/29/2003 SB-26	SB-26 16-19 10/1/2003 SB-26	SB-30 10 - 14 02/20/05 SB-30	SB-30 34 - 36 02/20/05 SB-30	SB-31 7 - 11 03/06/05 SB-31	SB-32 9 - 11 03/02/05 SB-32	SB-32 9 - 11 03/02/05 SB-32 DL	SB-32 35 - 39 03/02/05 SB-32	SB-33 5 - 7 02/27/05 SB-33	SB-34 13 - 17 02/23/05 SB-34	SB-34 37 - 39 02/24/05 SB-34	SB-38 25 - 27 02/22/05 SB-38
2,2- dichloropropane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	NA	0.008 U	NA	NA	NA	NA
cis- 1,3- dichloropropane	- -	- -	- -	mg/kg	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1- dichloropropene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
trans- 1,3- dichloropropene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Ethylbenzene	41	390	1	mg/kg	1.2 J	14 J	3.8 J	18	0.039 U	0.006 U	0.002 J	0.006 U	0.008 U	0.008 U	0.054	0.003 J	**190**
Ethylene dibromide	- -	- -	- -	mg/kg	NA	NA	NA	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Freon 12	- -	- -	- -	mg/kg	NA	NA	NA	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Hexachlorobutadiene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
2- hexanone	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Iodomethane (methyl iodide)	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Isopropylbenzene	- -	- -	- -	mg/kg	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4- isopropyltoluene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	NA	0.008 U	NA	NA	NA	NA
4- methyl- 2- pentanone	- -	- -	- -	mg/kg	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl isobutyl ketone	- -	- -	- -	mg/kg	NA	NA	NA	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Methyl tert-butyl ether	100	500	0.93	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Methylene bromide	- -	- -	- -	mg/kg	NA	NA	NA	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Methylene chloride	- -	- -	- -	mg/kg	0.58 J	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2- oxyblis (1-chloropropane)	- -	- -	- -	mg/kg	NA	NA	NA	10 U	0.52 U	0.41 U	2.2 U	NA	0.5 U	0.4 U	5.3 U	0.52 U	54 U
n- propylbenzene	100	500	3.9	mg/kg	U	U	U	3.4 J	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.16	0.008 U	8.7
Styrene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Tetrachloroethylene	19	150	1.3	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,1,1,2- tetrachloroethane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,1,2,2- tetrachloroethane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Toluene	100	500	0.7	mg/kg	U	U	5.4 J	14	0.039 U	0.006 U	0.002 J	0.006 U	0.008 U	0.008 U	0.012 J	0.008 U	**220**
1,2,3- trichlorobenzene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,2,4- trichlorobenzene	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,1,1- trichloroethane (methyl chloroform)	100	500	0.68	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,1,2- trichloroethane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Trichloroethene (trichloroethylene)	21	200	0.47	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Trichlorofluoromethane (freon 11)	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,2,3 - trichloropropane	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
1,2,4- trimethylbenzene	52	190	3.6	mg/kg	0.88 J	11 J	5.6 J	46	0.031 J	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	**120**
1,3,5- trimethylbenzene	52	190	8.4	mg/kg	U	U	U	21	0.014 J	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	**56**
Vinyl acetate	- -	- -	- -	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Vinyl chloride (chloroethene)	0.9	13	0.02	mg/kg	U	U	U	7.6 U	0.039 U	0.006 U	0.006 U	0.006 U	0.008 U	0.008 U	0.04 U	0.008 U	8 U
Total xylenes	100	500	0.26	mg/kg	2.02 J	37	15.2	75	0.041	0.006 U	0.006 J	0.006 U	0.008 U	0.008 U	0.052	0.009	**350**
Total BTEX	- -	- -	- -	mg/kg	3.220	51.000	25.900	115.100	0.041	ND	0.013	0.003	ND	ND	0.130	0.015	880.000
Total VOCs	- -	- -	- -	mg/kg	4.88	62	31.5	193.4	0.174	0.013	0.043	0.007	0.016	0.016	0.841	0.038	1074.4

See notes on page 9.

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO – Unrestricted Use (shade)	Units	SB-38 43 - 45 02/22/05 SB-38	SB-39 45 - 47 03/10/05 SB-39	SB-39 65 - 67 03/12/05 SB-39	SB-40 28 - 30 04/05/05 SB-40	SB-40 46 - 48 04/05/05 SB-40	SB-41 13 - 14 12/06/06 SB-41	SB-41 24 - 25 12/06/06 SB-41	SB-42 13 - 14 12/06/06 SB-42	SB-42 24 - 25 12/06/06 SB-42	SB-42 27 - 28 12/06/06 SB-42	SB-43 16 - 17 12/05/06 SB-43	SB-43 28 - 29 12/05/06 SB-43	SB-44 14 - 15 12/05/06 SB-44	SB-44 19 - 20 12/05/06 SB-44
Acetone (2- propanone, dimethyl ketone)	100	500	0.05	mg/kg	0.039	18 U	0.055	0.03 B	1.5 U	0.057 P	0.011 JP	0.024 P	0.082 JP	0.047 P	0.096 P	0.012 JP	0.024 JP	0.023 JP
Benzene	4.8	44	0.06	mg/kg	0.01 J	***140***	0.14	0.006 U	1.1 J	0.032	0.0013 U	0.019	0.62	0.0029 J	0.025	0.0088	0.0041 J	0.013
Bromobenzene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromochloromethane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0011 U	0.0015 U	0.0012 U	0.0076 U	0.0015 U	0.0014 U	0.0012 U	0.0012 U	0.0013 U
Bromomethane/ methyl bromide	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00095 U	0.0012 U	0.00098 U	0.0063 U	0.0013 U	0.0012 U	0.00096 U	0.00098 U	0.0011 U
2- butanone (methyl ethyl ketone)	100	500	0.12	mg/kg	0.02 U	18 U	0.034 U	0.012	1.5 U	0.013	0.0026 U	0.0054 J	0.014 U	0.0085 J	0.023	0.0032 J	0.0053 J	0.005 J
n- butylbenzene	100	500	12	mg/kg	0.02 U	18 U	0.034 U	0.002 J	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec- butylbenzene	100	500	11	mg/kg	0.02 U	18 U	0.034 U	0.002 J	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert- butylbenzene	100	500	5.9	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	- -	- -	- -	mg/kg	0.014 J	18 U	0.034 UU	0.006 U	1.5 U	0.00071 U	0.00089 U	0.0013 J	0.0053 J	0.0024 J	0.00088 U	0.002 J	0.00073 U	0.0008 U
Carbon tetrachloride	2.4	22	0.76	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0009 U	0.0011 U	0.00093 U	0.006 U	0.0012 U	0.0011 U	0.00091 U	0.00093 U	0.001 U
Chlorobenzene	100	500	1.1	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00092 U	0.0012 U	0.00094 U	0.006 U	0.0012 U	0.0011 U	0.00093 U	0.00094 U	0.001 U
Chlorodibromomethane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00048 U	0.0006 U	0.00049 U	0.0031 U	0.00063 U	0.00059 U	0.00048 U	0.00049 U	0.00053 U
Chloroethane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0022 U	0.0028 U	0.0023 U	0.014 U	0.0029 U	0.0027 U	0.0022 U	0.0023 U	0.0025 U
Chloroform	49	350	0.37	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00061 U	0.00078 U	0.00063 U	0.0041 U	0.00081 U	0.00076 U	0.00062 U	0.00063 U	0.00069 U
Chloromethane (methyl chloride)	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.001 U	0.0013 U	0.0011 U	0.0069 U	0.0014 U	0.0013 U	0.0011 U	0.0011 U	0.0012 U
2- chlorotoluene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
4- chlorotoluene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.001 J	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2- dibromo- 3- chloropropane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2- dibromoethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromomethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis- 1,3- dichloro, 1- propene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0009 U	0.0011 U	0.00093 U	0.006 U	0.0012 U	0.0011 U	0.00091 U	0.00093 U	0.001 U
1,2- dichlorobenzene	100	500	1.1	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3- dichlorobenzene	49	280	2.4	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4- dichlorobenzene	13	130	1.8	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorobromomethane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00097 U	0.0012 U	0.001 U	0.0064 U	0.0013 U	0.0012 U	0.00098 U	0.001 U	0.0011 U
Dichlorodifluoromethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1- dichloroethane	26	240	0.27	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00094 U	0.0012 U	0.00097 U	0.0062 U	0.0012 U	0.0012 U	0.00095 U	0.00097 U	0.0011 U
1,2- dichloroethane	3.1	30	0.02	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0011 U	0.0015 U	0.0012 U	0.0076 U	0.0015 U	0.0014 U	0.0012 U	0.0012 U	0.0013 U
cis- 1,2- dichloroethene	100	500	0.25	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0012 U	0.0015 U	0.0012 U	0.008 U	0.0016 U	0.0015 U	0.0012 U	0.0012 U	0.0014 U
trans- 1,2- dichloroethene	100	500	0.19	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00067 U	0.00085 U	0.00069 U	0.0044 U	0.00089 U	0.00083 U	0.00068 U	0.00069 U	0.00076 U
1,1- dichloroethylene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0013 U	0.0016 U	0.0013 U	0.0083 U	0.0017 U	0.0016 U	0.0013 U	0.0013 U	0.0014 U
Dichloromethane	100	500	0.05	mg/kg	0.02 U	18 U	0.034 U	0.006 U	0.4 J	0.014 JP	0.02 JP	0.024 JP	0.071 JP	0.023 JP	0.016 JP	0.013 JP	0.014 JP	0.015 JP
1,2- dichloropropane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0012 U	0.0016 U	0.0013 U	0.0081 U	0.0016 U	0.0015 U	0.0012 U	0.0013 U	0.0014 U
1,3- dichloropropane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO – Unrestricted Use (shade)	Units	SB-38 43 - 45 02/22/05 SB-38	SB-39 45 - 47 03/10/05 SB-39	SB-39 65 - 67 03/12/05 SB-39	SB-40 28 - 30 04/05/05 SB-40	SB-40 46 - 48 04/05/05 SB-40	SB-41 13 - 14 12/06/06 SB-41	SB-41 24 - 25 12/06/06 SB-41	SB-42 13 - 14 12/06/06 SB-42	SB-42 24 - 25 12/06/06 SB-42	SB-42 27 - 28 12/06/06 SB-42	SB-43 16 - 17 12/05/06 SB-43	SB-43 28 - 29 12/05/06 SB-43	SB-44 14 - 15 12/05/06 SB-44	SB-44 19 - 20 12/05/06 SB-44
2,2- dichloropropane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis- 1,3- dichloropropane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1- dichloropropene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans- 1,3- dichloropropene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0011 U	0.0013 U	0.0011 U	0.007 U	0.0014 U	0.0013 U	0.0011 U	0.0011 U	0.0012 U
Ethylbenzene	41	390	1	mg/kg	0.005 J	**49**	0.1	0.006 U	0.7 J	0.001 J	0.041	0.00094 U	0.76	0.065	0.0011 U	0.0085	0.00094 U	0.001 U
Ethylene dibromide	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freon 12	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2- hexanone	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0029 U	0.0037 U	0.003 U	0.019 U	0.0039 U	0.0036 U	0.003 U	0.003 U	0.0033 U
Iodomethane (methyl iodide)	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4- isopropyltoluene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4- methyl- 2- pentanone	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl isobutyl ketone	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0014 U	0.0017 U	0.0014 U	0.009 U	0.0018 U	0.0017 U	0.0014 U	0.0014 U	0.0015 U
Methyl tert-butyl ether	100	500	0.93	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene bromide	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2- oxyblis (1-chloropropane)	- -	- -	- -	mg/kg	0.51 U	2.3 U	0.44 U	0.44 U	0.51 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
n- propylbenzene	100	500	3.9	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0012 U	0.0016 U	0.0013 U	0.0081 U	0.0016 U	0.0015 U	0.0012 U	0.0013 U	0.0014 U
Tetrachloroethylene	19	150	1.3	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1,2- tetrachloroethane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2- tetrachloroethane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00081 U	0.001 U	0.00084 U	0.0054 U	0.0011 U	0.001 U	0.00082 U	0.00084 U	0.00091 U
Toluene	100	500	0.7	mg/kg	0.006 J	100	0.12	0.006 U	0.31 J	0.0024 J	0.0012 U	0.0015 J	0.019 J	0.0013 U	0.0015 J	0.0026 J	0.001 U	0.0011 U
1,2,3- trichlorobenzene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4- trichlorobenzene	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1- trichloroethane (methyl chloroform)	100	500	0.68	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00097 U	0.0012 U	0.001 U	0.0064 U	0.0013 U	0.0012 U	0.00098 U	0.001 U	0.0011 U
1,1,2- trichloroethane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.0012 U	0.0015 U	0.0012 U	0.008 U	0.0016 U	0.0015 U	0.0012 U	0.0012 U	0.0014 U
Trichloroethene (trichloroethylene)	21	200	0.47	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.00079 U	0.001 U	0.00084 J	0.0084 J	0.001 U	0.001 J	0.0008 U	0.00081 U	0.00089 U
Trichlorofluoromethane (freon 11)	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3 - trichloropropane	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4- trimethylbenzene	52	190	3.6	mg/kg	0.007 J	34	0.16	0.001 J	0.46 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5- trimethylbenzene	52	190	8.4	mg/kg	0.02 U	14 J	0.054	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	- -	- -	- -	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride (chloroethene)	0.9	13	0.02	mg/kg	0.02 U	18 U	0.034 U	0.006 U	1.5 U	0.001 U	0.0013 U	0.001 U	0.0067 U	0.0013 U	0.0012 U	0.001 U	0.001 U	0.0011 U
Total xylenes	100	500	0.26	mg/kg	0.016 J	**110**	0.33	0.006 U	1.8	0.0023 U	0.088	0.0023 U	0.97	0.093	0.0028 U	0.0068	0.0023 U	0.0026 U
Total BTEX	- -	- -	- -	mg/kg	0.037	399.000	0.690	ND	3.910	0.035	0.129	0.021	2.369	0.161	0.027	0.027	0.004	0.013
Total VOCs	- -	- -	- -	mg/kg	0.097	447	0.959	0.048	4.77	0.1194	0.16	0.07604	2.5357	0.2418	0.1625	0.0569	0.0474	0.056

See notes on page 9.

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO – Unrestricted Use (shade)	Units	SB-44 21 - 22 12/05/06 SB-44	SB-44-DUP 21 - 22 12/05/06 SB-44-DUP	SB-46 25 - 28 06/12/08 SB-46	SB-46 28 - 30 06/12/08 SB-46	SB-47 5 - 7 03/26/08 SB-47	SB-47 23 03/26/08 SB-47	SB-48 12 07/24/10 SB-48	SB-48 18.5 - 19 07/24/10 SB-48	SB-48-DUP 18.5 - 19 07/24/10 SB-48-DUP	SB-49 9.5 07/25/10 SB-49	SB-49 12 07/25/10 SB-49	SB-50 9 02/26/11 SB-50	SB-51 14.5 02/27/11 SB-51	SB-51-DUP 14.5 02/27/11 SB-51-DUP
Acetone (2- propanone, dimethyl ketone)	100	500	0.05	mg/kg	0.14 P	0.1 P	19 UJ	20 UJ	0.024 U	0.13 J	140 U	0.024 UPJ	0.023 UPJ	0.093 J	0.14 UPJ	0.0037 J	0.023 J	0.016 J
Benzene	4.8	44	0.06	mg/kg	0.0023 J	0.0021 J	***260***	***130***	0.0059 U	0.038 J	**31 J**	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Bromobenzene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromochloromethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	- -	- -	- -	mg/kg	0.0016 U	0.0015 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Bromomethane/ methyl bromide	- -	- -	- -	mg/kg	0.0013 U	0.0013 U	7.6 UJ	7.9 UJ	0.0059 UJ	0.0076 U	58 UJ	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
2- butanone (methyl ethyl ketone)	100	500	0.12	mg/kg	0.043	0.03	7.6 U	7.9 U	0.012 U	0.051 U	58 U	0.012 U	0.012 U	0.064 U	0.07 U	0.012 U	0.012 U	0.012 U
n- butylbenzene	100	500	12	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec- butylbenzene	100	500	11	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
tert- butylbenzene	100	500	5.9	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	- -	- -	- -	mg/kg	0.0011 J	0.0015 J	7.6 U	7.9 U	0.0059 U	0.0085 U	58 UJ	0.0026 J	0.0027 J	0.032 U	0.035 U	0.006 U	0.0016 J	0.0011 J
Carbon tetrachloride	2.4	22	0.76	mg/kg	0.0013 U	0.0012 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 UJ	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Chlorobenzene	100	500	1.1	mg/kg	0.0013 U	0.0012 U	7.6 U	7.9 U	0.0059 UJ	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 UJ	0.006 U	0.0059 U	0.0058 U
Chlorodibromomethane	- -	- -	- -	mg/kg	0.00067 U	0.00063 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Chloroethane	- -	- -	- -	mg/kg	0.0031 U	0.0029 U	7.6 UJ	7.9 UJ	0.0059 UJ	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Chloroform	49	350	0.37	mg/kg	0.00086 U	0.00081 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Chloromethane (methyl chloride)	- -	- -	- -	mg/kg	0.0015 U	0.0014 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 UJ	0.0059 U	0.0059 U	0.032 U	0.035 U	***R***	0.0059 U	0.0058 U
2- chlorotoluene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4- chlorotoluene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cumene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2- dibromo- 3- chloropropane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2- dibromoethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromomethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis- 1,3- dichloro, 1- propene	- -	- -	- -	mg/kg	0.0013 U	0.0012 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
1,2- dichlorobenzene	100	500	1.1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3- dichlorobenzene	49	280	2.4	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4- dichlorobenzene	13	130	1.8	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorobromomethane	- -	- -	- -	mg/kg	0.0014 U	0.0013 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Dichlorodifluoromethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1- dichloroethane	26	240	0.27	mg/kg	0.0013 U	0.0012 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
1,2- dichloroethane	3.1	30	0.02	mg/kg	0.0016 U	0.0015 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
cis- 1,2- dichloroethene	100	500	0.25	mg/kg	0.0017 U	0.0016 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
trans- 1,2- dichloroethene	100	500	0.19	mg/kg	0.00095 U	0.00089 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
1,1- dichloroethylene	- -	- -	- -	mg/kg	0.0018 U	0.0017 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Dichloromethane	100	500	0.05	mg/kg	0.019 JP	0.021 JP	7.6 UJ	7.9 UJ	0.0021 J	0.0092 J	58 UP	0.024 UP	0.023 UP	0.13 UP	0.14 UP	0.024 UP	0.024 UP	0.023 UP
1,2- dichloropropane	- -	- -	- -	mg/kg	0.0017 U	0.0016 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
1,3- dichloropropane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: Sample Depth (feet): Date Collected: Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO – Unrestricted Use (shade)	Units	SB-44 21 - 22 12/05/06 SB-44	SB-44-DUP 21 - 22 12/05/06 SB-44-DUP	SB-46 25 - 28 06/12/08 SB-46	SB-46 28 - 30 06/12/08 SB-46	SB-47 5 - 7 03/26/08 SB-47	SB-47 23 03/26/08 SB-47	SB-48 12 07/24/10 SB-48	SB-48 18.5 - 19 07/24/10 SB-48	SB-48-DUP 18.5 - 19 07/24/10 SB-48-DUP	SB-49 9.5 07/25/10 SB-49	SB-49 12 07/25/10 SB-49	SB-50 9 02/26/11 SB-50	SB-51 14.5 02/27/11 SB-51	SB-51-DUP 14.5 02/27/11 SB-51-DUP
2,2- dichloropropane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis- 1,3- dichloropropane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1- dichloropropene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans- 1,3- dichloropropene	- -	- -	- -	mg/kg	0.0015 U	0.0014 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Ethylbenzene	41	390	1	mg/kg	0.0013 U	0.019	**130**	**97**	0.0059 UJ	0.27 D	**110**	0.0059 U	0.0059 U	0.032 U	0.035 UJ	0.006 U	0.0059 U	0.0058 U
Ethylene dibromide	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freon 12	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2- hexanone	- -	- -	- -	mg/kg	0.0041 U	0.0039 U	7.6 U	7.9 U	0.012 U	0.015 U	58 U	0.012 U	0.012 U	0.064 U	0.07 UJ	0.012 U	0.012 U	0.012 U
Iodomethane (methyl iodide)	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4- isopropyltoluene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4- methyl- 2- pentanone	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl isobutyl ketone	- -	- -	- -	mg/kg	0.0019 U	0.0018 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Methyl tert-butyl ether	100	500	0.93	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene bromide	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2- oxyblis (1-chloropropane)	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n- propylbenzene	100	500	3.9	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	- -	- -	- -	mg/kg	0.0017 U	0.0016 U	110	36	0.0059 UJ	0.0076 U	14 J	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Tetrachloroethylene	19	150	1.3	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1,2- tetrachloroethane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2- tetrachloroethane	- -	- -	- -	mg/kg	0.0011 U	0.0011 U	7.6 U	7.9 U	0.0059 U	0.0011 J	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Toluene	100	500	0.7	mg/kg	0.0014 U	0.0013 U	**350 D**	**200**	0.0059 U	0.011 J	75	0.0059 UP	0.0059 UP	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
1,2,3- trichlorobenzene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4- trichlorobenzene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1- trichloroethane (methyl chloroform)	100	500	0.68	mg/kg	0.0014 U	0.0013 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
1,1,2- trichloroethane	- -	- -	- -	mg/kg	0.0017 U	0.0016 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Trichloroethene (trichloroethylene)	21	200	0.47	mg/kg	0.0011 U	0.001 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Trichlorofluoromethane (freon 11)	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3 - trichloropropane	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4- trimethylbenzene	52	190	3.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5- trimethylbenzene	52	190	8.4	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride (chloroethene)	0.9	13	0.02	mg/kg	0.0014 U	0.0013 U	7.6 U	7.9 U	0.0059 U	0.0076 U	58 U	0.0059 U	0.0059 U	0.032 U	0.035 U	0.006 U	0.0059 U	0.0058 U
Total xylenes	100	500	0.26	mg/kg	0.0045 J	0.017	***600***	**330**	0.0059 UJ	0.12 D	**280 J**	0.00086 J	0.0012 J	0.032	0.012 J	0.006 U	0.0059 U	0.0058 U
Total BTEX	- -	- -	- -	mg/kg	0.007	0.038	1340.000	757.000	ND	0.439	496.000	0.001	0.001	0.032	0.012	ND	ND	ND
Total VOCs	- -	- -	- -	mg/kg	0.2099	0.1906	1450	793	0.0021	0.5793	510	0.00346	0.0039	0.125	0.012	0.0037	0.0246	0.0171

See notes on page 9.

Table 2
Soil Analytical Results - Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Notes:
Italicized result exceeds SCO for Restricted – Commercial use.
Bolded result exceeds SCO Restricted – Residential use.
Shaded result exceeds SCO Unrestricted use.
1. Qualifiers are as follows:
   - B Analyte was also detected in the associated method blank.
   - D The reported concentration is based on a diluted sample analysis.
   - E Analyte exceeded calibration range.
   - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
   - M Indicates manually integrated compound.
   - N Indicates spike sample recovery is not within the quality control limits.
   - P Indicates an estimated value between the instrument detection limit and practical quantitation limit (PQL).
   - R The reported concentration was rejected.
   - U The analyte was analyzed for, but not detected. The associated value is the analyte quantitation limit.
2. Screening levels were provided in New York State Department of Environmental Conservation 6 New York Codes, Rules and Regulations Subpart 375.6: Remedial Program Soil Cleanup Objectives.
3. Duplicate samples are indicated by location ID ending in DUP.

BTEX = benzene, toluene, ethylbenzene and xylene
mg/kg = milligrams per kilogram
NA = not analyzed for
ND = not detected
% = percent
PAHs = polycyclic aromatic hydrocarbons
SCO = Soil cleanup objective
VOCs = volatile organic compounds
- - = criteria not indicated

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:					SB-09		SB-09		SB-20		SB-20		SB-21		SB-21		SB-22		SB-22		SB-23		SB-23		SB-24		SB-24		SB-24	
Sample Depth:					11-15		31-33.5		12-16		16-20		12-16		36-38.9		12-16		36-44		20-24		52-54.5		30-32		34-36		36-38	
Date:	SCO Restricted-Residential		SCO Restricted-Commercial	SCO – Unrestricted Use	37869		37869		37896		37896		37894		37894		37893		37893		37894		37894		37897		37897		37896	
Sample Name:	(bold)		(italics)	(shaded)	Units	SB-09		SB-09		SB-20		SB-20		SB-21		SB-21		SB-22		SB-22		SB-23		SB-23		SB-24		SB-24		SB-24	
Acenaphthene	100		500	20	mg/kg	0.086	J	U		3.4		1.4		11		1.2		6.9		0.094	J	**220**	**D**	19		***4400***		1		***7000***	
Acenaphthylene	100		500	100	mg/kg	U		U		U		U		4.3		0.44		1.7		U		**250**	**D**	15		***7900***		1.9		***12000***	
Anthracene	100		500	100	mg/kg	0.16	J	U		1.8		0.26	J	9.5		1.4		6.6		0.081	J	**330**	**D**	24		***7600***		2.2		***11000***	
Benzo (a) anthracene	1		5.6	1	mg/kg	0.42		U		**5.4**		0.171	J	***19***		**2.2**		***9.1***	***D***	0.089	J	***280***	***D***	***24***		***6900***		**2.1**		***12000***	
Benzo (a) pyrene	1		1	1	mg/kg	0.52		U		**5.4**		0.17	J	***18***		***1.7***		***8.2***	***D***	0.069	J	***240***	***D***	***19***		***5300***		***1.6***		***8600***	
Benzo (b) fluoranthene	1		5.6	1	mg/kg	0.61		U		3.8		0.12	J	15		1.8		8.4	D	0.074	J	270	D	22		6200		1.8		10000	
Benzo (g,h,I) perylene	100		500	100	mg/kg	0.36	J	U		2.7		0.093	J	9.8		0.93		4.3		0.046	J	74		8		***2200***		0.5		***3200***	
Benzo (k) fluoranthene	3.9		56	0.8	mg/kg	0.22	J	U		1.2		U		**5.3**		0.54		**4.1**		U		***120***	***D***	**9.3**		***2700***		0.81		***4300***	
Benzyl alcohol	- -		- -	- -	mg/kg	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
Bis (2- chloroethoxy) methane	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
Bis (2- Chloroethyl) ether	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
Bis (2- ethylhexyl) phthalate	- -		- -	- -	mg/kg	2.2		0.3	J	U		U		U		U		U		U		U		0.45	J	U		U		U	
4- Bromofluorobenzene	- -		- -	- -	mg/kg	NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA	
4- Bromophenyl- phenylether	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
Butylbenzylphthalate	- -		- -	- -	mg/kg	0.044	J	U		U		U		U		U		U		U		U		U		U		U		U	
Carbazole	- -		- -	- -	mg/kg	0.091	J	U		U		U		U		0.083	J	2.5		U		140	D	12		3200		0.96		5400	
4- Chloro- 3- methylphenol	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
4- Chloroaniline	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
2- Chloronaphthalene	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
2- Chlorophenol	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
4- Chlorophenyl- phenylether	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
Chrysene	3.9		56	1	mg/kg	0.44		U		**5.2**		0.172	J	**18**		2.4		**7.7**	**D**	0.075	J	***260***	***D***	**22**		***5700***		1.7		***9200***	
Dibenzo (a,h) anthracene	0.33		0.56	0.33	mg/kg	0.071	J	U		**0.49**	**J**	U		***2.1***		0.2	J	***1.1***		U		***21***		***2.4***		***700***	***J***	0.16	J	***1000***	***J***
Dibenzofuran	59		350	7	mg/kg	0.06	J	U		1.4		0.086	J	1.9	J	0.27	J	4.8		0.062	J	**280**	**D**	20		***7500***		2		***12000***	
Dibutyl phthalate	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
1,2- Dichlorobenzene	100		500	1.1	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
1,3- Dichlorobenzene	49		280	2.4	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
1,4- Dichlorobenzene	13		130	1.8	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
3,3'- Dichlorobenzidine	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
2,4- Dichlorophenol	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
Diethyl phthalate	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
2,4- Dimethylphenol	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		39		1.8	J	200	J	U		360	J
Dimethyl phthalate	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	
4,6- Dinitro- 2- methylphenol	- -		- -	- -	mg/kg	U		U		U		U		U		U		U		U		U		U		U		U		U	

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:	SCO Restricted-Residential	SCO Restricted-Commercial	SCO – Unrestricted Use		SB-09	SB-09	SB-20	SB-20	SB-21	SB-21	SB-22	SB-22	SB-23	SB-23	SB-24	SB-24	SB-24
Sample Depth:					11-15	31-33.5	12-16	16-20	12-16	36-38.9	12-16	36-44	20-24	52-54.5	30-32	34-36	36-38
Date:					37869	37869	37896	37896	37894	37894	37893	37893	37894	37894	37897	37897	37896
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-09	SB-09	SB-20	SB-20	SB-21	SB-21	SB-22	SB-22	SB-23	SB-23	SB-24	SB-24	SB-24
2,4- Dinitrophenol	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4- Dinitrotoluene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
2,6- Dinitrotoluene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Dioctyl phthalate	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Fluoranthene	100	500	100	mg/kg	0.76	U	6.1	0.3 J	22	3.2	20 D	0.21 J	***600 D***	58 D	***13000***	4	***20000***
Fluorene	100	500	30	mg/kg	0.077 J	U	U	1.1	7.7	1.9	6.2	0.088 J	**360 D**	24	***9200***	2.5	***14000***
Hexachlorobenzene	1.2	6	0.33	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U		U
Indeno (1,2,3- cd) pyrene	0.5	5.6	0.5	mg/kg	0.34 J	U	**1.5**	U	***6.4***	**0.59**	**3.5**	U	***64***	***7.7***	***2100***	**0.51**	***3400***
Isophorone	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
2- Methylnaphthalene	- -	- -	- -	mg/kg	0.089 J	0.2 J	U	3.2	1.3 J	0.68	5.8	0.085 J	460 D	32	12000	2.5	19000
2- Methylphenol	100	500	0.33	mg/kg	U	U	U	U	U	U	0.066 J	U	2.3 J	0.31 J	U	U	U
4- Methylphenol	100	500	0.33	mg/kg	U	U	U	U	U	U	0.2 J	U	8.1	1	U	U	U
Naphthalene	100	500	12	mg/kg	0.99	4.4	0.11 JB	6 B	3.1 B	2.3 B	22 D	2.5 B	***1300 DB***	**110 DB**	***38000 DB***	5.9 B	***56000 DB***
2- Nitroaniline	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
3- Nitroaniline	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
4- Nitroaniline	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
2- Nitrophenol	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
4- Nitrophenol	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N- Nitrosodi- n- propylamine	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
N- Nitrosodiphenylamine	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
2,2- Oxybis (1-Chloropropane)	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	6.7	6.7	0.8	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Phenanthrene	100	500	100	mg/kg	0.61	U	U	1.4	11	5.2	30 D	0.33 J	***820 D***	85 D	***20000***	5.8	***35000 D***
Phenol	100	500	0.33	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Pyrene	100	500	100	mg/kg	0.75	U	18 D	0.59	53 D	6.2	20 D	0.18 J	***520 D***	54 D	***13000***	3.9	***21000***
1,2,4- Trichlorobenzene	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5- Trichlorophenol	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
2,4,6- Trichlorophenol	- -	- -	- -	mg/kg	U	U	U	U	U	U	U	U	U	U	U	U	U
Total PAHs	- -	- -	- -	mg/kg	6.503	4.6	55.1	14.976	216.5	32.88	165.6	3.921	6189	535.4	156900	38.88	246700
Total SVOCs	- -	- -	- -	mg/kg	8.898	4.9	56.5	15.062	218.4	33.233	173.166	3.983	6658.4	570.96	167800	41.84	264460

See notes on page 11.

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:	SCO Restricted-Residential	SCO Restricted-Commercial	SCO – Unrestricted Use		SB-25	SB-25	SB-26	SB-26	SB-30	SB-30	SB-30	SB-31	SB-31	SB-32	SB-32	SB-32	SB-33
Sample Depth:					12-16	24-28	9-13	16-19	10 - 14	10 - 14	34 - 36	7 - 11	7 - 11	9 - 11	9 - 11	35 - 39	5 - 7
Date:					37895	37895	9/29/2003	10/1/2003	02/20/05	02/20/05	02/20/05	03/06/05	03/06/05	03/02/05	03/02/05	03/02/05	02/27/05
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-25	SB-25	SB-26	SB-26	SB-30	SB-30 DL	SB-30	SB-31	SB-31 DL	SB-32	SB-32 DL	SB-32	-33
Acenaphthene	100	500	20	mg/kg	28	0.17 J	24	**160 DJ**	90	90 D	0.45 J	4.8	3.7 DJ	3.7	3.5 DJ	0.5 U	0.11 J
Acenaphthylene	100	500	100	mg/kg	13	U	19	**430 D**	31	27 DJ	0.12 J	0.099 J	4.1 U	1.4 J	0.87 DJ	0.5 U	0.32 J
Anthracene	100	500	100	mg/kg	46	0.38 J	81 D	**380 D**	**170 D**	**170 D**	0.7	9.4 E	11 D	5.7	5 D	0.21 J	0.41
Benzo (a) anthracene	1	5.6	1	mg/kg	***45***	0.16 J	***100 D***	***320 D***	***120***	***120 D***	0.44 J	***30 E***	***24 D***	***21***	***18 D***	0.43 J	**2**
Benzo (a) pyrene	1	1	1	mg/kg	***39***	0.13 J	***93***	***260 DJ***	***100***	***100 D***	0.35 J	***23 E***	***20 D***	***29***	***27 D***	0.45 J	***2.6***
Benzo (b) fluoranthene	1	5.6	1	mg/kg	***46***	0.15 J	***110 D***	***250 DJ***	***110***	***98 D***	0.38 J	***35 E***	***22 D***	***29***	***25 D***	0.59	**3.2**
Benzo (g,h,I) perylene	100	500	100	mg/kg	19	U	41 D	48	52	51 D	0.17 J	5.8	9.4 D	13	15 D	0.12 J	0.8
Benzo (k) fluoranthene	3.9	56	0.8	mg/kg	**18**	0.065 J	**32**	***130 DJ***	**42**	**48 D**	0.18 J	**14 E**	**10 D**	**9.9**	**8.8 D**	0.25 J	1.4
Benzyl alcohol	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis (2- chloroethoxy) methane	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
Bis (2- Chloroethyl) ether	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
Bis (2- ethylhexyl) phthalate	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.32 J	4.1 U	2.2 U	4.3 U	0.17 J	0.4 U
4- Bromofluorobenzene	- -	- -	- -	mg/kg	NA	NA	NA	NA	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
4- Bromophenyl- phenylether	- -	- -	- -	mg/kg	U	U	U	U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
Carbazole	- -	- -	- -	mg/kg	18	0.13 J	29	180 DJ	39	38 DJ	0.22 J	3.2	2.4 DJ	2.4	4.3 U	0.5 U	0.4 U
4- Chloro- 3- methylphenol	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
4- Chloroaniline	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
2- Chloronaphthalene	- -	- -	- -	mg/kg	U	U	U	2 J	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
2- Chlorophenol	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
4- Chlorophenyl- phenylether	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
Chrysene	3.9	56	1	mg/kg	**42**	0.16 J	***92 D***	***240 DJ***	***120***	***120 D***	0.47 J	**24 E**	**23 D**	**22**	**22 D**	0.45 J	2.1
Dibenzo (a,h) anthracene	0.33	0.56	0.33	mg/kg	***5.1***	U	***9***	***13***	***15***	***16 DJ***	0.52 U	***1.8***	***2.6 DJ***	***3.6***	***4 DJ***	0.5 U	0.22 J
Dibenzofuran	59	350	7	mg/kg	31	0.16 J	32	**350 D**	**86**	**85 D**	0.34 J	2.6	2.1 DJ	0.8 J	0.78 DJ	0.11 J	0.12 J
Dibutyl phthalate	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.14 J	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.26 J
1,2- Dichlorobenzene	100	500	1.1	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
1,3- Dichlorobenzene	49	280	2.4	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
1,4- Dichlorobenzene	13	130	1.8	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
3,3'- Dichlorobenzidine	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
2,4- Dichlorophenol	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
Diethyl phthalate	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
2,4- Dimethylphenol	- -	- -	- -	mg/kg	U	U	0.91 J	29	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
Dimethyl phthalate	- -	- -	- -	mg/kg	U	U	U	U	10 U	41 U	0.52 U	0.41 U	4.1 U	2.2 U	4.3 U	0.5 U	0.4 U
4,6- Dinitro- 2- methylphenol	- -	- -	- -	mg/kg	U	U	U	U	21 U	84 U	1 U	0.83 U	8.3 U	4.4 U	8.8 U	1 U	0.81 U

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:					SB-25		SB-25		SB-26		SB-26		SB-30		SB-30		SB-30		SB-31		SB-31		SB-32		SB-32		SB-32		SB-33	
Sample Depth:	SCO Restricted-Residential	SCO Restricted-Commercial	SCO – Unrestricted Use		12-16		24-28		9-13		16-19		10 - 14		10 - 14		34 - 36		7 - 11		7 - 11		9 - 11		9 - 11		35 - 39		5 - 7	
Date:					37895		37895		9/29/2003		10/1/2003		02/20/05		02/20/05		02/20/05		03/06/05		03/06/05		03/02/05		03/02/05		03/02/05		02/27/05	
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-25		SB-25		SB-26		SB-26		SB-30		SB-30 DL		SB-30		SB-31		SB-31 DL		SB-32		SB-32 DL		SB-32		-33	
2,4- Dinitrophenol	- -	- -	- -	mg/kg		U		U		U		U	21	U	84	U	1	U	0.83	U	8.3	U	4.4	U	8.8	U	1	U	0.81	U
2,4- Dinitrotoluene	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
2,6- Dinitrotoluene	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
Dioctyl phthalate	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
Fluoranthene	100	500	100	mg/kg	92	D	0.46	J	**190**	**D**	***790***	***D***	**290**	**D**	**290**	**D**	1.1		23	E	54	D	25		26	D	0.87		3.2	
Fluorene	100	500	30	mg/kg	36		0.18	J	80	D	**420**	**D**	**110**		**110**	**D**	0.45	J	3.6		2.8	DJ	1.2	J	1	DJ	0.1	J	0.14	J
Hexachlorobenzene	1.2	6	0.33	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
Hexachlorobutadiene	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
Hexachlorocyclopentadiene	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
Hexachloroethane	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
Indeno (1,2,3- cd) pyrene	0.5	5.6	0.5	mg/kg	***17***		0.053	J	***31***		***44***		***46***		***46***	***D***	0.16	J	***5.8***		***8.7***	***D***	***11***		***12***	***D***	0.12	J	**0.77**	
Isophorone	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
2- Methylnaphthalene	- -	- -	- -	mg/kg	15		0.19	J	71	D	660	D	87		85	D	0.37	J	0.26	J	4.1	U	0.31	J	4.3	U	0.12	J	0.065	J
2- Methylphenol	100	500	0.33	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
4- Methylphenol	100	500	0.33	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
Naphthalene	100	500	12	mg/kg	61	B	1.5	B	**270**	**DB**	***3700***	***D***	**300**	**D**	**300**	**D**	1.2		0.31	J	4.1	U	1	J	0.97	DJ	0.48	J	0.4	U
2- Nitroaniline	- -	- -	- -	mg/kg		U		U		U		U	21	U	84	U	1	U	0.83	U	8.3	U	4.4	U	8.8	U	1	U	0.81	U
3- Nitroaniline	- -	- -	- -	mg/kg		U		U		U		U	21	U	84	U	1	U	0.83	U	8.3	U	4.4	U	8.8	U	1	U	0.81	U
4- Nitroaniline	- -	- -	- -	mg/kg		U		U		U		U	21	U	84	U	1	U	0.83	U	8.3	U	4.4	U	8.8	U	1	U	0.81	U
Nitrobenzene	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
2- Nitrophenol	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
4- Nitrophenol	- -	- -	- -	mg/kg		NA		NA		NA		NA	21	U	84	U	1	U	0.83	U	8.3	U	4.4	U	8.8	U	1	U	0.81	U
N- Nitrosodi- n- propylamine	- -	- -	- -	mg/kg		U		U		U		U	10	U		NA	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
N- Nitrosodiphenylamine	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
2,2- Oxybis (1-Chloropropane)	- -	- -	- -	mg/kg		U		U		U		U		NA		NA		NA		NA		NA		NA		NA		NA		NA
Pentachlorophenol	6.7	6.7	0.8	mg/kg		U		U		U		U	21	U	84	U	1	U	0.83	U	8.3	U	4.4	U	8.8	U	1	U	0.81	U
Phenanthrene	100	500	100	mg/kg	**110**	**D**	0.7	D	**200**	**D**	***1300***	***D***	**450**	**D**	**450**	**D**	1.7		22	E	43	D	10		9.4	D	0.7		1.3	
Phenol	100	500	0.33	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
Pyrene	100	500	100	mg/kg	88	D	0.36	J	**180**	**D**	***580***	***D***	**260**	**D**	**260**	**D**	0.95		33	E	49	D	38	E	42	D	0.81		3.5	
1,2,4- Trichlorobenzene	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
2,4,5- Trichlorophenol	- -	- -	- -	mg/kg		U		U		U		U	10	U	41	U	0.52	U	0.41	U	4.1	U	2.2	U	4.3	U	0.5	U	0.4	U
2,4,6- Trichlorophenol	- -	- -	- -	mg/kg		U		U		U		U	21	U	84	U	1	U	0.83	U	8.3	U	4.4	U	8.8	U	1	U	0.81	U
Total PAHs	- -	- -	- -	mg/kg	720.1		4.658		1623		9725		2393		2381		9.19		235.869		283.2		224.81		220.54		5.7		22.135	
Total SVOCs	- -	- -	- -	mg/kg	769.1		4.948		1684.91		10286		2518		2504		9.89		241.989		287.7		228.01		221.32		5.98		22.515	

See notes on page 11.

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:					SB-34		SB-34		SB-34		SB-38		SB-38		SB-38		SB-39		SB-39		SB-39		SB-39		SB-40		SB-40		SB-40	
Sample Depth:	SCO Restricted- Residential	SCO Restricted- Commercial	SCO – Unrestricted Use		13 - 17		13 - 17		37 - 39		25 - 27		25 - 27		43 - 45		45 - 47		45 - 47		65 - 67		65 - 67		28 - 30		28 - 30		46 - 48	
Date:					02/23/05		02/23/05		02/24/05		02/22/05		02/22/05		02/22/05		03/10/05		03/10/05		03/12/05		03/12/05		04/05/05		04/05/05		04/05/05	
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-34		SB-34 DL		SB-34		SB-38		SB-38 DL		SB-38		SB-39		SB-39 DL		SB-39		SB-39 DL		SB-40		SB-40 DL		SB-40	
Acenaphthene	100	500	20	mg/kg	44		46	DJ	0.52	U	**490**		**470**	**DJ**	0.76		**190**	**DJ**	**190**	**DJ**	11	D	11	D	1.2		1.7	DJ	3.8	
Acenaphthylene	100	500	100	mg/kg	**120**	**D**	**120**	**D**	0.52	U	***2200***	***DJ***	***2200***	***DJ***	0.36	J	**370**	**D**	**370**	**D**	24	D	24	D	0.21	J	0.33	DJ	14	E
Anthracene	100	500	100	mg/kg	***540***	***D***	***540***	***D***	0.12	J	***2400***	***DJ***	***2400***	***DJ***	1.1		**340**	**D**	**340**	**D**	20	D	20	D	1.5		1.9	D	11	E
Benzo (a) anthracene	1	5.6	1	mg/kg	***680***	***D***	***680***	***D***	0.13	J	***1600***	***DJ***	***1600***	***DJ***	1		***260***	***D***	***260***	***D***	***19***	***D***	***19***	***D***	**2.9**		**2.9**	**D**	***7.2***	
Benzo (a) pyrene	1	1	1	mg/kg	***600***	***D***	***600***	***D***	0.11	J	***1300***	***DJ***	***1300***	***DJ***	0.88		***230***	***DJ***	***230***	***DJ***	***18***	***D***	***18***	***D***	***2.5***		***2.6***	***D***	***13***	***E***
Benzo (b) fluoranthene	1	5.6	1	mg/kg	***610***	***D***	***610***	***D***	0.12	J	***1300***	***DJ***	***1300***	***DJ***	**1.1**		***240***	***D***	***240***	***D***	***18***	***D***	***18***	***D***	**4.5**		**3.7**	**D**	***18***	***E***
Benzo (g,h,I) perylene	100	500	100	mg/kg	**320**	**D**	**320**	**D**	0.52	U	***550***		***690***	***DJ***	0.22	J	**120**	**DJ**	**120**	**DJ**	4.5		8.9	DJ	0.52		1.3	DJ	2.7	
Benzo (k) fluoranthene	3.9	56	0.8	mg/kg	***230***	***D***	***230***	***D***	0.52	U	***560***		***660***	***DJ***	0.43	J	***100***	***DJ***	***100***	***DJ***	**8.7**	**DJ**	**8.7**	**DJ**	1.5		1.4	DJ	**4.9**	
Benzyl alcohol	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Bis (2- chloroethoxy) methane	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Bis (2- Chloroethyl) ether	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Bis (2- ethylhexyl) phthalate	- -	- -	- -	mg/kg	5.3	U	110	U	0.13	J	54	U	2700	U	0.51	U	2.3	U	230	U	0.19	J	8.9	U	0.44	U	1.8	U	0.51	U
4- Bromofluorobenzene	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
4- Bromophenyl- phenylether	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Butylbenzylphthalate	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Carbazole	- -	- -	- -	mg/kg	7.7		110	U	0.52	U	740		2700	U	0.37	J	130	DJ	130	DJ	9.2	D	9.2	D	0.44	J	0.42	DJ	2.7	
4- Chloro- 3- methylphenol	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
4- Chloroaniline	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2- Chloronaphthalene	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2- Chlorophenol	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
4- Chlorophenyl- phenylether	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Chrysene	3.9	56	1	mg/kg	***650***	***D***	***650***	***D***	0.15	J	***1800***	***DJ***	***1800***	***DJ***	0.89		***240***	***D***	***240***	***D***	**16**	**D**	**16**	**D**	2.2		3.4	D	**6.6**	
Dibenzo (a,h) anthracene	0.33	0.56	0.33	mg/kg	***38***		***73***	***DJ***	0.52	U	***140***		2700	U	0.068	J	***20***		230	U	***1.1***		***2***	***DJ***	0.12	J	1.8	U	***0.74***	
Dibenzofuran	59	350	7	mg/kg	12		110	U	0.52	U	***1500***	***DJ***	***1500***	***DJ***	0.71		**310**	**D**	**310**	**D**	21	D	21	D	0.64		1	DJ	13	E
Dibutyl phthalate	- -	- -	- -	mg/kg	5.3	U	110	U	0.34	J	54	U	2700	U	0.2	J	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
1,2- Dichlorobenzene	100	500	1.1	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
1,3- Dichlorobenzene	49	280	2.4	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
1,4- Dichlorobenzene	13	130	1.8	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
3,3'- Dichlorobenzidine	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2,4- Dichlorophenol	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Diethyl phthalate	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2,4- Dimethylphenol	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	180		2700	U	0.51	U	110	DJ	110	DJ	3.9		2	DJ	0.44	U	1.8	U	0.51	U
Dimethyl phthalate	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
4,6- Dinitro- 2- methylphenol	- -	- -	- -	mg/kg	11	U	220	U	1	U	110	U	5500	U	1	U	4.8	U	480	U	0.9	U	18	U	0.9	U	3.6	U	1	U

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:					SB-34		SB-34		SB-34		SB-38		SB-38		SB-38		SB-39		SB-39		SB-39		SB-39		SB-40		SB-40		SB-40	
Sample Depth:	SCO Restricted-Residential	SCO Restricted-Commercial	SCO – Unrestricted Use		13 - 17		13 - 17		37 - 39		25 - 27		25 - 27		43 - 45		45 - 47		45 - 47		65 - 67		65 - 67		28 - 30		28 - 30		46 - 48	
Date:					02/23/05		02/23/05		02/24/05		02/22/05		02/22/05		02/22/05		03/10/05		03/10/05		03/12/05		03/12/05		04/05/05		04/05/05		04/05/05	
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-34		SB-34 DL		SB-34		SB-38		SB-38 DL		SB-38		SB-39		SB-39 DL		SB-39		SB-39 DL		SB-40		SB-40 DL		SB-40	
2,4- Dinitrophenol	- -	- -	- -	mg/kg	11	U	220	U	1	U	110	U	5500	U	1	U	4.8	U	480	U	0.9	U	18	U	0.9	U	3.6	U	1	U
2,4- Dinitrotoluene	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2,6- Dinitrotoluene	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Dioctyl phthalate	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Fluoranthene	100	500	100	mg/kg	***1600***	***D***	***1600***	***D***	0.31	J	***4500***	***D***	***4500***	***D***	2.7		***820***	***D***	***820***	***D***	57	D	57	D	10	E	6.6	D	21	E
Fluorene	100	500	30	mg/kg	10		110	U	0.52	U	***1800***	***DJ***	***1800***	***DJ***	0.8		**340**	**D**	**340**	**D**	23	D	23	D	1.1		1.7	DJ	16	E
Hexachlorobenzene	1.2	6	0.33	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Hexachlorobutadiene	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Hexachlorocyclopentadiene	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Hexachloroethane	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
Indeno (1,2,3- cd) pyrene	0.5	5.6	0.5	mg/kg	***270***	***D***	***270***	***D***	0.52	U	***530***		***620***	***DJ***	0.22	J	***100***	***DJ***	***100***	***DJ***	**4.2**		***8***	***DJ***	0.44	J	**1.2**	**DJ**	**2.8**	
Isophorone	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2- Methylnaphthalene	- -	- -	- -	mg/kg	4.2	J	110	U	0.52	U	2700	D	2700	D	0.86		460	D	460	D	26	D	26	D	0.48		0.79	DJ	10	E
2- Methylphenol	100	500	0.33	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	47	DJ	47	DJ	1.2		1	DJ	0.44	U	1.8	U	0.51	U
4- Methylphenol	100	500	0.33	mg/kg	5.3	U	110	U	0.52	U	**240**		2700	U	0.51	U	**220**	**DJ**	**220**	**DJ**	4.1		3.7	DJ	0.075	J	1.8	U	0.51	U
Naphthalene	100	500	12	mg/kg	25		110	U	0.3	J	***16000***	***D***	***16000***	***D***	4.2		***3200***	***D***	***3200***	***D***	**140**	**DE**	**140**	**DE**	0.68		0.89	DJ	25	E
2- Nitroaniline	- -	- -	- -	mg/kg	11	U	220	U	1	U	110	U	5500	U	1	U	4.8	U	480	U	0.9	U	18	U	0.9	U	3.6	U	1	U
3- Nitroaniline	- -	- -	- -	mg/kg	11	U	220	U	1	U	110	U	5500	U	1	U	4.8	U	480	U	0.9	U	18	U	0.9	U	3.6	U	1	U
4- Nitroaniline	- -	- -	- -	mg/kg	11	U	220	U	1	U	110	U	5500	U	1	U	4.8	U	480	U	0.9	U	18	U	0.9	U	3.6	U	1	U
Nitrobenzene	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2- Nitrophenol	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
4- Nitrophenol	- -	- -	- -	mg/kg	11	U	220	U	1	U	110	U	5500	U	1	U	4.8	U	480	U	0.9	U	18	U	0.9	U	3.6	U	1	U
N- Nitrosodi- n- propylamine	- -	- -	- -	mg/kg	5.3	U		NA	0.52	U	54	U		NA	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
N- Nitrosodiphenylamine	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2,2- Oxybis (1-Chloropropane)	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Pentachlorophenol	6.7	6.7	0.8	mg/kg	11	U	220	U	1	U	110	U	5500	U	1	U	4.8	U	480	U	0.9	U	18	U	0.9	U	3.6	U	1	U
Phenanthrene	100	500	100	mg/kg	**170**	**D**	**170**	**D**	0.18	J	***7100***	***D***	***7100***	***D***	3.7		***1200***	***D***	***1200***	***D***	82	D	82	D	9.7	E	7.6	D	25	E
Phenol	100	500	0.33	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	100	DJ	100	DJ	2.8		2.7	DJ	0.44	U	1.8	U	0.51	U
Pyrene	100	500	100	mg/kg	***1500***	***D***	***1500***	***D***	0.32	J	***3900***	***D***	***3900***	***D***	2.4		***640***	***D***	***640***	***D***	45	D	45	D	3.7		7.5	D	9.4	E
1,2,4- Trichlorobenzene	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2,4,5- Trichlorophenol	- -	- -	- -	mg/kg	5.3	U	110	U	0.52	U	54	U	2700	U	0.51	U	2.3	U	230	U	0.44	U	8.9	U	0.44	U	1.8	U	0.51	U
2,4,6- Trichlorophenol	- -	- -	- -	mg/kg	11	U	220	U	1	U	110	U	5500	U	1	U	4.8	U	480	U	0.9	U	18	U	0.9	U	3.6	U	1	U
Total PAHs	- -	- -	- -	mg/kg	7411.2		7409		1.74		48870		49040		21.688		8870		8850		517.5		526.6		43.25		45.51		191.14	
Total SVOCs	- -	- -	- -	mg/kg	7430.9		7409		2.21		51530		50540		22.968		9787		9767		559.89		566.2		44.405		46.93		206.84	

See notes on page 11.

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:					SB-40		SB-41		SB-41		SB-42		SB-42		SB-42		SB-43		SB-43		SB-44		SB-44		SB-44		SB-44-DUP	
Sample Depth:	SCO Restricted-Residential	SCO Restricted-Commercial	SCO – Unrestricted Use		46 - 48		13 - 14		24 - 25		13 - 14		24 - 25		27 - 28		16 - 17		28 - 29		14 - 15		19 - 20		21 - 22		21 - 22	
Date:					04/05/05		12/06/06		12/06/06		12/06/06		12/06/06		12/06/06		12/05/06		12/05/06		12/05/06		12/05/06		12/05/06		12/05/06	
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-40 DL		SB-41		SB-41		SB-42		SB-42		SB-42		SB-43		SB-43		SB-44		SB-44		SB-44		SB-44-DUP	
Acenaphthene	100	500	20	mg/kg	3.9	DJ	0.35	J	0.08	U	0.46	J	0.082	U	0.59	J	0.16	U	0.063	U	0.062	U	0.14	U	0.18	U	0.083	U
Acenaphthylene	100	500	100	mg/kg	10	DJ	0.093	U	0.059	U	0.56	J	0.061	U	0.12	U	0.12	U	0.047	U	0.046	U	0.11	U	0.13	U	0.062	U
Anthracene	100	500	100	mg/kg	13	DJ	0.12	U	0.08	U	1.1	J	0.082	U	0.16	U	0.16	U	0.063	U	0.062	U	0.14	U	0.18	U	0.083	U
Benzo (a) anthracene	1	5.6	1	mg/kg	***9.6***	***DJ***	0.1	U	0.065	U	***5.8***		0.067	U	0.13	U	0.13	U	0.052	U	0.17	J	0.16	J	0.21	J	0.068	U
Benzo (a) pyrene	1	1	1	mg/kg	***8.2***	***DJ***	0.093	U	0.059	U	***10***		0.061	U	0.12	U	0.12	U	0.047	U	0.12	J	0.11	J	0.13	U	0.062	U
Benzo (b) fluoranthene	1	5.6	1	mg/kg	***11***	***DJ***	0.21	U	0.13	U	***8.4***	***M***	0.14	U	0.27	U	0.26	U	0.11	U	0.1	U	0.24	U	0.3	U	0.14	U
Benzo (g,h,I) perylene	100	500	100	mg/kg	3.5	DJ	0.084	U	0.054	U	18		0.055	U	0.11	U	0.1	U	0.042	U	0.042	U	0.095	U	0.12	U	0.056	U
Benzo (k) fluoranthene	3.9	56	0.8	mg/kg	3.7	DJ	0.084	U	0.054	U	**5.9**	**M**	0.055	U	0.11	U	0.1	U	0.042	U	0.082	J	0.095	U	0.12	U	0.056	U
Benzyl alcohol	- -	- -	- -	mg/kg		NA	0.14	U	0.091	U	0.29	U	0.094	U	0.19	U	0.18	U	0.072	U	0.071	U	0.16	U	0.2	U	0.095	U
Bis (2- chloroethoxy) methane	- -	- -	- -	mg/kg	20	U	0.13	U	0.082	U	0.26	U	0.085	U	0.17	U	0.16	U	0.065	U	0.064	U	0.15	U	0.18	U	0.086	U
Bis (2- Chloroethyl) ether	- -	- -	- -	mg/kg	20	U	0.1	U	0.065	U	0.21	U	0.067	U	0.13	U	0.13	U	0.052	U	0.051	U	0.12	U	0.14	U	0.068	U
Bis (2- ethylhexyl) phthalate	- -	- -	- -	mg/kg	20	U	0.1	UB	0.11	JB	0.2	UB	0.09	JB	0.16	JB	0.18	JB	0.12	JB	0.086	JB	0.13	JB	0.15	JB	0.097	JB
4- Bromofluorobenzene	- -	- -	- -	mg/kg	20	U		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
4- Bromophenyl- phenylether	- -	- -	- -	mg/kg		NA	0.12	U	0.074	U	0.23	U	0.076	U	0.15	U	0.14	U	0.059	U	0.057	U	0.13	U	0.16	U	0.077	U
Butylbenzylphthalate	- -	- -	- -	mg/kg	20	U	0.098	U	0.062	U	0.2	U	0.064	U	0.13	U	0.12	U	0.049	U	0.048	U	0.11	U	0.14	U	0.065	U
Carbazole	- -	- -	- -	mg/kg	3	DJ	0.11	U	0.071	U	0.41	J	0.073	U	1		0.14	U	0.056	U	0.055	U	0.13	U	0.16	U	0.074	U
4- Chloro- 3- methylphenol	- -	- -	- -	mg/kg	20	U	0.26	U	0.16	U	0.52	U	0.17	U	0.33	U	0.32	U	0.13	U	0.13	U	0.29	U	0.36	U	0.17	U
4- Chloroaniline	- -	- -	- -	mg/kg	20	U	0.24	U	0.15	U	0.49	U	0.16	U	0.32	U	0.3	U	0.12	U	0.12	U	0.28	U	0.34	U	0.16	U
2- Chloronaphthalene	- -	- -	- -	mg/kg	20	U	0.11	U	0.071	U	0.22	U	0.073	U	0.14	U	0.14	U	0.056	U	0.055	U	0.13	U	0.16	U	0.074	U
2- Chlorophenol	- -	- -	- -	mg/kg	20	U	0.2	U	0.12	U	0.39	U	0.13	U	0.25	U	0.24	U	0.099	U	0.097	U	0.22	U	0.28	U	0.13	U
4- Chlorophenyl- phenylether	- -	- -	- -	mg/kg	20	U	0.1	U	0.067	U	0.21	U	0.069	U	0.14	U	0.13	U	0.053	U	0.052	U	0.12	U	0.15	U	0.069	U
Chrysene	3.9	56	1	mg/kg	**11**	**DJ**	0.095	U	0.061	U	**5.8**		0.063	U	0.12	U	0.12	U	0.048	U	0.16	J	0.14	J	0.36	J	0.063	U
Dibenzo (a,h) anthracene	0.33	0.56	0.33	mg/kg	20	U	0.084	U	0.054	U	***4.3***	***M***	0.055	U	0.11	U	0.1	U	0.042	U	0.042	U	0.095	U	0.12	U	0.056	U
Dibenzofuran	59	350	7	mg/kg	8.8	DJ	0.12	U	0.077	U	0.35	J	0.079	U	0.42	J	0.15	U	0.061	U	0.06	U	0.14	U	0.17	U	0.08	U
Dibutyl phthalate	- -	- -	- -	mg/kg	20	U	0.1	U	0.064	U	0.2	U	0.066	U	0.13	U	0.12	U	0.05	U	0.05	U	0.11	U	0.14	U	0.066	U
1,2- Dichlorobenzene	100	500	1.1	mg/kg	20	U	0.13	U	0.081	U	0.26	U	0.084	U	0.16	U	0.16	U	0.064	U	0.063	U	0.14	U	0.18	U	0.084	U
1,3- Dichlorobenzene	49	280	2.4	mg/kg	20	U	0.12	U	0.074	U	0.23	U	0.076	U	0.15	U	0.14	U	0.059	U	0.057	U	0.13	U	0.16	U	0.077	U
1,4- Dichlorobenzene	13	130	1.8	mg/kg	20	U	0.12	U	0.077	U	0.24	U	0.079	U	0.16	U	0.15	U	0.061	U	0.06	U	0.14	U	0.17	U	0.08	U
3,3'- Dichlorobenzidine	- -	- -	- -	mg/kg	20	U	0.2	U	0.13	U	0.41	U	0.13	U	0.26	U	0.25	U	0.1	U	0.1	U	0.23	U	0.29	U	0.13	U
2,4- Dichlorophenol	- -	- -	- -	mg/kg	20	U	0.25	U	0.16	U	0.5	U	0.16	U	0.32	U	0.31	U	0.13	U	0.12	U	0.28	U	0.35	U	0.16	U
Diethyl phthalate	- -	- -	- -	mg/kg	20	U	0.11	U	0.071	U	0.22	U	0.073	U	0.14	U	0.14	U	0.056	U	0.055	U	0.13	U	0.16	U	0.074	U
2,4- Dimethylphenol	- -	- -	- -	mg/kg	20	U	0.39	U	0.25	U	0.79	U	0.26	U	0.51	U	0.49	U	0.2	U	0.19	U	0.44	U	0.55	U	0.26	U
Dimethyl phthalate	- -	- -	- -	mg/kg	20	U	0.12	U	0.074	U	0.23	U	0.076	U	0.15	U	0.14	U	0.059	U	0.057	U	0.13	U	0.16	U	0.077	U
4,6- Dinitro- 2- methylphenol	- -	- -	- -	mg/kg	41	U	0.54	U	0.35	U	1.1	U	0.36	U	0.7	U	0.68	U	0.27	U	0.27	U	0.62	U	0.77	U	0.36	U

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:					SB-40		SB-41		SB-41		SB-42		SB-42		SB-42		SB-43		SB-43		SB-44		SB-44		SB-44		SB-44-DUP	
Sample Depth:	SCO Restricted-Residential	SCO Restricted-Commercial	SCO – Unrestricted Use		46 - 48		13 - 14		24 - 25		13 - 14		24 - 25		27 - 28		16 - 17		28 - 29		14 - 15		19 - 20		21 - 22		21 - 22	
Date:					04/05/05		12/06/06		12/06/06		12/06/06		12/06/06		12/06/06		12/05/06		12/05/06		12/05/06		12/05/06		12/05/06		12/05/06	
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-40 DL		SB-41		SB-41		SB-42		SB-42		SB-42		SB-43		SB-43		SB-44		SB-44		SB-44		SB-44-DUP	
2,4- Dinitrophenol	- -	- -	- -	mg/kg	41	U	0.26	U	0.17	U	0.53	U	0.17	U	0.34	U	0.33	U	0.13	U	0.13	U	0.3	U	0.37	U	0.17	U
2,4- Dinitrotoluene	- -	- -	- -	mg/kg	20	U	0.14	U	0.087	U	0.27	U	0.089	U	0.18	U	0.17	U	0.069	U	0.068	U	0.15	U	0.19	U	0.09	U
2,6- Dinitrotoluene	- -	- -	- -	mg/kg	20	U	0.14	U	0.088	U	0.28	U	0.091	U	0.18	U	0.17	U	0.07	U	0.069	U	0.16	U	0.2	U	0.092	U
Dioctyl phthalate	- -	- -	- -	mg/kg	20	U	0.08	U	0.051	U	0.16	U	0.052	U	0.1	U	0.099	U	0.04	U	0.039	U	0.09	U	0.11	U	0.053	U
Fluoranthene	100	500	100	mg/kg	26	D	0.14	J	0.061	U	6.5		0.063	U	0.25	J	0.12	U	0.048	U	0.11	J	0.23	J	0.3	J	0.063	U
Fluorene	100	500	30	mg/kg	9.2	DJ	0.11	J	0.062	U	0.31	J	0.064	U	0.62	J	0.12	U	0.049	U	0.048	U	0.11	U	0.14	U	0.065	U
Hexachlorobenzene	1.2	6	0.33	mg/kg	20	U	0.11	U	0.071	U	0.22	U	0.073	U	0.14	U	0.14	U	0.056	U	0.055	U	0.13	U	0.16	U	0.074	U
Hexachlorobutadiene	- -	- -	- -	mg/kg	20	U	0.15	U	0.098	U	0.31	U	0.1	U	0.2	U	0.19	U	0.078	U	0.077	U	0.18	U	0.22	U	0.1	U
Hexachlorocyclopentadiene	- -	- -	- -	mg/kg	20	U	0.56	U	0.36	U	1.1	U	0.37	U	0.73	U	0.7	U	0.28	U	0.28	U	0.64	U	0.8	U	0.37	U
Hexachloroethane	- -	- -	- -	mg/kg	20	U	0.13	U	0.085	U	0.27	U	0.088	U	0.17	U	0.17	U	0.068	U	0.066	U	0.15	U	0.19	U	0.089	U
Indeno (1,2,3- cd) pyrene	0.5	5.6	0.5	mg/kg	**3.7**	**DJ**	0.077	U	0.049	U	***16***		0.051	U	0.1	U	0.096	U	0.039	U	0.038	U	0.088	U	0.11	U	0.051	U
Isophorone	- -	- -	- -	mg/kg	20	U	0.14	U	0.087	U	0.27	U	0.089	U	0.18	U	0.17	U	0.069	U	0.068	U	0.15	U	0.19	U	0.09	U
2- Methylnaphthalene	- -	- -	- -	mg/kg	11	DJ	0.16	J	0.077	U	0.29	J	0.079	U	1.3		0.22	J	0.061	U	0.06	U	0.14	U	0.17	U	0.08	U
2- Methylphenol	100	500	0.33	mg/kg	20	U	0.2	U	0.13	U	0.41	U	0.13	U	0.26	U	0.25	U	0.1	U	0.1	U	0.23	U	0.29	U	0.13	U
4- Methylphenol	100	500	0.33	mg/kg	20	U	0.41	U	0.26	U	0.82	U	0.27	U	0.53	U	0.51	U	0.21	U	0.2	U	0.46	U	0.58	U	0.27	U
Naphthalene	100	500	12	mg/kg	70	D	3.2		0.24	J	1.2	J	6		12		11		0.065	U	2.2		0.15	U	0.18	U	0.68	
2- Nitroaniline	- -	- -	- -	mg/kg	41	U	0.095	U	0.061	U	0.19	U	0.063	U	0.12	U	0.12	U	0.048	U	0.047	U	0.11	U	0.14	U	0.063	U
3- Nitroaniline	- -	- -	- -	mg/kg	41	U	0.16	U	0.1	U	0.32	U	0.1	U	0.2	U	0.2	U	0.079	U	0.078	U	0.18	U	0.22	U	0.1	U
4- Nitroaniline	- -	- -	- -	mg/kg	41	U	0.11	U	0.069	U	0.22	U	0.072	U	0.14	U	0.14	U	0.055	U	0.054	U	0.12	U	0.15	U	0.072	U
Nitrobenzene	- -	- -	- -	mg/kg	20	U	0.091	U	0.058	U	0.18	U	0.06	U	0.12	U	0.11	U	0.046	U	0.045	U	0.1	U	0.13	U	0.06	U
2- Nitrophenol	- -	- -	- -	mg/kg	20	U	0.26	U	0.17	U	0.53	U	0.17	U	0.34	U	0.33	U	0.13	U	0.13	U	0.3	U	0.37	U	0.17	U
4- Nitrophenol	- -	- -	- -	mg/kg	41	U	0.32	U	0.21	U	0.65	U	0.21	U	0.42	U	0.4	U	0.16	U	0.16	U	0.37	U	0.46	U	0.21	U
N- Nitrosodi- n- propylamine	- -	- -	- -	mg/kg	20	U	0.11	U	0.072	U	0.23	U	0.075	U	0.15	U	0.14	U	0.057	U	0.056	U	0.13	U	0.16	U	0.075	U
N- Nitrosodiphenylamine	- -	- -	- -	mg/kg	20	U	0.1	U	0.065	U	0.21	U	0.067	U	0.13	U	0.13	U	0.052	U	0.051	U	0.12	U	0.14	U	0.068	U
2,2- Oxybis (1-Chloropropane)	- -	- -	- -	mg/kg		NA	0.11	U	0.068	U	0.21	U	0.07	U	0.14	U	0.13	U	0.054	U	0.053	U	0.12	U	0.15	U	0.071	U
Pentachlorophenol	6.7	6.7	0.8	mg/kg	41	U	0.65	U	0.42	U	1.3	U	0.43	U	0.85	U	0.82	U	0.33	U	0.32	U	0.74	U	0.93	U	0.43	U
Phenanthrene	100	500	100	mg/kg	41	D	0.17	J	0.056	U	3.9		0.058	U	0.78	J	0.11	U	0.045	U	0.044	U	0.22	J	0.22	J	0.059	U
Phenol	100	500	0.33	mg/kg	20	U	0.22	U	0.14	U	0.44	U	0.14	U	0.29	U	0.27	U	0.11	U	0.11	U	0.25	U	0.31	U	0.15	U
Pyrene	100	500	100	mg/kg	26	D	0.14	J	0.067	U	7.8		0.069	U	0.26	J	0.13	U	0.053	U	0.16	J	0.21	J	0.54	J	0.069	U
1,2,4- Trichlorobenzene	- -	- -	- -	mg/kg	20	U	0.13	U	0.081	U	0.26	U	0.084	U	0.16	U	0.16	U	0.064	U	0.063	U	0.14	U	0.18	U	0.084	U
2,4,5- Trichlorophenol	- -	- -	- -	mg/kg	20	U	0.19	U	0.12	U	0.39	U	0.13	U	0.25	U	0.24	U	0.098	U	0.096	U	0.22	U	0.27	U	0.13	U
2,4,6- Trichlorophenol	- -	- -	- -	mg/kg	41	U	0.27	U	0.18	U	0.55	U	0.18	U	0.36	U	0.34	U	0.14	U	0.14	U	0.31	U	0.39	U	0.18	U
Total PAHs	- -	- -	- -	mg/kg	260.8		4.27		0.24		96.32		6		15.8		11.22		ND		3.002		1.07		1.63		0.68	
Total SVOCs	- -	- -	- -	mg/kg	272.6		4.27		0.35		97.08		6.09		17.38		11.4		0.12		3.088		1.2		1.78		0.777	

See notes on page 11.

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:	SCO Restricted-Residential	SCO Restricted-Commercial	SCO – Unrestricted Use		SB-46	SB-46	SB-47	SB-47	SB-48	SB-48	SB-48-DUP	SB-49	SB-49	SB-50	SB-51	SB-51-DUP
Sample Depth:					25 - 28	28 - 30	5 - 7	23	12	18.5 - 19	18.5 - 19	9.5	12	9	14.5	14.5
Date:					06/12/08	06/12/08	03/26/08	03/26/08	07/24/10	07/24/10	07/24/10	07/25/10	07/25/10	02/26/11	02/27/11	02/27/11
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-46	SB-46	SB-47	SB-47	SB-48	SB-48	SB-48-DUP	SB-49	SB-49	SB-50	SB-51	SB-51-DUP
Acenaphthene	100	500	20	mg/kg	49	84	0.66	47 D	35	0.32 U	0.32 U	24	0.73	0.32 U	0.033 J	0.32 U
Acenaphthylene	100	500	100	mg/kg	**250 D**	**370**	3.2	2.5	5 J	0.32 U	0.32 U	2.4 J	0.38 U	0.32 U	0.32 U	0.32 U
Anthracene	100	500	100	mg/kg	**130**	**290**	3.7	26 D	40	0.32 U	0.32 U	52	1.2	0.32 U	0.055 J	0.32 U
Benzo (a) anthracene	1	5.6	1	mg/kg	***130***	***220***	***11 D***	***20 D***	***27***	0.32 U	0.32 U	***66 J***	**2.1**	0.32 U	0.039 J	0.32 U
Benzo (a) pyrene	1	1	1	mg/kg	***95***	***160***	***13 D***	***16 D***	***26***	0.32 U	0.32 U	***62***	***2.1***	0.32 U	0.02 J	0.32 U
Benzo (b) fluoranthene	1	5.6	1	mg/kg	***91***	***150***	***13 D***	***17 D***	***20***	0.32 U	0.32 U	***59***	**1.9**	0.32 U	0.021 J	0.32 U
Benzo (g,h,I) perylene	100	500	100	mg/kg	62	**110**	12 D	8.8 DJ	16	0.32 U	0.32 U	31	1.3	0.32 U	0.32 U	0.32 U
Benzo (k) fluoranthene	3.9	56	0.8	mg/kg	**40**	***67***	**5.6 D**	**6.3 DJ**	**9.6**	0.32 U	0.32 U	**25**	0.69	0.32 U	0.32 U	0.32 U
Benzyl alcohol	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
Bis (2- chloroethoxy) methane	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
Bis (2- Chloroethyl) ether	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
Bis (2- ethylhexyl) phthalate	- -	- -	- -	mg/kg	12 U	26 U	0.98	1.4	6.2 U	0.32 U	0.32 U	14 UJ	0.059 J	0.32 UB	0.32 UB	0.32 UB
4- Bromofluorobenzene	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4- Bromophenyl- phenylether	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
Butylbenzylphthalate	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 UJ	0.38 U	0.32 U	0.32 U	0.022 J
Carbazole	- -	- -	- -	mg/kg	57	100	0.65	11 D	17	0.32 U	0.32 U	19	0.5 J	0.32 U	0.32 U	0.32 U
4- Chloro- 3- methylphenol	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
4- Chloroaniline	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 UJ	0.32 U	0.32 U
2- Chloronaphthalene	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
2- Chlorophenol	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
4- Chlorophenyl- phenylether	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
Chrysene	3.9	56	1	mg/kg	***91***	***200***	**11 D**	**18 D**	**28**	0.32 U	0.32 U	***62 J***	2	0.32 U	0.047 J	0.32 U
Dibenzo (a,h) anthracene	0.33	0.56	0.33	mg/kg	***18***	***30***	***2.6 D***	***1.9 DJ***	***3.8 J***	0.32 U	0.32 U	***9 J***	0.25 J	0.32 U	0.32 U	0.32 U
Dibenzofuran	59	350	7	mg/kg	**150**	**260**	0.5	25 D	22	0.32 U	0.32 U	20	0.44	0.32 U	0.32 U	0.32 U
Dibutyl phthalate	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
1,2- Dichlorobenzene	100	500	1.1	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
1,3- Dichlorobenzene	49	280	2.4	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
1,4- Dichlorobenzene	13	130	1.8	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
3,3'- Dichlorobenzidine	- -	- -	- -	mg/kg	25 U	52 U	0.76 U	1 U	7.6 U	0.39 U	0.39 U	17 UJ	0.46 U	R	0.39 U	0.39 U
2,4- Dichlorophenol	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
Diethyl phthalate	- -	- -	- -	mg/kg	12 U	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
2,4- Dimethylphenol	- -	- -	- -	mg/kg	15	26 U	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
Dimethyl phthalate	- -	- -	- -	mg/kg	12 U	23 J	0.38 U	0.5 U	6.2 U	0.32 U	0.32 U	14 U	0.38 U	0.32 U	0.32 U	0.32 U
4,6- Dinitro- 2- methylphenol	- -	- -	- -	mg/kg	61 U	130 U	1.9 U	2.4 U	39 U	2 U	2 U	87 U	2.4 UJ	2 UJ	2 U	2 U

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:					SB-46		SB-46		SB-47		SB-47		SB-48		SB-48		SB-48-DUP		SB-49		SB-49		SB-50		SB-51		SB-51-DUP	
Sample Depth:					25 - 28		28 - 30		5 - 7		23		12		18.5 - 19		18.5 - 19		9.5		12		9		14.5		14.5	
Date:	SCO Restricted-Residential	SCO Restricted-Commercial	SCO – Unrestricted Use		06/12/08		06/12/08		03/26/08		03/26/08		07/24/10		07/24/10		07/24/10		07/25/10		07/25/10		02/26/11		02/27/11		02/27/11	
Sample Name:	(bold)	(italics)	(shaded)	Units	SB-46		SB-46		SB-47		SB-47		SB-48		SB-48		SB-48-DUP		SB-49		SB-49		SB-50		SB-51		SB-51-DUP	
2,4- Dinitrophenol	- -	- -	- -	mg/kg	61	U	130	U	1.9	U	2.4	U	39	U	2	U	2	UJ	87	U	2.4	UJ	2	UJ	2	U	2	U
2,4- Dinitrotoluene	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
2,6- Dinitrotoluene	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
Dioctyl phthalate	- -	- -	- -	mg/kg	12	U	26	U	0.049	J	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
Fluoranthene	100	500	100	mg/kg	**380**	**D**	***580***	***D***	18	D	58	D	67		0.25	J	0.32	U	**130**		4.8	J	0.32	U	0.093	J	0.32	U
Fluorene	100	500	30	mg/kg	**180**		**300**		0.72		26	D	27		0.32	U	0.32	U	29		0.53		0.32	U	0.022	J	0.32	U
Hexachlorobenzene	1.2	6	0.33	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
Hexachlorobutadiene	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
Hexachlorocyclopentadiene	- -	- -	- -	mg/kg	25	U	26	U	0.76	U	1	U	15	U	0.79	U	0.78	UJ	34	U		R	0.8	UJ	0.79	U	0.78	U
Hexachloroethane	- -	- -	- -	mg/kg	12	U	52	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
Indeno (1,2,3- cd) pyrene	0.5	5.6	0.5	mg/kg	***78***		***130***		***12***	***D***	***9.1***	***DJ***	***18***		0.32	U	0.32	U	***38***		**1.3**		0.32	U	0.19	J	0.32	U
Isophorone	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
2- Methylnaphthalene	- -	- -	- -	mg/kg	300	D	450	D	0.33	J	13	D	3.7	J	0.32	U	0.32	U	16		0.24	J	0.32	U	0.016	J	0.32	U
2- Methylphenol	100	500	0.33	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	0.84	J	0.38	U	0.32	U	0.32	U	0.32	U
4- Methylphenol	100	500	0.33	mg/kg	12	U	26	U	0.077	J	0.62		6.2	U	0.32	U	0.32	U	2	J	0.38	U	0.32	U	0.32	U	0.32	U
Naphthalene	100	500	12	mg/kg	***1400***	***D***	***2300***	***D***	0.94		56	D	76		0.11	J	0.21	J	30		0.44		0.32	U	0.32	U	0.32	U
2- Nitroaniline	- -	- -	- -	mg/kg	61	U	130	U	1.9	U	2.4	U	15	U	0.79	U	0.78	U	34	U	0.93	U	0.8	U	0.79	U	0.78	U
3- Nitroaniline	- -	- -	- -	mg/kg	61	U	130	U	1.9	U	2.4	U	15	U	0.79	U	0.78	U	34	U	0.93	U	0.8	UJ	0.79	U	0.78	U
4- Nitroaniline	- -	- -	- -	mg/kg	25	U	52	U	0.76	U	1	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
Nitrobenzene	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
2- Nitrophenol	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
4- Nitrophenol	- -	- -	- -	mg/kg	61	U	130	U	1.9	U	2.4	U	39	U	2	U	2	U	87	U	2.4	U	2	U	2	U	2	U
N- Nitrosodi- n- propylamine	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
N- Nitrosodiphenylamine	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
2,2- Oxybis (1-Chloropropane)	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
Pentachlorophenol	6.7	6.7	0.8	mg/kg	61	U	130	U	1.9	U	2.4	U	15	U	0.79	U	0.78	U	34	U	0.93	U	0.8	U	0.79	U	0.78	U
Phenanthrene	100	500	100	mg/kg	***680***	***D***	***1000***	***D***	9.1	D	**110**	**D**	**120**		0.069	J	0.32	U	**190**		4.4	J	0.32	U	0.29	J	0.32	U
Phenol	100	500	0.33	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
Pyrene	100	500	100	mg/kg	**300**	**D**	**420**		19	D	53	D	63		0.32	U	0.32	U	**170**	**J**	4.6	J	0.32	U	0.12	J	0.32	U
1,2,4- Trichlorobenzene	- -	- -	- -	mg/kg	12	U	26	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
2,4,5- Trichlorophenol	- -	- -	- -	mg/kg	12	U	130	U	0.38	U	0.5	U	6.2	U	0.32	U	0.32	U	14	U	0.38	U	0.32	U	0.32	U	0.32	U
2,4,6- Trichlorophenol	- -	- -	- -	mg/kg	61	U	26	U	1.9	U	2.4	U	39	U	2	U	2	U	87	U	2.4	U	2	U	2	U	2	U
Total PAHs	- -	- -	- -	mg/kg	4274		6861		135.85		488.6		585.1		0.429		0.21		995.4		28.58		ND		0.946		ND	
Total SVOCs	- -	- -	- -	mg/kg	4496		7244		138.106		526.62		624.1		0.429		0.21		1037.24		29.579		0		0.946		0.022	

See notes on page 11.

Table 3
Soil Analytical Results - Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Notes:

Italicized result exceeds SCO for Restricted – Commercial use.

Bolded result exceeds SCO Restricted – Residential use.

Shaded result exceeds SCO Unrestricted use.

1. Qualifiers are as follows:
   - B Analyte was also detected in the associated method blank.
   - D The reported concentration is based on a diluted sample analysis.
   - E Analyte exceeded calibration range.
   - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
   - M Indicates manually integrated compound.
   - R The reported concentration was rejected.
   - U The analyte was analyzed for, but not detected. The associated value is the analyte quantitation limit.

2. Screening levels were provided in New York State Department of Environmental Conservation 6 New York Codes, Rules and Regulations Subpart 375.6: Remedial Program Soil Cleanup Objectives.
3. Duplicate samples are indicated by location ID ending in DUP.

mg/kg = milligrams per kilogram
NA = not analyzed for
ND = not detected
PAHs = polycyclic aromatic hydrocarbons
SCO = Soil cleanup objective
SVOCs = Semi-volatile organic compounds
Total PAHs = represents the summation of 17 Target Compound List PAHs.
- - = criteria not indicated

Table 4
Soil Analytical Results - Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO Unrestricted Use (shaded)	Units	SB-09 11-15 9/5/2003 SB-09	SB-09 31-33.5 9/5/2003 SB-09	SB-20 12-16 10/2/2003 SB-20	SB-20 16-20 10/2/2003 SB-20	SB-21 12-16 9/30/2003 SB-21	SB-21 36-38.9 9/30/2003 SB-21	SB-22 12-16 9/29/2003 SB-22	SB-22 36-44 9/29/2003 SB-22	SB-23 20-24 9/30/2003 SB-23	SB-23 52-54.5 9/30/2003 SB-23	SB-24 30-32 10/3/2003 SB-24
Aluminum	- -	- -	- -	mg/kg	10800	4990	6980	10800	9830	11100	9260	4430	13700	7660	3850
Antimony	- -	- -	- -	mg/kg	5.1	3	U	U	U	U	0.3 B	U	U	U	U
Arsenic	16	16	13	mg/kg	2	2.6	9.9	8.1	6.8	7	***24.2***	2.9	10.1	2.4	9.2
Barium	400	400	350	mg/kg	153	44.9	232	38.2	168	60.9	160	12.8	60.8	60.3	11.2 B
Beryllium	72	590	7.2	mg/kg	1.1	0.44	0.3 B	0.36	0.27	0.37	0.35	0.084 B	0.47	0.1 B	0.037 B
Cadmium	4.3	9.3	2.5	mg/kg	U	U	0.47	1.1	0.69	0.87	1.8	0.33	1.2	0.59	**5.1**
Calcium	- -	- -	- -	mg/kg	4980	1980	10500	2810	4790	8050	13300	936	11800	1470	4470
Chromium	- -	- -	- -	mg/kg	26.1	14.6	13.7	20.9	15	17.8	15.7	9.7	21.8	18.4	65.8
Cobalt	- -	- -	- -	mg/kg	8.8	3.9	5.4	8.3	6.5	7.5	18	3.4	9	5.9	3.5
Copper	270	270	50	mg/kg	34.9	8.5	26.8	16.6	39.8	20.8	99.1	5.8	33.2	17	59.5
Iron	- -	- -	- -	mg/kg	23400	12600	10400	22600	14300	19300	37400	8320	24900	13900	92900
Lead	400	1,000	63	mg/kg	46.4	6.4	**467**	20.8	109	112	164	3.2	212	12	6
Magnesium	- -	- -	- -	mg/kg	5050	2540	1810	5200	2970	4380	2760	2320	5740	4030	1550
Manganese	2,000	10,000	1,600	mg/kg	243	196	224	555	187	339	417	84.9	426	247	653
Mercury	0.81	2.8	0.18	mg/kg	0.29	0.026 B	0.22	0.045 B	0.27	0.097	0.57	U	**0.94**	0.16	0.077
Nickel	310	310	30	mg/kg	25.6	11	13.2	18.2	13.6	16	24.7	9.1	22.8	13.9	21.2
Potassium	- -	- -	- -	mg/kg	4280	908	1270	1960	1070	2030	1390	988	2460	1930	481
Selenium	180	1,500	3.9	mg/kg	U	U	2.9	4.3	3.3	3.4	6.8	2.2	4.9	3.1	6.2
Silver	180	1,500	2	mg/kg	U	0.96 B	1.4 B	2.2	1.6	1.9	3.3	0.99 B	2.4	1.5 B	3.8
Sodium	- -	- -	- -	mg/kg	194	584	622	609	336	717	425	1370	2860	1420	1070
Thallium	- -	- -	- -	mg/kg	4.2	2.9	1.4	1.2 B	0.46 B	1.1 B	1.8	0.86 B	2	1.4	2.4
Vanadium	- -	- -	- -	mg/kg	33.6	18.5	20.9	26.4	24.1	24.1	26.4	14.5	30.2	22.8	7.3
Zinc	10,000	10,000	109	mg/kg	61.1	30.3	44.8	56.2	61.6	67.8	136	19.1	74.8	33.1	77.8
Total Cyanide	27	27	27	mg/kg	1.2 B	U	6.7	U	6.5	0.78 B	U	U	2	0.63 B	1.2 B
Miscellaneous															
Percent moisture	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent solids	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on page 6.

Table 4
Soil Analytical Results - Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO Unrestricted Use (shaded)	Units	SB-24 34-36 10/3/2003 SB-24	SB-24 36-38 10/2/2003 SB-24	SB-25 12-16 10/1/2003 SB-25	SB-25 24-28 10/1/2003 SB-25	SB-26 9-13 9/29/2003 SB-26	SB-26 16-19 10/1/2003 SB-26	SB-30 10 - 14 02/20/05 SB-30	SB-30 34 - 36 02/20/05 SB-30	SB-31 7 - 11 03/06/05 SB-31	SB-32 9 - 11 03/02/05 SB-32	SB-32 35 - 39 03/02/05 SB-32
Aluminum	- -	- -	- -	mg/kg	12200	291	9980	15200	8290	13100	4360	10200	9060	6140	13400
Antimony	- -	- -	- -	mg/kg	U	U	U	0.33 B	0.37 B	1.7 B	2.3 N	3.1 N	0.91 BN	3.9 N*	2.2 N*
Arsenic	16	16	13	mg/kg	10.8	5.2	3.5	11.3	4.3	6.7	5.8 N	3.6 N	4.2 N*	***31.6*** ***N****	5.9 N*
Barium	400	400	350	mg/kg	24.7	1.7 B	82.1	34	81.8	103	84.1	20.8	123 *E	72.1 *E	32.3 *E
Beryllium	72	590	7.2	mg/kg	0.43	U	0.098 B	0.55	U	0.095 B	0.49 E	0.74 E	0.39	0.35 B	0.61
Cadmium	4.3	9.3	2.5	mg/kg	1.3	0.068 B	0.78	1.5	1.1	0.91	2.8 E	3 E	2.1 N*	**5.2** **N***	3.8 N*
Calcium	- -	- -	- -	mg/kg	3630	191	4610	6330	9740	2150	6110	6400	12700	2310	7820
Chromium	- -	- -	- -	mg/kg	20.6	0.86 B	14.4	25.2	16.6	24.8	15.5 N	19.2 N	16 *	8.7 *	22.8 *
Cobalt	- -	- -	- -	mg/kg	9.4	0.35 B	7	11	6.2	11.5	5.1 E	7.6 E	7.5	4.3	9
Copper	270	270	50	mg/kg	14	0.94 B	20.5	17.1	34.3	40.2	57.6 N	9.9 N	57.7 *	59.2 *	25.4 *
Iron	- -	- -	- -	mg/kg	27600	987	18300	33200	23200	24200	15200	51200	17200	37900	30600
Lead	400	1,000	63	mg/kg	9.6	2.9	112	12.1	55.6	94.2	215 E	9.2 E	134 NE	37.9 NE	11.6 NE
Magnesium	- -	- -	- -	mg/kg	6740	168	3480	7440	5070	5580	2040	5870	4850 *E	1000 *E	6810 *E
Manganese	2,000	10,000	1,600	mg/kg	675	30	236	571	236	198	84.5 E	669 E	168 E	58.9 E	714 E
Mercury	0.81	2.8	0.18	mg/kg	0.032 B	0.04 B	**0.96**	0.039 B	0.33	0.3	**2.2** *	0.029 B*	0.61	0.5	0.05
Nickel	310	310	30	mg/kg	19.4	0.79 B	14	23.5	13.6	22.7	14.5 E	18.1 E	17.7 *	16.7 *	21.4 *
Potassium	- -	- -	- -	mg/kg	2550	116	2300	2970	4060	4540	1550 E	2350 E	4240 E	673 E	3020 E
Selenium	180	1,500	3.9	mg/kg	4.8	U	4.4	5.4	5.1	5.5	0.093 UN	0.092 UN	0.066 UN	8.1 N*	0.098 UN
Silver	180	1,500	2	mg/kg	2.5	U	1.9	2.6	2.4	0.34 B	5.2 E	6.7 E	6.5 *E	14.6 *E	11.5 *E
Sodium	- -	- -	- -	mg/kg	3980	257	475	2720	304	788	2390 E	3890 E	764	1720	5070
Thallium	- -	- -	- -	mg/kg	1.2 B	0.21 B	1.8	1.7	2.2	4.4	0.11 UN	0.11 UN	0.078 U	0.093 U	0.12 U
Vanadium	- -	- -	- -	mg/kg	26	7	19.2	31.8	19.9	25.4	13.3	23.8	22.1 *	12.6 *	27.6 *
Zinc	10,000	10,000	109	mg/kg	62.1	4.2	46.7	74.1	53.4	69	188 NE	56.6 NE	112	24.2	66.7
Total Cyanide	27	27	27	mg/kg	U	3.8	0.6 B	U	7.3	4.4	2.6 N	0.26 BN	4.1	1.6	0.21 B
Miscellaneous															
Percent moisture	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Percent solids	- -	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on page 6.

Table 4
Soil Analytical Results - Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO Unrestricted Use (shaded)	Units	SB-33 5 - 7 02/27/05 SB-33		SB-34 13 - 17 02/23/05 SB-34		SB-34 37 - 39 02/24/05 SB-34		SB-38 25 - 27 02/22/05 SB-38		SB-38 43 - 45 02/22/05 SB-38		SB-39 45 - 47 03/10/05 SB-39		SB-39 65 - 67 03/12/05 SB-39		SB-40 28 - 30 04/05/05 SB-40		SB-40 46 - 48 04/05/05 SB-40		SB-41 13 - 14 12/06/06 SB-41		SB-41 24 - 25 12/06/06 SB-41	
Aluminum	- -	- -	- -	mg/kg	9540		9050		14200		12400		10600		5520		10400		6390	E	11400	E		NA		NA
Antimony	- -	- -	- -	mg/kg	1.8	N	1.4	BN	3.5	N	3.4	N	2.4	N	1.3		0.26	B	0.77	BN	1.1	BN	2	UN	3.4	UN
Arsenic	16	16	13	mg/kg	1.8	N	4.4	N	5.5	N	***19.3***	***N***	4.8	N	12		6.2		4.6	*	7.8	*	4.8	BN	9.7	BN
Barium	400	400	350	mg/kg	106		109		28.6		143		21.8		94.5		37.6		167	*E	23.7	*E		NA		NA
Beryllium	72	590	7.2	mg/kg	0.54	E	1.3	E	1	E	0.82	E	0.75	E	0.31	B	0.48		0.19	B	0.45	B	0.58	U	0.96	U
Cadmium	4.3	9.3	2.5	mg/kg	1.6	E	1.1	E	3.8	E	3.6	E	3.1	E	0.53		0.0065	U	1	*E	0.0082	U*	1	UN	1.7	UN
Calcium	- -	- -	- -	mg/kg	2980		5570		6260		7280		3670		5360		4790		10700	E	4490	E		NA		NA
Chromium	- -	- -	- -	mg/kg	15.2	N	14.4	N	27.1	N	38.7	N	19.1	N	20		19.4		17.9	*E	21.3	*E	5.8		21.1	
Cobalt	- -	- -	- -	mg/kg	4.8	E	5.5	E	10.1	E	8.4	E	7.7	E	4.8		8.1		7.3	E	10.2	E		NA		NA
Copper	270	270	50	mg/kg	22.4	N	78.8	N	14.7	N	86.7	N	10.6	N	83.5		23.2		128	NE	19.4	NE	22	*	12.2	*
Iron	- -	- -	- -	mg/kg	13500		9240		61000		49900		51300		14600		27900		12500	*E	27700	*E		NA		NA
Lead	400	1,000	63	mg/kg	100	E	115	E	12.5	E	353	E	9	E	284		11.5		211	*E	11.2	*E	150	*	12.4	B*
Magnesium	- -	- -	- -	mg/kg	3340		1990		7660		5510		6190		3140		6700		3880	E	7170	E		NA		NA
Manganese	2,000	10,000	1,600	mg/kg	114	E	118	E	802	E	338	E	594	E	201		340		380	E	689	E		NA		NA
Mercury	0.81	2.8	0.18	mg/kg	0.47	*	***4***	*****	0.04	B*	***10.6***	*****	0.038	B*	***3.7***		0.034	B	***5.8***		0.035	B	0.061	*	0.032	B*
Nickel	310	310	30	mg/kg	15.1	E	11.8	E	24.7	E	21.7	E	18.9	E	13.5		16.2		21.3	E	24.8	E	8.5		20.6	
Potassium	- -	- -	- -	mg/kg	979	E	1600	E	3370	E	2570	E	2720	E	1210		2470		2180		2460			NA		NA
Selenium	180	1,500	3.9	mg/kg	0.072	UN	0.093	UN	0.096	UN	0.092	UN	0.094	UN	3.3		3.5		0.082	U	0.1	U	2.1	UN	3.4	UN
Silver	180	1,500	2	mg/kg	6.3	E	5.9	E	9.1	E	9.7	E	7.2	E	0.021	U	0.023	U	8.3	*E	3.1	*E	0.3	U	0.5	U
Sodium	- -	- -	- -	mg/kg	942	E	2820	E	5400	E	4820	E	4630	E	3250		3460		2140		4770			NA		NA
Thallium	- -	- -	- -	mg/kg	0.085	UN	0.11	UN	0.11	UN	0.11	UN	0.11	UN	2		3.8		1.9		3.9		3.6	U	6	U
Vanadium	- -	- -	- -	mg/kg	17.1		19		34.4		26.1		23.2		15.6		27.7		23	E	25.5	E		NA		NA
Zinc	10,000	10,000	109	mg/kg	89	NE	154	NE	75.6	NE	245	NE	58	NE	267		55.8		373	N*	69.4	N*	65.4		54.1	
Total Cyanide	27	27	27	mg/kg	0.25	BN	0.36	BN	0.3	BN	15.6	N	0.34	BN	0.76	B	0.15	U	0.15	U	0.17	U	0.308	B	0.1	U
Miscellaneous																										
Percent moisture	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	13.7		31.8	
Percent solids	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	86.3		68.2	

See notes on page 6.

Table 4
Soil Analytical Results - Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO Unrestricted Use (shaded)	Units	SB-42 13 - 14 12/06/06 SB-42		SB-42 24 - 25 12/06/06 SB-42		SB-42 27 - 28 12/06/06 SB-42		SB-43 16 - 17 12/05/06 SB-43		SB-43 28 - 29 12/05/06 SB-43		SB-44 14 - 15 12/05/06 SB-44		SB-44 19 - 20 12/05/06 SB-44		SB-44 21 - 22 12/05/06 SB-44		SB-44-DUP 21 - 22 12/05/06 SB-44-DUP		SB-46 25 - 28 06/12/08 SB-46		SB-46 28 - 30 06/12/08 SB-46	
Aluminum	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	9840		12700	
Antimony	- -	- -	- -	mg/kg	2.4	UN	2.8	UN	3.5	UN	3.1	UN	2.5	UN	2.2	UN	2.8	UN	2.9	UN	3.5	UN	18.8	U	19.6	U
Arsenic	16	16	13	mg/kg	4.3	BN	11.2	BN	3.7	BN	9.2	BN	2.7	BN	2.1	UN	3.1	BN	9.6	BN	12.8	BN	9.7		12.2	
Barium	400	400	350	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	41.7		31.2	
Beryllium	72	590	7.2	mg/kg	0.69	U	0.81	U	1	U	0.88	U	0.71	U	0.62	U	0.8	U	1.1	B	1	U	0.73	J	0.89	J
Cadmium	4.3	9.3	2.5	mg/kg	1.2	UN	1.4	UN	1.8	UN	1.6	UN	1.3	UN	1.1	UN	1.4	UN	1.5	UN	1.8	UN	9.4	U	9.8	U
Calcium	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	21400		3680	
Chromium	- -	- -	- -	mg/kg	20.5		27.9		23.1		20.1		10.4		18.2		13.2		35.5		30.6		22.5		26.3	
Cobalt	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	8.3		10.7	
Copper	270	270	50	mg/kg	30.2	*	17.2	*	29.4	*	27	*	6.5	*	18.2	*	23	*	36.6	*	21.2	*	30.3		15	
Iron	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	23300		30800	
Lead	400	1,000	63	mg/kg	72.3	*	14	*	162	*	196	*	5.7	B*	43.1	*	87.6	*	65.5	*	18.4	*	64.8		14.9	
Magnesium	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	15900		7030	
Manganese	2,000	10,000	1,600	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	461		697	
Mercury	0.81	2.8	0.18	mg/kg	0.057	*	0.033	B*	0.12	*	0.12	*	0.015	U*	0.17	*	0.068	*	0.16	*	0.15	*	0.25		0.039	J
Nickel	310	310	30	mg/kg	18.2		25.5		16.9		21		23.7		18.4		14.7		34.2		24.8		19.8		24.1	
Potassium	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	2250	J	2810	J
Selenium	180	1,500	3.9	mg/kg	2.5	UN	2.9	UN	3.6	UN	3.1	UN	2.5	UN	2.2	UN	2.9	UN	2.9	UN	3.6	UN	18.8	U	19.6	U
Silver	180	1,500	2	mg/kg	0.36	U	0.42	U	0.52	U	0.46	U	0.37	U	0.32	U	0.42	U	0.43	U	0.52	U	5.7	U	5.9	U
Sodium	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	2620	J	4220	J
Thallium	- -	- -	- -	mg/kg	4.3	U	5	U	6.3	U	5.5	U	4.4	U	3.9	U	5	U	5.1	U	6.2	U	13.2	U	13.7	U
Vanadium	- -	- -	- -	mg/kg		NA		NA		NA		NA		NA		NA		NA		NA		NA	27.7		32.9	
Zinc	10,000	10,000	109	mg/kg	70.4		69.7		53.4		76.2		9.5	B	37.4		45.4		98.7		60.6		68.6	J	71.4	J
Total Cyanide	27	27	27	mg/kg	13.3		0.111	U	0.108	U	0.106	U	0.085	U	0.085	U	0.0965	U	0.12	U	0.113	U	0.76	U	0.79	U
Miscellaneous																										
Percent moisture	- -	- -	- -	mg/kg	16.4		34.7		34.7		30.3		14.6		16.3		23.3		38.7		34.5		34.3		36.9	
Percent solids	- -	- -	- -	mg/kg	83.6		65.3		65.3		69.7		85.4		83.7		76.7		61.3		65.5		65.7		63.1	

See notes on page 6.

Table 4
Soil Analytical Results - Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth (feet): / Date Collected: / Sample Name:	SCO Restricted – Residential (bold)	SCO Restricted – Commercial (italics)	SCO Unrestricted Use (shaded)	Units	SB-47 5 - 7 03/26/08 SB-47	SB-47 23 03/26/08 SB-47	SB-48 12 07/24/10 SB-48	SB-48 18.5 - 19 07/24/10 SB-48	SB-48-DUP 18.5 - 19 07/24/10 SB-48-DUP	SB-49 9.5 07/25/10 SB-49	SB-49 12 07/25/10 SB-49	SB-50 9 02/26/11 SB-50	SB-51 14.5 02/27/11 SB-51	SB-51-DUP 14.5 02/27/11 SB-51-DUP
Aluminum	- -	- -	- -	mg/kg	4580	7920	5340	8330	5690	2110	3300	9880	10700	11300
Antimony	- -	- -	- -	mg/kg	1.8 J	12.8 U	4.7 UJ	4.8 UJ	4.7 UJ	5 UJ	5.7 UJ	4.7 UJ	4.6 UJ	4.8 UJ
Arsenic	16	16	13	mg/kg	7.9	10.5	6 UJ	2.2 J	5.9 UJ	2.9 J	7.2 U	2.9 J	3.5 J	2.6 J
Barium	400	400	350	mg/kg	97	207	53.7	40.3	28.9	35.5	40.6	69.5	185	197
Beryllium	72	590	7.2	mg/kg	1.6 U	1.8 U	0.15 J	0.33 J	0.24 J	0.1 J	0.18 J	0.51 J	0.57 J	0.61 J
Cadmium	4.3	9.3	2.5	mg/kg	5.8 U	6.4 U	1.4 UJ	1.5 UJ	1.4 UJ	1.5 UJ	1.7 UJ	1.4 U	1.4 U	1.5 U
Calcium	- -	- -	- -	mg/kg	31400	18600	7090 J	316 J	392 J	834 J	746 J	1270	689	644
Chromium	- -	- -	- -	mg/kg	14.2	23.2	9.8 J	16 J	11.6 J	13 J	11.3 J	15.9 J	24.9 J	25.7 J
Cobalt	- -	- -	- -	mg/kg	5.7	7.4	4.6 J	4.7 J	3.4 J	2.9 J	2.6 J	7	4.6	5.6
Copper	270	270	50	mg/kg	66.6	111	13.9 J	7.4 J	5.2 J	17.9 J	12.4 J	18.5	12.2	13.1
Iron	- -	- -	- -	mg/kg	16400	23600	9480	10400	7290	14600	7750	15600	14600	12300
Lead	400	1,000	63	mg/kg	**696**	***1150***	11.5 J	6.3 J	3.7 J	83 J	59.5 J	18.4 J	9.2 J	5.8 J
Magnesium	- -	- -	- -	mg/kg	4320	4170	3110	2120	1550	862	1450	3300	2550	2590
Manganese	2,000	10,000	1,600	mg/kg	245	235	98.6	58.1	58.3	65.9	59.6	165	86.5	75.6
Mercury	0.81	2.8	0.18	mg/kg	0.74	***3.5***	0.097	0.03 J	0.034 J	***5.1***	0.32	0.35 J	0.019 J	0.02 J
Nickel	310	310	30	mg/kg	14.1	19	9.7 J	11.7 J	8.2 J	7.9 J	7.2 J	14.5	16.8	18.8
Potassium	- -	- -	- -	mg/kg	825	1810	2440 J	831 J	559 J	425 J	654 J	1810 J	1290 J	1350 J
Selenium	180	1,500	3.9	mg/kg	11.6 U	12.8 U	10.7 UJ	10.9 UJ	10.6 UJ	11.4 UJ	12.9 UJ	10.8 UJ	10.6 UJ	10.9 UJ
Silver	180	1,500	2	mg/kg	3.5 U	3.6 J	0.17 J	0.23 J	0.17 J	0.54 J	0.27 J	0.25 J	0.23 J	0.15 J
Sodium	- -	- -	- -	mg/kg	879	2770	88.9 J	633 J	467 J	69.1 J	207 J	487	459	457
Thallium	- -	- -	- -	mg/kg	8.1 U	9 U	1.2 J	4.4 UJ	4.2 UJ	4.6 UJ	5.1 UJ	1 J	2.1 J	1.5 J
Vanadium	- -	- -	- -	mg/kg	18.6	23	11.3 J	17.9 J	13.3 J	8.6 J	11.3 J	18.9 J	23.2 J	24.4 J
Zinc	10,000	10,000	109	mg/kg	253	512	36.6	19.5	16.9	71.3	37.6	52	23.1	23.5
Total Cyanide	27	27	27	mg/kg	3.8	0.45 J	0.578 U	0.589 U	0.586 U	0.64 U	0.696 UJ	0.596 U	0.591 U	0.585 U
Miscellaneous														
Percent moisture	- -	- -	- -	mg/kg	15.4	34.2	13.5	15.1	14.7	21.8	28.2	16	15.4	14.5
Percent solids	- -	- -	- -	mg/kg	84.6	65.8	86.5	84.9	85.3	78.2	71.8	84	84.6	85.5

See notes on page 6.

Table 4
Soil Analytical Results - Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Notes:
Italicized result exceeds SCO for Restricted – Commercial use.
Bolded result exceeds SCO Restricted – Residential use.
Shaded result exceeds SCO Unrestricted use.
Qualifiers are as follows:

- B The reported value was obtained from a reading less than the CRDL but greater than or equal to the IDL.
- D The reported concentration is based on a diluted sample analysis.
- E Estimated due to intereference presence.
- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- N Indicates spike sample recovery is not within the quality control limits.
- U The analyte was analyzed for, but not detected. The associated value is the instrument detection limit.
- * Indicates analysis is not within the quality control limits.

Screening levels were provided in New York State Department of Environmental Conservation 6 New York Codes, Rules and Regulations Subpart 375.6: Remedial Program Soil Cleanup Objectives.
Duplicate samples are indicated by location ID ending in DUP.

mg/kg = milligrams per kilogram
NA = not analyzed
% = percent
SCO = Soil cleanup objective
- - = criteria not indicated

Table 5
Well Construction Details

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Monitoring Well ID	Approximate Ground Elevation (feet[1])	Elevation of Top of Well (feet[1])	Screen Interval Depth		Hydrostratigraphic Unit Screened	Subsurface Materials Observed in Screened Interval
			(feet bgs)	(feet[1])		
MW-07	2.03	1.49	5 - 15	-3.0 - -13.0	Fill Unit	Fill/Sand/gravel
MW-08	2.15	1.57	5 - 15	-2.9 - -12.9	Fill Unit	Fill/Sand/gravel
MW-09	2.20	1.48	5 - 15	-2.8 - -12.8	Fill Unit	Fill/Sand/gravel
MW-10	2.08	1.92	5 - 15	-2.9 - -12.9	Fill Unit	Fill/Sand/gravel
MW-11	13.28	13.00	7 - 17	6.3 - -3.7	Fill Unit	Fill/Sand

Notes:
1. MW-08 to MW-10 elevations in NGVD 1929; MW-11 elevations in NAVD 1988
2. Installation of monitoring wells were performed by the following:
   - ADT on February 20-27, 2005 (Borings MW-07, MW-08, MW-09 and MW-10).
   - NYEG Drilling LLC on July 23, 2010 (Borings MW-11).

bgs = below ground surface

Table 6
Groundwater Analytical Results – Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Date Collected: / Sample Name:	NYSDEC GA	Units	MW-03 10/08/03 MW-03	MW-03 10/08/03 MW-03 DL	MW-07 03/19/05 MW-07	MW-07 03/07/11 MW-07	MW-08 03/19/05 MW-08	MW-08 03/05/11 MW-08	MW-09 03/18/05 MW-09	MW-09 03/18/05 MW-09 DL	MW-09 03/01/11 MW-09	MW-09-DUP 03/01/11 REP 3-1-11	MW-10 03/18/05 MW-10	MW-10 03/18/05 MW-10 DL	MW-10 03/01/11 MW-10	MW-11 07/29/10 MW-11
Acetone (2- propanone, dimethyl ketone)	50	µg/L	5 U	10 U	40 U	2.7 UB	5 U	1.3 J	5 U	40 U	2 U	2 U	5 U	15 U	2 U	3 UBJ
Benzene	1	µg/L	**280 E**	**220 D**	**80**	**25 J**	5 U	0.5 U	**78**	**61 D**	**35**	**41**	**69**	**50 D**	**1.4**	0.23 J
Bromobenzene	- -	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Bromochloromethane	- -	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Bromoform	50	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
Bromomethane/ methyl bromide	- -	µg/L	5 U	10 U	40 U	1 U	5 U	1 U	5 U	40 U	1 U	1 U	5 U	15 U	1 U	1 U
2- butanone (methyl ethyl ketone)	- -	µg/L	5 U	10 U	40 U	2 U	5 U	2 U	5 U	40 U	2 U	2 U	5 U	15 U	2 U	2 U
n- butylbenzene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
sec- butylbenzene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	1 J	40 U	NA	NA	5 U	15 U	NA	NA
tert- butylbenzene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	**6**	40 U	NA	NA	5 U	15 U	NA	NA
Carbon disulfide	- -	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.24 J
Carbon tetrachloride	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
Chlorobenzene	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
Chloroethane	5	µg/L	5 U	10 U	40 U	1 U	5 U	1 U	5 U	40 U	1 U	1 U	5 U	15 U	1 U	1 U
Chloroform	7	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
Chloromethane (methyl chloride)	- -	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
2- Chlorotoluene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
4- Chlorotoluene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Cumene	5	µg/L	2 J	10 U	**9 J**	NA	5 U	NA	**29**	**20 DJ**	NA	NA	2 J	15 U	NA	NA
1,2- Dibromo- 3- chloropropane	- -	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Dibromochloromethane	- -	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
cis- 1,3- Dichloro, 1- propene	- -	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
1,2- Dichlorobenzene	3	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
1,3- Dichlorobenzene	3	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
1,4- Dichlorobenzene	3	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Dichlorobromomethane	- -	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
1,1- Dichloroethane	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
1,2- Dichloroethane	0.6	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
cis- 1,2- Dichloroethene	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
trans- 1,2- Dichloroethene	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
1,1- Dichloroethylene	- -	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
Dichloromethane	5	µg/L	5 U	10 U	40 U	2 UJ	5 U	2 UB	5 U	40 U	2 UBJ	2 UBJ	5 U	15 U	2 UJ	2 UJ
1,2- Dichloropropane	1	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U

Table 6
Groundwater Analytical Results – Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Date Collected: / Sample Name:	NYSDEC GA	Units	MW-03 10/08/03 MW-03	MW-03 10/08/03 MW-03 DL	MW-07 03/19/05 MW-07	MW-07 03/07/11 MW-07	MW-08 03/19/05 MW-08	MW-08 03/05/11 MW-08	MW-09 03/18/05 MW-09	MW-09 03/18/05 MW-09 DL	MW-09 03/01/11 MW-09	MW-09-DUP 03/01/11 REP 3-1-11	MW-10 03/18/05 MW-10	MW-10 03/18/05 MW-10 DL	MW-10 03/01/11 MW-10	MW-11 07/29/10 MW-11
1,3- Dichloropropane	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
1,1- Dichloropropene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
trans- 1,3- Dichloropropene	0.4	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
Ethylbenzene	5	µg/L	5 U	10 U	**63**	**9.5**	5 U	0.5 U	**130**	**160 D**	**53**	**57**	**25**	**20 D**	0.59	0.5 U
Ethylene dibromide	6.00E-04	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Freon 12	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Hexachlorobutadiene	0.5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	8 DJ	NA	NA
2- Hexanone	- -	µg/L	5 U	10 U	40 U	2 U	5 U	2 U	5 U	40 U	2 U	2 U	5 U	15 U	2 U	2 U
Iodomethane (methyl iodide)	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Methyl isobutyl ketone	- -	µg/L	5 U	10 U	40 U	0.71 J	5 U	2 U	5 U	40 U	2 UJ	2 UJ	5 U	15 U	2 UJ	2 U
Methyl tert-butyl ether	10	µg/L	2 J	2 DJ	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Methylene bromide	- -	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
n- propylbenzene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	**12**	**9 DJ**	NA	NA	5 U	15 U	NA	NA
Styrene	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
1,1,1,2- Tetrachloroethane	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
1,1,2,2- Tetrachloroethane	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 UJ
Tetrachloroethylene	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
Toluene	5	µg/L	5 U	10 U	**28 J**	2.4	5 U	0.5 U	**62**	**42 D**	4.6	**5.2**	**37**	**25 D**	0.5 U	0.5 UB
1,2,3- Trichlorobenzene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
1,2,4- Trichlorobenzene	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
1,1,1- Trichloroethane (methyl chloroform)	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
1,1,2- Trichloroethane	- -	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.5 U
Trichloroethene (trichloroethylene)	5	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 U	0.5 U	5 U	15 U	0.5 U	0.42 J
Trichlorofluoromethane (freon 11)	5	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
1,2,3 - Trichloropropane	0.04	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
1,2,4- Trimethylbenzene	5	µg/L	5 U	10 U	**42**	NA	5 U	NA	**53**	**44 D**	NA	NA	**11**	**10 DJ**	NA	NA
1,3,5- Trimethylbenzene	5	µg/L	5 U	10 U	**11 J**	NA	5 U	NA	**12**	**10 DJ**	NA	NA	**6**	**6 DJ**	NA	NA
Vinyl acetate	- -	µg/L	5 U	10 U	40 U	NA	5 U	NA	5 U	40 U	NA	NA	5 U	15 U	NA	NA
Vinyl chloride (chloroethene)	2	µg/L	5 U	10 U	40 U	0.5 U	5 U	0.5 U	5 U	40 U	0.5 UJ	0.5 UJ	5 U	15 U	0.5 UJ	0.5 U
Total xylenes	5	µg/L	5 U	10 U	**110**	**12**	5 U	1 U	**180**	**140 D**	**27**	**31**	**53**	**41 D**	1 U	1 U
Total BTEX	- -	µg/L	280	NA	148 J	J	ND	ND	77	162	5	6	52	63	1	0.66
Total VOCs			284	222	343	49.61	0	1.3	550	477	119.6	134.2	203	152	1.99	0.89

See notes on page 3.

Table 6
Groundwater Analytical Results – Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Notes:
Bold and shaded values exceed NYSDEC GA screening criteria.
1. Qualifiers are as follows:
   B Analyte was also detected in the associated method blank.
   D The reported concentration is based on a diluted sample analysis.
   J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
   N Indicates that spike sample recovery is not within the quality control limits.
   U The analyte was analyzed for, but not detected. The associated value is the analyte quantitation limit.
2. Screening levels for class GA groundwater were provided in NYSDEC Technical and Operational Guidance Series 1.1.1 for Groundwater.
3. Sample IDs that end in the letters DL indicate that the original sample extraction was diluted to be able to report a value for one or more constituents being analyzed for.
BTEX = benzene, toluene, ethylbenzene, and xylene
µg/L = micrograms per liter
NA = Not analyzed
NYSDEC = New York State Department of Environmental Conservation
PAH = polycyclic aromatic hydrocarbon
- - = criteria not identified

Table 7
Groundwater Analytical Results – Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID:	NYSDEC		MW-07		MW-07		MW-07		MW-08		MW-08		MW-09		MW-09		MW-09		MW-09-DUP		MW-10		MW-10		MW-11	
Date Collected:			03/19/05		38430		03/07/11		03/19/05		03/05/11		03/18/05		03/18/05		03/01/11		03/01/11		03/18/05		03/01/11		07/29/10	
Sample Name:	GA	Units	MW-07		MW-07 DL		MW-07		MW-08		MW-08		MW-09		MW-09 DL		MW-09		REP 3-1-11		MW-10		MW-10		MW-11	
Acenaphthene	20	µg/L	**73**		**78**	**DJ**	**30**		10	U	4.2	U	**63**		**57**	**DJ**	**41**		**48**		**23**		**28**		4.2	U
Acenaphthylene	- -	µg/L	4	J	100	U	1.1	J	10	U	4.2	U	41		36	DJ	15		20		2	J	1.8	J	4.2	U
Anthracene	50	µg/L	19		24	DJ	9.2		10	U	4.2	U	32		28	DJ	15		15		8	J	5.7		4.2	U
Benzo (a) anthracene	0.002	µg/L	**8**	**J**	**13**	**DJ**	**4.7**		10	U	4.2	U	**13**		200	U	**2.9**	**J**	**2.4**	**J**	**10**		**7.5**		4.2	U
Benzo (a) pyrene	0	µg/L	**5**	**J**	100	U	**3.5**	**J**	10	U	4.2	U	**10**		200	U	**2.1**	**J**	**1.6**	**J**	**8**	**J**	**7.9**		4.2	U
Benzo (b) fluoranthene	0.002	µg/L	**6**	**J**	100	U	**3.4**	**J**	10	U	4.2	U	**10**		200	U	**1.9**	**J**	**1.5**	**J**	**9**	**J**	**7.7**		4.2	U
Benzo (g,h,I) perylene	- -	µg/L	3	J	100	U	5.4	J	10	U	4.2	U	7	J	200	U	6.6	J	6.2	J	6	J	6.4		4.2	UJ
Benzo (k) fluoranthene	0.002	µg/L	**2**	**J**	100	U	**1.7**	**J**	10	U	4.2	U	**4**	**J**	200	U	8.5	U	8.5	U	**4**	**J**	**3.6**	**J**	4.2	U
Benzyl alcohol		µg/L		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Bis (2- chloroethoxy) methane	5	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
Bis (2- Chloroethyl) ether	1	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
Bis (2- ethylhexyl) phthalate	5	µg/L	10	U	100	U	3.3	J	10	U	4.2	U	10	U	200	U	8.5	UB	8.5	UB	10	U	4	UB	4.2	U
4- Bromofluorobenzene	- -	µg/L	10	U	100	U		NA	10	U		NA	10	U	200	U		NA		NA	10	U		NA		NA
4- Bromophenyl- phenylether	- -	µg/L		NA		NA	4.2	U		NA	4.2	U		NA		NA	8.5	U	8.5	U		NA	4	U	4.2	U
Butylbenzylphthalate	50	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
Carbazole	- -	µg/L	99		120	D	11		10	U	4.2	U	76		65	DJ	10		13		10	U	1	J	4.2	U
4- Chloro- 3- methylphenol	- -	µg/L	10	U	100	U	5.2	U	10	U	5.2	U	10	U	200	U	11	U	11	U	10	U	5	U	5.3	U
4- Chloroaniline	- -	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
2- Chloronaphthalene	10	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
2- Chlorophenol	- -	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
4- Chlorophenyl- phenylether	- -	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
Chrysene	0.002	µg/L	**8**	**J**	**11**	**DJ**	**4.6**		10	U	4.2	U	**18**		200	U	**4.1**	**J**	**3.2**	**J**	**6**	**J**	**6**		4.2	U
Dibenzo (a,h) anthracene	- -	µg/L	10	U	100	U	3.7	J	10	U	4.2	U	1	J	200	U	5.8	J	8.5	U	10	U	3.2	J	4.2	UJ
Dibenzofuran	- -	µg/L	52		60	DJ	18		10	U	4.2	U	37		36	DJ	13		16		16		10		4.2	U
Dibutyl phthalate	50	µg/L	10	U	100	U	0.43	J	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	0.43	J	4.2	U
1,2- Dichlorobenzene	3	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
1,3- Dichlorobenzene	3	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
1,4- Dichlorobenzene	3	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
3,3'- Dichlorobenzidine	5	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
2,4- Dichlorophenol	5	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
Diethyl phthalate	50	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	UB
2,4- Dimethylphenol	1	µg/L	**8**	**J**	100	U	0.93	J	10	U	4.2	U	**8**	**J**	200	U	**2**	**J**	**2.4**	**J**	**18**		4	U	4.2	U
Dimethyl phthalate	50	µg/L	10	U	100	U	4.2	U	10	U	4.2	U	10	U	200	U	8.5	U	8.5	U	10	U	4	U	4.2	U
4,6- Dinitro- 2- methylphenol	- -	µg/L	20	U	200	U		R	20	U	26	U	20	U	400	U	53	U	53	U	20	U	25	U	26	U

Table 7
Groundwater Analytical Results – Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Date Collected: / Sample Name:	NYSDEC GA	Units	MW-07 03/19/05 MW-07	MW-07 38430 MW-07 DL	MW-07 03/07/11 MW-07	MW-08 03/19/05 MW-08	MW-08 03/05/11 MW-08	MW-09 03/18/05 MW-09	MW-09 03/18/05 MW-09 DL	MW-09 03/01/11 MW-09	MW-09-DUP 03/01/11 REP 3-1-11	MW-10 03/18/05 MW-10	MW-10 03/01/11 MW-10	MW-11 07/29/10 MW-11
2,4- Dinitrophenol	*	µg/L	20 U	200 U	R	20 U	26 U	20 U	400 U	53 U	53 U	20 U	25 U	26 UJ
2,4- Dinitrotoluene	5	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
2,6- Dinitrotoluene	5	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
Dioctyl phthalate	50	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
Fluoranthene	50	µg/L	31	38 DJ	13	10 U	4.2 U	45	39 DJ	15	16	31	20	4.2 U
Fluorene	50	µg/L	41	48 DJ	3.9 J	10 U	4.2 U	28	28 DJ	2.5 J	3.3 J	18	1.9 J	4.2 U
Hexachlorobenzene	0.04	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
Hexachlorobutadiene	0.5	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
Hexachlorocyclopentadiene	- -	µg/L	10 U	100 U	4.2 UJ	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
Hexachloroethane	5	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
Indeno (1,2,3- cd) pyrene	0.002	µg/L	**2 J**	100 U	**4.9 J**	10 U	4.2 U	**5 J**	200 U	**6.1 J**	**5.7 J**	**5 J**	**6.6**	4.2 UJ
Isophorone	50	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
2- Methylnaphthalene	- -	µg/L	78	92 DJ	1.9 J	10 U	4.2 U	75	71 DJ	3.7 J	4.9 J	10 U	0.35 J	4.2 U
2- Methylphenol	1	µg/L	**2 J**	100 U	0.35 J	10 U	4.2 U	1 J	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
4- Methylphenol	1	µg/L	**2 J**	100 U	0.42 J	10 U	4.2 U	**7 J**	200 U	8.5 U	8.5 U	10 U	4 U	**1.1 J**
Naphthalene	10	µg/L	**1,100 E**	**1400 D**	**40**	10 U	4.2 U	**1,100 E**	**1,300 D**	**69**	**87**	2 J	6.7	4.2 U
2- Nitroaniline	5	µg/L	20 U	200 U	4.2 U	20 U	4.2 U	20 U	400 U	8.5 U	8.5 U	20 U	4 U	4.2 U
3- Nitroaniline	5	µg/L	20 U	200 U	4.2 U	20 U	4.2 U	20 U	400 U	8.5 U	8.5 U	20 U	4 U	4.2 U
4- Nitroaniline	5	µg/L	20 U	200 U	4.2 U	20 U	4.2 U	20 U	400 U	8.5 U	8.5 U	20 U	4 U	4.2 U
Nitrobenzene	0.4	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
2- Nitrophenol	- -	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
4- Nitrophenol	- -	µg/L	20 U	200 U	10 U	20 U	10 U	20 U	400 U	21 U	21 U	20 U	10 U	11 U
N- Nitrosodi- n- propylamine	- -	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
N- Nitrosodiphenylamine	- -	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
2,2- Oxybis (1-Chloropropane)	- -	µg/L	NA	NA	4.2 U	NA	4.2 U	NA	NA	8.5 U	8.5 U	NA	4 U	4.2 U
Pentachlorophenol	*	µg/L	20 U	200 U	26 U	20 U	26 U	20 U	400 U	53 U	53 U	20 U	25 U	26 U
Phenanthrene	50	µg/L	**110**	**110 D**	20	10 U	4.2 U	**85**	**71 DJ**	19	23	**57**	9.9	0.41 J
Phenol	1	µg/L	1 J	100 U	0.34 J	10 U	4.2 U	**2 J**	200 U	8.5 U	8.5 U	1 J	4 U	4.2 U
Pyrene	50	µg/L	29	32 DJ	16 J	10 U	4.2 U	48	38 DJ	16	15	25	17	4.2 U
1,2,4- Trichlorobenzene	5	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
2,4,5-trichlorophenol	- -	µg/L	20 U	200 U	10 U	20 U	10 U	20 U	400 U	21 U	21 U	20 U	10 U	11 U
2,4,6- Trichlorophenol	- -	µg/L	10 U	100 U	4.2 U	10 U	4.2 U	10 U	200 U	8.5 U	8.5 U	10 U	4 U	4.2 U
Total PAHs	- -	µg/L	1519 J	1846 DJ	167 J	ND	ND	1585 J	1668 J	225.7 J	252.8 J	214 J	140.3 J	0.41 J
Total SVOCs	- -	µg/L	1683	2026	201.77	ND	ND	1716	1769	250.7	284.2	249	151.68	1.51

See notes on page 3.

Table 7
Groundwater Analytical Results – Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Notes:
Bold and shaded values exceed NYSDEC GA screening criteria.
1. Qualifiers are as follows:
   - B Analyte was also detected in the associated method blank.
   - D The reported concentration is based on a diluted sample analysis.
   - E Indicates a value estimated or not reported due to the presence of interferences.
   - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
   - N Indicates that spike sample recovery is not within the quality control limits.
   - R The reported concentration was rejected.
   - U The analyte was analyzed for, but not detected. The associated value is the analyte quantitation limit.
2. Screening levels for class GA groundwater were provided in NYSDEC Technical and Operational Guidance Series 1.1.1 for Groundwater.
3. Sample Ids that end in the letters DL indicate that the original sample extraction was diluted to be able to report a value for one or more constituents being analyzed for.

µg/L = micrograms per liter
NA = Not analyzed
NYSDEC = New York State Department of Environmental Conservation
PAHs = polycyclic aromatic hydrocarbons
SVOCs = Semi-volatile organic compounds
Total PAHs = represents the summation of 17 Target Compound List PAHs.
SVOCs = Semivolatile organic compounds

Table 8
Groundwater Analytical Results – Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Date Collected: / Sample Name:	NYSDEC GA	Units	MW-07 03/19/05 MW-07		MW-07 03/07/11 MW-07		MW-08 03/19/05 MW-08		MW-08 03/05/11 MW-08		MW-09 03/18/05 MW-09		MW-09 03/01/11 MW-09		MW-09-DUP 03/01/11 REP 3-1-11		MW-10 03/18/05 MW-10		MW-10 03/01/11 MW-10		MW-11 07/29/10 MW-11	
Metals																						
Aluminum	- -	µg/L		NA	769	J		NA	127	J		NA	199	J	205	J		NA	327		101	J
Antimony	3	µg/L		NA	75	U		NA	**10**	**J**		NA	15	U	15	U		NA	15	U	15	U
Arsenic	25	µg/L	6.8	B	75	U	1.6	U	9.1	J	8.6	B	15	U	15	U	2.6	B	15	U	15	U
Barium	1,000	µg/L	216		801		164	B	190		72	B	94.3		93.6		60.9	B	72.3		422	
Beryllium	3	µg/L		NA	25	U		NA	5	U		NA	5	U	5	U		NA	5	U	5	U
Cadmium	5	µg/L	0.1	U	25	U	0.1	U	5	U	0.1	U	5	U	5	U	0.1	U	5	U	5	U
Calcium	- -	µg/L		NA	692,000			NA	375,000			NA	187,000		184,000			NA	185,000		287,000	
Chromium	50	µg/L	3.4	B	25	U	0.38	U	1.3	J	2	B	5	U	5	U	1.1	B	5	U	5	U
Cobalt	- -	µg/L		NA	25	UB		NA	5	UB		NA	2.4	J	1.2	J		NA	1.2	J	5	U
Copper	- -	µg/L		NA	21.2	J		NA	14.6			NA	7.9	J	6.3	J		NA	12.2		2.4	J
Iron	300	µg/L		NA	**4,060**			NA	**356**			NA	**956**		**929**			NA	**455**		**11,100**	
Lead	25	µg/L	12.7		75	U	**29.9**		13.1	J	**36.1**		15	U	15	U	20.8		9.8	J	15	U
Magnesium	35,000	µg/L		NA	**168,000**			NA	**43,700**			NA	**362,000**		**357,000**			NA	**329,000**		**39,100**	
Manganese	300	µg/L		NA	**471**			NA	15.5			NA	65.6		69.6			NA	124		**1,330**	
Mercury	0.7	µg/L		NA	0.2	U		NA	0.2	U		NA	0.2	U	0.2	U		NA	0.2	U	0.2	U
Nickel	100	µg/L		NA	7.4	J		NA	3.3	J		NA	5	U	1.8	J		NA	4.5	J	5	U
Potassium	- -	µg/L		NA	102,000			NA	30,800			NA	176,000		173,000			NA	159,000		59,400	
Selenium	10	µg/L		NA	190	UJ		NA	**28.8**	**J**		NA	38	U	38	U		NA	38	U	38	U
Silver	50	µg/L		NA	25	U		NA	5	U		NA	5	U	5	U		NA	5	U	5	U
Sodium	20,000	µg/L		NA	**9,660,000**			NA	**612,000**			NA	**3,920,000**		**3,820,000**			NA	**3,520,000**		**842,000**	
Thallium	1	µg/L		NA	75	UJ		NA	15	U		NA	15	U	15	U		NA	15	U	15	U
Vanadium	- -	µg/L		NA	23	J		NA	1.9	J		NA	5	U	5	U		NA	15.4		3.9	J
Zinc	2,000	µg/L		NA	125	U		NA	24	J		NA	25	U	25	U		NA	28.5		25	U
Dissolved Metals																						
Aluminum	- -	µg/L	1,740			NA	115	B		NA	687			NA		NA	300			NA		NA
Antimony	3	µg/L	**11.6**	**B**		NA	**4**	**B**		NA	**16.5**	**B**		NA		NA	**14.3**	**B**		NA		NA
Beryllium	3	µg/L	0.15	U		NA	0.15	U		NA	0.15	U		NA		NA	0.15	U		NA		NA
Calcium	- -	µg/L	189,000	E		NA	232,000	E		NA	160,000	E		NA		NA	144,000	E		NA		NA
Cobalt	- -	µg/L	1.2	B		NA	0.97	B		NA	0.61	B		NA		NA	0.33	B		NA		NA
Copper	200	µg/L	6.3	U		NA	12.1	B		NA	6.3	U		NA		NA	6.3	U		NA		NA
Iron	300	µg/L	**3,630**			NA	**791**			NA	**1,500**			NA		NA	**558**			NA		NA
Magnesium	35,000	µg/L	**228,000**	**E**		NA	32,000	E		NA	367,000	E		NA		NA	**353,000**	**E**		NA		NA
Manganese	300	µg/L	226	E		NA	214	E		NA	133	E		NA		NA	91.6	E		NA		NA
Mercury	0.7	µg/L	0.066	U		NA	0.076	B		NA	0.19	B		NA		NA	0.064	U		NA		NA
Nickel	100	µg/L	2.7	B		NA	2.7	B		NA	0.92	B		NA		NA	2.8	B		NA		NA
Potassium	- -	µg/L	108,000	E		NA	31,400	E		NA	169,000	E		NA		NA	161,000	E		NA		NA
Selenium	10	µg/L	0.98	U		NA	0.98	U		NA	0.98	U		NA		NA	0.98	U		NA		NA
Silver	50	µg/L	23.8	B		NA	16.2	B		NA	19.9	B		NA		NA	19.1	B		NA		NA
Sodium	20,000	µg/L	**3,760,000**	**E**		NA	**1,110,000**	**E**		NA	**6,530,000**	**E**		NA		NA	**4,220,000**	**E**		NA		NA
Thallium	1	µg/L	1.2	UN		NA	1.2	UN		NA	1.2	UN		NA		NA	1.2	UN		NA		NA
Vanadium	- -	µg/L	4.2	B		NA	1.6	B		NA	1.5	B		NA		NA	5.7	B		NA		NA
Zinc	2,000	µg/L	87			NA	8.4	B		NA	2.3	U		NA		NA	2.3	U		NA		NA
Total Cyanide																						
Cyanide – total	200	µg/L	39.9		63.6		**298**		194		9.1	U	11.3		12.3		9.1	U	10	U	37.6	

See notes on page 2.

Table 8
Groundwater Analytical Results – Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Notes:
Bold and shaded values exceed NYSDEC GA screening criteria.
1. Qualifiers are as follows:
   B Indicates an estimated value between the instrument detection limit and practical quantitation limit.
   D The reported concentration is based on a diluted sample analysis.
   E Indicates a value estimated or not reported due to the presence of interferences.
   J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
   N Indicates that spike sample recovery is not within the quality control limits.
   U The analyte was analyzed for, but not detected. The associated value is the analyte quantitation limit.
   * Indicates analysis is not within the quality control limits.
2. Screening levels for class GA groundwater were provided in NYSDEC Technical and Operational Guidance Series 1.1.1 for Groundwater.
3. Sample IDs that end in the letters DL indicate that the original sample extraction was diluted to be able to report a value for one or more constituents being analyzed for.
µg/L = micrograms per liter
NA = Not analyzed
NYSDEC = New York State Department of Environmental Conservation
- - = criteria not identified

Table 9
Sediment Analytical Results – Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: Sample Depth (feet): Date Collected:	Units	Benthic Aquatic Life Acute Toxicty	Benthic Aquatic Life Chronic	SD-01 0 - 0.5 02/27/08	SD-02 0 - 0.5 02/29/08	SD-02 6 - 9.5 02/29/08	SD-02A 0 - 0.5 02/29/08	SD-02A 5 - 6 02/29/08	SD-02A 10 - 11 02/29/08	SD-03 0 - 0.5 03/03/08	SD-03 8 - 12 03/03/08	SD-04 0 - 0.5 02/28/08	SD-05 0 - 0.5 02/28/08	SD-06 0 - 0.5 02/28/08	SD-06-DUP 0 - 0.5 02/28/08
Acetone (2-propanone, dimethyl ketone)	mg/kg	- -	- -	0.052 UJ	0.048 UJ	0.1 J	0.053 UJ	0.047 UJ	0.078 J	0.038 UJ	0.077 UJ	0.053 UJ	0.091 J	0.13 J	0.092 J
Benzene	mg/kg	0.09	0.026	0.0088 U	0.011 U	0.012	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
4-bromofluorobenzene	mg/kg	- -	- -	0.021	0.024	0.033	0.023	0.023	0.038	0.058	0.032	0.033	0.036	0.032	0.039
Bromoform	mg/kg	- -	- -	0.0088 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.0094 U	0.011 U	0.013 UJ	0.012 UJ	0.01 UJ	0.01 UJ
Bromomethane/methyl bromide	mg/kg	- -	- -	0.0088 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.0094 U	0.011 U	0.013 UJ	0.012 UJ	0.01 UJ	0.01 UJ
2-butanone (methyl ethyl ketone)	mg/kg	- -	- -	0.018 U	0.023 U	0.028 U	0.021 U	0.022 U	0.021 J	0.019 UJ	0.021 UJ	0.026 U	0.023 U	0.028 U	0.02 U
Carbon disulfide	mg/kg	- -	- -	0.0088 UJ	0.011 UJ	0.0035 J	0.0028 J	0.011 UJ	0.0031 J	0.0094 U	0.011 UJ	0.013 UJ	0.012 U	0.01 U	0.01 U
Carbon tetrachloride	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Chlorobenzene	mg/kg	0.0346	0.0035	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Chlorodibromomethane	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Chloroethane	mg/kg	- -	- -	0.0088 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.0094 U	0.011 UJ	0.013 UJ	0.012 UJ	0.01 UJ	0.01 UJ
Chloroform	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Chloromethane (methyl chloride)	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
cis-1,3-dichloro, 1-propene	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Dichlorobromomethane	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
1,1-dichloroethane	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
1,2-Dichloroethane	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
cis-1,2-dichloroethene	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
trans-1,2-dichloroethene	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
1,1-dichloroethylene	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Dichloromethane	mg/kg	- -	- -	0.035 U	0.046 U	0.043 U	0.042 U	0.045 U	0.046 U	0.038 U	0.043 UJ	0.053 U	0.046 U	0.04 U	0.041 U
1,2-dichloropropane	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
trans-1,3-dichloropropene	mg/kg	- -	- -	0.0088 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.0094 U	0.011 U	0.013 UJ	0.012 UJ	0.01 UJ	0.01 UJ
Ethyl benzene	mg/kg	0.058	0.0064	0.0088 U	0.011 U	0.0045 J	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Methyl isobutyl ketone	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Styrene	mg/kg	- -	- -	0.0088 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.011 UJ	0.0094 U	0.011 U	0.013 UJ	0.012 UJ	0.01 UJ	0.01 UJ
1,1,2,2-tetrachloroethane	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Tetrachloroethene (perchloroethylene)	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Toluene	mg/kg	0.211	0.045	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
1,1,1-trichloroethane (methyl chloroform)	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
1,1,2-trichloroethane	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Trichloroethene (trichloroethylene)	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Vinyl chloride (chloroethene)	mg/kg	- -	- -	0.0088 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.0094 U	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Xylene, total	mg/kg	0.24	0.027	0.0088 U	0.011 U	0.012	0.011 U	0.011 U	0.011 U	0.0056 J	0.011 U	0.013 U	0.012 U	0.01 U	0.01 U
Total BTEX	mg/kg			ND	ND	0.029	ND	ND	ND	0.0056	ND	ND	ND	ND	ND
Total VOCS	mg/kg			ND	ND	0.132	0.003	ND	0.102	0.0056	ND	ND	0.091	0.13	0.09

Notes:
1. Screening levels are Benthic aquatic life criteria from Table 1 of the NYSDEC (1999) guidance (criteria in ug/gOC).
2. Results for duplicate samples are presented in brackets.
3. Qualifiers are as follows:
D = compound quantitated using a secondary dilution
J = estimated value
U = compound was analyzed for but not detected; the associated value is the compound quantitation limit.
mg/kg = milligrams per kilogram
NYSDEC = New York State Department of Environmental Conservation
-- = not applicable.
BTEX= benzene, toluene, ethylbenzene, and xylenes
ND= Not detected

Table 10
Sediment Analytical Results – Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth(Feet): / Date Collected:	Units	NYSDEC ER-L (Bold)	NYSDEC ER-M (Shade)	SD-01 0 - 0.5 02/27/08	SD-02 0 - 0.5 02/29/08	SD-02 6 - 9.5 02/29/08	SD-02A 0 - 0.5 02/29/08	SD-02A 5 - 6 02/29/08	SD-02A 10 - 11 02/29/08	SD-03 0 - 0.5 03/03/08	SD-03 8 - 12 03/03/08	SD-04 0 - 0.5 02/28/08	SD-05 0 - 0.5 02/28/08	SD-06 0 - 0.5 02/28/08	SD-06-DUP 0 - 0.5 02/28/08
Acenaphthene	mg/kg	0.016	0.5	0.58 U	0.72 U	**4.6**	0.69 U	0.73 U	0.72 U	0.62 U	**0.13 J**	**0.34 J**	0.75 U	0.64 U	0.64 U
Acenaphthylene	mg/kg	0.044	0.64	**0.16 J**	**0.23 J**	**3.6**	**0.36 J**	**0.24 J**	**0.21 J**	**0.18 J**	**0.17 J**	**0.32 J**	**0.15 J**	**0.17 J**	**0.14 J**
Anthracene	mg/kg	0.0853	1.1	**0.2 J**	**0.27 J**	**9.8**	**0.41 J**	**0.32 J**	**0.3 J**	**0.2 J**	**0.33 J**	**0.41 J**	**0.23 J**	**0.22 J**	**0.27 J**
Benzo (a) anthracene	mg/kg	0.261	1.6	**0.47 J**	**0.83**	**13 D**	**0.92**	**0.63 J**	**0.53 J**	**0.52 J**	**0.7**	**0.94**	**0.48 J**	**0.47 J**	**0.6 J**
Benzo (a) pyrene	mg/kg	0.43	1.6	**0.51 J**	**0.86**	**11 D**	**0.87**	**0.66 J**	**0.54 J**	**0.53 J**	**0.61 J**	**0.85**	0.43 J	**0.49 J**	**0.58 J**
Benzo (b) fluoranthene	mg/kg	- -	- -	0.59	0.91	11 D	0.95	0.74	0.6 J	0.61 J	0.73	0.97	0.52 J	0.52 J	0.66
Benzo (g,h,i) perylene	mg/kg	- -	- -	0.42 J	0.64 J	5.8	0.51 J	0.43 J	0.35 J	0.46 J	0.64 J	0.55 J	0.35 J	0.38 J	0.38 J
Benzo (k) fluoranthene	mg/kg	- -	- -	0.2 J	0.3 J	4.3	0.31 J	0.26 J	0.2 J	0.27 J	0.29 J	0.31 J	0.15 J	0.2 J	0.18 J
Benzyl alcohol	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Bis-(2-chloroethoxy) methane	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Bis-(2-chloroethyl) ether	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Bis-(2-ethylhexyl) phthalate	mg/kg	- -	- -	0.69	0.87	2.9	1.3	2.6	4	1.2 U	5.4 U	1.1	0.76	0.64 J	0.71
4-bromophenyl phenyl ether	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Butylbenzylphthlate	mg/kg	- -	- -	0.58 U	0.1 J	0.14 J	0.098 J	0.11 J	0.12 J	0.62 U	0.13 J	0.85 U	0.75 U	0.64 U	0.64 U
Carbazole	mg/kg	- -	- -	0.58 U	0.72 U	0.66 J	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
4-chloro-3-methylphenol	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
4-chloroaniline	mg/kg	- -	- -	0.58 U	0.72 U	0.25 J	0.11 J	0.17 J	0.44 J	0.62 U	0.16 J	0.85 U	0.75 U	0.64 U	0.64 U
2-chloronaphthalene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
2-chlorophenol	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
4-chlorophenyl-phenylether	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Chrysene	mg/kg	0.384	2.8	**0.54 J**	**0.81**	**11 D**	**0.87**	**0.69 J**	**0.55 J**	**0.53 J**	**0.68 J**	**0.98**	**0.47 J**	**0.48 J**	**0.62 J**
Dibenzo (a,h) anthracene	mg/kg	0.0634	0.26	**0.33 J**	**0.44 J**	**1.5**	**0.47 J**	**0.4 J**	**0.38 J**	**0.11 J**	**0.14 J**	**0.49 J**	**0.38 J**	**0.34 J**	**0.36 J**
Dibenzofuran	mg/kg	- -	- -	0.58 U	0.72 U	2.1	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Dibutyl phthalate	mg/kg	- -	- -	0.58 U	0.72 U	0.13 J	0.69 U	0.73 U	0.15 J	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
1,2-dichlorobenzene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
1,3-dichlorobenzene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
1,4-dichlorobenzene	mg/kg	- -	- -	0.58 U	0.72 U	0.14 J	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
3,3'-dichlorobenzidine	mg/kg	- -	- -	1.2 U	1.4 U	1.4 U	1.4 U	1.5 U	1.4 U	1.2 U	1.4 U	1.7 U	1.5 U	1.3 U	1.3 U
2,4-dichlorophenol	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Diethylphthlate	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
2,4-dimethylphenol	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Dimethylphthlate	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
4,6-dinitro-2-methylphenol	mg/kg	- -	- -	2.8 U	3.5 U	3.3 U	3.3 U	3.6 U	3.5 U	3 U	3.3 U	4.1 U	3.6 U	3.1 U	3.1 U
2,4-dinitrophenol	mg/kg	- -	- -	2.8 U	3.5 U	3.3 U	3.3 U	3.6 U	3.5 U	3 U	3.3 U	4.1 U	3.6 U	3.1 U	3.1 U
2,4-dinitrotoluene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
2,6-dinitrotoluene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
dioctyl phthlate	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Fluoranthene	mg/kg	0.6	5.1	**0.65**	**1**	**28 D**	**1.3**	**0.91**	**0.76**	**0.7**	**1**	**1.9**	**1.1**	**0.66**	**0.84**
Fluorene	mg/kg	0.019	0.54	0.58 U	0.72 U	**3.6**	0.69 U	0.73 U	0.72 U	0.62 U	**0.14 J**	**0.17 J**	0.75 U	0.64 U	0.64 U

Table 10
Sediment Analytical Results – Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Sample Depth(Feet): / Date Collected:	Units	NYSDEC ER-L (Bold)	NYSDEC ER-M (Shade)	SD-01 0 - 0.5 02/27/08	SD-02 0 - 0.5 02/29/08	SD-02 6 - 9.5 02/29/08	SD-02A 0 - 0.5 02/29/08	SD-02A 5 - 6 02/29/08	SD-02A 10 - 11 02/29/08	SD-03 0 - 0.5 03/03/08	SD-03 8 - 12 03/03/08	SD-04 0 - 0.5 02/28/08	SD-05 0 - 0.5 02/28/08	SD-06 0 - 0.5 02/28/08	SD-06-DUP 0 - 0.5 02/28/08
Hexachlorobenzene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Hexachlorobutadiene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Hexachloroethane	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Hexaclorocyclopentadiene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Indeno (1,2,3-cd)pyrene	mg/kg	- -	- -	0.75	1.1	6.7	1	0.86	0.78	0.5 J	0.7	1.1	0.78	0.73	0.77
Isophorone	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
2-methyl phenol	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
2-methylnaphthalene	mg/kg	0.07	0.67	0.58 U	0.72 U	**2**	0.69 U	0.73 U	**0.14 J**	0.62 U	**0.13 J**	0.85 U	0.75 U	0.64 U	0.64 U
4-methylphenol (p-cresol)	mg/kg	- -	- -	0.58 U	0.72 U	0.64 J	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Naphthalene	mg/kg	0.16	2.1	0.09 J	0.14 J	**4.9**	0.69 U	0.16 J	**0.18 J**	0.098 J	**0.2 J**	0.85 U	0.75 U	0.64 U	0.64 U
3-nitroaniline	mg/kg	- -	- -	2.8 U	3.5 U	3.3 U	3.3 U	3.6 U	3.5 U	3 U	3.3 U	4.1 U	3.6 U	3.1 U	3.1 U
3-nitroaniline	mg/kg	- -	- -	2.8 U	3.5 U	3.3 U	3.3 U	3.6 U	3.5 U	3 U	3.3 U	4.1 U	3.6 U	3.1 U	3.1 U
4-nitroaniline	mg/kg	- -	- -	1.2 U	1.4 U	1.4 U	1.4 U	1.5 U	1.4 U	1.2 U	1.4 U	1.7 U	1.5 U	1.3 U	1.3 U
Nitrobenzene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
3-nitrophenol	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
4-nitrophenol	mg/kg	- -	- -	2.8 U	3.5 U	3.3 U	3.3 U	3.6 U	3.5 U	3 U	3.3 U	4.1 U	3.6 U	3.1 U	3.1 U
N-nitrosodi-n-propylamine	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
N-nitrosodi-phenylamine	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
2,2-oxybis (1-chloropropane)	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Pentachlorophenol	mg/kg	- -	- -	2.8 U	3.5 U	3.3 U	3.3 U	3.6 U	3.5 U	3 U	3.3 U	4.1 U	3.6 U	3.1 U	3.1 U
Phenanthrene	mg/kg	0.24	1.5	**0.32 J**	**0.44 J**	**26 D**	**0.49 J**	**0.4 J**	**0.45 J**	**0.33 J**	**0.5 J**	**0.49 J**	**0.36 J**	**0.26 J**	**0.38 J**
Phenol	mg/kg	- -	- -	0.58 U	0.72 U	0.14 J	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Pyrene	mg/kg	0.665	2.6	**0.75**	**1.3**	**26 D**	**1.2**	**0.92**	**0.78**	**0.87**	**1.1**	**1.5**	**0.9**	**0.73**	**0.8**
1,2,4-trichlorobenzene	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
2,4,5-trichlorophenol	mg/kg	- -	- -	2.8 U	3.5 U	3.3 U	3.3 U	3.6 U	3.5 U	3 U	3.3 U	4.1 U	3.6 U	3.1 U	3.1 U
2,4,6-trichlorophenol	mg/kg	- -	- -	0.58 U	0.72 U	0.69 U	0.69 U	0.73 U	0.72 U	0.62 U	0.68 U	0.85 U	0.75 U	0.64 U	0.64 U
Total PAHs	mg/kg	4.022	44.792	**5.98 J**	**9.27 J**	**172.8**	**9.66 J**	**7.62 J**	**6.75 J**	**5.9 J**	**8.19 J**	**11.3 J**	**6.30 J**	**5.65 J**	**6.58 J**
Total SVOCs	mg/kg			6.67	10.24	179.9	11.17	10.5	11.46	5.9	8.48	12.4	7.06	6.29	7.29

Notes:
1. Screening levels are E-RL (chronic criteria) and ER-M (acute criteria) from Table 4 of the NYSDEC (1999) Technical Guidance for Screening
2. Results for duplicate samples are presented in brackets.
3. Qualifiers are as follows:
D = compound quantitated using a secondary dilution
J = estimated value
U = compound was analyzed for but not detected; the associated value is the compound quantitation limit.
ER-L = effects range-low
ER-M = effects range-median
LEL = lowest effect level
mg/kg = milligrams per kilogram
NYSDEC = New York State Department of Environmental Conservation
-- = not applicable.
PAH = polycyclic aromatic hydrocarbon
Total PAHs = represents the summation of 17 TCL PAHs

Table 11
Sediment Analytical Results – Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: Sample Depth (feet): Date Collected:	Units	NYSDEC LEL (Bold)	NYSDEC SEL (Shaded)	SD-01 0 - 0.5 02/27/08	SD-02 0 - 0.5 02/29/08	SD-02 6 - 9.5 02/29/08	SD-02A 0 - 0.5 02/29/08	SD-02A 5 - 6 02/29/08	SD-02A 10 - 11 02/29/08	SD-03 0 - 0.5 03/03/08	SD-03 8 - 12 03/03/08	SD-04 0 - 0.5 02/28/08	SD-05 0 - 0.5 02/28/08	SD-06 0 - 0.5 02/28/08	SD-06-DUP 0 - 0.5 02/28/08
Metals															
Aluminum	mg/kg	- -	- -	9,110	12,800	17,100	15,900	19,100	19,800	9,930	16,300	18,200	17,400	13,100	13,300
Antimony	mg/kg	2	25	16.7 U	21.9 U	21.9 U	24.3 U	20.5 U	23.4 U	17.8 U	20 U	22.8 U	19.9 U	17.5 U	22.2 U
Arsenic	mg/kg	6	33	**6.5 J**	**10.1 J**	**38.5**	**13**	**15.1**	**17.6**	4.4 J	**12**	**14.5**	**12**	**9.4**	**10 J**
Barium	mg/kg	- -	- -	48.5	70.8	369	79.4	98.3	116	49.6	85.2	76	74.7	55.1	56.8
Beryllium	mg/kg	- -	- -	2.3 U	3.1 U	1.1 J	3.4 U	1.1 J	1.1 J	2.5 U	2.8 U	1.1 J	1 J	2.4 U	3.1 U
Cadmium	mg/kg	0.6	9	8.4 U	11 U	**7.4 J**	12.2 U	**2.7 J**	**4.9 J**	8.9 U	10 U	11.4 U	10 U	8.7 U	11.1 U
Calcium	mg/kg	- -	- -	4,420	6,450	7,250	6,490	5,710	6,880	4,850	5,980	5,410	7,230	5,350	5,130
Chromium	mg/kg	26	110	**40.4 J**	**78.5**	**143**	**84.1**	**142**	**221**	**47.1**	**145**	**83.5**	**80.6 J**	**54.2 J**	**50**
Cobalt	mg/kg	- -	- -	8.8 J	14.4	13.6	11.8	13.9	14.2	8.8	14	13.2	14 J	11.1 J	10.7
Copper	mg/kg	16	110	**48.6**	**93.6**	**413**	**118**	**195**	**292**	**57.7**	**177**	**117**	**101**	**65.9**	**61.6**
Iron	mg/kg	2%	4%	19,900	**28,200**	**43,000**	**32,600**	**38,200**	**39,200**	**23,100**	**37,600**	**36,800**	**34,900**	**27,400**	**28,400**
Lead	mg/kg	31	110	**53.4**	**108**	**668**	**118**	**187**	**230**	**61.9**	**166**	**105**	**107**	**65.1**	**64.8**
Magnesium	mg/kg	- -	- -	5,570	8,040	8,700	8,360	9,450	9,520	6,180	8,630	9,130	8,930	7,120	7,120
Manganese	mg/kg	460	1100	352	**551**	450	**616**	**689**	**671**	404	**677**	**975**	**914**	**612**	**671**
Mercury	mg/kg	0.15	1.3	**0.6**	**0.85**	**29.9**	**0.83**	**1.4**	**2**	**0.54**	**1.6**	**0.98**	**0.71**	**0.61**	**3**
Nickel	mg/kg	16	50	**21**	**31**	**53.4**	**32.9**	**40.4**	**46.1**	**25.6**	**39.1**	**34.4**	**34.7**	**27.3**	**26.2**
Potassium	mg/kg	- -	- -	1,680	2,660	3,400	3,070	3,720	4,000	1,830	3,240	3,520	3,570	2,520	2,380
Selenium	mg/kg	- -	- -	16.7 U	21.9 U	4.3 J	24.3 U	20.5 U	23.4 U	17.8 U	20 U	22.8 U	19.9 U	17.5 U	22.2 U
Silver	mg/kg	1	2.2	**1.5 J**	**3.8 J**	**122**	**4.6 J**	**10.2**	**20.2**	**2 J**	**9.1**	**3.8 J**	**3.5 J**	**1.9 J**	**1.8 J**
Sodium	mg/kg	- -	- -	3,920 J	6,340 J	7,670 J	6,730 J	7,980 J	9,490 J	4,570	8,490	9,980 J	8,730 J	6,550 J	5,830 J
Thallium	mg/kg	- -	- -	11.7 U	15.3 U	15.3 U	17 U	14.4 U	16.4 U	5.3 J	6 J	16 U	13.9 U	12.2 U	15.6 U
Vanadium	mg/kg	- -	- -	21.9	38.2	53.6	38.2	48.3	54.2	23.8	45.2	41.7	43.2	30.1	29
Zinc	mg/kg	120	270	**130 J**	**214**	**889**	**226**	**311**	**373**	**148**	**289**	**236**	**219 J**	**166 J**	**159**
Total Cyanide															
Total Cyanide	mg/kg	- -	- -	0.88 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.94 U	1.1 U	1.3 U	1.2 U	1 U	1 U
Total Petroleum Hydrocarbon															
Diesel range organics [c10-c28]	mg/kg	- -	- -	69	210	2,600	230	700	730	180	710	310	150	140 J	45 J
Miscellaneous															
Percent moisture	%	- -	- -	43.4	56.1	53.1	52.8	55.2	56.2	46.8	53.3	61.9	56.7	49.9	51.1
Solids, percent	%	- -	- -	56.6	43.9	46.9	47.2	44.8	43.8	53.2	46.7	38.1	43.3	50.1	48.9
Total organic carbon	mg/kg	- -	- -	16,500	29,300	74,600	32,100	43,700	43,700	17,900	40,300	47,500	31,600	29,200	27,000

Notes:
Constituents detected above LEL are bolded.
Constituents detected above SEL are shaded.

1. Screening levels are Contaminated Sediments or LEL and SEL from Table 2 of the NYSDEC (1999) guidance.
2. Results for duplicate samples are presented in brackets.
3. Qualifiers are as follows:
D = compound quantitated using a secondary dilution
J = estimated value
U = compound was analyzed for but not detected; the associated value is the compound quantitation limit.
LEL = lowest effect level
mg/kg = milligrams per kilogram
NYSDEC = New York State Department of Environmental Conservation
% = percent
-- = not applicable.
SEL = severe effect level

Table 12
Surface Water Analytical Results – Volatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Date Collected:	State of New York Surface-Water Guidelines	Units	SW-01 03/04/08	SW-02 03/04/08	SW-03 03/04/08	SW-04 03/04/08	SW-05 03/04/08
1,2-dichloroethane	0.6	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Acetone (2-propanone, dimethyl ketone)	50 (G)	µg/L	10 UJ [10 UJ]	10 UJ	10 UJ	10 UJ	10 UJ
Benzene	1	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Bromoform	50 (G)	µg/L	5 UJ [5 UJ]	5 UJ	5 UJ	5 UJ	5 UJ
Bromomethane/methyl bromide	5	µg/L	5 UJ [5 UJ]	5 UJ	5 UJ	5 UJ	5 UJ
2-butanone (methyl ethyl ketone)	50 (G)	µg/L	10 UJ [10 UJ]	10 U	10 U	10 U	10 UJ
Carbon disulfide	- -	µg/L	5 U [5 UJ]	5 U	5 U	5 U	5 UJ
Carbon tetrachloride	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Chlorobenzene	5	µg/L	5 U [5 UJ]	5 U	5 U	5 U	5 UJ
Chlorodibromomethane	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Chloroethane	5 (G)	µg/L	5 UJ [5 U]	5 UJ	5 UJ	5 UJ	5 U
Chloroform	7	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Chloromethane (methyl chloride)	5	µg/L	5 UJ [5 UJ]	5 U	5 U	5 U	5 UJ
cis-1,3-dichloro, 1-propene	0.4	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Dichlorobromomethane	- -	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
1,1-dichloroethane	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
cis-1,2-dichloroethene	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
trans-1,2-dichloroethene	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
1,1-dichloroethylene	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Dichloromethane	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
1,2-dichloropropane	1	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
trans-1,3-dichloropropene	0.4	µg/L	5 UJ [5 UJ]	5 UJ	5 UJ	5 UJ	5 UJ
Ethyl benzene	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
2-hexanone	50 (G)	µg/L	10 UJ [10 UJ]	10 UJ	10 UJ	10 UJ	10 UJ
Methyl isobutyl ketone	- -	µg/L	10 U [10 U]	10 U	10 U	10 U	10 U
Styrene	5	µg/L	5 UJ [5 UJ]	5 UJ	5 UJ	5 UJ	5 UJ
1,1,2,2-tetrachloroethane	5	µg/L	5 UJ [5 UJ]	5 U	5 U	5 U	5 UJ
Tetrachloroethene (perchloroethylene)	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Toluene	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
1,1,1-trichloroethane (methyl chloroform)	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
1,1,2-trichloroethane	1	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Trichloroethene (trichloroethylene)	5	µg/L	5 U [5 U]	5 U	5 U	5 U	0.32 J
Vinyl chloride (chloroethene)	2	µg/L	5 UJ [5 U]	5 U	5 U	5 U	5 U
Xylene, total	5	µg/L	5 UJ [5 U]	5 U	5 U	5 U	5 U
Total BTEX	- -	µg/L	ND	ND	ND	ND	ND
Total VOCs	- -	µg/L	ND	ND	ND	ND	0.32

Notes:
Constitutents detected above screening levels are shaded.

1. Qualifiers are as follows:
   J = estimated value
   ND = Indicates analyte was analyzed for, but not detected at or above the reporting limit.
   U = compound was analyzed for but not detected; the associated value is the compound quantitation limit.
   -- = criteria not applicable.
2. Screening levels were provided in NYSDEC 6 NYCRR Part 703 Surface Water and Groundwater Quality Standards.
3. Results for duplicate samples are presented in brackets.

G = guidance value
BTEX = benzene, toluene, ethylbenzene and xylene
µg/L = micrograms per liter
NA = not analyzed
NYSDEC = New York State Department of Environmental Conservation

Table 13
Surface Water Analytical Results – Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Date Collected:	State of New York Surface-Water Guidelines	Units	SW-01 03/04/08	SW-02 03/04/08	SW-03 03/04/08	SW-04 03/04/08	SW-05 03/04/08
Acenaphthene	5.3 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Acenaphthylene	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Anthracene	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Benzo (a) anthracene	0.002 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Benzo (a) pyrene	0.002 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Benzo (b) fluoranthene	0.002 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Benzo (g,h,i) perylene	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Benzo (k) fluoranthene	0.002 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Benzyl alcohol	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
4-bromophenyl phenyl ether	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Butylbenzylphthlate	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Carbazole	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
4-chloro-3-methylphenol	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
4-Chloroaniline	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Bis-(2-chloroethoxy) methane	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Bis-(2-chloroethyl) ether	0.03 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2-chloronaphthalene	10	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2-chlorophenol	1	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
4-chlorophenyl-phenylether	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Chrysene	0.002 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Dibenzo (a,h) anthracene	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Dibenzofuran	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Dibutyl phthalate	50	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
1,2-dichlorobenzene	3	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
1,3-dichlorobenzene	3	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
1,4-dichlorobenzene	3	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
3,3'-dichlorobenzidine	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2,4-dichlorophenol	1	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Diethylphthlate	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2,4-dimethylphenol	1	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Dimethylphthlate	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
4,6-dinitro-2-methylphenol	1	µg/L	56 U [54 U]	54 U	50 U	50 U	50 U
2,4-dinitrophenol	1	µg/L	56 U [54 U]	54 U	50 U	50 U	50 U
2,4-dinitrotoluene	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U

Table 13
Surface Water Analytical Results – Semivolatile Organic Compounds

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Date Collected:	State of New York Surface-Water Guidelines	Units	SW-01 03/04/08	SW-02 03/04/08	SW-03 03/04/08	SW-04 03/04/08	SW-05 03/04/08
2,6-dinitrotoluene	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Dioctyl phthlate	50 (G)	µg/L	11 UJ [11 UJ]	11 UJ	10 UJ	10 UJ	10 UJ
Bis-(2-ethylhexyl) phthalate	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Fluoranthene	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Fluorene	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Hexachlorobenzene	0.04	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Hexachlorobutadiene	0.5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Hexachloroethane	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Hexaclorocyclopentadiene	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Indeno (1,2,3-cd)pyrene	0.002 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Isophorone	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2-methyl phenol	1	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2-methylnaphthalene	4.7 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
4-methylphenol (p-cresol)	1	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Naphthalene	13 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2-nitroaniline	5	µg/L	56 U [54 U]	54 U	50 U	50 U	50 U
3-nitroaniline	5	µg/L	56 U [54 U]	54 U	50 U	50 U	50 U
4-nitroaniline	5	µg/L	22 U [22 U]	22 U	20 U	20 U	20 U
Nitrobenzene	0.4	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2-nitrophenol	1	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
4-nitrophenol	1	µg/L	56 U [54 U]	54 U	50 U	50 U	50 U
N-nitroso-di-phenylamine	- -	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
N-nitrosodi-n-propylamine	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2,2-oxybis (1-chloropropane)	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Pentachlorophenol	1	µg/L	56 U [54 U]	54 U	50 U	50 U	50 U
Phenanthrene	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Phenol	1	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Pyrene	50 (G)	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
1,2,4-trichlorobenzene	5	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
2,4,5-trichlorophenol	1	µg/L	56 U [54 U]	54 U	50 U	50 U	50 U
2,4,6-trichlorophenol	1	µg/L	11 U [11 U]	11 U	10 U	10 U	10 U
Total PAHs	- -	µg/L	ND	ND	ND	ND	ND
Total SVOCs	- -	µg/L	ND	ND	ND	ND	ND

Notes:
Constitutents detected above screening levels are shaded.

1. Qualifiers are as follows:
   J = estimated value
   ND = Indicates analyte was analyzed for, but not detected at or above the reporting limit.
   U = compound was analyzed for but not detected; the associated value is the compound quantitation limit.
   -- = criteria not applicable.
2. Screening levels were provided in NYSDEC 6 NYCRR Part 703 Surface Water and Groundwater Quality Standards.
3. Results for duplicate samples are presented in brackets.

G = guidance value
µg/L = micrograms per liter
NA = not analyzed
NYSDEC = New York State Department of Environmental Conservation
PAH = polycyclic aromatic hydrocarbon
SVOCs = semi-volatile organic compounds
Total PAHs = represents the summation of 17 TCL PAHs

Table 14
Surface Water Analytical Results - Metals and Cyanide

Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

Location ID: / Date Collected:	State of New York Surface Water Guidelines	Units	SW-01 03/04/08	SW-02 03/04/08	SW-03 03/04/08	SW-04 03/04/08	SW-05 03/04/08
Metals							
Aluminum	- -	µg/L	300 J [250 J]	270 J	180 J	280 J	150 J
Antimony	3	µg/L	20 U [20 U]	20 U	20 U	20 U	20 U
Arsenic	50	µg/L	20 U [20 U]	20 U	20 U	20 U	20 U
Barium	1,000	µg/L	16 [15]	15	16	16	14
Beryllium	3	µg/L	3 U [3 U]	3 U	3 U	3 U	3 U
Cadmium	5	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Calcium	- -	µg/L	121,000 [117,000]	127,000	132,000	122,000	124,000
Chromium	50	µg/L	10 U [10 U]	10 U	10 U	10 U	10 U
Cobalt	5	µg/L	10 U [10 U]	10 U	10 U	10 U	10 U
Copper	200	µg/L	10 U [10 U]	10 U	7.3 J	10 U	10 U
Iron	300	µg/L	420 [420]	440	300	420	260
Lead	25	µg/L	10 U [10 U]	10 U	10 U	10 U	10 U
Magnesium	35,000	µg/L	339,000 [323,000]	362,000	374,000	345,000	351,000
Manganese	300	µg/L	27 [27]	28	27	26	24
Mercury	0.7	µg/L	0.2 U [0.2 U]	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	100	µg/L	10 U [10 U]	10 U	10 U	10 U	10 U
Potassium	- -	µg/L	200,000 [190,000]	217,000	223,000	208,000	208,000
Selenium	10	µg/L	30 U [30 U]	30 U	30 U	30 U	30 U
Silver	50	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Sodium	20,000	µg/L	394,000 [379,000 J]	371,000 J	377,000 J	371,000 J	374,000 J
Thallium	0.5	µg/L	30 UJ [8.6 J]	30 UJ	30 UJ	8.3 J	30 UJ
Vanadium	14	µg/L	5 U [5 U]	5 U	5 U	5 U	5 U
Zinc	2,000	µg/L	50 U [50 U]	50 U	50 U	50 U	50 U
Total Cyanide							
Total Cyanide	200	µg/L	10 U [10 U]	10 U	10 U	10 U	10 U
Total Petroleum Hydrocarbon							
Diesel range organics [c10-c28]	- -	µg/L	500 U [500 U]	500 U	500 U	500 U	500 U
Total SVOCs	- -	µg/L	ND	ND	ND	ND	ND

Notes:
Constitutents detected above screening levels are shaded.

1. Qualifiers are as follows:
   J = estimated value
   ND = Indicates analyte was analyzed for, but not detected at or above the reporting limit.
   U = compound was analyzed for but not detected; the associated value is the compound quantitation limit.
   -- = criteria not applicable.
2. Screening levels were provided in NYSDEC 6 NYCRR Part 703 Surface Water and Groundwater Quality Standards.
3. Results for duplicate samples are presented in brackets.

G = guidance value
µg/L = micrograms per liter
NA = not analyzed
NYSDEC = New York State Department of Environmental Conservation
SVOCs = Semi-volatile organic compounds

FIGURES

NOTE:

1. BASE MAP SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP IMAGES ENTITLED CENTRAL PARK AND WEEHAWKEN PROVIDED BY THE NEW YORK STATE GIS CLEARINGHOUSE.

0 1,000 2,000 Feet

GRAPHIC SCALE

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42ND STREET MGP
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

CITY:SYR DIV: IM/DV DB: JAYME RAPP
Con Ed (is B0043036.0000.00003)
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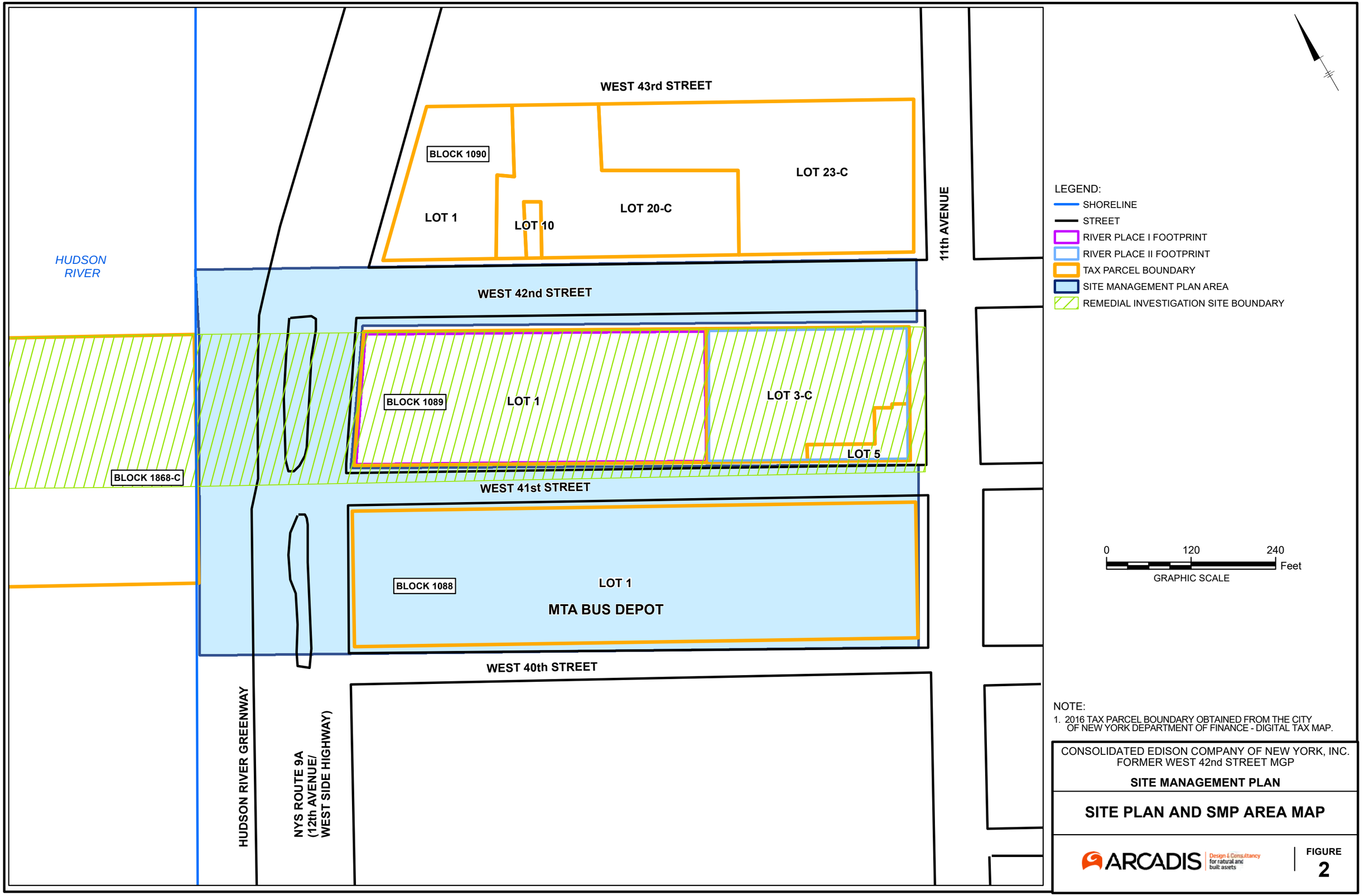

NOTE:

1. 2016 TAX PARCEL BOUNDARY OBTAINED FROM THE CITY OF NEW YORK DEPARTMENT OF FINANCE - DIGITAL TAX MAP.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42nd STREET MGP

SITE MANAGEMENT PLAN

SITE PLAN AND SMP AREA MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

CITY:SYR DIV: IM/DV DB: JAYME RAPP
Con Ed (60043036)
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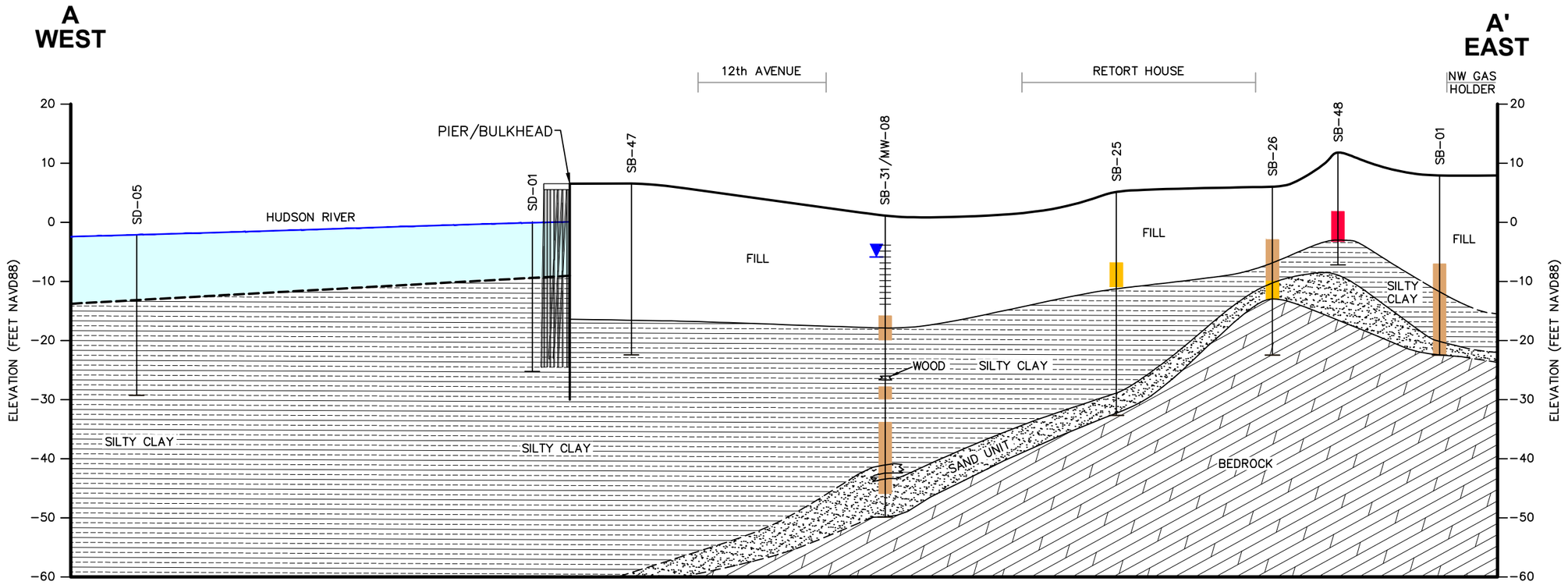
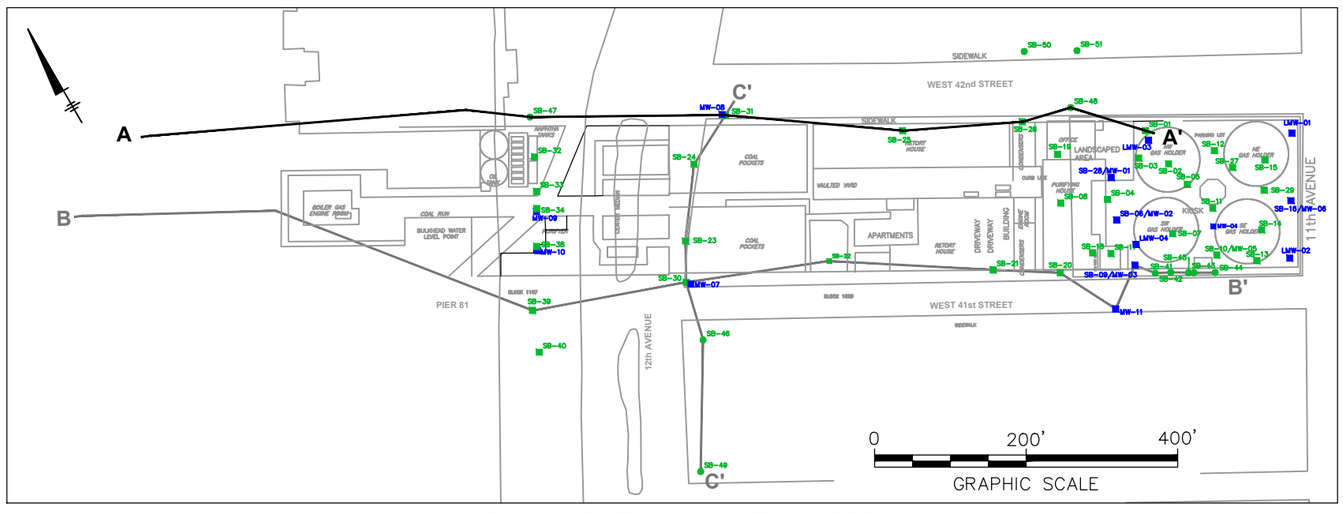




CROSS SECTION LOCATION MAP

SB-38 BORING/WELL ID

LEGEND:

- GROUND SURFACE
- WATER TABLE
- LITHOLOGICAL CONTACT
- SCREENED INTERVAL
- BOTTOM OF BORING/WELL
- ODOR
- STAINING/SHEEN
- NAPL
- FILL
- SILTY CLAY
- SAND UNIT
- BEDROCK (HARTLAND FORMATION)
- SEDIMENT SURFACE ELEVATION

NOTES:

1. ELEVATIONS REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. WATER LEVELS SHOWN REFLECT UPPER MOST AQUIFER.

0 20' 40'
VERTICAL SCALE

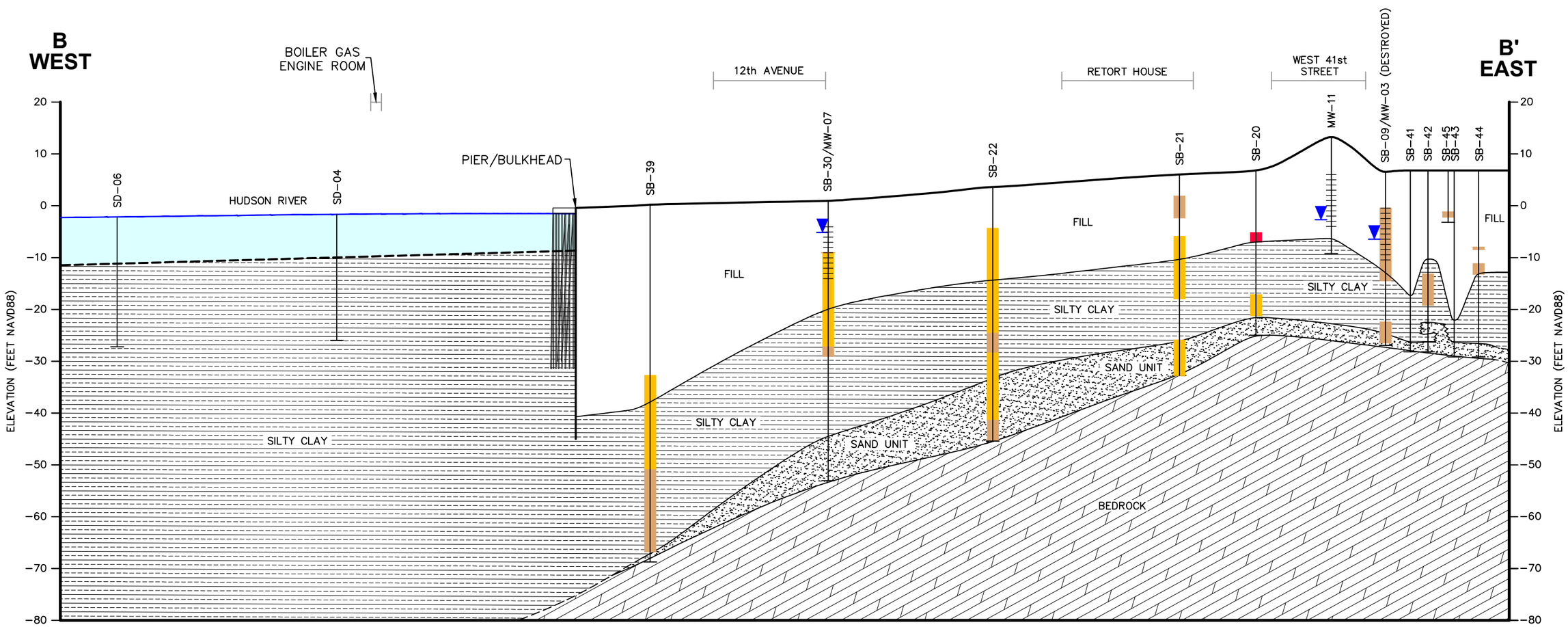
0 120' 240'
HORIZONTAL SCALE

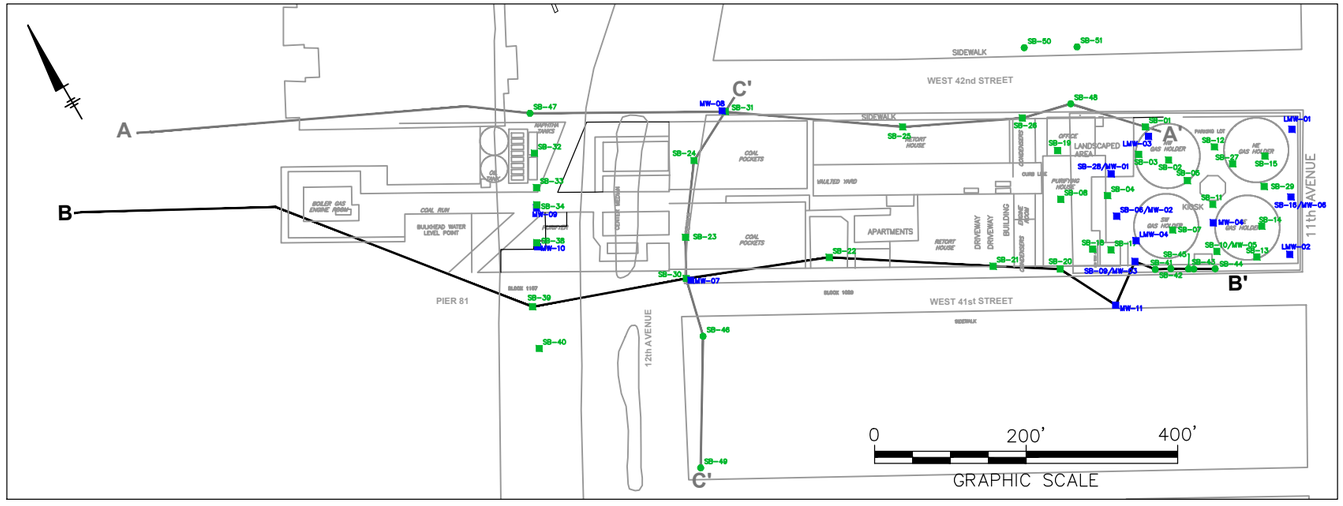
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42ND STREET MPG
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

GEOLOGIC CROSS - SECTION A - A'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3





CROSS SECTION LOCATION MAP

SB-38

LEGEND:

- BORING/WELL ID
- GROUND SURFACE
- WATER TABLE
- LITHOLOGICAL CONTACT
- SCREENED INTERVAL
- BOTTOM OF BORING/WELL
- ODOR
- STAINING/SHEEN
- NAPL
- FILL
- SILTY CLAY
- SAND UNIT
- BEDROCK (HARTLAND FORMATION)
- SEDIMENT SURFACE ELEVATION

NOTES:

1. ELEVATIONS REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. WATER LEVELS SHOWN REFLECT UPPER MOST AQUIFER.

0 20' 40'
VERTICAL SCALE

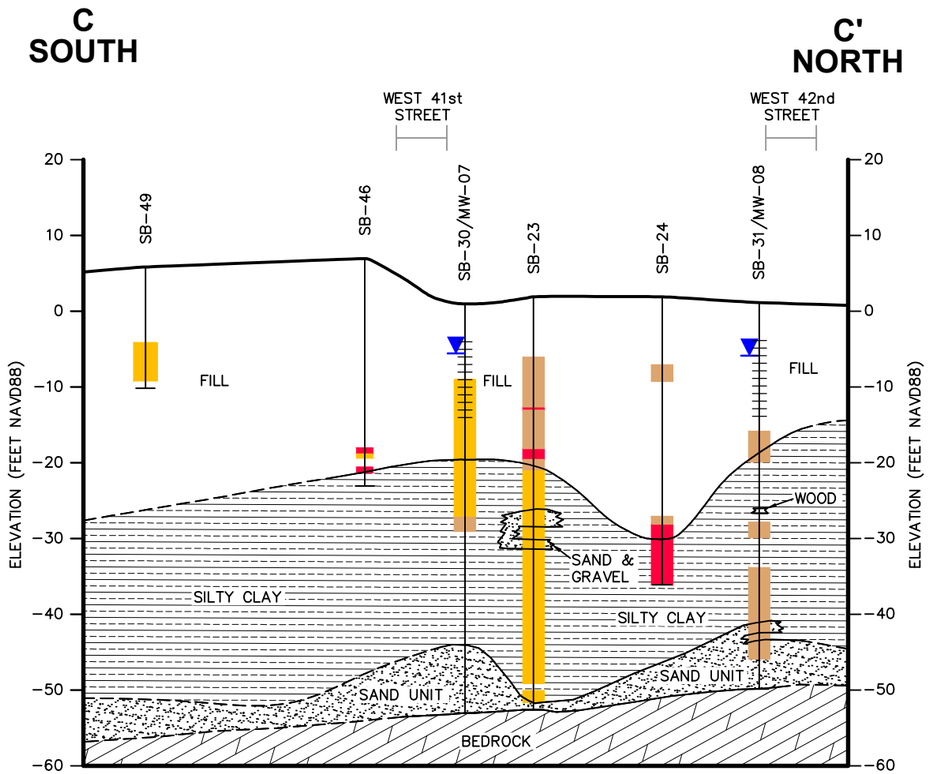
0 120' 240'
HORIZONTAL SCALE

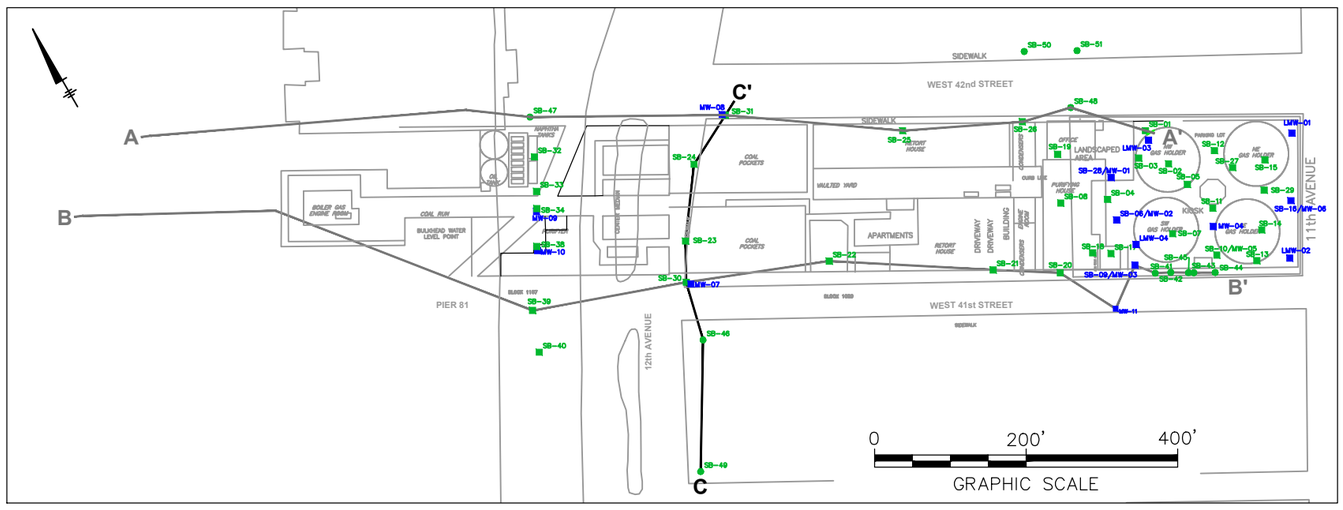
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42ND STREET MPG
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

GEOLOGIC CROSS - SECTION B - B'

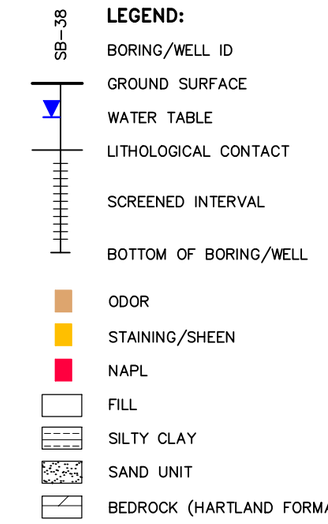
ARCADIS Design & Consultancy for natural and built assets

FIGURE
4



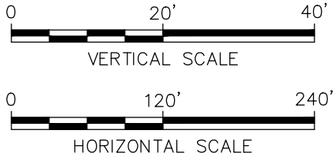


CROSS SECTION LOCATION MAP



NOTES:

1. ELEVATIONS REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. WATER LEVELS SHOWN REFLECT UPPER MOST AQUIFER.

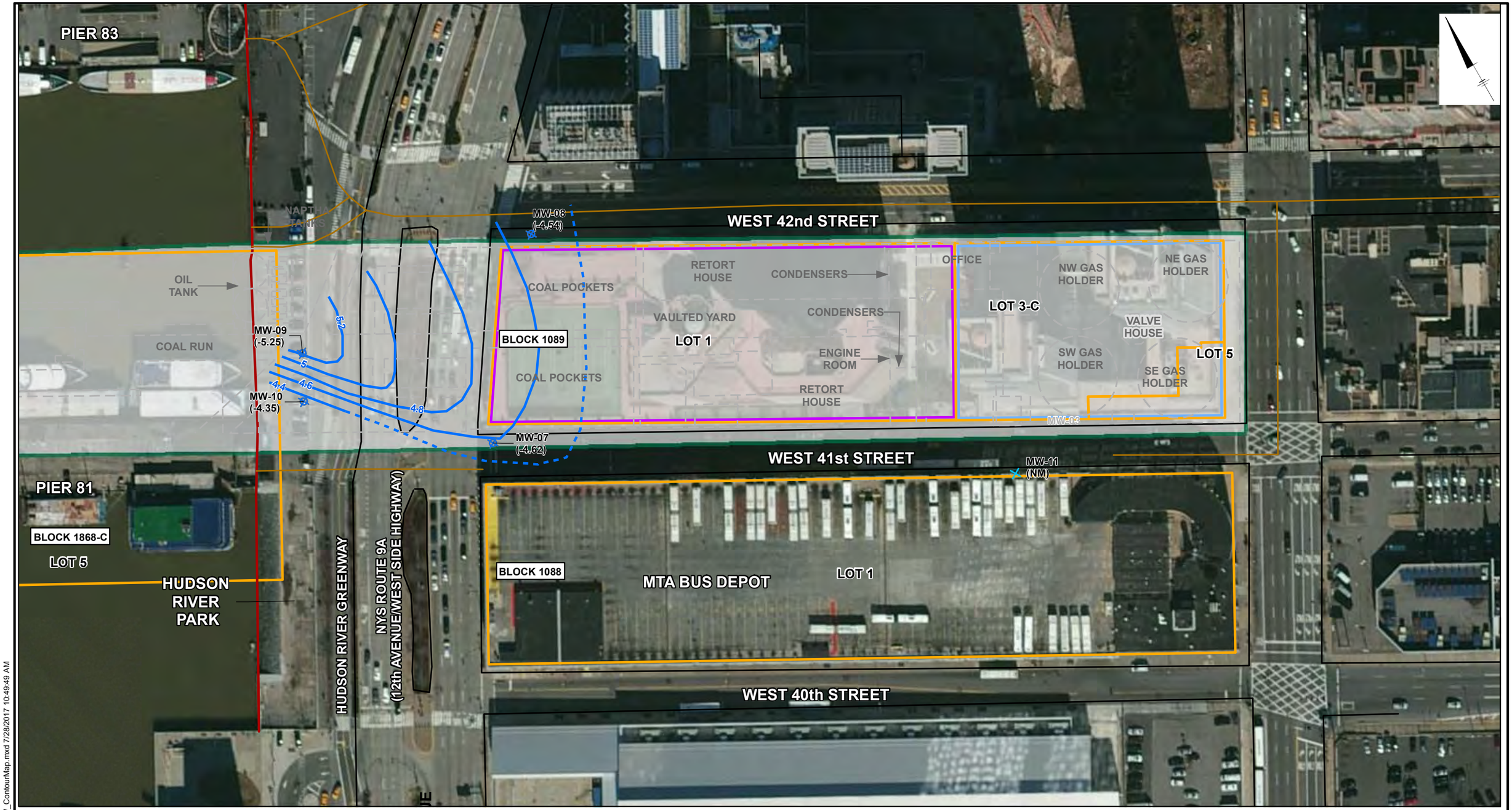


CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42ND STREET MPG
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

GEOLOGIC CROSS - SECTION C - C'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
5



LEGEND:

- MW-11 - ARCADIS (2011) MONITORING WELL
- MW-06 - D & B (2004, 2005) MONITORING WELL
- HISTORIC STRUCTURE
- BULKHEAD
- COMBINED SEWER OVERFLOWS (CSOs)
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED) (5.0) GROUNDWATER ELEVATION
- RIVER PLACE I FOOTPRINT
- RIVER PLACE II FOOTPRINT
- TAX PARCEL BOUNDARY
- REMEDIAL INVESTIGATION SITE BOUNDARY

NOTES:

1. THE LOCATIONS AND ELEVATIONS OF MW-11 WERE SURVEYED BY MUNOZ ENGINEERING IN JULY 2010. HORIZONTAL COORDINATES ARE IN NYS COORDINATE SYSTEM (EAST) NAD83 AS DERIVED FROM GPS. ALL ELEVATIONS REFER TO NAVD 88 VERTICAL DATUM AS DERIVED FROM GPS.
2. HISTORIC STRUCTURES PROVIDED BY DVIRKA AND BARTILUCCI ENGINEERING (D & B). THE LOCATIONS OF ALL STRUCTURES ARE APPROXIMATE.
3. 2015 IMAGERY OBTAINED FROM ESRI SERVICE.
4. GROUNDWATER CONTOUR MAP IS APPROXIMATE AND WAS PREPARED USING GROUNDWATER ELEVATION DATA FROM MONITORING WELLS MW-07 TO MW-10, WHICH WERE MEASURED BETWEEN MARCH 1, 2011 AND MARCH 7, 2011. GROUNDWATER ELEVATION DATA FROM MONITORING WELL MW-11 WAS NOT USED BECAUSE MW-11 WAS MEASURED ONLY IN 2010 DUE TO ACCESS CONSTRAINTS.
5. VERTICAL DATUM IS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. ELEVATIONS PROVIDED IN FEET.
6. 2016 TAX PARCEL BOUNDARY OBTAINED FROM THE CITY OF NEW YORK DEPARTMENT OF FINANCE - DIGITAL TAX MAP.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42nd STREET MGP
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

GROUNDWATER CONTOUR MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6

CITY:SYR DIV: IM/DV DB: JAYME RAPP
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LEGEND:

ARCADIS BORINGS COMPLETED BETWEEN 2006 TO 2011:
- SOIL BORING
- MW-11 - MONITORING WELL LOCATION
- SEDIMENT AND SURFACE WATER SAMPLE LOCATIONS

D & B (2004, 2005) SAMPLES:
- MW-06 - MONITORING WELL
- SB-32 - SOIL BORING
- W-7, L-2a - HRTP SOIL BORING

- HISTORIC STRUCTURE
- BULKHEAD
- COMBINED SEWER OVERFLOWS (CSOs)
- RIVER PLACE I FOOTPRINT
- RIVER PLACE II FOOTPRINT
- TAX PARCEL BOUNDARY
- REMEDIAL INVESTIGATION SITE BOUNDARY

NOTES:

1. THE LOCATIONS AND ELEVATIONS OF SB-46 THROUGH SB-49, AND MW-11 WERE SURVEYED BY MUNOZ ENGINEERING IN JULY 2010. HORIZONTAL COORDINATES ARE IN NYS COORDINATE SYSTEM (EAST) NAD83 AS DERIVED FROM GPS. ALL ELEVATIONS REFER TO NAVD 88 VERTICAL DATUM AS DERIVED FROM GPS.
2. HISTORIC STRUCTURES PROVIDED BY DVIRKA AND BARTILUCCI ENGINEERING (D & B). THE LOCATIONS OF ALL STRUCTURES ARE APPROXIMATE.
3. 2015 IMAGERY FROM ESRI IMAGE SERVICE.
4. 2016 TAX PARCEL BOUNDARY OBTAINED FROM THE CITY OF NEW YORK DEPARTMENT OF FINANCE - DIGITAL TAX MAP.
5. SEDIMENT CORE LOCATIONS WERE SURVEYED BY ARCADIS IN MARCH 2008.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42nd STREET MGP
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

SAMPLE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
7

SB-32	
Depth (ft)	Observation
7-17	SHEEN/STAINING
17-19	SHEEN

SB-34/MW-09	
Depth (ft)	Observation
13-23	SHEEN/STAINING
23-27	STAINING

SB-38/MW-10	
Depth (ft)	Observation
19-31	SHEEN/STAINING
31-43	SHEEN

SB-24	
Depth (ft)	Observation
30-32	NAPL (SATURATED TAR)
32-36	SHEEN/STAINING/NAPL
36-38	SHEEN/NAPL

SB-25	
Depth (ft)	Observation
12-16	SHEEN

SB-26	
Depth (ft)	Observation
16-19	SHEEN

SB-48	
Depth (ft)	Observation
10-14	NAPL (TAR-LIKE MATERIAL)

SB-20	
Depth (ft)	Observation
12-13.8	SHEEN/NAPL (BLEBS) TRACE STAINING (@ 8 FT)
24-28	SHEEN

SB-39	
Depth (ft)	Observation
33-49	SHEEN/STAINING
49-51	STAINING

SB-46	
Depth (ft)	Observation
25-25.8	NAPL (BLEBS)
25.8-26.3	SHEEN
28-28.7	NAPL (BLEBS)

SB-40	
Depth (ft)	Observation
28-32	STAINING

SB-49	
Depth (ft)	Observation
10-11	SHEEN/STAINING
11-15	SHEEN

SB-30/MW-07	
Depth (ft)	Observation
10-22	SHEEN/STAINING
22-28	STAINING

SB-23	
Depth (ft)	Observation
14.5-15	SHEEN/STAINING/NAPL (SATURATED TAR)
20-21.5	SHEEN/STAINING/NAPL (SATURATED TAR)
23-44	SHEEN
52-53.5	SHEEN

SB-22	
Depth (ft)	Observation
8-12	SHEEN
12.5-16	SHEEN/STAINING
16-20	SHEEN/STAINING
20-24	SHEEN/STAINING
24-28	STAINING
32-46	SHEEN

SB-21	
Depth (ft)	Observation
12-16.3	SHEEN
20-24	SHEEN
32-38.8	SHEEN/STAINING

WEST 42nd STREET
WEST 41st STREET
WEST 40th STREET
OIL TANK
COAL RUN
COAL POCKETS
RETORT HOUSE
CONDENSERS
VAULTED YARD
LOT 1
BLOCK 1089
ENGINE ROOM
OFFICE
NW GAS HOLDER
NE GAS HOLDER
LOT 3-C
VALVE HOUSE
SW GAS HOLDER
SE GAS HOLDER
LOT 5
PIER 81
BLOCK 1868-C
LOT 5
HUDSON RIVER PARK
HUDSON RIVER GREENWAY
NYS ROUTE 9A (12th AVENUE/ WEST SIDE HIGHWAY)
BLOCK 1088
LOT 1
MTA BUS DEPOT
SB-32
SB-33
SB-34/MW-09
SB-38/MW-10
SB-39
SB-40
SB-47
MW-08
SB-31
SB-24
SB-25
SB-26
SB-48
SB-50
SB-51
SB-23
SB-22
SB-21
SB-20
SB-09
SB-41
SB-42
SB-43
SB-44
SB-30/MW-07
MW-11
SB-46
SB-49

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the

LEGEND:

ARCADIS BORINGS COMPLETED BETWEEN 2006 TO 2011:
- SOIL BORING - NO SHEEN/STAIN OR NAPL PRESENT
- MW-11 - MONITORING WELL
- SOIL BORING - NAPL PRESENT
- SOIL BORING - SHEEN/STAIN PRESENT

D & B (2004, 2005) SAMPLES:
- MW-06 - MONITORING WELL
- SB-32 - SOIL BORING - NO SHEEN/STAIN OR NAPL PRESENT
- SOIL BORING - NAPL PRESENT
- SOIL BORING - SHEEN/STAIN PRESENT

- HISTORIC STRUCTURE
- BULKHEAD
- COMBINED SEWER OVERFLOWS (CSOs)
- REMEDIAL INVESTIGATION SITE BOUNDARY
- RIVER PLACE I FOOTPRINT
- RIVER PLACE II FOOTPRINT
- TAX PARCEL BOUNDARY

0 100 200 Feet
GRAPHIC SCALE

NOTES:

1. THE LOCATIONS AND ELEVATIONS OF SB-46 THROUGH SB-49, AND MW-11 WERE SURVEYED BY MUNOZ ENGINEERING IN JULY 2010. HORIZONTAL COORDINATES ARE IN NYS COORDINATE SYSTEM (EAST) NAD83 AS DERIVED FROM GPS. ALL ELEVATIONS REFER TO NAVD 88 VERTICAL DATUM AS DERIVED FROM GPS.
2. HISTORIC STRUCTURES PROVIDED BY DVIRKA AND BARTILUCCI ENGINEERING (D & B). THE LOCATIONS OF ALL STRUCTURES ARE APPROXIMATE.
3. 2015 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
4. 2016 TAX PARCEL BOUNDARY OBTAINED FROM THE CITY OF NEW YORK DEPARTMENT OF FINANCE - DIGITAL TAX MAP.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42nd STREET MGP
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

OCCURRENCE OF NAPL/STAINING/ SHEEN IN SOILS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 8

CITY:SYR DIV: IM/DV DB: JAYME RAPP
Con Ed (B0043036)
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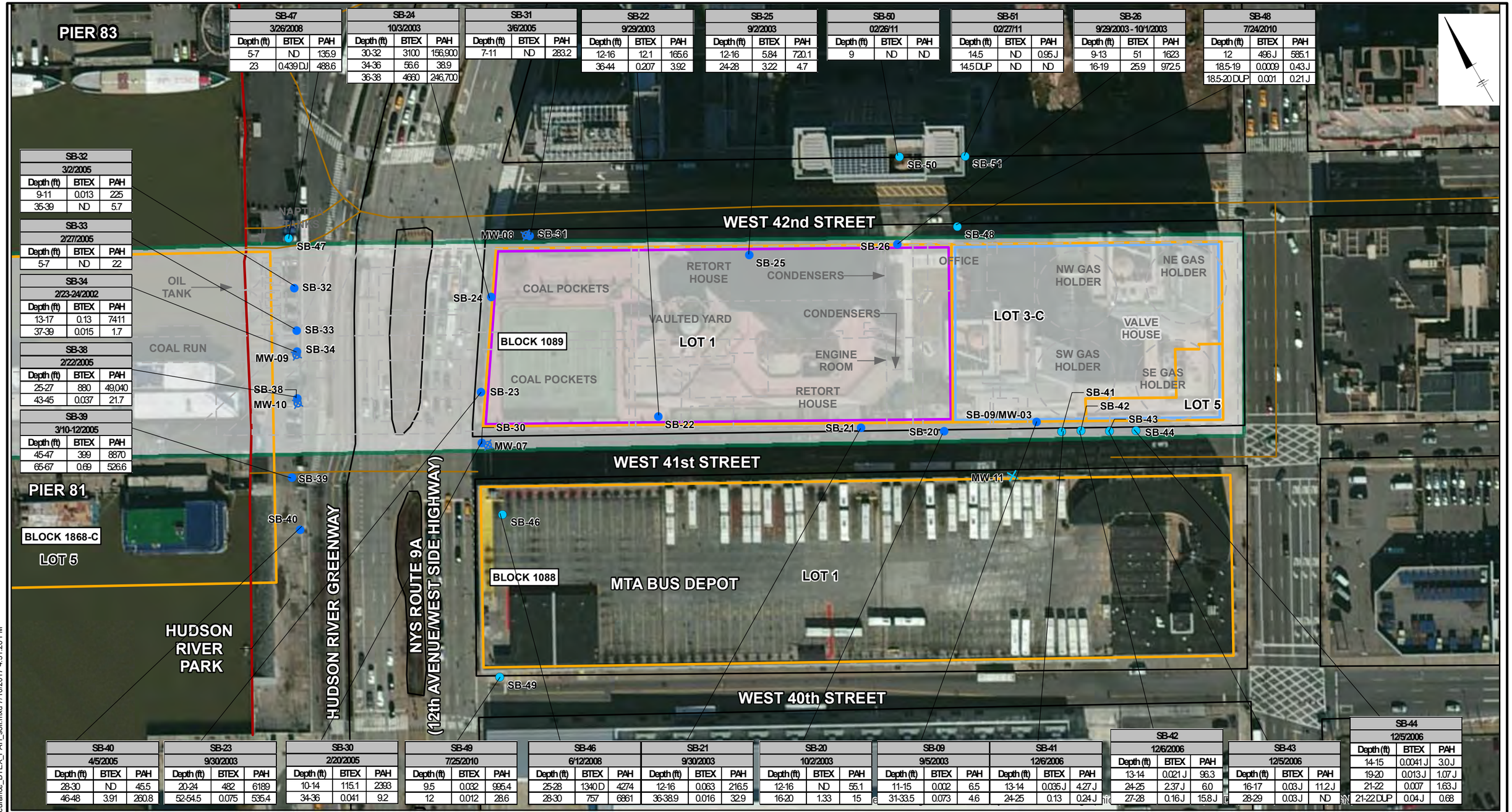

SB-47		
3/26/2008		
Depth (ft)	BTEX	PAH
5-7	ND	135.9
23	0.439 DJ	488.6

SB-24		
10/3/2003		
Depth (ft)	BTEX	PAH
30-32	3100	156,900
34-36	56.6	38.9
36-38	4660	246,700

SB-31		
3/6/2005		
Depth (ft)	BTEX	PAH
7-11	ND	283.2

SB-22		
9/29/2003		
Depth (ft)	BTEX	PAH
12-16	12.1	165.6
36-44	0.207	3.92

SB-25		
9/2/2003		
Depth (ft)	BTEX	PAH
12-16	5.84	720.1
24-28	3.22	4.7

SB-50		
02/26/11		
Depth (ft)	BTEX	PAH
9	ND	ND

SB-51		
02/27/11		
Depth (ft)	BTEX	PAH
14.5	ND	0.95 J
14.5 DUP	ND	ND

SB-26		
9/29/2003 - 10/1/2003		
Depth (ft)	BTEX	PAH
9-13	51	1623
16-19	25.9	972.5

SB-48		
7/24/2010		
Depth (ft)	BTEX	PAH
12	496 J	585.1
18.5-19	0.0009 J	0.43 J
18.5-20 DUP	0.001 J	0.21 J

SB-32		
3/2/2005		
Depth (ft)	BTEX	PAH
9-11	0.013	225
35-39	ND	5.7

SB-33		
2/27/2005		
Depth (ft)	BTEX	PAH
5-7	ND	22

SB-34		
2/23-24/2002		
Depth (ft)	BTEX	PAH
13-17	0.13	7411
37-39	0.015	1.7

SB-38		
2/22/2005		
Depth (ft)	BTEX	PAH
25-27	880	49,040
43-45	0.037	21.7

SB-39		
3/10-12/2005		
Depth (ft)	BTEX	PAH
45-47	399	8870
65-67	0.69	526.6

SB-40		
4/5/2005		
Depth (ft)	BTEX	PAH
28-30	ND	45.5
46-48	3.91	260.8

SB-23		
9/30/2003		
Depth (ft)	BTEX	PAH
20-24	482	6189
52-54.5	0.075	535.4

SB-30		
2/20/2005		
Depth (ft)	BTEX	PAH
10-14	115.1	2393
34-36	0.041	9.2

SB-49		
7/25/2010		
Depth (ft)	BTEX	PAH
9.5	0.032	995.4
12	0.012	28.6

SB-46		
6/12/2008		
Depth (ft)	BTEX	PAH
25-28	1340 D	4274
28-30	757	6861

SB-21		
9/30/2003		
Depth (ft)	BTEX	PAH
12-16	0.063	216.5
36-38.9	0.016	32.9

SB-20		
10/2/2003		
Depth (ft)	BTEX	PAH
12-16	ND	55.1
16-20	1.33	15

SB-09		
9/5/2003		
Depth (ft)	BTEX	PAH
11-15	0.002	6.5
31-33.5	0.073	4.6

SB-41		
12/6/2006		
Depth (ft)	BTEX	PAH
13-14	0.035 J	4.27 J
24-25	0.13	0.24 J

SB-42		
12/6/2006		
Depth (ft)	BTEX	PAH
13-14	0.021 J	96.3
24-25	2.37 J	6.0
27-28	0.16 J	15.8 J

SB-43		
12/5/2006		
Depth (ft)	BTEX	PAH
16-17	0.03 J	11.2 J
28-29	0.03 J	ND

SB-44		
12/5/2006		
Depth (ft)	BTEX	PAH
14-15	0.0041 J	3.0 J
19-20	0.013 J	1.07 J
21-22	0.007	1.63 J
21-22 DUP	0.04 J	0.68

LEGEND:

ARCADIS (2011) SAMPLES:
- SOIL BORING
- MW-11 - MONITORING WELL LOCATION

D & B (2004, 2005) SAMPLES:
- MW-06 - MONITORING WELL
- SB-32 - SOIL BORING

- HISTORIC STRUCTURE
- BULKHEAD
- COMBINED SEWER OVERFLOWS (CSOs)
- RIVER PLACE I FOOTPRINT
- RIVER PLACE II FOOTPRINT
- TAX PARCEL BOUNDARY
- REMEDIAL INVESTIGATION SITE BOUNDARY

NOTES:

1. THE LOCATIONS AND ELEVATIONS OF SB-46 THROUGH SB-49 WERE SURVEYED BY MUNOZ ENGINEERING IN JULY 2010. HORIZONTAL COORDINATES ARE IN NYS COORDINATE SYSTEM (EAST) NAD83 AS DERIVED FROM GPS. ALL ELEVATIONS REFER TO NAVD 88 VERTICAL DATUM AS DERIVED FROM GPS.
2. HISTORIC STRUCTURES PROVIDED BY DVIRKA AND BARTILUCCI ENGINEERING (D & B). THE LOCATIONS OF ALL STRUCTURES ARE APPROXIMATE.
3. 2015 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
4. 2016 TAX PARCEL BOUNDARY OBTAINED FROM THE CITY OF NEW YORK DEPARTMENT OF FINANCE - DIGITAL TAX MAP.
5. PAH IS THE SUM OF THE 17 TCL PAHS.
6. BTEX IS THE SUM OF BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES.
7. ALL RESULTS ARE PRESENTED IN MILLIGRAMS/KILOGRAM (mg/kg).

0 100 200 Feet
GRAPHIC SCALE

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42nd STREET MGP
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

OCCURRENCE OF TOTAL BTEX AND TOTAL PAH IN SOIL

ARCADIS Design & Consultancy for natural and built assets

FIGURE 9

CITY:SYR DIV: IM/DV DB: JAYME RAPP
Con Ed (B0043036)
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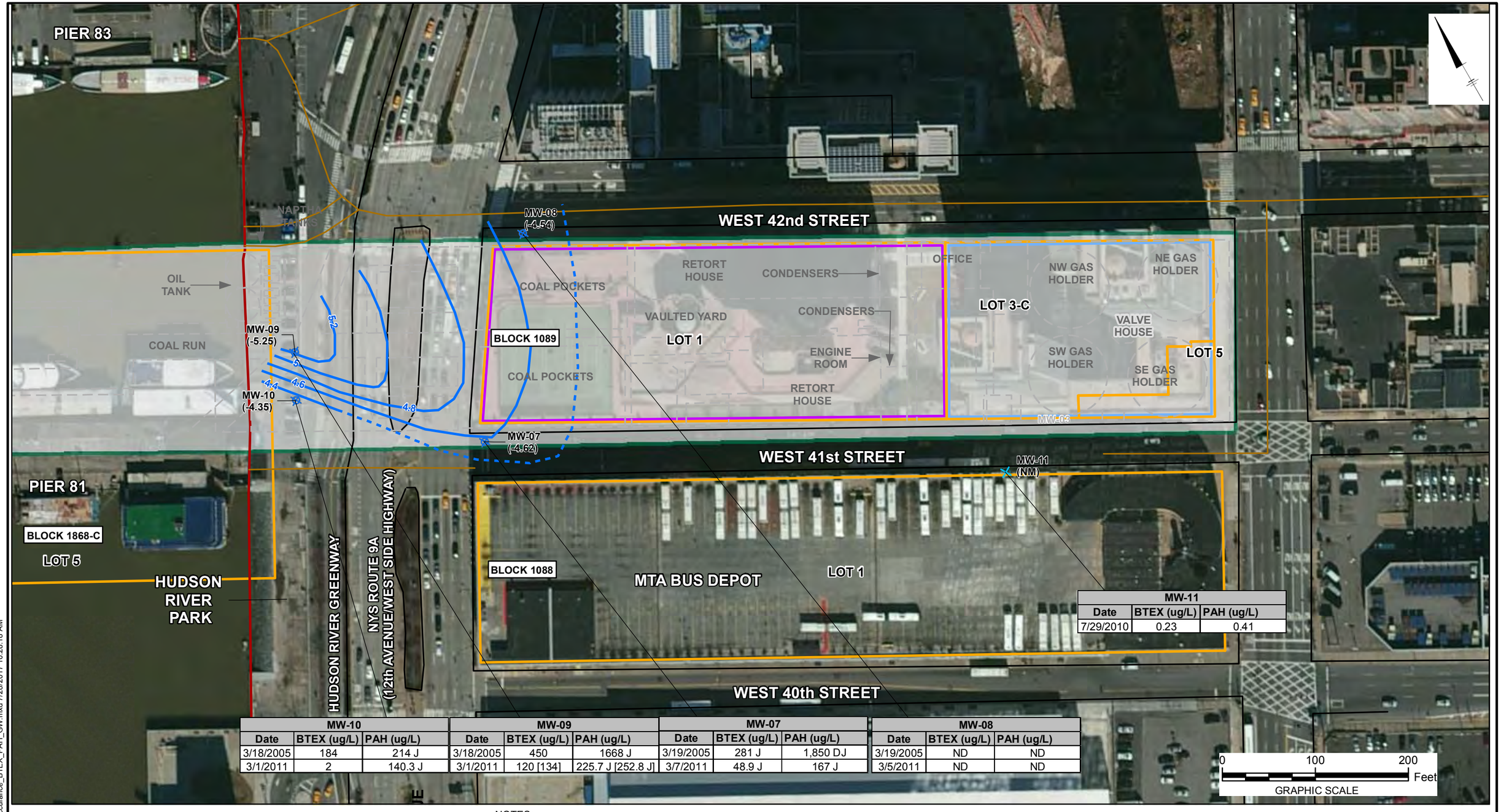

MW-11		
Date	BTEX (ug/L)	PAH (ug/L)
7/29/2010	0.23	0.41

MW-10		
Date	BTEX (ug/L)	PAH (ug/L)
3/18/2005	184	214 J
3/1/2011	2	140.3 J

MW-09		
Date	BTEX (ug/L)	PAH (ug/L)
3/18/2005	450	1668 J
3/1/2011	120 [134]	225.7 J [252.8 J]

MW-07		
Date	BTEX (ug/L)	PAH (ug/L)
3/19/2005	281 J	1,850 DJ
3/7/2011	48.9 J	167 J

MW-08		
Date	BTEX (ug/L)	PAH (ug/L)
3/19/2005	ND	ND
3/5/2011	ND	ND

LEGEND:

- MW-11 - ARCADIS (2011) MONITORING WELL
- MW-06 - D & B (2004, 2005) MONITORING WELL
- HISTORIC STRUCTURE
- BULKHEAD
- COMBINED SEWER OVERFLOWS (CSOs)
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED) (5.0) GROUNDWATER ELEVATION
- RIVER PLACE I FOOTPRINT
- RIVER PLACE II FOOTPRINT
- TAX PARCEL BOUNDARY
- REMEDIAL INVESTIGATION SITE BOUNDARY

NOTES:

1. THE LOCATIONS AND ELEVATIONS OF MW-11 WERE SURVEYED BY MUNOZ ENGINEERING IN JULY 2010. HORIZONTAL COORDINATES ARE IN NYS COORDINATE SYSTEM (EAST) NAD83 AS DERIVED FROM GPS. ALL ELEVATIONS REFER TO NAVD 88 VERTICAL DATUM AS DERIVED FROM GPS.
2. HISTORIC STRUCTURES PROVIDED BY DVIRKA AND BARTILUCCI ENGINEERING (D & B). THE LOCATIONS OF ALL STRUCTURES ARE APPROXIMATE.
3. 2015 IMAGERY OBTAINED FROM ESRI SERVICE.
4. PAH IS THE SUM OF THE 17 TCL PAHS.
5. BTEX IS THE SUM OF BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES.
6. DUPLICATE SAMPLE RESULTS ARE PRESENTED IN BRACKETS.
7. GROUNDWATER CONTOUR MAP IS APPROXIMATE AND WAS PREPARED USING GROUNDWATER ELEVATION DATA FROM MONITORING WELLS MW-07 TO MW-10, WHICH WERE MEASURED BETWEEN MARCH 1, 2011 AND MARCH 7, 2011. GROUNDWATER ELEVATION DATA FROM MONITORING WELL MW-11 WAS NOT USED BECAUSE MW-11 WAS MEASURED ONLY IN 2010 DUE TO ACCESS CONSTRAINTS.
8. VERTICAL DATUM IS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929. ELEVATIONS PROVIDED IN FEET.
9. DATA QUALIFIERS:
   J: THE ANALYTE WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.
   D: THE REPORTED CONCENTRATION IS BASED ON A DILUTED SAMPLE ANALYSIS.
10. 2016 TAX PARCEL BOUNDARY OBTAINED FROM THE CITY OF NEW YORK DEPARTMENT OF FINANCE - DIGITAL TAX MAP.
11. ND – NOT DETECTED
    NM - NOT MEASURED

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42nd STREET MGP
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

OCCURRENCE OF TOTAL BTEX AND TOTAL PAH IN GROUNDWATER

ARCADIS Design & Consultancy for natural and built assets

FIGURE 10

CITY:SYR DIV: IM/DV DB: JAYME RAPP
Con Ed (60043036)
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SD-06		
Depth (ft)	PAH	BTEX
0-0.5	5.65	ND
0-0.5 DUP	6.58	ND

SD-05		
Depth (ft)	PAH	BTEX
0-0.5	6.3	ND

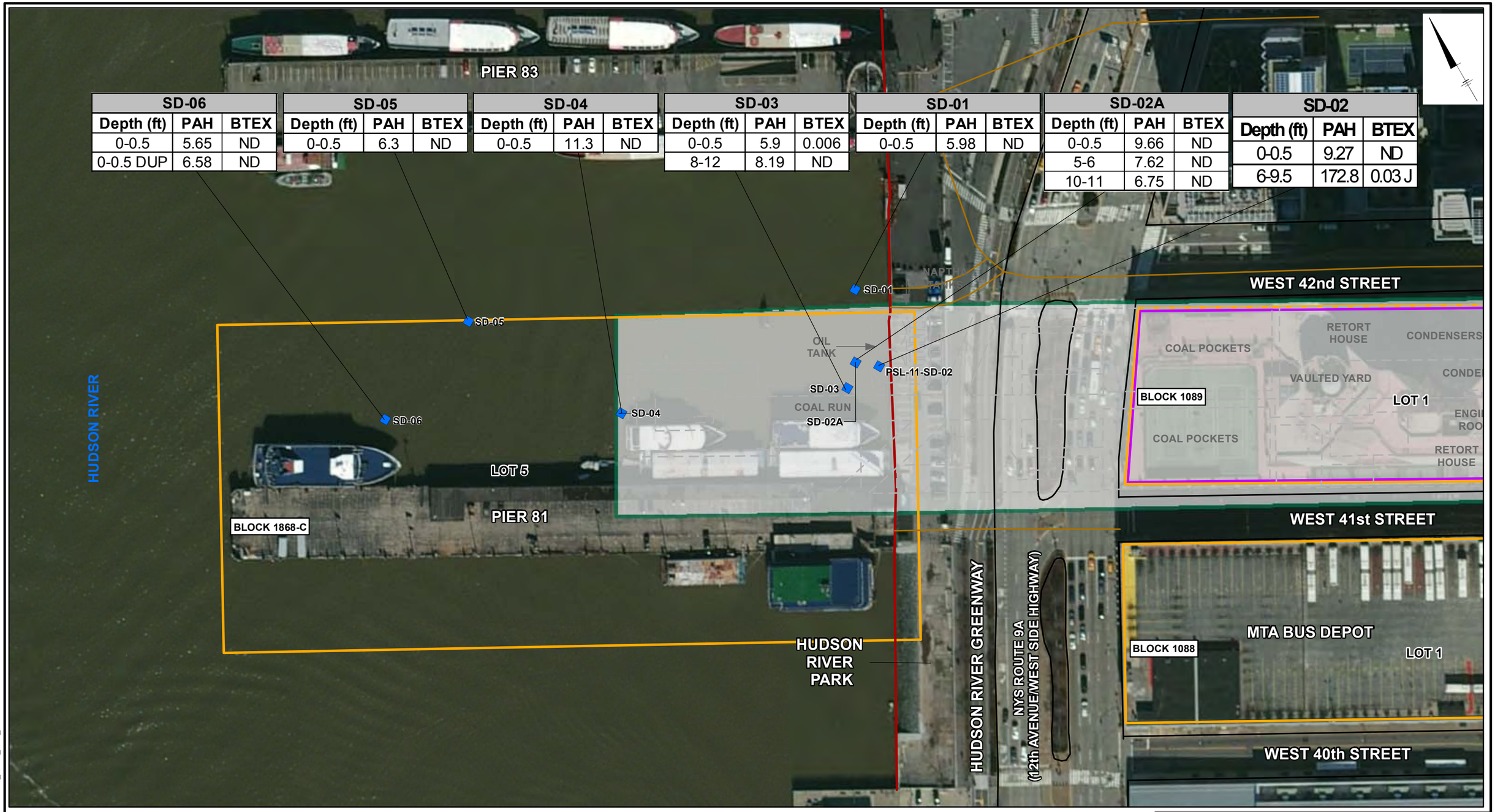
SD-04		
Depth (ft)	PAH	BTEX
0-0.5	11.3	ND

SD-03		
Depth (ft)	PAH	BTEX
0-0.5	5.9	0.006
8-12	8.19	ND

SD-01		
Depth (ft)	PAH	BTEX
0-0.5	5.98	ND

SD-02A		
Depth (ft)	PAH	BTEX
0-0.5	9.66	ND
5-6	7.62	ND
10-11	6.75	ND

SD-02		
Depth (ft)	PAH	BTEX
0-0.5	9.27	ND
6-9.5	172.8	0.03 J



LEGEND:

- SEDIMENT CORE LOCATION
- HISTORIC STRUCTURE
- BULKHEAD
- COMBINED SEWER OVERFLOWS (CSOs)
- TAX PARCEL BOUNDARY
- REMEDIAL INVESTIGATION SITE BOUNDARY
- RIVER PLACE I FOOTPRINT

0 100 200 Feet

GRAPHIC SCALE

NOTES:

1. 2015 IMAGERY OBTAINED FROM ESRI SERVICE..
2. HISTORIC STRUCTURES PROVIDED BY DVIRKA AND BARTILUCCI ENGINEERING (D & B). THE LOCATIONS OF ALL STRUCTURES ARE APPROXIMATE.
3. 2015 IMAGERY OBTAINED FROM ESRI IMAGE SERVICE.
4. SEDIMENT CORES WERE COLLECTED BY ARCADIS IN FEBRUARY 2008.
5. 2016 TAX PARCEL BOUNDARY OBTAINED FROM THE CITY OF NEW YORK DEPARTMENT OF FINANCE - DIGITAL TAX MAP.
5. PAH IS THE SUM OF THE 17 TCL PAHS.
6. BTEX IS THE SUM OF BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES.
7. DATA QUALIFIERS:
   J: THE ANALYTE WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.
   D: THE REPORTED CONCENTRATION IS BASED ON A DILUTED SAMPLE ANALYSIS.
8. ND – NOT DETECTED

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
FORMER WEST 42nd STREET MGP
MANHATTAN, NEW YORK
SITE MANAGEMENT PLAN

OCCURRENCE OF TOTAL BTEX AND TOTAL PAH IN SEDIMENT

ARCADIS Design & Consultancy for natural and built assets

FIGURE 11

CITY:SYR DIV: IM/DV DB: JAYME RAPP
Con Ed (B0043036)
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APPENDIX A

Soil Boring and Monitoring Well Construction Logs

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB-09

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 09/05/03 - 09/05/03

Total Depth: 35.00'

Elevation: 9.55'

Datum: Mean Sea Level

Logged By: K. Panella

Drilling Method: Hand Auger from 0-5' HSA from 5-35'

Contractor: Jersey Boring

Borehole Dia.: 6.25in

Remarks: Samples selected for analysis at 11-15' and 31-33.5'.
WH:Weight of Hammer
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
		0-5'				0.75' reinforced concrete FILL, topsoil, brick, concrete
5		5-7'	0.0 ppm	8 6 4 4 7 6 5 3		Brown, medium SAND, some mica fragments, loose, dry
		7-9'	8.3 ppm			Dark brown-black, medium SAND, some mica fragments, slight hydrocarbon-like odor, dense, moist
		9-11'	1.3 ppm	4 2 1 1 3 1 2 4		Black, silty fine SAND, slight hydrocarbon-like odor, dense, moist
10		11-13'	3.5 ppm	12 11 4 3		Gray, silty fine SAND, slight hydrocarbon-like odor, dense, moist
		13-15'	2.2 ppm			Black, silty fine SAND from 13-13.5', mica fragments from 13.5-14', slight hydrocarbon-like odor, dense, wet
15		15-17'	1.6 ppm	1 2 18 23		Black, silty fine SAND, slight hydrocarbon-like odor, dense, wet
		17-19'	1.5 ppm	3 14 20 6		Same as above
		19-21'	2.5 ppm	3 2 4 3 WH		Black-gray, CLAY, trace seashells, slight hydrocarbon-like odor, dense, wet
20		21-23'	5.2 ppm	1 1 WH		Black-gray, CLAY, dense, wet
		23-25'	2.5 ppm	WH 2 2 2 WH WH 1 1 WH WH		Gray, CLAY, trace seashells, trace wood, dense, moist
25		25-27'	0.5 ppm			Same as above
		27-29'	0.6 ppm			Same as above, some seashells
		29-31'	4.7 ppm			Gray, silty CLAY, slight hydrocarbon-like odor, dense, wet

Location: West 42nd Street	Site Id: SB-09
Purpose: Soil Boring	Total Depth: 35.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 6.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
35		31-33'	23.4 ppm	2 2 3 3 3 2		Gray, silty fine SAND, slight hydrocarbon-like odor, dense, wet
		33-35'	0.5 ppm			Same as above (bedrock at 33.5')
						Base of boring - 33.5 ft.
40						
45						
50						
55						
60						
65						

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB-30

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 02/19/05 – 02/20/05

Total Depth: 54.00'

Elevation: 2.03'

Datum: Mean Sea Level

Logged By: AC/KP

Drilling Method: Vacuum from 0–6', HSA from 6–54'

Contractor: ADT

Borehole Dia.: 4.25in

Remarks: Samples selected for analysis at 10–14' and 34–36'.
WH:Weight of Hammer
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
0		0–6'	0.5 ppm	4 6		1' of asphalt/concrete to dk brown, sandy FILL, some gravel, concrete, dry
			0.6 ppm	3 2		Lt brown–tan, fine–med sandy FILL, some fine gravel, brick, concrete, dry
			0.7 ppm	6 39		Tan, fine sandy FILL, little fine–medium gravel, few rocks, moist
			0.6 ppm	4 3		
5			0.7 ppm	3 7		Tan–black, fine–med sandy FILL, some fine–medium gravel, wood, moist
			0.6 ppm	13 4		Dk brown–black, medium sandy FILL, some gravel and mica, wood, moist–wet
		6–8'	1.2 ppm	9 12		Gray–black, FILL, wood, some gravel, few rocks, wet
				11 10		
		8–10'	1.1 ppm	3 9		Black, FILL, black stained wood, sheen, moderate hydrocarbon–like odor, wet
10			1414 ppm	13 16		Black, FILL, black stained wood, organic matter, gravel, sheen, moderate naphthalene–like odor, wet
		10–12'		13 16		Black, coarse gravelly FILL, some black stained wood, some black medium–coarse sand, sheen, moderate–strong naphthalene–like odor, wet
			65.8 ppm	27 50/4		Black, gravelly FILL, black stained wood, organic matter, trace black med–coarse sand, sheen, mod–strong naphthalene–like odor, wet
		12–14'		7 9		No recovery, wood in tip of split spoon
			49 ppm	12 10		
		14–16'		9 7		FILL, wood, organic material, staining, sheen, mod–strong naphthalene–like odor, wet, to gray–black, CLAY, medium dense, wet
15				4 2		Gray–black, CLAY, light staining, slight naphthalene–like odor, medium dense, wet
		16–18'	92 ppm	3 2		Same as above
				2 2		
		18–20'		1 1		
				2 2		Gray–black, CLAY, trace sand, trace organic matter, slight staining, slight naphthalene–like odor, loose, wet
20				2 2		
		20–22'	24.1 ppm	2 1		Gray, CLAY, trace silt, trace shells, trace mica, slight naphthalene–like odor, medium dense, wet
				1 1		
		22–24'	26.3 ppm	1 1		
				1 1		
		24–26'		1 2		
25			54.6 ppm	2 2		
			7.2 ppm	2 2		
		26–28'		2 1		
				1 1		
		28–30'		1 1		
			31.6 ppm	1 2		

Location: West 42nd Street	Site Id: SB-30
Purpose: Soil Boring	Total Depth: 54.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Graphic Log	Material Description
		30-32'	22.5 ppm	1 1 2		Gray, CLAY, trace shells, dense, wet
		32-34'	4.0 ppm	3 1 1		Gray, CLAY, trace shells, very dense, wet
		34-36'	3.6 ppm	2 5 3		Same as above, some shells
35		36-38'		2 3 4		No recovery
		38-40'	5.1 ppm	3 2 2		Gray, CLAY, trace shells, very dense, wet
		40-42'	3.6 ppm	2 1 1		Gray, CLAY, trace silty sand, some shells, trace wood, dense, wet
40		42-44'	7.7 ppm	1 1 2		Same as above
		44-46'	2.7 ppm	3 4 2		Same as above Dk brown-black, medium SAND, some silty clay, loose, wet
45		46-48'	1.7 ppm	2 1 1		Dk brown-black, medium SAND, trace shells, loose, wet
		48-50'	2.3 ppm	2 1 1		Same as above
		50-52'	0.7 ppm	2 1 2		Dark brown-gray, medium-coarse SAND, some fine-medium gravel, few shells, loose, wet
50		52-54'	1.1 ppm	3 2 1		Same as above (bedrock at 54')
				2 3 2		Base of boring - 54 ft.
55				1		
60						
65						

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB–31

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 03/05/05 – 03/06/05

Total Depth: 51.00'

Elevation: 2.20'

Datum: Mean Sea Level

Logged By: AC/KP

Drilling Method: Vacuum from 0–5', HSA from 5–51'

Contractor: ADT

Borehole Dia.: 4.25in

Remarks: Sample selected for analysis at 7–11'.
WH:Weight of Hammer
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
		0–5'	0.0 ppm			1.5' of asphalt/concrete to brown, sandy FILL, construction debris, dry
			0.0 ppm			Brown, coarse gravelly FILL, trace sand, trace construction debris, dry
			0.5 ppm			Dark brown, medium–coarse sandy FILL, coarse gravel, loose, dry
			0.5 ppm			
			0.3 ppm			
5			0.2 ppm			
		5–7'		5		Dark brown–gray, coarse sandy FILL, micaceous, some gravel, loose, moist
				3		
				8		
		7–9'	0.1 ppm	6		Dark brown–black, coarse sandy FILL, some mica, some gravel, loose, wet
				3		
				4		
				3		No recovery
		9–11'		3		
				1		
10				1		
				1/12		
		11–13'	0.2 ppm	1		Gray–black, medium–coarse sandy FILL, some gravel, some mica, some red brick, little wood, loose, wet
				1		
				1		
		13–15'	0.3 ppm	2		Black, medium–coarse sandy FILL, some gravel, organic material, rock in tip of split spoon
				3		
				4		
				50/1		
15				1		Black, medium sandy FILL, some gravel, silt, little clay, red brick, concrete in tip of split spoon, loose, wet
		15–17'	0.4 ppm	2		
				2		
				1		
		17–19'	1.0 ppm	1		Bk, CLAY, some silt, little sand, slight hydrocarbon–like odor, med dense to black, med SAND, some gravel, silt, little clay, loose, wet
				1		
				1		
				1		
		19–21'	0.5 ppm	1/24		Same as above to black, CLAY, loose, wet
20						
		21–23'		1/12		Gray, CLAY, dense, wet
			0.6 ppm	1/12		
				WH		Same as above, wood in tip of split spoon, some mica, few shells
		23–25'	0.7 ppm	WH		
				WH		
				10/6		
25				10		6" of wood, wet
		25–27'	0.5 ppm	12		
				50/1		
				1		Gray, CLAY, some silt, some shells, medium dense, wet
		27–29'	0.6 ppm	WH		
				1		
				1		
			1.8 ppm	1		Gray, CLAY, trace silt, slight hydrocarbon–like odor, soft, wet
		29–31'		2		

Location: West 42nd Street	Site Id: SB-31
Purpose: Soil Boring	Total Depth: 51.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Graphic Log	Material Description
		31-33'	0.9 ppm	2 1 WH WH WH		Gray, CLAY, little silt, trace shells, soft-medium dense, wet
		33-35'	0.9 ppm	2 1 1 1 1		Same as above
35		35-37'	0.9 ppm	WH WH 1 1		Gray, silty CLAY, some shells, slight organic (H2S-like) odor, soft, wet
		37-39'	2.1 ppm	WH WH WH WH		Gray, silty CLAY, strong organic (H2S-like) odor, dense, wet
		39-41'	1.6 ppm	WH WH WH WH		Same as above, 0.5" zone of peat at 40'
40		41-43'	1.7 ppm	WH WH WH 1 1		Same as above to gray, fine SAND, some silt, trace clay, some shells, organic (H2S-like) odor, loose, wet
		43-45'	0.9 ppm	3 WH 2 1		Gray, silty CLAY, some sand to gray, fine SAND, some silt, little clay slight-moderate organic (H2S-like) odor, wet
45		45-47'	1.0 ppm	3 1 2 2		Gray, medium-coarse SAND, little silt, some gravel, slight organic (H2S-like) odor, loose, wet to brown, fine-medium sandy SILT, trace mica, slight organic (H2S-like) odor, dense, wet
		47-49'	0.8 ppm	2 3 6 12		Brown, fine-medium sandy SILT, dense, wet
		49-51'	0.8 ppm	13 13 21 50/0		Weathered bedrock, white/gray rock pieces w/veins of quartz (bedrock at 51') Base of boring - 51 ft.
50						
55						
60						
65						

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB–32

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 02/21/05 – 03/02/05

Total Depth: 67.00'

Elevation: 2.23'

Datum: Mean Sea Level

Logged By: KP

Drilling Method: Vacuum from 0–5', HSA from 5–67'

Contractor: ADT

Borehole Dia.: 4.25in

Remarks: Samples selected for analysis at 9–11' and 35–39'.
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
		0–5'	0.0 ppm			Asphalt/concrete
			0.7 ppm			Brown, medium–coarse sandy FILL, some gravel, trace brick/concrete, dry
			0.6 ppm			Red brown–brown, silty FILL w/fine sand, micaceous, trace gravel, moist
			0.7 ppm			Brown, silty FILL, some sand and clay, trace gravel, red brick, moist
			0.7 ppm			Brown, coarse sandy FILL, trace gravel, loose, wet
5		5–7'	10.7 ppm	8 10		
		7–9'	20.4 ppm	4 3 3 6		Black, coarse gravelly FILL, some sand, black staining, slight sheen, slight petroleum–like odor, wet
		9–11'	124 ppm	5 6 7 8		Same as above
10		11–13'	24.5 ppm	9 11 3 2		Black, coarse gravelly FILL, some wood, black staining, sheen, slight petroleum–like odor, wet
		13–15'		2 25		No recovery, large cobble in tip of split spoon
15		15–17'	5.5 ppm	2 2 2 2		Black, coarse sandy FILL, some organic material, black staining, slight sheen, hydrocarbon–like odor, loose, wet
		17–19'	7.1 ppm	1 2 1 1		Black, medium sandy FILL, trace gravel, trace shells, slight sheen, hydrocarbon–like odor, dense, wet
		19–21'	4.1 ppm	5 24 30 7		Black, medium–coarse gravelly FILL, trace wood, some organic material, hydrocarbon–like odor, loose, wet
20		21–23'	5.9 ppm	9 11 12 3		Same as above, no wood
		23–25'		1 2 1 22		Black, FILL, wood, dense, wet
25		25–27'		35 31 20 7		Black, coarse gravelly FILL, trace silt, trace black clay, organic material (wood), hydrocarbon–like odor, loose, wet
		27–29'	0.1 ppm	12 10 6 9		Black, GRAVEL, some coarse sand, loose, wet
		29–31'		7 18 5 3 6		No recovery, black gravel in tip of split spoon

Location: West 42nd Street	Site Id: SB-32
Purpose: Soil Boring	Total Depth: 67.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Graphic Log	Material Description
				4 7		Gray, CLAY, micaceous, trace silt, loose, wet
		31-33'	0.0 ppm	5 5		
				14 10		Dark gray, CLAY, mica, trace silt, soft/loose, wet
		33-35'	0.0 ppm	6 5		
35		35-37'	0.0 ppm	9 13		Same as above, trace shells
				7 9		
		37-39'	0.7 ppm	10 6		Gray, CLAY, trace silt, trace shells, dense, wet
				3 2		
		39-41'		5 7		Same as above
40			0.0 ppm	12 14		
		41-43'	0.1 ppm	9 6		Gray, CLAY, trace silt, some shells, dense, wet
				7 7		
		43-45'	0.0 ppm	14 11		Same as above
				1 3		
45		45-47'	0.2 ppm	5 4		Same as above, trace organic material
				5 7		
		47-49'	0.0 ppm	6 9		Same as above, loose
				3 6		
		49-51'		6 5		Gray, silty CLAY, micaceous, loose, wet
50			4.9 ppm	3 3		
		51-53'		5 4		Same as above
			0.0 ppm	3 5		
		53-55'		6 9		Gray, silty CLAY, some shells
			0.0 ppm	8 8		
55		55-57'	0.0 ppm	8 6		Same as above, trace fine sand, trace-some shells
				7 9		
		57-59'	0.0 ppm	10 11		Same as above
				5 5		
				5 6		
		59-61'	0.0 ppm	9 7		Gray, fine-medium SAND, some clay, some silt, trace shells, loose, wet
60				9 10		
		61-63'	0.0 ppm	11 5		Same as above
				7 7		
		63-65'	0.0 ppm	11 7		Same as above, organic material
				9 10		
65		65-67	0.0 ppm	11 17		Gray, medium-fine SAND, loose, wet
				25 50/3		(bedrock at 66')
						Base of boring - 67 ft.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB-33

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 02/21/05 - 02/28/05

Total Depth: 69.00'

Elevation: 2.29'

Datum: Mean Sea Level

Logged By: AC/KP

Drilling Method: Vacuum from 0-5', HSA from 5-69'

Contractor: ADT

Borehole Dia.: 4.25in

Remarks: Sample selected for analysis at 5-7'.
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
		0-5'	0.0 ppm			1.5' of asphalt/concrete to brown, coarse sandy FILL, some gravel, dry
			0.3 ppm			Brown, silty sandy FILL, trace gravel, loose, dry
			0.4 ppm			
			0.4 ppm			
5		5-7'	0.3 ppm	1 2 3 2		Brown-black, silty fine sandy FILL, trace gravel, trace clay, some mica, loose, wet
		7-9'	0.3 ppm	1 1 2 3		Brown-black, silty sandy FILL, clay, trace shells, trace mica, loose-medium dense, wet
		9-11'	0.8 ppm	2 3 4 5		Dark brown, silty fine sandy FILL, loose, wet
10		11-13'	0.3 ppm	3 4 3 5		Dark brown, gravelly FILL, micaceous rocks, some fine sand and silt, loose, wet
		13-15'	0.5 ppm	5 6 5 4		Dark brown-black, gravelly FILL, brick, concrete, rock, some coarse sand, loose, wet
15		15-17'	0.6 ppm	5 6 9 5		Same as above, trace wood
		17-19'	0.5 ppm	5 6 7 8		Same as above, no wood, asphalt
		19-21'	0.3 ppm	9 12 16 8		Black, coarse gravelly FILL, trace brick, wood, construction debris, trace coarse sand, loose, wet
20		21-23'	4.4 ppm	7 8 6 10		Black, fine silty SAND, some gravel, loose, wet to black, silty CLAY, trace shells, slight naphthalene-like odor, med dense, wet
		23-25'		12 11 15 5		No recovery, clay in tip of split spoon
25		25-27'	1.4 ppm	4 3 1 5		Gray, CLAY, trace silt, medium dense, wet
		27-29'	0.5 ppm	6 6 4 5		Gray, CLAY, dense, wet
		29-31'	0.4 ppm	4		Same as above, trace silt

Location: West 42nd Street	Site Id: SB-33
Purpose: Soil Boring	Total Depth: 69.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Graphic Log	Material Description
		31-33'	0.1 ppm	5 3 4 4 5		Gray, CLAY, trace silt, medium dense, wet
		33-35'	0.5 ppm	5 5 3 3 5		Gray, CLAY, trace silt, trace black banding, medium dense, wet
35		35-37'	0.0 ppm	5 5 3 5 13		Black-gray, CLAY, trace silt, trace organics/wood, loose, wet
		37-39'	0.3 ppm	17 3 3 7 7		Same as above
		39-41'	0.2 ppm	5 6 2 8 5		Gray, CLAY, trace wood and shells, dense, wet
40		41-43'	0.0 ppm	5 4 8 4 6		Same as above, some shells
		43-45'	0.0 ppm	5 6 4 5 4		Gray, CLAY, trace wood and shells, dense, wet
45		45-47'	0.6 ppm	10 5 2 5 6		Same as above
		47-49'	0.4 ppm	5 3 7 6 2		Same as above
		49-51'	0.4 ppm	4 9 6 4 4		Same as above
50		51-53'	0.6 ppm	7 8 4 9 7		Same as above
		53-55'	0.8 ppm	12 3 4 7 8		Gray, CLAY, some shells, trace wood, dense, wet
		55-57'	0.6 ppm	2 7 9 12 3		Gray, silty SAND, trace clay, trace peat, trace shells, loose, wet
55		57-59'	0.4 ppm	5 8 7 9 15		Same as above
		59-61'	0.1 ppm	26 50 36 >100 50		Same as above
60		61-63'	0.2 ppm	50/1		Gray, fine SAND, trace silt, trace organics, shells, loose, wet
		63-65'	0.9 ppm			Same as above
		65-67'	1.2 ppm			Same as above
65		67-69'	1.5 ppm			Weathered quartz bedrock, gray coarse sand, some gravel, wet
						(bedrock at 67.5')
						Base of boring - 69 ft.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB–34

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 02/20/05 – 02/24/05

Total Depth: 69.00'

Elevation: 2.23'

Datum: Mean Sea Level

Logged By: KP

Drilling Method: Vacuum from 0–5', HSA from 5–69'

Contractor: ADT

Borehole Dia.: 4.25in

Remarks: Samples selected for analysis at 13–17' and 37–39'.
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
		0–5'	0.0 ppm 0.0 ppm 0.0 ppm 0.0 ppm 0.0 ppm			1.5' of asphalt/concrete to brown, medium–coarse sandy FILL, some gravel, trace concrete/brick, loose, dry
5		5–7'	0.6 ppm	2 2 1		Dark brown–black, medium–coarse sandy FILL, some gravel, trace brick/ concrete, loose, dry
		7–9'	0.3 ppm	2 2 3		Dark brown–black, coarse gravelly FILL, some coarse sand, trace brick/ concrete, loose, dry
		9–11'	0.2 ppm	2 1 2		Same as above to black, fine sandy FILL, trace gravel, slight naphthalene–like odor, loose, wet
10		11–13'	10.2 ppm	9 17 21		Black, FILL, coarse gravel and sand, slight naphthalene–like odor, loose, wet
		13–15'	47 ppm	22 14 50/3		Black, FILL, construction debris, concrete, brick, some sand and gravel, slight naphthalene–like odor, loose, wet
		15–17'	44.4 ppm	11 12 12		Black, gravelly FILL, trace fine sand, black staining, sheen, naphthalene–like odor, loose, wet
15		17–19'	6.9 ppm	11 5 6		Same as above, trace organics, wood
		19–21'	10.3 ppm	4 9 7		Same as above
		21–23'	6.5 ppm	12 13 15		Black, coarse gravelly FILL, some silty sand, trace wood, organics, black staining, sheen, naphthalene–like odor, loose, wet
20		23–25'	0.8 ppm	6 7 11		Same as above to black, silty clayey FILL, trace fine sand, trace organics, wood, bk staining, sheen, slight naphthalene–like odor, loose, wet
		25–27'	4.5 ppm	14 10 7		Gray–black, CLAY, slight staining, slight naphthalene–like odor, loose, wet
25		27–29'	1.0 ppm	4 2 7		Same as above
		29–31'	2.3 ppm	3 4 4		Gray, CLAY, trace silt, micaceous, slight naphthalene–like odor, wet
				3 4 5		Same as above
				4 2 2		
				2 2 4		
				2 2		

Location: West 42nd Street	Site Id: SB-34
Purpose: Soil Boring	Total Depth: 69.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Graphic Log	Material Description
		31-33'	3.2 ppm	2 2 3 2		Gray, CLAY, trace silt, micaceous, slight naphthalene-like odor, wet
				1		Same as above
		33-35'	2.1 ppm	1 3 2		Same as above
35		35-37'	0.2 ppm	2 3 5 6		Gray, CLAY, trace shells, dense, wet
		37-39'	0.4 ppm	6 8 13 3		Gray, CLAY, trace shells, trace silt, trace wood, dense, wet
		39-41'	0.2 ppm	3 7 9 4		Same as above
40				7 9 12		Same as above
		41-43'	0.2 ppm	4 3 2		
		43-45'	0.3 ppm	5 2 3		Gray, CLAY, trace shells, trace silt, trace wood, dense, wet
45		45-47'	0.2 ppm	2 1 3 3		Same as above
		47-49'	0.3 ppm	5 4 2 3		Same as above
		49-51'	0.2 ppm	4 7 3 3		Gray, CLAY, trace silt, trace shells/organic material, loose, wet
50				6 7		Gray, silty fine SAND, some shells, loose, wet
		51-53'	0.2 ppm	3 4 7 7		Same as above, trace wood
		53-55'	0.2 ppm	3 5 7 2		Gray, fine SAND, some silt, trace shells and wood, loose, wet
55		55-57'	0.4 ppm	3 7 6 4		Same as above, some shells
		57-59'	0.3 ppm	9 9 8 16		Gray, fine SAND, trace silt, trace shells, loose, wet
		59-61'	0.2 ppm	9 2 3		Gray, CLAY, loose, wet
60				10 9		Gray, medium-fine SAND, trace shells, loose, wet
		61-63'	1.1 ppm	11 2 7		Same as above
		63-65'	1.3 ppm	2 4 7 7		Same as above, trace clay
65		65-67'	1.3 ppm	12 14 15 16		Gray, medium-fine SAND, trace silty clay, trace quartz, loose, wet
		67-69'	1.7 ppm	12 >100		(bedrock at 67.5')
						Base of boring - 69 ft.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB-38

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 02/20/05 – 02/22/05

Total Depth: 70.00'

Elevation: 2.10'

Datum: Mean Sea Level

Logged By: AC/KP

Drilling Method: Vacuum from 0–5', HSA from 5–70'

Contractor: ADT

Borehole Dia.: 4.25in

Remarks: Samples selected for analysis at 25–27' and 43–45'.
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
		0–5'	0.0 ppm 0.0 ppm 1.0 ppm 0.7 ppm 1.0 ppm	2 3 2 2 2		2' of asphalt/concrete Brown, coarse gravelly FILL, some medium–coarse brown sand, trace concrete/brick, loose, dry Brown, medium–coarse sandy FILL, some coarse gravel, loose, dry
5		5–7'				No recovery
		7–9'	0.4 ppm	19 23 8		Dark brown, medium–coarse sandy FILL, some gravel, micaceous, loose, wet Same as above
		9–11'	0.5 ppm	2 7 8		
10		11–13'	0.4 ppm	12 3 6 9 11		Dark brown–black, medium–coarse sandy FILL, some gravel, trace wood, loose, wet No recovery
		13–15'		2 3 5		
15		15–17'	5.3 ppm	9 2 15 21 28		Black, coarse sandy FILL, some gravel, some organic material, organic (H2S–like) odor, wet Same as above, piece of coal in split spoon
		17–19'	6.4 ppm	2 9 7 12		
		19–21'	238 ppm	9 8 12		Black, medium–coarse sandy FILL, trace gravel, some wood, heavy black staining, sheen, moderate naphthalene–like odor, wet Same as above
20		21–23'	25.8 ppm	15 18 9 15 10		
		23–25'	56.8 ppm	5 6 4 5		Black, SILT, trace fine sand, some wood/organic material, black staining, sheen, moderate naphthalene–like odor, wet Same as above
25		25–27'	300 ppm	4 2 6 10		
		27–29'	48 ppm	1 5 3		Same as above to black–gray, CLAY, trace silt, slight black staining, slight sheen, slight naphthalene–like odor, loose, wet Same as above, gray, trace organic material
		29–31'	13.2 ppm	7 7 1		

Location: West 42nd Street	Site Id: SB-38
Purpose: Soil Boring	Total Depth: 70.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Graphic Log	Material Description
		31-33'	4.5 ppm	1 5 2 2 9		Gray, CLAY, trace silt, trace organic material, slight sheen, slight naphthalene-like odor, loose, wet
		33-35'	10 ppm	7 2 3 2 5		Same as above
35		35-37'	9.6 ppm	3 2 5 9 3		Same as above, trace shells
		37-39'	1.2 ppm	2 5 7 2 2		Same as above
		39-41'	13.5 ppm	2 2 2 2 3		Same as above
40		41-43'	11.3 ppm	3 6 3 3 4		Same as above
		43-45'	2.3 ppm	4 1 1 5 5		Gray, silty CLAY, trace shells, trace fine sand, loose, wet
		45-47'	2.1 ppm	3 3 4 4 2		Same as above
45		47-49'	5.1 ppm	2 4 4 1 2		Gray, silty CLAY, organic (H2S-like) odor, loose, wet
		49-51'	1.7 ppm	8 5 1 3 4		Same as above
		51-53'	1.9 ppm	4 1 2 2 2		Same as above
50		53-55'	1.3 ppm	2 2 2 2 3		Same as above, trace shells
		55-57'	1.2 ppm	4 4 1 2 2		Same as above, some shells
		57-59'	1.4 ppm	2 2 2 3 4		Gray, silty CLAY, some shells, organic (H2S-like) odor, loose, wet
55		59-61'	3.3 ppm	3 5 9 11		Same as above
		61-63'	2.0 ppm	2 2 5 6 2		Black-dark brown, fine silty SAND, some shells, loose, wet
		63-65'	2.2 ppm	3 5 7 2 4		Same as above
60		65-67'	4.4 ppm	5 8 2 5 7		Same as above
		67-69'	3.9 ppm	7 12 11		Brown, silty med-fine SAND, trace organic material, loose, wet (bedrock at 70')
		69-70'				Base of boring - 70 ft.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB-39

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 03/08/05 – 03/12/05

Total Depth: 69.00'

Elevation: 1.62'

Datum: Mean Sea Level

Logged By: AC/KP

Drilling Method: Vacuum from 0–5', HSA from 5–69'

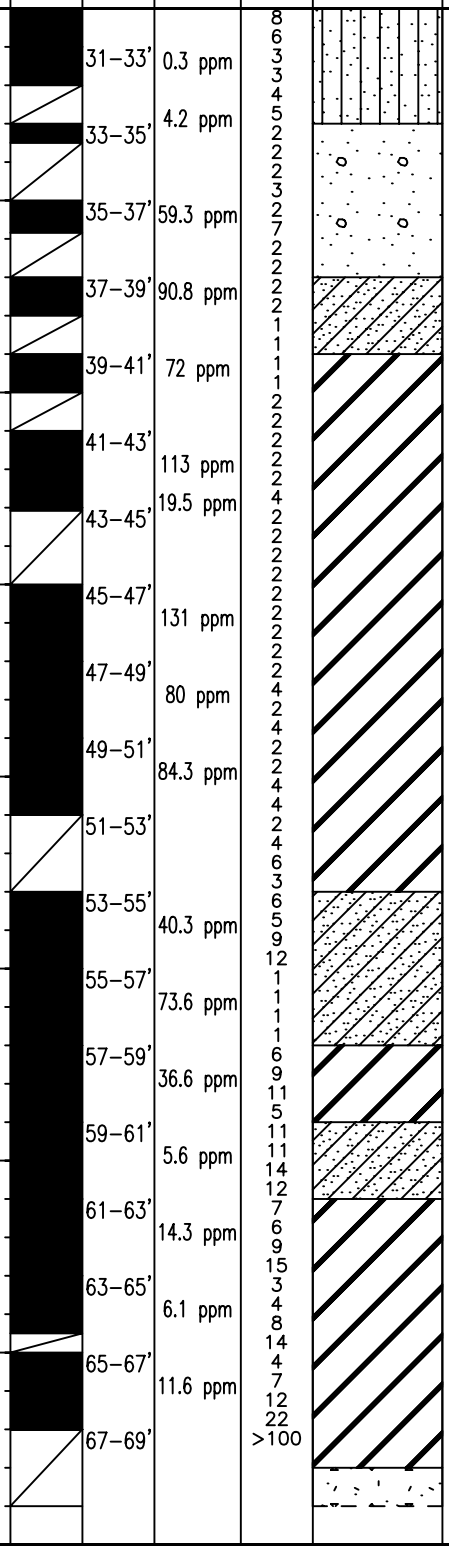
Contractor: ADT

Borehole Dia.: 4.25in

Remarks: Samples selected for analysis at 45–47' and 65–67'.
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
		0–5'	0.0 ppm			1' of asphalt/concrete to lt brown, medium–coarse sandy FILL, trace gravel, trace concrete, loose, dry
			0.0 ppm			Dark brown, coarse sandy FILL, gravel, loose, dry
			0.0 ppm			
			0.0 ppm			
			0.0 ppm			
5		5–7'	0.0 ppm	24 16 12		Same as above
		7–9'	0.0 ppm	14 13 9 7		Dark brown–gray, coarse sandy FILL, some gravel, trace wood, loose, moist
		9–11'	0.0 ppm	8 9 12 8		Dark brown–black, coarse sandy FILL, gravel, concrete, brick, wood, loose, wet
10				4		Black, coarse sandy FILL, gravel, loose, wet
		11–13'	0.0 ppm	12 10 12		
				39		Same as above
		13–15'	0.0 ppm	10 12 50/1		
						Same as above, trace wood
15		15–17'	0.0 ppm	10 10 15		
		17–19'	0.0 ppm	15 7 7		Black–gray, fine–medium sandy FILL, dense, wet
				10		
		19–21'	0.0 ppm	21 8 12		Gray–black, coarse sandy FILL, trace concrete, dense, wet
20				11		
		21–23'	0.0 ppm	15 7 5		Gray, coarse–medium sandy FILL, loose, wet
				4		
		23–25'	0.0 ppm	6 3 3		Dark gray, medium–fine sandy FILL, some silt, trace wood, loose, wet
25			0.0 ppm	3		Same as above
		25–27'		3 2 3		
				5		
		27–29'	0.0 ppm	2 2 2		Dark gray, medium–fine SAND, some silt, loose, wet
				4		
		29–31'	0.0 ppm	1 3 7		Same as above

Location: West 42nd Street	Site Id: SB-39
Purpose: Soil Boring	Total Depth: 69.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in



Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Material Description
		31-33'	0.3 ppm	8 6 3 3 4 5	Dark gray, medium-fine SAND, some silt, loose, wet
		33-35'	4.2 ppm	2 2 2 2 3 2	Black, coarse SAND, black staining, sheen, moderate naphthalene-like odor, loose, wet
35		35-37'	59.3 ppm	7 2 2 2	Same as above, trace clay
		37-39'	90.8 ppm	2 2 1 1	Dark gray-black, silty CLAY, some coarse sand, black staining, sheen, strong naphthalene-like odor, dense
		39-41'	72 ppm	1 1 2 2	Black, silty CLAY, black staining, sheen, strong naphthalene-like odor, soft
40		41-43'	113 ppm	2 2 2 2	Same as above, trace organic material
		43-45'	19.5 ppm	4 2 2 2	Black, silty CLAY, trace organic material, black staining, sheen, strong naphthalene-like odor, soft
45		45-47'	131 ppm	2 2 2 2	Same as above
		47-49'	80 ppm	2 4 2 4	Same as above
		49-51'	84.3 ppm	2 2 4 4	Black-gray, CLAY, trace peat, black staining, strong naphthalene-like odor, soft
50		51-53'		2 4 6 3	No recovery
		53-55'	40.3 ppm	6 5 9 12	Gray, CLAY, some sand, some silt, some shells, strong naphthalene-like odor, wet
55		55-57'	73.6 ppm	1 1 1 1	Same as above
		57-59'	36.6 ppm	6 9 11 5	Gray, silty CLAY, some shells, moderate naphthalene-like odor, dense, wet
		59-61'	5.6 ppm	11 11 14 12	Gray, sandy CLAY, some silt, slight-moderate hydrocarbon-like odor, medium dense-dense, wet
60		61-63'	14.3 ppm	7 6 9 15	Gray, silty CLAY, some mica, slight-moderate hydrocarbon-like odor, dense, wet
		63-65'	6.1 ppm	3 4 8 14	Gray, CLAY, little mica, little shells, slight hydrocarbon-like odor, dense, wet
65		65-67'	11.6 ppm	4 7 12 22	Gray, CLAY, little-some sand, slight-moderate hydrocarbon-like odor, dense, wet
		67-69'		>100	No recovery (bedrock at 68') Base of boring - 69 ft.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: SB-40

Location: West 42nd Street

Purpose: Soil Boring

Date(s): 04/04/05 – 04/05/05

Total Depth: 78.00'

Elevation: 1.53'

Datum: Mean Sea Level

Logged By: KP

Drilling Method: Vacuum from 0–5', HSA from 5–78'

Contractor: ADT

Borehole Dia.: 4.25in

Remarks: Samples selected for analysis at 28–30' and 46–48'.
HSA:Hollow Stem Auger

Depth (ft)	Recovery	Sample Interval	PID	Blow Count (Per 6")	Graphic Log	Material Description
		0–5'	0.0 ppm			Dark brown–black, m–c sandy FILL, gravel, concrete, asphalt, dry
			0.2 ppm			Dark brown–dark gray, fine–coarse sandy FILL, some fine–medium gravel, rocks, loose, dry
			0.6 ppm			Brown–dark brown, sandy FILL, some gravel and rocks, loose, dry
			1.1 ppm			Black, fine sandy FILL, some gravel, trace concrete, dry
5		5–7'	0.0 ppm	36 12 13		
				5		Black, silty fine sandy FILL, trace concrete and wood, moist
		7–9'	0.0 ppm	16 8 10		
				6		Black, silty fine sandy FILL, trace concrete and gravel, wet
		9–11'	0.0 ppm	8 9 6		
10				5		Black, fine–medium sandy FILL, trace gravel, trace wood, trace shells, wet
		11–13'	0.0 ppm	2 3 3		
			0.1 ppm	2 7 10		Black, fine sandy FILL, some shells, trace gravel, wet
		13–15'		8		
15				7		Same as above
		15–17'	0.1 ppm	3 3 5		
			0.0 ppm	7		FILL, red brick
		17–19'		8 50/1		
			0.0 ppm			FILL, red brick, wood, concrete
		19–21'		34 50/3		
20			0.0 ppm			FILL, concrete debris, wood
		21–23'		37 50/3		
						No recovery
		23–25'		3 5 50/3		
25						No recovery
		25–27'		3 2 2 2		
						FILL, concrete debris, wood, brick, shells, wet
		27–28'	0.0 ppm	15 10		Black, silty sandy FILL, some clay, trace shells, some gravel
		28–30'	25.6 ppm	3 4 6 4		slight staining, slight hydrocarbon–like odor, wet

Location: West 42nd Street	Site Id: SB-40
Purpose: Soil Boring	Total Depth: 78.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Graphic Log	Material Description
		30-32'	14.0 ppm	6 5 3 4		Same as above
		32-34'	9.9 ppm	41 46 36		Black, medium sandy FILL, trace gravel, trace brick, trace concrete, trace quartz, slight hydrocarbon-like odor, wet
		34-36'	0.8 ppm	31 50/4		Black, medium sandy FILL, trace wood, slight hydrocarbon-like odor, wet
35		36-38'		26 50/3		FILL, brick
		38-40'	0.0 ppm	36 50/2		Black, coarse GRAVEL, wet
40		40-42'	0.0 ppm	10 6 4 2		Gray, silty CLAY, soft, wet
		42-44'	0.0 ppm	8 16 14 7		Same as above
		44-46'	0.0 ppm	4 5 6 8		Gray, CLAY, trace silt, soft, wet
45		46-48'	0.0 ppm	4 5 7 10		Same as above
		48-50'	0.0 ppm	4 7 7 4		Same as above
50		50-52'	0.0 ppm	2 2 2 3		Same as above
		52-54'	0.0 ppm	2 1 2 3		Gray, silty CLAY, some shells, loose, wet
55		54-56'	0.0 ppm	2 6 3 3		Same as above
		56-58'	0.0 ppm	1 1 2 2		Same as above
		58-60'	0.0 ppm	1 1 1 1		Gray, silty SAND, some clay, some shells, loose, wet
60		60-62'	0.0 ppm	1 1 1/12		Same as above
		62-64'	0.0 ppm	1 1 2		Gray, medium-fine SAND, loose, wet
		64-66'	0.0 ppm	1 2 3 6		Same as above
65		66-68'	0.0 ppm	4 1 1 1		Same as above
		68-70'	0.0 ppm	1 1 1 50/2		

Location: West 42nd Street	Site Id: SB-40
Purpose: Soil Boring	Total Depth: 78.00'
Consulting Firm: Dvirka & Bartilucci	Borehole Dia.: 4.25in

Depth (ft)	Recovery	Sample Interval	PID	Blow Count	Graphic Log	Material Description
		70-72'	0.0 ppm	26 50/1		Gray, medium-fine SAND, loose, wet
			0.0 ppm			Same as above
		72-74'		28 50/1		
			0.0 ppm			Same as above
		74-76'		25 36 50/1		
75						Same as above
		76-78'	0.0 ppm	20 50/2		(bedrock at 78')
						Base of boring - 78 ft.
80						
85						
90						
95						
100						
105						

Date Start/Finish: 12/06/06
Drilling Company: Aquifer Drilling and Testing
Driller's Name: Andrea Babel
Drilling Method: Geoprobe
Sampler Size: 2" Macro Cores

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 35'
Surface Elevation: NA

Descriptions By: Jeremy Cuccuini

Boring ID: SB-41

Client: Consolidated Edison Company of New York, Inc.

Location: West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
0 / 0								CONCRETE	
								Black fine to coarse SAND with Brick and Coal particles, Cinders, trace Silt, no odors, dry. (fill)	
	1	0'-5'	30"	ND				Brown fine to coarse SAND, trace Cinders, no odors, moist. (fill)	
5 / -5								Light brown fine to coarse SAND, some Silt, with Wood particles, no odors, moist. (fill)	
	2	5'-10'	60"	ND	X				
								Black fine to medium SAND with SILT and Wood particles, no odors, moist. (fill)	
10 / -10								Black fine to medium SAND with SILT, no odors, moist.	Borehole backfilled with soil cuttings to grade.
								BRICK particles. (fill)	
	3	10'-15'	36"	ND	X			Black fine to coarse SAND with SILT, trace Coal particles, no odors, wet. (fill)	
15 / -15								Dark brown fine SAND and SILT, trace Brick particles, no odors, wet. (fill)	

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Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs,
13'-14 ' bgs, and from 24'-25' bgs.

Date Start/Finish: 12/06/06
Drilling Company: Aquifer Drilling and Testing
Driller's Name: Andrea Babel
Drilling Method: Geoprobe
Sampler Size: 2" Macro Cores

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 35'
Surface Elevation: NA

Descriptions By: Jeremy Cuccuini

Boring ID: SB-41

Client: Consolidated Edison Company of New York, Inc.

Location: West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
	4	15'-20'	40"	ND					
20-20									
	5	20'-25'	50"	ND	X			Gray CLAY, trace marine fragments, no odors, very moist.	
25-25								Similar soils as above, grading to light brown.	Borehole backfilled with soil cuttings to grade.
	6	25'-30'	60"	ND					
30-30									
	7	30'-35'	60"	ND				Light brown fine to coarse SAND, trace fine Gravel (at 34' bgs), no odors, moist.	
35-35								Weathered Gneiss - Rock at 35' bgs. Refusal at 35' bgs.	

Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs,
13'-14 ' bgs, and from 24'-25' bgs.

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Project:
Data File:SB-41

Template:Geoprobe2003.ldf
Date: 12/7/06

Date Start/Finish: 12/06/06 **Drilling Company:** Aquifer Drilling and Testing **Driller's Name:** Andrea Babel **Drilling Method:** Geoprobe **Sampler Size:** 2" Macro Cores	**Northing:** NA **Easting:** NA **Casing Elevation:** NA **Borehole Depth:** 35.5' **Surface Elevation:** NA **Descriptions By:** Jeremy Cuccuini	**Boring ID:** SB-42 **Client:** Consolidated Edison Company of New York, Inc. **Location:** West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
0	0									
		1	0'-5'	55"	ND				CONCRETE (sidewalk) Dark brown fine to medium SAND, some Silt, trace Cinders, Brick, and Coal particles. No odors, dry. (fill)	
									Light brown fine SAND and SILT, trace Cinders, no odors, moist. (fill)	
5	-5								Similar soils as above with trace Brick particles. (fill)	
		2	5'-10'	32"	ND	X				
10	-10									Borehole backfilled with soil cuttings to grade.
		3	10'-15'	38	ND					
						X	▽		Dark brown fine to coarse SAND with SILT, trace Coal particles, black Ash-like material, no odors, wet at 14' bgs. (fill)	
15	-15									

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Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs,
13'-14 ' bgs, 24'-25' bgs, and from 27'-28' bgs.

Date Start/Finish: 12/06/06
Drilling Company: Aquifer Drilling and Testing
Driller's Name: Andrea Babel
Drilling Method: Geoprobe
Sampler Size: 2" Macro Cores

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 35.5'
Surface Elevation: NA

Descriptions By: Jeremy Cuccuini

Boring ID: SB-42

Client: Consolidated Edison Company of New York, Inc.

Location: West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
	4	15'-20'	50"	ND 3				Dark brown to gray Clayey SILT, trace Organics, odors, very moist.	
20-20				3 10				Dark brown fine to medium SAND and SILT, odors, wet.	
	5	20'-25'	40"	10 25 25	X			Gray CLAY, trace marine fragments, odors, very moist.	
25-25				1 1				Gray CLAY, trace marine fragments, odors to 26' bgs, very moist.	Borehole backfilled with soil cuttings to grade.
	6	25'-30'	45"	ND	X			Dark brown fine to coarse SAND, trace Silt, no odors, wet.	
30-30								Gray CLAY, trace marine fragments, no odors, moist.	
	7	30'-35'	58"	ND				Light Brown fine to coarse SAND, trace Silt, fine Gravel, no odors, wet.	
35-35								Weathered Gneiss - Refusal / Bedrock.	

BBL® an ARCADIS company

Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs,
13'-14 ' bgs, 24'-25' bgs, and from 27'-28' bgs.

Date Start/Finish: 12/05/06
Drilling Company: Aquifer Drilling and Testing
Driller's Name: Jiri Kamecincek
Drilling Method: Geoprobe
Sampler Size: 2" Macro Cores

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 36'
Surface Elevation: NA

Descriptions By: Jeremy Cuccuini

Boring ID: SB-43

Client: Consolidated Edison Company of New York, Inc.

Location: West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
0	0									
		1	0'-5'	48"	ND				Light brown fine to coarse SAND, some Silt, trace Organics (Grass), no odors, dry. (fill)	
									Dark Brown fine to coarse SAND, some Cinders, trace Brick, no odors, moist. (fill)	
									Brown fine to coarse SAND and SILT, trace Cinders and black Ash-like material, no odors, moist. (fill)	
5	-5									
		2	5'-10'	28"	ND	X			Dark brown fine to coarse SAND, some Silt, trace Coal particles and black Ash-like material, no odors, moist. (fill)	
10	-10									Borehole backfilled with soil cuttings to grade.
		3	10'-15'	36"	ND				CONCRETE (fill)	
									Dark brown fine to medium SAND, some Silt, trace black Ash-like material and Coal particles, very moist. (fill)	
15	-15								Dark brown SILT and fine SAND, trace black Ash-like materials, no odors, wet @ 17' bgs. (fill)	
						X				

BBL® an ARCADIS company

Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs,
16'-17 ' bgs, and from 28'-29' bgs.

Date Start/Finish: 12/05/06
Drilling Company: Aquifer Drilling and Testing
Driller's Name: Jiri Kamecincek
Drilling Method: Geoprobe
Sampler Size: 2" Macro Cores

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 36'
Surface Elevation: NA

Descriptions By: Jeremy Cuccuini

Boring ID: SB-43

Client: Consolidated Edison Company of New York, Inc.

Location: West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
	4	15'-20'	40"	ND					
20-20								CONCRETE (fill)	
								Dark brown SILT and fine SAND, trace black Ash-like materials, no odors, wet. (fill)	
	5	20'-25'	48"	ND					
								Dark brown fine to coarse SAND, no odors, wet.	
25-25									Borehole backfilled with soil cuttings to grade.
	6	25'-30'	58"	ND	X				
								Gray CLAY, trace marine shell fragments, no odors, very moist.	
30-30									
	7	30'-35'	36"	ND					
								Dark brown fine to medium SAND and SILT, no odors, wet.	
35-35									
	8	35'-36'		ND				Dark brown fine to medium SAND and SILT, some Gravel (weathered Bedrock), no odors, wet.	
								Competent GNEISS encountered/ Bed-Rock. Bottom Of Boring at 36' bgs.	

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Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs,
16'-17 ' bgs, and from 28'-29' bgs.

Date Start/Finish: 12/05/06
Drilling Company: Aquifer Drilling and Testing
Driller's Name: Jiri Kamecincek
Drilling Method: Geoprobe
Sampler Size: 2" Macro Cores

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 36'
Surface Elevation: NA

Descriptions By: Jeremy Cuccuini

Boring ID: SB-44

Client: Consolidated Edison Company of New York, Inc.

Location: West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
0	0								CONCRETE	
		1	0'-5'	30"	ND				Brown fine to coarse SAND, some Silt, trace Brick; Coal particles, Cinders, no odors, dry to moist. (fill)	
5	-5	2	5'-10'	36"	ND	X			BRICK (fill)	
10	-10								Light brown fine to medium SAND and SILT, trace Gravel, gray Ash-like material, and Coal fragments, moist (fill).	Boring backfilled to grade.
		3	10'-15'	40"	ND	X	▽		Dark brown fine SAND and SILT, trace black Ash-like material, slight odor, wet at 15' bgs. (fill)	
15	-15									

BBL® an ARCADIS company

Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs,
14'-15 ' bgs, 19'-20' bgs, and from 21'-20' bgs.

Date Start/Finish: 12/05/06
Drilling Company: Aquifer Drilling and Testing
Driller's Name: Jiri Kamecincek
Drilling Method: Geoprobe
Sampler Size: 2" Macro Cores

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 36'
Surface Elevation: NA

Descriptions By: Jeremy Cuccuini

Boring ID: SB-44

Client: Consolidated Edison Company of New York, Inc.

Location: West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
	4	15'-20'	48"	ND				Black organic Clay, no odors, moist.	
					X			Dark brown fine to coarse SAND, some Silt, Brick particles, and black to gray Ash-like material. Sulfur-like odor, wet. (fill)	
20-20									
	5	20'-25'	60"	ND	X			Black organic CLAY, no odors, moist.	
								Light brown fine to coarse SAND, no odors, wet.	
25-25									Boring backfilled to grade.
	6	25'-30'	42"	ND				Gray CLAY, trace fine Sand, no odors, moist.	
30-30									
	7	30'-35'	55"	ND				Dark brown fine to medium SAND and SILT, no odors, wet.	
35-35									
	8	35'-37'	20"	ND				Similar soils as above, with gravel, (fractured weathered Gneiss) Refusal, top of competent Rock (Gneiss)	

BBL® an ARCADIS company

Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs,
14'-15 ' bgs, 19'-20' bgs, and from 21'-20' bgs.

Date Start/Finish: 12/05/06
Drilling Company: Aquifer Drilling and Testing
Driller's Name: Jiri Kamecincek
Drilling Method: Geoprobe
Sampler Size: 2" Macro Cores

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 10'
Surface Elevation: NA

Descriptions By: Jeremy Cuccuini

Boring ID: SB-45

Client: Consolidated Edison Company of New York, Inc.

Location: West 41st Street between 11th and 12th Avenue New York, New York 10036

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Water Table	Geologic Column	Stratigraphic Description	Boring Construction
0	0									
		1	0'-5'	48"	ND				Light brown fine to coarse SAND, trace Organics, no odors, dry. (fill)	
									BRICK particles. (fill)	
									Dark brown fine to coarse SAND, some Silt, trace Brick particles, Cinders and Coal particles, no odors, moist. (fill)	
5	-5									Borehole backfilled with soil cuttings to grade.
		2	5'-10'	40"	ND	X			Dark brown fine SAND and SILT, trace black Ash like material, Coal particles, and Brick particles. Slight odor, moist. (fill)	
									Dark brown fine to coarse SAND, some Silt, trace Cinders and black Ash-like material, moist. (fill)	
10	-10								Bottom of boring at 10' bgs.	

BBL® an ARCADIS company

Remarks: bgs = below ground surface; NA = Not Available;
ND = Non-Detect;
Soil samples taken from 3' - 10'bgs.

Date Start/Finish: 6/12/2008
Drilling Company: Aquifer Drilling and Testing, INC.
Driller's Name:
Drilling Method: HSA
Auger Size: 4.25" ID
Rig Type: LC55 Track Mounted
Sampling Method: Split Spoon 2"

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 30' BGS
Surface Elevation: NA

Descriptions By: Rolando Arco

Well/Boring ID: **SB-46**

Client: Consolidated Edison Company of New York, Inc.

Location: Former W. 42nd Street MGP Site (MTA Bus Depot) SE corner 41st and Rt 9A

DEPTH / ELEVATION	Saturated Soils	PID Readings	LNAPL/DNAPL	Analytical Sample	Recovery	Blow Counts	Lithology	Stratigraphic Description
0 – 2 – 4 – 5		0.0				N/A		0'-0.5' FILL, reinforced concrete. 0.5'-1' FILL, yellow medium to fine SAND , NVI. 1'-2' FILL, dark brown coarse to fine SAND, NVI. 2'-3' FILL, very dark coarse SAND, NVI. 3'-5' FILL, boulder (Potential Rip Rap), NVI.
6		N/A			<2"	10		FILL, a piece of concrete and cobble fragment (gray, from boulder above), NVI.
8		2.4			16"	1,1,1,1		7'- 7.8' FILL, black well-graded SAND and fine GRAVEL, NVI. 7.8'-8.3' FILL, red to brown SANDSTONE, NVI.
10 -10		0.3			4"	9,8,8,10		Grey to black, very soft SILT, wet, NVI.
12		0.2			5"	41,13,8,5		Grey to black very soft SILT and red to brown angular GRAVEL, wet, NVI.
14		0.3			20"	14,3,3,23		Dark grey to black very soft SILT, wet, very loose, NVI.
15 16		0.3			20"	14,3,3,23		Dark grey to black very soft SILT, some Gravel, very loose, wet, NVI.
18		0.4			20"	1,1,1,1		Dark grey to black very soft SILT, some Gravel, wood pieces in the cutting shoe, slightly denser silt in the bottom 2", loose, wet, NVI.

ARCADIS
Infrastructure, environment, facilities

Remarks: BGS = Below Grade Surface, WOR = Weight of Rods, N/A = Not Applicable
*Rebar at 5 feet,
*Some material fell out of the spoon when drillers were unscrewing the shoe for interval 19'-21'.
*PID malfunctioned while measuring 25-28'. Restarted device with no further problems.
*No data at 25-28' due to WOR and softness of the material.
*At 28-30' collected sample from apparently unimpacted core of the clay sample. At 25-28', collected sample from the river mud containing NAPL.

Date Start/Finish: 6/12/2008
Drilling Company: Aquifer Drilling and Testing, INC.
Driller's Name:
Drilling Method: HSA
Auger Size: 4.25" ID
Rig Type: LC55 Track Mounted
Sampling Method: Split Spoon 2"

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 30' BGS
Surface Elevation: NA

Descriptions By: Rolando Arco

Well/Boring ID: **SB-46**

Client: Consolidated Edison Company of New York, Inc.

Location: Former W. 42nd Street MGP Site (MTA Bus Depot) SE corner 41st and Rt 9A

DEPTH / ELEVATION	Saturated Soils	PID Readings	LNAPL/DNAPL	Analytical Sample	Recovery	Blow Counts	Lithology	Stratigraphic Description
20 -20		0.4			8"	1,1,1,1		Dark grey to black very soft SILT, some Gravel, wood pieces in the cutting shoe, slightly denser silt in the bottom 2", loose, wet, NVI
22		0.3			16"	WOR		Dark grey to black very soft SILT, some Gravel, loose, wet, NVI.
24		N/A			0"	WOR		NO RECOVERY. ADVANCED TO 25'BGS.
25 26		26		X	16"	1-1-2-1		25'-25.8' Dark grey to black very soft SILT, NAPL blebs. 25.8'-26.3' Grey Clay, stiff, sheen.
28		150		X	20"	1-1-2-1		28'-28.7' Grey SILT, very soft, wet, NAPL blebs. 28.7'-29.4' Grey CLAY, sheen on the outside, inside of core appears clean, stiff, wet. END OF BORING AT 30'BGS.
30 -30								

ARCADIS
Infrastructure, environment, facilities

Remarks: BGS = Below Grade Surface, WOR = Weight of Rods, N/A = Not Applicable
*Rebar at 5 feet,
*Some material fell out of the spoon when drillers were unscrewing the shoe for interval 19'-21'.
*PID malfunctioned while measuring 25-28'. Restarted device with no further problems.
*No data at 25-28' due to WOR and softness of the material.
*At 28-30' collected sample from apparently unimpacted core of the clay sample. At 25-28', collected sample from the river mud containing NAPL.

Date Start/Finish: 3-26-08
Drilling Company: Summit Drilling, Inc.
Driller's Name: Jeff Seagrams
Drilling Method: HSA
Auger Size: 4.25" ID
Rig Type: Truck Mounted CME
Sampling Method: Split Spoon 3"

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 29'
Surface Elevation: SB-47

Descriptions By: Craig Massaro

Well/Boring ID: **SB-47**

Client: Consolidated Edison Company of New York, Inc.

Location: Former W. 42nd Street MGP Site (MTA Bus Depot) SE corner 41st and Rt 9A

DEPTH / ELEVATION	Saturated Soils	PID Readings	LNAPL/DNAPL	Analytical Sample	Recovery	Blow Counts	Lithology	Stratigraphic Description
0		0.1,0.1,0.2,0.1						0'-0.5' FILL, asphalt. 0.5'-5' FILL, black to brown coarse to fine SAND, some brick, asphalt and misc. rock fragments, moist.
2								
4								
5								
6		0.1		X	6"	4,4,4,3		FILL, black coarse to fine SAND, trace coarse to medium gravel, loose, moist, NVI.
8		0.7			6"	1,2,2,1		Black medium to fine SAND, little Silt, trace medium to fine gravel, wet, medium dense, NVI.
10 -10		0.8			9"	1,4,6,6		Dark grey coarse to fine SAND, little Silt, trace coarse gravel, loose, wet, NVI.
12		1,0.8			16"	4,2,2,3		11'-11.5' Gray coarse to fine SAND, little medium to fine Gravel, trace brick, loose, wet, NVI. 11.5'-12.3' Black medium to fine SAND, little Silt, trace brick, loose, wet, NVI.
14		0.8			10"	1,8,2,2		Dark grey medium to fine SAND, little Silt and Micaceous rock fragments, loose, wet, NVI.
15								
16		0.8,0			13"	2,3,3,2		15'-15.5' Grey coarse to fine SAND, some concrete, brick, and coarse to fine Gravel, firm, wet, NVI. 15.5'-16.5' Black medium to fine SAND, some Silt, trace clay, brick, and timber, soft, wet, NVI.
18		N/A			0"	1,1,1,1		NO RECOVERY, spoon appeared free of any visible impacts.

ARCADIS
Infrastructure, environment, facilities

Remarks: NVI = No Visual Impact, N/A = None Applicable, BGS = Below Grade Surface.

*Air Knifed borehole from 0'-5'BGS.
*Analytical samples collected from 5-7 and 23' bgs.

Client: Consolidated Edison Company of New York, Inc.

Well/Boring ID: SB-47

Borehole Depth: 29'

Site Location:
Former W. 42nd Street MGP Site
(MTA Bus Depot) SE corner 41st and Rt 9A

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
20 -20		N/A				0"	1,3,3,3		NO RECOVERY, spoon appeared free of any visible impacts.	
22		N/A				0"	4,3,2,3		NO RECOVERY. Some soil in cutting shoe. Black fine to very fine SAND, little Silt and Clay, loose, wet, NVI.	
24		3,4,21.3			X	15"	WOR,1,1,2		Black fine to very fine SAND, little brick and angular Gravel, trace organic roots, wet, loose, NVI. Grey CLAY, little Silt, soft, wet, NVI.	
-25 26		32,43				22"	1,1,1,1		Grey CLAY, little Silt, trace organics, soft, wet, NVI.	
28		14,3,62				24"	1,2,2,2		Grey CLAY, little Silt, trace organics (roots) and brick pieces at 28'BGS, soft, wet, NVI. END OF BORING at 29'BGS.	

ARCADIS
Infrastructure, environment, facilities

Remarks: NVI = No Visual Impact, N/A = None Applicable, BGS = Below Grade Surface.

*Air Knifed borehole from 0'-5'BGS.
*Analytical samples collected from 5-7 and 23' bgs.

Date Start/Finish: 7/24/2010
Drilling Company: NYEG Drilling LLC
Driller's Name: John Gibbs
Drilling Method: Direct Push
Sampling Method: 5' Acetate Liner
Rig Type: Geoprobe 7822DT

Northing: 216599.09
Easting: 984399.33
Casing Elevation: NA

Borehole Depth: 19' bgs
Surface Elevation: 11.79' AMSL

Descriptions By: Patricia Prezorski

Well/Boring ID: **SB-48**

Client: Consolidated Edison Company of New York, Inc

Location: West 42nd Street Works
New York, NY
620 West 42nd Street Sidewalk

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0				0.0		CONCRETE.	Borehole backfilled with grout to grade.
					0.0		SAND, very fine to coarse, subrounded, some Gravel, fine to coarse, subrounded to subangular, little Gneiss fragments and concrete fragments (up to 5.5" diameter), trace red brick fragments, glass, moist, dark brown (7.5YR 3/4). NVI, no odor. At 1.16' bgs Irregular stone and brick debris (13"x7" in size) reddish-yellow (7.5YR 7/8).	
		NA	NA	NA	0.0		SAND, very fine to coarse, subrounded, some Gravel, fine to coarse, subrounded to subangular, little Gneiss fragments and concrete fragments (up to 5.5" diameter), trace red brick fragments, glass, moist, dark brown (7.5YR 3/4). NVI, no odor. 2.5-2.75' bgs: Red brick debris (7"x4" in size), Concrete debris, Asphalt debris. Metal pipe (3" long x 1" diameter). Dense brick (5"x9" in size) at 2.5' bgs. Moisture increasing with depth.	
					0.0		At 3.33' bgs flat Metamorphic rock (7.5" by 7.5" in size).	
5	-5				0.0		SAND, very fine to coarse, little Glass debris, Concrete debris, red Brick debris, and weathered Schist rock fragments, poorly sorted, dark brown. Concrete debris (3"x3" in size) at 3.8' bgs. NVI, no odor.	
							CONCRETE and red BRICK debris.	
		1	5-10	3.1	0.0		SAND, fine to coarse, poorly sorted, moist, dark brown. Layered CONCRETE and Red BRICK debris with SAND, fine to medium and SILT, moist, strong brown.	
10	-10						Fractured SCHIST rock and visible TLM, moderate odor, moist.	
					210			
		2	10-15	2.6	537			
					60.0		CLAY, high plasticity, no dilatancy, black, odor.	
15	-15						CLAY, high plasticity, no dilatancy, some shells (conical and clam-like) throughout sample, wood debris in upper section, moist, dark brown (7.5YR 3/2) to very dark gray (7.5YR 3/1).	

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = not applicable/available; AMSL = above mean sea level, NVI = no visible impacts; TLM = tar-like material. Location hand cleared to 5 ft bgs.

Client: Consolidated Edison Company of New York, Inc

Well/Boring ID: **SB-48**

Borehole Depth: 19' bgs

Site Location:
West 42nd Street Works
New York, NY
620 West 42nd Street Sidewalk

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	3	15-19	3.5	0.0		CLAY, high plasticity, no dilatancy, some shells (conical and clam-like) throughout sample, wood debris in upper section, moist, dark brown (7.5YR 3/2) to very dark gray (7.5YR 3/1).	Borehole backfilled with grout to grade.
20 -20						Refusal at 19' bgs. End of Boring.	
25 -25							
30 -30							
35 -35							

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = not applicable/available; AMSL = above mean sea level, NVI = no visible impacts; TLM = tar-like material. Location hand cleared to 5 ft bgs.

Date Start/Finish: 7/25/10
Drilling Company: NYEG Drilling LLC
Driller's Name: John Gibbs
Drilling Method: Direct Push
Sampling Method: 5' Acetate Liner
Rig Type: Geoprobe 7822DT

Northing: 216427.38
Easting: 983736.34
Casing Elevation: NA

Borehole Depth: 16' bgs
Surface Elevation: 5.83' AMSL

Descriptions By: Patricia Prezorski

Well/Boring ID: **SB-49**

Client: Consolidated Edison Company of New York, Inc

Location: West 42nd Street Works
New York, NY
West 40th Street northern sidewalk near intersection of 12th Avenue

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0 / 5.83				0.0		CONCRETE.	
5 / 0.83	NA	NA	NA	0.0		SAND, very fine to coarse, some Gravel, fine to coarse, subrounded, little red brick material, little concrete debris, trace schist fragments, Styrofoam, and glass fragments, poorly sorted, dry, brown (7.5YR 4/3). No odor. Heavy red pavers (appear old) in sizes of 6.5"x11" and 7"x6" observed at depths of 3.15', 3.6', and 4' bgs.	
10 / -4.17	1	5-10	2.33	0.0		SAND, fine to coarse, little Gravel, fine to coarse, poorly sorted, dry to moist, brown (7.5YR 4/3). No odor.	Borehole backfilled with grout to grade.
				47.0		47.0 ppm PID reading from just above observed water table at 10' bgs.	
						SAND, very fine to medium, poorly sorted, wet, stained black. Moderate odor, iridescent sheen observed.	
15 / -9.17	2	10-15	2.75	11.25		SAND, very fine to medium and fractured rock fragments, some wood debris fragments, some sea shells, poorly sorted, wet, dark red (2.5YR 3/6). Odor and slight iridescent sheen observed in Sand.	
				12.5			
				13.75			
	3	15-16	NA	NA		NO RECOVERY. Refusal at 16' bgs. End of Boring.	

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = not applicable/available; AMSL = above mean sea level, NVI = no visible impacts. Location hand cleared to 5 ft bgs.

Boring Log: SB-51

West 42nd Street
New York, NY

Date Start/Finish: 2/27/2011
Borehole Depth (ft bgs): 19.8'
Surface Elevation (ft NGVD29):

Northing (ft):
Easting (ft):
Coordinate System: .

Drilling Company: NYEG Drilling
Driller: John Gibbs and Drek Weis
Logged By: Prezorski

DEPTH (ft) / ELEVATION	Saturated Soils	PID Readings	LNAPL/DNAPL	Analytical Sample	Recovery	Sample Type	Lithology	Stratigraphic Description
0 / 0		0.0			--	Core		7" of concrete.
		0.0			--	HC		Brick and concrete debris fragments, some medium to large pebbles, trace wood fragments.
		0.0 0.0			--	HC		SAA, except some large pebbles, some coarse to fine sand, strong brown (7.5YR 4/6), moist.
		0.0 0.0 0.0			--	MC		Very fine to medium sand, some schist rock fragments, little red brick debris, concrete, and wood fragments, brown, moist.
		0.0			--	MC		Schist: schist fragments filled borehole.
		0.0			--	MC		Very fine to fine poorly sorted sand, some schist fragments, little medium sand, strong brown, moist.
5		0.0			2.25	MC		Layers of schist with some very fine to medium sand, strong brown, moist.
		0.0 0.0			--	MC		Very fine to fine well sorted sand, dark gray (7.5YR 4/1), moist.
10		0.0			2.42	MC		Clay, little very fine to fine sand, gray, moist, no dilatancy, medium plasticity.
		0.0 0.0			--	MC		Very fine to fine well sorted sand, little medium sand, dark redish brown, moist.
15	▼	0.0 0.0			2.75	MC		SAA, except wet. Bedrock encountered at base of 15 - 19.8' interval.

Remarks: bgs = below ground surface; -- = not recorded / not applicable; MC = macro-core; HC = hand cleared;

*Geoprobe / direct push drilling method used.
*5' x 2" Macro-Core sampler used to collect samples.

Boring Log: SB-50

West 42nd Street
New York, NY

Date Start/Finish: 2/26/11
Borehole Depth (ft bgs): 11.0'
Surface Elevation (ft NGVD29):

Northing (ft):
Easting (ft):
Coordinate System: .

Drilling Company: NYEG Drilling
Driller: John Gibbs and Drek Weis
Logged By: Prezorski

DEPTH (ft) / ELEVATION	Saturated Soils	PID Readings	LNAPL/DNAPL	Analytical Sample	Recovery	Sample Type	Lithology	Stratigraphic Description
0 / 0		0.0			--	Core		7" Concrete plus 5" cement/brick debris in concrete.
		0.0 0.0			--	HC		Brick and concrete debris fragments, some medium to large pebbles (30-40mm in diameter). Note: at 1.1' bgs, 4" diameter cast iron pipe.
		0.0 0.0 0.0			--	HC		Very fine to coarse sand, some pebbles, some red brick and concrete debris fragments, some schist fragments, trace wood debris fragments, poorly sorted, dark brown (7.5YR 3/3), wet. Concrete fragments up to 4" by 7".
		0.0 0.0 0.0 0.0			--	MC		Very fine to coarse sand with marconite flakes, little subangular large pebbles, some clay, medium plasticity, strong brown and gray, poorly sorted, moist. 3.4 - 3.6' bgs. Clay layer.
5		0.0 0.0 0.0 0.0 0.0			3.29	MC		Fine to medium sand with layers of clay, medium plasticity, strong brown and gray, poorly sorted, moist. Very fine to medium sand, moist to wet. Wet at 9.5' bgs.
		0.0						Clay, medium plasticity, strong brown and gray, wet.
10		0.0						Fine sand and silt, dark brown, well sorted, wet.
		0.0			1.33	MC		Fine to medium sand, brown, well sorted, wet. Bedrock encountered at base of 10-11' macro-core.

ARCADIS

Remarks: bgs = below ground surface; -- = not recorded / not applicable; MC = macro-core; HC = hand cleared;

*Geoprobe / direct push drilling method used.
*5' x 2" Macro-Core sampler used to collect samples.

WELL COMPLETION LOGS

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: MW-07

Date(s): 02/20/05 – 02/20/05

Datum: Mean Sea Level

Elevation: 2.03' | Measuring Point: 1.49'

Completed Depth: 17.00' | Total Depth: 54.00'

Location: West 42nd Street

Purpose: Monitoring Well, Shallow

Logged By: AC/KP

Drilling Method: Hollow Stem Auger

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 5.00' to: 15.00'

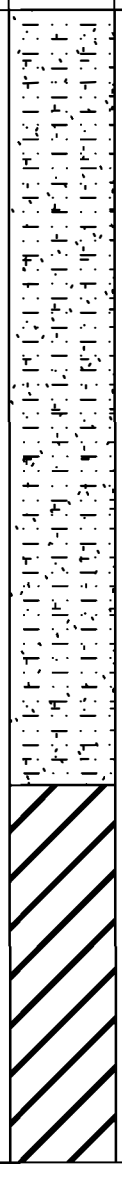
Borehole Dia.: 4.25in

Contractor: ADT

Remarks: Logged from boring SB-30.
Well placed in SB-30 borehole.

Depth (ft)	Recovery	Sample Interval	PID	Material Description
		0–6'	0.5 ppm	1' of asphalt/concrete to dk brown, sandy FILL, some gravel, concrete, dry
			0.6 ppm	Lt brown-tan, fine-med sandy FILL, some fine gravel, brick, concrete, dry
			0.7 ppm	Tan, fine sandy FILL, little fine-medium gravel, few rocks, moist
			0.6 ppm	
			0.7 ppm	
5			0.6 ppm	Tan-black, fine-med sandy FILL, some fine-medium gravel, wood, moist
		6–8'	1.2 ppm	Dk brown-black, medium sandy FILL, some gravel and mica, wood, moist-wet
		8–10'	1.1 ppm	Gray-black, FILL, wood, some gravel, few rocks, wet
10		10–12'	1414 ppm	Black, FILL, black stained wood, sheen, moderate hydrocarbon-like odor, wet
		12–14'	65.8 ppm	Black, FILL, black stained wood, organic matter, gravel, sheen, moderate naphthalene-like odor, wet
		14–16'	49 ppm	Black, coarse gravelly FILL, some black stained wood, some black medium-coarse sand, sheen, moderate-strong naphthalene-like odor, wet
15		16–18'	92 ppm	Black, gravelly FILL, black stained wood, organic matter, trace black med-coarse sand, sheen, mod-strong naphthalene-like odor, wet
		18–20'		No recovery, wood in tip of split spoon
20		20–22'	24.1 ppm	FILL, wood, organic material, staining, sheen, mod-strong naphthalene-like odor, wet, to gray-black, CLAY, medium dense, wet
		22–24'	26.3 ppm	Gray-black, CLAY, light staining, slight naphthalene-like odor, medium dense, wet
		24–26'		Same as above
25			54.6 ppm	
		26–28'	7.2 ppm	Gray-black, CLAY, trace sand, trace organic matter, slight staining, slight naphthalene-like odor, loose, wet
		28–30'	31.6 ppm	Gray, CLAY, trace silt, trace shells, trace mica, slight naphthalene-like odor, medium dense, wet

Graphic Log



Screen Zones

Consulting Firm: Dvirka & Bartilucci	Site Id: MW-07
Location: West 42nd Street	Date(s): 02/20/05 - 02/20/05
Purpose: Monitoring Well, Shallow	Total Depth: 54.00'

Depth (ft)	Recovery	Sample Interval	PID	Material Description	Graphic Log	Screen Zones
		30-32'	22.5 ppm	Gray, CLAY, trace shells, dense, wet		
				Gray, CLAY, trace shells, very dense, wet		
		32-34'	4.0 ppm			
				Same as above, some shells		
		34-36'	3.6 ppm			
35				No recovery		
		36-38'				
				Gray, CLAY, trace shells, very dense, wet		
		38-40'	5.1 ppm			
				Gray, CLAY, trace silty sand, some shells, trace wood, dense, wet		
40		40-42'	3.6 ppm			
				Same as above		
		42-44'	7.7 ppm			
				Same as above		
		44-46'	2.7 ppm	Dk brown-black, medium SAND, some silty clay, loose, wet		
45				Dk brown-black, medium SAND, trace shells, loose, wet		
		46-48'	1.7 ppm			
				Same as above		
		48-50'	2.3 ppm			
50		50-52'	0.7 ppm	Dark brown-gray, medium-coarse SAND, some fine-medium gravel, few shells, loose, wet		
				Same as above (bedrock at 54')		
		52-54'	1.1 ppm			
				Base of boring - 54 ft.		
55						
60						
65						

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: MW-08

Date(s): 03/06/05 – 03/06/05

Datum: Mean Sea Level

Elevation: 2.15' | Measuring Point: 1.57'

Completed Depth: 17.00' | Total Depth: 51.00'

Location: West 42nd Street

Purpose: Monitoring Well, Shallow

Logged By: AC/KP

Drilling Method: Hollow Stem Auger

Borehole Dia.: 4.25in

Contractor: ADT

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 5.00' to: 15.00'

Remarks: Logged from boring SB-31.

Depth (ft)	Recovery	Sample Interval	PID	Material Description
		0–5'	0.0 ppm	1.5' of asphalt/concrete to brown, sandy FILL, construction debris, dry
			0.0 ppm	Brown, coarse gravelly FILL, trace sand, trace construction debris, dry
			0.5 ppm	Dark brown, medium–coarse sandy FILL, coarse gravel, loose, dry
			0.5 ppm	
			0.3 ppm	
5		5–7'	0.2 ppm	Dark brown–gray, coarse sandy FILL, micaceous, some gravel, loose, moist
		7–9'	0.1 ppm	Dark brown–black, coarse sandy FILL, some mica, some gravel, loose, wet
		9–11'		No recovery
10		11–13'	0.2 ppm	Gray–black, medium–coarse sandy FILL, some gravel, some mica, some red brick, little wood, loose, wet
		13–15'	0.3 ppm	Black, medium–coarse sandy FILL, some gravel, organic material, rock in tip of split spoon
15		15–17'	0.4 ppm	Black, medium sandy FILL, some gravel, silt, little clay, red brick, concrete in tip of split spoon, loose, wet
		17–19'	1.0 ppm	Bk, CLAY, some silt, little sand, slight hydrocarbon–like odor, med dense to black, med SAND, some gravel, silt, little clay, loose, wet
		19–21'	0.5 ppm	Same as above to black, CLAY, loose, wet
20		21–23'		Gray, CLAY, dense, wet
			0.6 ppm	
		23–25'	0.7 ppm	Same as above, wood in tip of split spoon, some mica, few shells
25		25–27'	0.5 ppm	6" of wood, wet
		27–29'	0.6 ppm	Gray, CLAY, some silt, some shells, medium dense, wet
		29–31'	1.8 ppm	Gray, CLAY, trace silt, slight hydrocarbon–like odor, soft, wet

Graphic Log

Screen Zones

Consulting Firm: Dvirka & Bartilucci	Site Id: MW-08
Location: West 42nd Street	Date(s): 03/06/05 - 03/06/05
Purpose: Monitoring Well, Shallow	Total Depth: 51.00'

Depth (ft)	Recovery	Sample Interval	PID	Material Description	Graphic Log	Screen Zones
		31-33'	0.9 ppm	Gray, CLAY, little silt, trace shells, soft-medium dense, wet		
		33-35'	0.9 ppm	Same as above		
35		35-37'	0.9 ppm	Gray, silty CLAY, some shells, slight organic (H2S-like) odor, soft, wet		
		37-39'	2.1 ppm	Gray, silty CLAY, strong organic (H2S-like) odor, dense, wet		
		39-41'	1.6 ppm	Same as above, 0.5" zone of peat at 40'		
40		41-43'	1.7 ppm	Same as above to gray, fine SAND, some silt, trace clay, some shells, organic (H2S-like) odor, loose, wet		
		43-45'	0.9 ppm	Gray, silty CLAY, some sand to gray, fine SAND, some silt, little clay slight-moderate organic (H2S-like) odor, wet		
45		45-47'	1.0 ppm	Gray, medium-coarse SAND, little silt, some gravel, slight organic (H2S-like) odor, loose, wet to brown, fine-medium sandy SILT, trace mica, slight organic (H2S-like) odor, dense, wet		
		47-49'	0.8 ppm	Brown, fine-medium sandy SILT, dense, wet		
		49-51'	0.8 ppm	Weathered bedrock, white/gray rock pieces w/veins of quartz (bedrock at 51')		
50				Base of boring - 51 ft.		
55						
60						
65						

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: MW-09

Date(s): 02/27/05 – 02/27/05

Datum: Mean Sea Level

Elevation: 2.20' | Measuring Point: 1.48'

Completed Depth: 17.00' | Total Depth: 69.00'

Location: West 42nd Street

Purpose: Monitoring Well, Shallow

Logged By: KP

Drilling Method: Hollow Stem Auger

Screens:
type: Slotted size: 0.020in dia: 2.00in fm: 5.00' to: 15.00'

Borehole Dia.: 4.25in

Contractor: ADT

Remarks: Logged from boring SB-34.

Depth (ft)	Recovery	Sample Interval	PID	Material Description
		0–5'	0.0 ppm	1.5' of asphalt/concrete to brown, medium–coarse sandy FILL, some gravel, trace concrete/brick, loose, dry
			0.0 ppm	
			0.0 ppm	Dark brown–black, medium–coarse sandy FILL, some gravel, trace brick/concrete, loose, dry
			0.0 ppm	
			0.0 ppm	
5		5–7'	0.6 ppm	Dark brown–black, coarse gravelly FILL, some coarse sand, trace brick/concrete, loose, dry
		7–9'	0.3 ppm	Same as above to black, fine sandy FILL, trace gravel, slight naphthalene–like odor, loose, wet
		9–11'	0.2 ppm	Black, FILL, coarse gravel and sand, slight naphthalene–like odor, loose, wet
10		11–13'	10.2 ppm	Black, FILL, construction debris, concrete, brick, some sand and gravel, slight naphthalene–like odor, loose, wet
		13–15'	47 ppm	Black, gravelly FILL, trace fine sand, black staining, sheen, naphthalene–like odor, loose, wet
15		15–17'	44.4 ppm	Same as above, trace organics, wood
		17–19'	6.9 ppm	Same as above
		19–21'	10.3 ppm	Black, coarse gravelly FILL, some silty sand, trace wood, organics, bk staining, sheen, naphthalene–like odor, loose, wet
20		21–23'	6.5 ppm	Same as above to bk, silty clayey FILL, trace f sand, trace organics, wood, bk staining, sheen, sl naphthalene–like odor, loose
		23–25'	0.8 ppm	Gray–black, CLAY, slight staining, slight naphthalene–like odor, loose, wet
25		25–27'	4.5 ppm	Same as above
		27–29'	1.0 ppm	Gray, CLAY, trace silt, micaceous, slight naphthalene–like odor, wet
		29–31'	2.3 ppm	Same as above

Consulting Firm: Dvirka & Bartilucci	Site Id: MW-09
Location: West 42nd Street	Date(s): 02/27/05 - 02/27/05
Purpose: Monitoring Well, Shallow	Total Depth: 69.00'

Depth (ft)	Recovery	Sample Interval	PID	Material Description	Graphic Log	Screen Zones
		31-33'	3.2 ppm	Gray, CLAY, trace silt, micaceous, slight naphthalene-like odor, wet		
				Same as above		
		33-35'	2.1 ppm	Same as above		
35		35-37'	0.2 ppm	Gray, CLAY, trace shells, dense, wet		
		37-39'	0.4 ppm	Gray, CLAY, trace shells, trace silt, trace wood, dense, wet		
		39-41'	0.2 ppm	Same as above		
40		41-43'	0.2 ppm	Same as above		
		43-45'	0.3 ppm	Gray, CLAY, trace shells, trace silt, trace wood, dense, wet		
45		45-47'	0.2 ppm	Same as above		
		47-49'	0.3 ppm	Same as above		
		49-51'	0.2 ppm	Gray, CLAY, trace silt, trace shells/organic material, loose, wet		
50		51-53'	0.2 ppm	Gray, silty fine SAND, some shells, loose, wet		
		53-55'	0.2 ppm	Same as above, trace wood		
55		55-57'	0.4 ppm	Gray, fine SAND, some silt, trace shells and wood, loose, wet		
		57-59'	0.3 ppm	Same as above, some shells		
		59-61'	0.2 ppm	Gray, fine SAND, trace silt, trace shells, loose, wet		
60				Gray, CLAY, loose, wet		
		61-63'	1.1 ppm	Gray, medium-fine SAND, trace shells, loose, wet		
		63-65'	1.3 ppm	Same as above		
65		65-67'	1.3 ppm	Same as above, trace clay		
		67-69'	1.7 ppm	Gray, medium-fine SAND, trace silty clay, trace quartz, loose, wet		
				(bedrock at 67.5')		
				Base of boring - 69 ft.		

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Site Id: MW-10	
Date(s): 02/27/05 – 02/27/05	
Datum: Mean Sea Level	
Elevation: 2.08'	Measuring Point: 1.92'
Completed Depth: 17.00'	Total Depth: 70.00'
Location: West 42nd Street	Screens: type: Slotted size: 0.020in dia: 2.00in fm: 5.00' to: 15.00'
Purpose: Monitoring Well, Shallow	
Logged By: AC/KP	
Drilling Method: Hollow Stem Auger	
Borehole Dia.: 4.25in	Remarks: Logged from boring SB-38.
Contractor: ADT	

Depth (ft)	Recovery	Sample Interval	PID	Material Description
		0–5'	0.0 ppm	2' of asphalt/concrete
			0.0 ppm	Brown, coarse gravelly FILL, some medium–coarse brown sand, trace concrete/brick, loose, dry
			1.0 ppm	
			0.7 ppm	Brown, med–coarse sandy FILL, some coarse gravel, loose, dry
			1.0 ppm	No recovery
5		5–7'		
		7–9'	0.4 ppm	Dark brown, medium–coarse sandy FILL, some gravel, micaceous, loose, wet
		9–11'	0.5 ppm	Same as above
10		11–13'	0.4 ppm	Dark brown–black, medium–coarse sandy FILL, some gravel, trace wood, loose, wet
		13–15'		No recovery
15		15–17'	5.3 ppm	Black, coarse sandy FILL, some gravel, some organic material, organic (H2S–like) odor, wet
		17–19'	6.4 ppm	Same as above, piece of coal in split spoon
		19–21'	238 ppm	Black, medium–coarse sandy FILL, trace gravel, some wood, heavy black staining, sheen, mod naphthalene–like odor, wet
20		21–23'	25.8 ppm	Same as above
		23–25'	56.8 ppm	Black, SILT, trace fine sand, some wood/organic material, black staining, sheen, moderate naphthalene–like odor, wet
25		25–27'	300 ppm	Same as above
		27–29'	48 ppm	Same as above to bk–gray, CLAY, trace silt, slight bk staining, slight sheen and naphthalene–like odor, loose, wet
		29–31'	13.2 ppm	Same as above, gray, trace organic material

Graphic Log

Screen Zones

Consulting Firm: Dvirka & Bartilucci	Site Id: MW-10
Location: West 42nd Street	Date(s): 02/27/05 - 02/27/05
Purpose: Monitoring Well, Shallow	Total Depth: 70.00'

Depth (ft)	Recovery	Sample Interval	PID	Material Description	Graphic Log	Screen Zones
		31-33'	4.5 ppm	Gray, CLAY, trace silt, trace organic material, slight sheen, slight naphthalene-like odor, loose, wet		
		33-35'	10 ppm	Same as above		
35		35-37'	9.6 ppm	Same as above, trace shells		
		37-39'	1.2 ppm	Same as above		
		39-41'	13.5 ppm	Same as above		
40		41-43'	11.3 ppm	Same as above		
		43-45'	2.3 ppm	Gray, silty CLAY, trace shells, trace fine sand, loose, wet		
		45-47'	2.1 ppm	Same as above		
45		47-49'	5.1 ppm	Gray, silty CLAY, organic (H2S-like) odor, loose, wet		
		49-51'	1.7 ppm	Same as above		
50		51-53'	1.9 ppm	Same as above		
		53-55'	1.3 ppm	Same as above, trace shells		
55		55-57'	1.2 ppm	Same as above, some shells		
		57-59'	1.4 ppm	Gray, silty CLAY, some shells, organic (H2S-like) odor, loose, wet		
		59-61'	3.3 ppm	Same as above		
60		61-63'	2.0 ppm	Black-dark brown, fine silty SAND, some shells, loose, wet		
		63-65'	2.2 ppm	Same as above		
65		65-67'	4.4 ppm	Same as above		
		67-69'	3.9 ppm	Brown, silty med-fine SAND, trace organic material, loose, wet (bedrock at 70')		
		69-70'		Base of boring - 70 ft.		

Date Start/Finish: 7/23/2010
Drilling Company: NYEG Drilling LLC
Driller's Name: John Gibbs
Drilling Method: Direct Push
Sampling Method: 5' Acetate Liner
Rig Type: Geoprobe 7822DT

Northing: 216339.63
Easting: 984318.10
Casing Elevation: 13.00' AMSL

Borehole Depth: 22.5' bgs
Surface Elevation: 13.28' AMSL

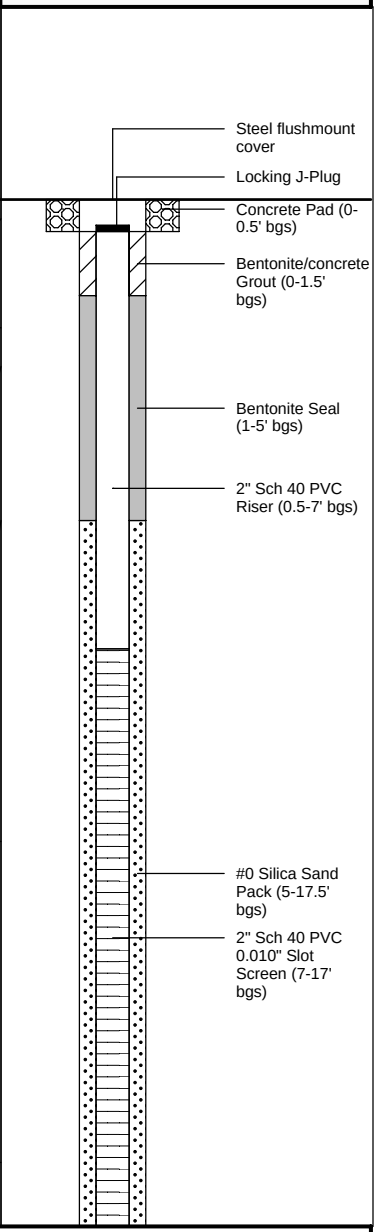
Descriptions By: Patricia Prezorski

Well/Boring ID: **MW-11**

Client: Consolidated Edison Company of New York, Inc

Location: West 42nd Street Works
New York, NY
West 41st Street southern sidewalk between 11th and 12th Avenue

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0 / 15						CONCRETE with Rebar.
						SAND, very fine to fine, subrounded, some Quartzite Gravel, fine to coarse, subrounded to subangular, trace Concrete fragments (up to 2" diameter), trace red brick fragments (up to 3" diameter), moist, brown (7.5YR 4/3) to dark brown (7.5YR 3/3).
	NA	NA	NA	0.0		SAND, very fine to medium, subrounded, little Silt, little fine Quartzite and Schist, subrounded, trace anthracite fragments, moist, dark brown (7.5YR 3/3).
10 / 5						Brick material in sizes of 2.5"x3.5" at 2.25' bgs. Cobble at 2.58' bgs.
						SAND, very fine to coarse, subrounded, little Gravel, fine, trace Concrete and red brick fragments, muscovite flakes visible, trace lump of brown Clay, medium plasticity, no dilatancy, moist, brown 7.5YR 4/3.
5						Large Cobble at 2.66' bgs. Schist fragments (up to 4"x7" in size) at 3.1' bgs. Wood debris at 3.6' bgs. Concrete fragments (up to 9"x5" in size) from 3.8-3.9' bgs. Wood fragments, Schist fragments, and trace slag material at 4.3' bgs. Flat Gneiss rock (5"x5.5" in size) at 4.5' bgs. Fragments of anthracite Coal, Gneiss fragments and Schist rock fragments covers bottom of borehole (hand dug portion).
	1	5-10	2	0.0		Crushed fragments of GRANITIC SCHIST.
5 / 10						GRANITIC SCHIST fragments in tip of shoe.
	2	10-15	NA	0.0		
0 / 15						SAND, very fine to medium, subrounded, some fragments of wood, little anthracite fragments, moist to very moist, brown/dark brown to dark gray (7.5 YR 4/4 - 4/1).



ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = not applicable/available; AMSL = above mean sea level, NVI = no visible impacts. Location hand cleared to 5 ft bgs.

Client: Consolidated Edison Company of New York, Inc

Well/Boring ID: **MW-11**

Borehole Depth: 22.5' bgs

Site Location:
West 42nd Street Works
New York, NY
West 41st Street southern sidewalk between 11th and 12th Avenue

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
-5	3	15-20	4	0.0		SAND, very fine to medium, subrounded, some fragments of wood, little anthracite fragments, moist to very moist, brown/dark brown to dark gray (7.5 YR 4/4 - 4/1).	2" Sch 40 PVC 0.010" Slot Screen (7-17' bgs); #0 Silica Sand Pack (5-17.5' bgs)
20						CLAY, high plasticity, no dilatancy, dark gray.	
	4	20-22.5	2.6	0.0		CLAY, high plasticity, no dilatancy, dark gray.	
-10						End of Boring at 22.5' bgs.	
25							
-15							
30							
-20							
35							

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = not applicable/available; AMSL = above mean sea level, NVI = no visible impacts. Location hand cleared to 5 ft bgs.

APPENDIX B

Well Abandonment Plan

APPENDIX B
Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

WELL ABANDONMENT PLAN

This Well Abandonment Plan (WAP) presents the proposed approach for decommissioning groundwater monitoring wells at the Consolidated Edison Company of New York, Inc. (Con Edison) West 42nd Street former Manufactured Gas Plant (MGP) Site (site), located in Manhattan, New York. The WAP has been developed as part of the Site Management Plan (SMP).

Well decommissioning will be conducted as needed in the future by the SMP entity, in accordance with New York State Department of Environmental Conservations (NYSDEC) Policy CP-43: Groundwater Monitoring Well Decommissioning Policy, issued November 3, 2009 (i.e., the policy).

Con Edison intends to decommission all monitoring wells using the methods provided in policy: grouting in place, perforating the casing followed by grouting in place, grouting in place followed by casing pulling, and over drilling and grouting with or without temporary casing. The specific method will be well specific based on each well's current condition and Figure 2 of the NYSDEC policy. The existing monitoring wells are screened in the fill unit above the silty clay unit. Further, these wells are located in areas of the site where either no contamination is present or contamination is present above, but not below, the silty clay unit and the bedrock unit. A summary of the existing monitoring well construction details is provided in Table 5 of the SMP.

Any groundwater displaced during grout placement, all decommissioned well materials and during any overdrilling, well materials and soils will be containerized for proper disposal at a Con Edison approved facility, in accordance with the policy as well as the waste and water management and disposal procedures and environmental monitoring set forth in Appendix C.

Prior to the start of well decommissioning activities, a letter work plan detailing the well abandonment methods, along with any proposed deviations or alternative methods from those listed above, will be prepared by the SMP entity and submitted to the NYSDEC for approval.

Upon completion of the well abandonment, the SMP entity will complete the required NYSDEC policy forms to record the decommissioning construction. Con Edison will provide the forms to NYSDEC and the property owners.

APPENDIX C

Excavation Work Plan

APPENDIX C
EXCAVATION WORK PLAN (EWP)

C-1 NOTIFICATION

This Excavation Work Plan (EWP) should be reviewed prior to any intrusive activities and must be followed if potentially manufactured gas plant (MGP)-impacted material may be encountered during intrusive activity.

At least 30 days prior to the start of any activity that is anticipated to encounter existing MGP residuals, the Site Management Plan (SMP) area owners, operators, and/or SMP Entity (i.e. Environmental Consultant), or their representatives will notify Con Edison. The SMP Entity will also review the Intrusive Activities Guidelines flowchart provided as Attachment C-1 to this appendix. Con Edison will subsequently notify the New York State Department of Environmental Conservation (NYSDEC) within 30 days prior to any construction activities. Workers must be notified of the environmental conditions with clear instruction regarding how the work is to proceed. This 30-day notification period does not apply to emergency situations where advance notification is not practicable (e.g., power/utility outages, emergency repairs, etc.). Table C1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information and is provided in Table A1 of the SMP text as well. A full listing of site-related emergency contact information is provided in Table C2 below and in the SMP text as Table A2 as well.

Table C-1: Notifications*

Name	Contact Information
NYSDEC Project Manager: Douglas MacNeal	Phone: (518) 402-9662 Email: Douglas.MacNeal@dec.ny.gov
Remedial Party: Con Edison	 Phone: 877.602.6633

*Note: Notifications are subject to change and will be updated as necessary.

Emergency Telephone Numbers

In the event of any environmental-related situation or unplanned occurrence requiring assistance, the SMP area owners, operators, representatives and/or or SMP Entity should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. These emergency contact lists must be maintained in an easily accessible location at the site.

Table C2: Emergency Telephone Numbers

Name	Contact Information
Organization	Contact
Medical, Fire, and Police	911
One Call Center	(800) 272-4480 (3-day notice required for utility mark-out)
Poison Control Center	(800) 222-1222
Pollution Toxic Chemical Oil Spills	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 Code of Federal Regulations (CFR) 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

DISCLAIMER: This SMP is not intended to serve as a design document for construction activities within potentially impacted areas. The SMP Entities are responsible for the preparation of the document(s) that incorporate the requirements set forth in this EWP. Intrusive and waste management activities will be conducted in accordance with all applicable state and federal rules, regulations, and guidance, regardless of whether they are specifically identified herein or not (including any and all applicable subsequent updates, modifications, or alternative/replacement rules, regulations, and guidance). These regulatory requirements may include:

- United States Environmental Protection Agency (USEPA) regulations, including Title 40 of the CFR.
- Occupational Safety and Health Administration (OSHA) regulations, including Title 29 CFR Parts 1910 and 1926, OSHA and United States Department of Labor.
- NYSDEC *DER-10*, *Technical Guidance for Site Investigation and Remediation*, May 2010.

- State of New York Codes, Rules and Regulations, including Title 6 of the Official Compilation of Codes, Rules, and Regulations (6 NYCRR) Parts 360, 364, and 370-374 regarding disposal/treatment, transportation, and management of hazardous waste.
- 6 NYCRR Part 375 regarding the environmental remediation program, effective December 14, 2006 (NYSDEC, 2006).
- Recommendations of the National Institute of Occupational Safety and Health (NIOSH).
- Applicable guidelines of the New York State Department of Health (NYSDOH).
- Transportation regulations, including U.S. Department of Transportation (USDOT) regulations, including Title 29 CFR Parts 171 and 172 and New York State Department of Transportation (NYSDOT) rules and regulations.
- Applicable federal, state, and local government regulations.

Whenever there is a conflict or overlap of any rules, regulation, or guidance, the most stringent provision shall be applicable. Any change in the ownership of the site or the responsibility for implementing this EWP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser has been provided with a copy of the Voluntary Cleanup Agreement (VCA), and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing.

In the event of any environmentally related situation or unplanned occurrence requiring assistance, the SMP area owners, operators, or their representatives should contact the appropriate party from the contact list provided in Section 1.3 of the SMP text (Table A1). For emergencies, appropriate emergency response personnel provided in Section 1.4 of the SMP text (Table A2), should be contacted. These emergency contact lists must be maintained in an easily accessible location.

C-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the Certificate of Completion (COC). Soil must be visually characterized for the presence of non-aqueous phase liquids (NAPLs), staining, and/or obvious odors. For purposes of this EWP, stained soil is soil that is observed to be discolored, tinted, dyed, unnaturally mottled, or contains a sheen. Soil that is excavated from the SMP area that does not exhibit visual evidence of NAPL, staining and possess an obvious odor, may be reused as fill material under a cap or approved soil cover.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-

site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section C-4 of this Appendix.

C-3 SOIL STAGING METHODS

During excavation activities in the SMP area, access to the open excavation and the excavated materials must be controlled (via construction fencing, perimeter flagging, barricades, or other means as defined in a task-specific work plan) to mitigate direct contact with potentially impacted materials. Access to the excavation will be controlled until an appropriate barrier layer (e.g., soil cover, concrete, or asphalt) is restored.

Potentially impacted soil must be placed on polyethylene sheeting or directly loaded into an appropriate container (e.g., roll-off, drum, etc.). Stockpiled, potentially MGP-impacted soil must be covered whenever the soil pile is not actively in use (e.g., soil being added to or removed from the stockpile), during overnight/weekend hours, during periods of precipitation, or whenever dust action levels are exceeded. The potentially impacted material will be covered using polyethylene sheeting, or similar, to reduce potential infiltration of precipitation, migration of wind-blown dust, and/or direct contact exposures.

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

C-4 SAMPLING OF EXCAVATED SOIL FOR DISPOSAL

Stockpiled potentially MGP-impacted soil will be sampled and sent for laboratory analysis to evaluate off-site disposal options. Each sample collected for characterization purposes must be submitted to an approved NYSDOH Environmental Laboratory Approval Program- (ELAP-) certified laboratory under proper Chain-Of-Custody protocols. Sampling procedures must be consistent with NYSDEC-approved procedures and protocols.

The potential disposal facility(ies) should be contacted to confirm the required sample frequency and analyses. At a minimum, samples will be collected for laboratory analysis of:

- Benzene, toluene, ethylbenzene, and xylenes (BTEX) using USEPA SW-846 Method 8260;
- Polycyclic aromatic hydrocarbons (PAHs) using USEPA SW-846 Method 8270C; and
- Hazardous waste characteristics (toxicity characteristic leaching procedure [TCLP] using SW-846 Method 1311, corrosivity, reactivity and ignitability).

Use of excavated soil for backfill material will be limited to placement above the groundwater table. Excavated soil that is not used for backfilling will be transported for off-site disposal in accordance with applicable requirements and regulations. The SMP Entity is required to use a Con Edison approved facility. A list of approved disposal facilities will be provided to the SMP Entity by Con Edison.

C-5 QUALITY ASSURANCE/QUALITY CONTROL

Stockpiled potentially MGP-impacted soil will be sampled and sent for laboratory analysis to evaluate soil and water characterization samples collected pursuant to this SMP shall be analyzed using the most recent NYSDEC Analytical Services Protocol (ASP). The laboratory selected to perform the analyses shall be NYSDOH ELAP-certified to perform Contract Laboratory Program (CLP) analysis and Solid Waste and Hazardous Waste Analytical testing on all media to be sampled. The laboratory shall maintain this certification for the duration of the project.

Procedures for chain of custody, laboratory instrumentation calibration, laboratory analyses, reporting of data, internal quality control, and corrective actions shall be followed in accordance with NYSDEC ASP and the laboratory's Quality Assurance Plan (QAPP). Quality assurance/ quality control (QA/QC) samples (e.g., field duplicate, matrix spike, matrix spike duplicate, and/or trip blank samples) shall be collected, as needed, to assess the quality of the analytical data. The laboratory's in-house QA/QC limits shall be utilized whenever they are more stringent than those suggested by the USEPA methods.

Laboratory detection limits shall be less than or equal to the Part 375 Restricted Use soil clean-up objectives (SCOs) for Industrial Use, 6 NYCRR Part 703.5 surface water and TOGS 1.1.1 groundwater quality standards and guidance values.

C-6 MATERIALS EXCAVATION AND LOAD-OUT

The SMP Entity will prepare a Materials Excavation and Load-out Plan for submittal to the NYSDEC at least 30 days prior to the start of any intrusive activity for review and approval. The plan will require that a qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The SMP Entity and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The Materials Excavation and Load-out Plan will require that the presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

The plan will require that loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

The plan will also require that locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

In addition, the qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

C-7 MATERIALS TRANSPORT OFF-SITE

All transport of excavated materials from the site will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used by all trucks carrying excavated materials from the site.

The SMP Entity will prepare a Transportation Management Plan (TMP) for submittal to the NYSDEC at least 30 days prior to the start of any intrusive activity for review and approval. The TMP will contain a map identifying the require truck transport routes to and from the site. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. The proposed routes will take into account: (a) limiting transport through residential areas and past sensitive sites; (b use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

The TMP will prohibit trucks from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site to minimize off-site disturbance. Off-site queuing will be prohibited.

C-8 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

As described in Section C-4, the SMP Entity is required to use a Con Edison approved facility. Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, construction/demolition (C/D), recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC and Con Edison in a Construction Completion Report (CCR). This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

C-9 MATERIALS REUSE ON-SITE

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Staged soil identified for potential reuse based on a lack of visual observation of impacts or presence of odors can be used as backfill material beneath a minimum of 24 inches of imported certified clean fill soil cover material, as described in Section C-12. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer (see Section C-11) or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. Use of excavated soil for backfill will also be limited to placement above the groundwater table.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

C-10 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a State Pollutant Discharge Elimination System (SPDES) permit.

Pumping of water from excavations (i.e., groundwater and/or storm water accumulating in excavations) within the SMP area, if necessary, shall be done in such a manner as to prevent the migration of particulates or soil/fill and to prevent damage to the existing subgrade. Water pumped from such excavations shall be assumed to exceed the surface water and groundwater quality standards set forth in 6 NYCRR Part 703.5 and TOGS 1.1.1, respectively. Water should be discharged to the local sewer authority (if authorized), transported offsite for proper disposal, or treated on site via a treatment system that has been approved by the NYSDEC, as appropriate. Runoff from surface discharges shall be controlled/eliminated. No discharges shall enter a surface water body without proper permits.

C-11 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the pre-existing cover materials will be restored in kind (e.g., grassed area, asphalt pavement, concrete sidewalks, etc.). At a minimum, the cover system will consist of a minimum of 24 inches of imported certified clean fill soil as described in Section C-12. The demarcation layer, consisting of a geotextile equivalent, will be placed to provide a visual reference to the top of the remaining contamination zone. The zone requires adherence to special conditions for disturbance of remaining contaminated soil as defined in the SMP.

C-12 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

Fill material that is imported from an off-site source(s) to backfill subsurface excavations or provide a cover layer in the SMP area shall meet the requirements of NYSDEC DER-10, Section 5.4(e), including the following criteria:

- Off site borrow soils shall be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products, and be compliant with the requirements of, and not exceed the allowable constituent levels for imported Unrestricted Use fill that are provided in Section 5.4(e) and Appendix 5 of NYSDEC DER-10.
- Off site borrow soils cannot otherwise be defined as a solid waste in accordance with 6NYCRR Part 360-1.2(a).
- Sampling is required for all imported soil backfill and cover material. Sampling frequency of the material will be determined using either: a) the guidance provided in NYSDEC DER-10, Table 5.4(e), or; b) a NYSDEC-approved work plan. Discrete and composite samples will be required; the quantity of samples will be determined based on the volume of soil imported for use.
- At least one sample from every source is required as described in Section 5.4(e)3 of NYSDEC DER-10.
- Laboratory analyses will be determined using either: a) the guidance provided in Table 5.4(e) and Section 10 of the NYSDEC DER-10, or; b) a NYSDEC-approved work plan. Generally, composite samples should be analyzed for polychlorinated biphenyls (PCBs), pesticides, Target Compound List (TCL) semi-volatile organic compounds (SVOCs), and Target Analyte List (TAL) inorganic constituents (including cyanide); discrete samples should be analyzed for TCL volatile organic compounds (VOCs).
- Material containing constituents at concentrations greater than the NYSDEC DER-10 Unrestricted Use criteria may only be used as fill material with prior approval from NYSDEC.
- In non-paved areas, the top 2 feet of backfill should be clean fill that meets NYSDEC DER-10 Unrestricted Use criteria.

C-13 STORMWATER POLLUTION PREVENTION

During activities covered by this EWP, erosion and sedimentation control measures shall be employed in accordance with site-specific plans (e.g., erosion control plans) prepared by the SMP Entity, or it's contractor, in conformance with applicable laws and regulations. Proven soil conservation practices shall be incorporated in any such plans in order to mitigate soil erosion, off-site sediment migration, and water pollution from erosion. Appropriate temporary erosion control measures (e.g., silt fencing, hay bales) shall be installed and maintained around all impacted and potentially impacted soil/fill stockpiles and non-vegetated soil surfaces in the SMP area during such activities. Such stockpiles shall be graded and compacted as necessary for positive surface water runoff and dust control.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the EWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

C-14 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL VOCs and SVOCs, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the CCR.

C-15 COMMUNITY AIR MONITORING PLAN

Community air monitoring will be conducted during soil disturbance activities within the SMP area. A copy of the NYSDOH *Generic Community Air Monitoring Plan* (Generic CAMP) is included as Appendix D to the SMP. The SMP Entity will confirm monitoring requirements with the NYSDEC prior to mobilization to the site for ground intrusive activities.

Real-time monitoring for VOCs and particulates (i.e., dust) at the upwind and downwind perimeter of each designated work area will be required. The intent is to provide a measure of protection for the community (including residences, on-site workers not directly involved with the subject work activities, etc.) from potential airborne contaminant releases. Normal lawn care and shallow (less than 2 feet below ground surface) seasonal plantings of shrubs or flowers will not require community air monitoring.

A figure showing the location of air sampling stations based on generally prevailing wind conditions should be prepared and submitted with the notification requirements described in Section C-1. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. A fixed monitoring station will be required at the site perimeter for any work conducted near a residential property adjacent to the SMP area, regardless of wind direction.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers on the day of exceedance. All data is to be reported in the CCR.

C-16 ODOR CONTROL PLAN

Odor control may be required during implementation of this SMP. The SMP Entity will prepare an Odor Control Plan for approval by the NYSDEC as part of the notifications requirements. Odor control methods shall be capable of controlling emissions of MGP related nuisance odors from intrusive work. If excavation-related nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. Con Edison and the NYSDEC will be notified of all odor events within one day of the odor event and notified of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the CCR.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils.

If odors develop and cannot be otherwise controlled, additional means to eliminate excavation-related odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

C-17 DUST CONTROL PLAN

During activates covered by the SMP, dust control measures shall be employed in accordance with site-specific plans (including a site-specific HASP and CAMP) prepared in conformance with applicable laws and regulations. The SMP Entity or it's contractor will incorporate a dust suppression plan in accordance with applicable regulations that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water supply for road wetting, applying water on traffic areas, wetting equipment, spraying water on earth-removal equipment buckets during dumping, and hauling materials in properly covered or watertight containers.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

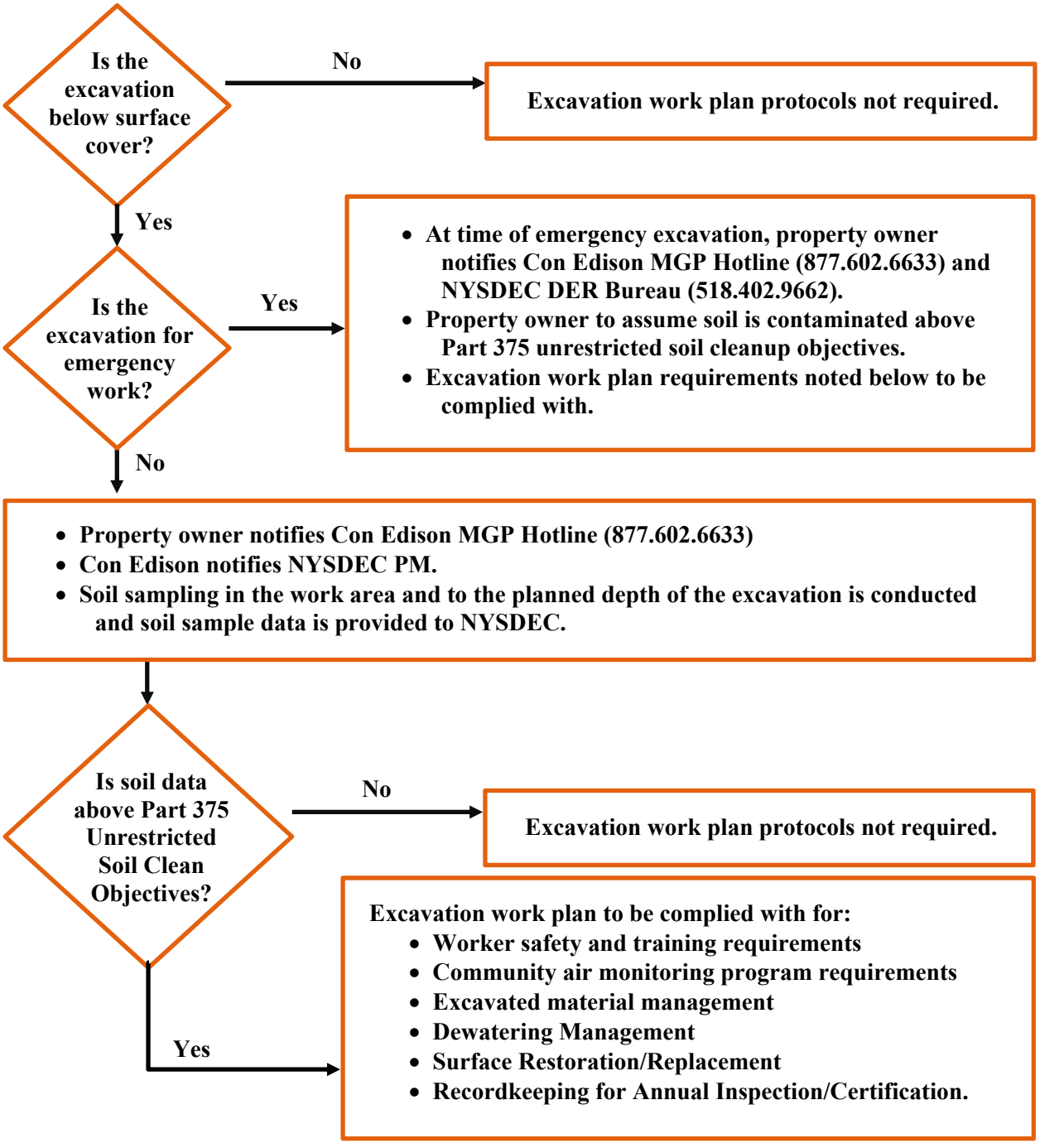
During activities involving earthwork in the SMP area that may generate significant dust, air monitoring for particulates (i.e., dust) shall be performed in accordance with applicable regulations. Appropriate measures shall be taken (as described above) to keep particulate levels below the action levels set forth in the site-specific HASP and CAMP. If action levels for dust are exceeded, work must be suspended until additional or other appropriate dust control measures are employed to remedy the situation.

C-18 REPORTING

A CCR will be submitted to the NYSDEC within 90 days of completion of the activities performed under this EWP. This report shall contain a summary of the activities performed; a summary of all data gathered and results; information about any media that was removed from the site: volume, contamination levels, area from which removed; and any other information that may be indicate a change to the “remaining contamination” that is at the site. Such changes may require revision of the SMP.

APPENDIX C: ATTACHMENT C-1
Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

INTRUSIVE ACTIVITIES GUIDELINES



APPENDIX D

NYSDOH Generic Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX E

Generic Health and Safety Plan Requirements

APPENDIX E
Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

GENERIC HEALTH AND SAFETY PLAN REQUIREMENTS

1.1 OVERVIEW

1. Contractor shall prepare and maintain a written, Site-specific Health and Safety Plan (HASP), and conduct all construction activities in a safe manner that avoids:
   a. Injuries to employees, subcontractors, and other persons with an interest at or near the site.
   b. Employee exposures to health hazards above occupational limits established respectively by the Occupational Safety and Health Administration (OSHA), American Conference of Governmental Industrial Hygienists (ACGIH), and Nuclear Regulatory Commission (NRC), as applicable.
   c. Exposure of the public and Owner's employees to air contaminants above levels established for public exposure by USEPA, NRC, NYSDEC, NYSDOH, NYCDEP and other authorities having jurisdiction for the Work and the Work Area.
   d. Significant increases in concentrations of contaminants in soil, water, or sediment near the Work Area.
   e. Violations of the Occupational Safety and Health Act, or other Laws or Regulations.

1.2 REGULATORY REQUIREMENTS

2. Laws and Regulations applying to the Work under this Section include, but are not limited to, the following:
   a. 29 CFR 1904, Recording and Reporting Occupational Injuries and Illnesses.
   b. 29 CFR 1910, Occupational Safety and Health Standards.
   c. 29 CFR 1926, Safety and Health Regulations for Construction.
   d. 40 CFR 261.3, 264, and 265, Resource Conservation and Recovery Act (RCRA).
   e. 49 CFR 171.8, Transportation, Definitions and Abbreviations.
   f. 6 NYCRR 371, Identification and Listing of Hazardous Wastes.
   g. 6 NYCRR 375, Environmental Remediation Programs.
   h. 12 NYCRR 23, Protection in Construction, Demolition, and Excavation Operations.
   i. 12 NYCRR 56, Asbestos.
   j. 12 NYCRR 57, High Voltage Proximity.
   k. 12 NYCRR 59, Workplace Safety and Loss Prevention Program.
   l. 12 NYCRR 61, Occupational Licensing and Certification.
   m. 16 NYCRR 753, Protection of Underground Facilities.
   n. 17 NYCRR 32, Oil Spill Prevention and Control – Actions to be Taken in Case of Discharge.

1.3 HASP REQUIREMENTS

B. General:
   1. Each employer working on the Site shall develop and implement a written HASP for its employees involved in Hazardous Waste operations. HASP shall include procedures that will be used to ensure the safe handling of Hazardous Waste during excavating, loading, and transporting activities.
   2. Comply with 29 CFR 1904, 29 CFR 1910, 29 CFR 1926, 12 NYCRR 23, 12 NYCRR 56, 12 NYCRR 57, 12 NYCRR 59, 12 NYCRR 61, 17 NYCRR 32, and other Laws and Regulations.
      Contractor's Site-Specific Health and Safety Plan shall cover all personnel who will be employed by the Contractor to perform the Work, including direct employees as well as subcontractors. If the Contractor does not include subcontractors under its Site-specific Health and Safety Plan, then each subcontractor will be responsible for developing, implementing, and submitting to the Contractor a Health and Safety Plan (HASP) that meets the requirements outlined herein.
   3. Include in HASP requirements for complying with owner's, operator's and/or their representative's health and safety requirements and site-specific hazard/emergency response plans, if any.
   4. HASP shall be kept at the Work Area, shall address safety and health hazards of each phase of operations of the Work, and shall include requirements and procedures for employee protection.

C. HASP Contents: HASP shall address and include the following:
   1. Organizational Structure:
      a. Specific chain of command and overall responsibilities of supervisors and employees. Include the following:
         1) Designation of general supervisor who has responsibility and authority to direct all Hazardous Waste operations.
         2) Name of Site safety representative who has responsibility and authority to implement and modify the HASP and verify compliance.
         3) Other personnel required for Hazardous Waste operations for the Work and emergency response, and general functions and responsibilities of each.
         4) Lines of authority, responsibility, and communication.
      b. Review and update organizational structure as necessary to reflect current status of Site operations and personnel.
   2. Site description, background, and scope of work.
   3. Safety and health risk or hazard analysis, and planned hazard controls, for each task and operation required to complete the Work including identifying and providing a means of mitigating all foreseeable biological, chemical, and physical hazards associated with the Work including, but not limited to, hazards associated with exposure to constituents of concern, heavy equipment operation, site conditions, weather, material handling, work around excavation areas, and work near water.
   4. Site control measures, including:
      a. Preventing trespassing.
      b. Preventing unqualified or unprotected workers from entering restricted areas.
      c. Preventing the "tracking" of contaminants out of the Work Area.
      d. Maintaining a log of employees and visitors to the Work Areas.
      e. Delineating exclusion, contamination reduction, and support zones.
      f. Locating personnel and equipment decontamination zones.
      g. Communicating routes of escape and gathering points.
   5. Training Program:
      a. Initial training requirements for workers and supervisors.

b. Exceptions to initial training requirements.
c. Site briefings for visitors and workers.
d. Refresher training requirements.
e. Certification of training for all Contractor and subcontractor employees assigned to the Work including:
   - Initial 40-hour HAZWOPER training.
   - Initial 24-hour HAZWOPER training.
   - Eight-hour HAZWOPER supervisor training.
   - Annual eight-hour HAZWOPER refresher training.
   - 10-hour construction safety training.
   - First-aid/cardiopulmonary resuscitation training.
   - Other training required by Contractor's HASP.

6. Medical Surveillance Program:
   a. Provisions of the medical surveillance program.
   b. Communication protocols between the personnel, physicians, and workers.
   c. Medical recordkeeping procedures.
   d. Certification of medical clearance for all Contractor and subcontractor employees assigned to the Work including:
      - Valid medical clearance certificates.
      - Valid respirator fit test certificates.
      - Other records required by Laws and Regulations.
7. Personal Protective Equipment (PPE):
   a. PPE selection criteria.
   b. Site- and task-specific PPE ensembles.
   c. Training in the use of PPE.
   d. Respiratory protection.
   e. Hearing conservation.
   f. PPE maintenance and storage.
8. Exposure Monitoring Program:
   a. Monitoring procedures to detect the presence of hazardous substances.
   b. Monitoring procedures to determine worker exposures to hazardous substances and physical hazards.
   c. Action levels and required responses for known and expected hazardous substances and physical hazards.
   d. Calibration and maintenance procedures for monitoring equipment.
   e. Identify protocols and criteria associated with work zone air monitoring.
9. Heat stress prevention program.
10. Spill prevention and response/containment program.
11. Work Zones - Provide a written plan that depicts the designation of zones, including: Exclusion Zone(s), Decontamination Zone(s), and Support Zone(s). The level of personal protection required for each zone must be included. The location of the designated zones may change daily.
12. Decontamination Program:
    a. Location and type of temporary decontamination facilities.
    b. General and specific decontamination procedures for personnel and PPE.
    c. General and specific decontamination procedures for equipment and vehicles.
    d. Disposal of residual waste from decontamination.
    e. Decontamination equipment and materials.
    f. Monitoring procedures used to evaluate the effectiveness of decontamination.
13. Emergency Response Plan:
    a. Potential emergencies that may occur during the Work.
    b. Pre-emergency planning.
    c. On-site emergency response equipment, materials, and PPE.

d. Emergency Maps: Evacuation routes, gathering points, and route to nearest hospital.
e. Emergency roles and responsibilities.
f. Emergency alerting and evacuation procedures for Site personnel.
g. Procedures for notifying, and list of emergency contact information for:
    1) Emergency responders, including fire officials, ambulance service, poison control, police, and local hospitals.
    2) Authorities having jurisdiction.
    3) Owner, operator and/or their representatives.
    4) Contractor's project manager, superintendent, safety representative, and foreman.
    5) Other entities, as required.
h. Emergency response procedures.
i. Emergency decontamination, medical treatment, and first-aid.
j. Emergency response training.

14. Confined space entry program.
15. Construction Safety Procedures (OSHA 1926.1 - 1926.652, Subparts A-P) to address excavation shoring and trenching safety, as well as a daily site safety inspection checklist to evaluate these items.
16. Safety Data Sheets - Provide Safety Data Sheets (SDSs) for all materials to be brought on site, as well as constituents which are expected to be encountered during the Work. SDSs for constituents that maybe encountered are provided as Attachment E-1.
17. Other standard operating procedures applicable to the Work.

ATTACHMENT E-1

SAFETY DATA SHEETS

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Benzene
BEN2200

Section 1 - Chemical Product and Company Identification 61

Material Name: Benzene
CAS Number: 71-43-2
Chemical Formula: C_6H_6
Structural Chemical Formula: C_6H_6
EINECS Number: 200-753-7
ACX Number: X1001488-9
Synonyms: Benzene; BENZENE; (6)ANNULENE; BENZEEN; BENZEN; BENZIN; BENZINE; BENZOL; BENZOL 90; BENZOLE; BENZOLENE; BENZOLO; BICARBURET OF HYDROGEN; CARBON OIL; COAL NAPHTHA; CYCLOHEXATRIENE; EPA PESTICIDE CHEMICAL CODE 008801; FENZEN; MINERAL NAPHTHA; MOTOR BENZOL; NITRATION BENZENE; PHENE; PHENYL HYDRIDE; POLYSTREAM; PYROBENZOL; PYROBENZOLE
General Use: Manufacture of chemicals including styrene, dyes, and many other organic chemicals. Has been used in artificial leather, linoleum, oil cloth, airplane dopes, lacquers; as solvent for waxes, resins, oils etc.
May also be a minor component of gasoline, petrol.
Exposure should be minimized by use in closed systems.
Handling procedures and control measures should be evaluated for exposure before commencement of use in plant operations.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
benzene	71-43-2	99.9

OSHA PEL
TWA: 1 ppm; STEL: 5 ppm.

NIOSH REL
TWA: 0.1 ppm; STEL: 1 ppm.

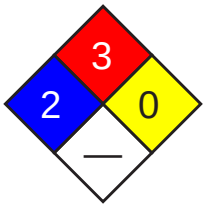
DFG (Germany) MAK
Skin.

ACGIH TLV
TWA: 0.5 ppm; STEL: 2.5 ppm; skin.

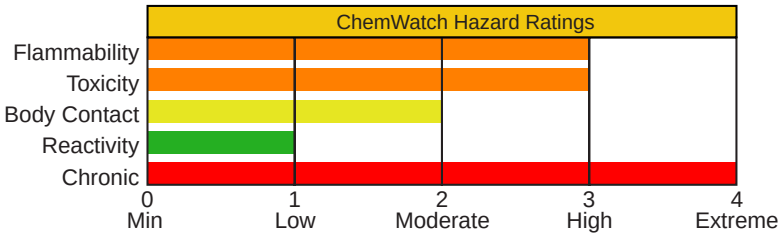
IDLH Level
500 ppm.

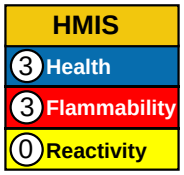
EU OEL
TWA: 1 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Danger!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; sweet odor. Irritating to eyes/skin/respiratory tract. Toxic. Other Acute Effects: headache, dizziness, drowsiness. Absorbed through skin. Chronic Effects: dermatitis, leukemia, bone marrow damage. Carcinogen. Reproductive effects. Flammable.

Potential Health Effects

Target Organs: blood, central nervous system (CNS), bone marrow, eyes, upper respiratory system, skin
Primary Entry Routes: inhalation, skin contact
Acute Effects
Inhalation: The vapor is discomforting to the upper respiratory tract and lungs and may be harmful if inhaled.

If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
Inhalation hazard is increased at higher temperatures.
The symptoms of acute exposure to high vapor concentrations include confusion, dizziness, tightening of the leg muscles and pressure over the forehead followed by a period of excitement. If exposure continues the casualty quickly becomes stupefied and lapses into a coma with narcosis.
Effects of inhalation may include nausea, vomiting headache, dizziness, drowsiness, weakness, sometimes preceded by brief periods of exhilaration, or euphoria, irritability, malaise, confusion, ataxia, staggering, weak and rapid pulse, chest pain and tightness with breathlessness, pallor, cyanosis of the lips and fingertips and tinnitus. Severe exposures may produce blurred vision, shallow, rapid breathing, delirium, cardiac arrhythmias, unconsciousness, deep anesthesia, paralysis and coma characterized by motor restlessness, tremors and hyperreflexia (occasionally preceded by convulsions). Polyneuritis and persistent nausea, anorexia, muscular weakness, headache, drowsiness, insomnia and agitation may also occur. Two-three weeks after the exposure, nervous irritability, breathlessness and unsteady gait may still persist; cardiac distress and an unusual dicoloration of the skin may be evident for up to four weeks.
Hemotoxicity is not normally a feature of acute exposures although anemia, thrombocytopenia, petechial hemorrhage, and spontaneous internal bleeding have been reported. Fatal exposures may result from asphyxia, central nervous system depression, cardiac and respiratory failure and circulatory collapse; sudden ventricular fibrillation may also be fatal.
Death may be sudden or may be delayed for 24 hours. Central nervous system, respiratory or hemorrhagic complications may occur up to five days after the exposure and may be lethal; pathological findings include respiratory inflammation with edema, and lung hemorrhage, renal congestion, cerebral edema and extensive petechial hemorrhage in the brain, pleurae, pericardium, urinary tract, mucous membrane and skin.
Exposure to toxic levels has also produced chromosome damage.

Eye: The liquid is highly discomforting to the eyes, may be harmful following absorption and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is moderately discomforting to the eyes.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: The liquid may produce skin discomfort following prolonged contact.
Defatting and/or drying of the skin may lead to dermatitis. Open cuts, abraded or irritated skin should not be exposed to this material.
Toxic effects may result from skin absorption.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Ingestion: The liquid is discomforting to the gastrointestinal tract and may be harmful if swallowed.
Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Class 1, Known to be a carcinogen; IARC - Group 1, Carcinogenic to humans; OSHA - Listed as a carcinogen; NIOSH - Listed as carcinogen; ACGIH - Class A2, Suspected human carcinogen; EPA - Class A, Human carcinogen; MAK - Class A1, Capable of inducing malignant tumors as shown by experience with humans.

Chronic Effects: Liquid is an irritant and may cause burning and blistering of skin on prolonged exposure.
Chronic exposure may cause headache, fatigue, loss of appetite and lassitude with incipient blood effects including anemia and blood changes.
Benzene is a myelotoxicant known to suppress bone-marrow cell proliferation and to induce hematologic disorders in humans and animals.
Signs of benzene-induced aplastic anemia include suppression off leukocytes (leukopenia), red cells (anemia), platelets (thromocytopenia) or all three cell types (pancytopenia). Classic symptoms include weakness, purpura, and hemorrhage. The most significant toxic effect is insidious and often irreversible injury to the blood forming tissue. Leukemia may develop.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

See DOT ERG

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to petroleum distillates or related hydrocarbons:

1.Primary threat to life from pure petroleum distillate ingestion and/or inhalation is respiratory failure.

2.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.

3.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.

4.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.

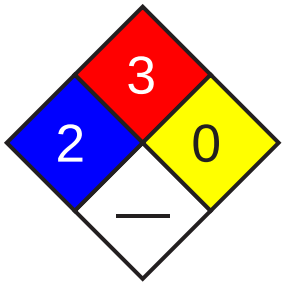
5.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.

6.Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. Consider complete blood count. Evaluate history of exposure.

Section 5 - Fire-Fighting Measures

Flash Point: -11 °C Closed Cup
Autoignition Temperature: 562 °C
LEL: 1.3% v/v
UEL: 7.1% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.

See DOT ERG



Fire Diamond

General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are highly flammable.
Severe fire hazard when exposed to heat, flame and/or oxidizers.
Vapor forms an explosive mixture with air.
Severe explosion hazard, in the form of vapor, when exposed to flame or spark. Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion/decomposition with violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).

Fire Incompatibility: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
Fight fire from a safe distance, with adequate cover.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.
Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

See DOT ERG

Large Spills: Pollutant - contain spillage. Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.

May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights, heat or ignition sources.
When handling, DO NOT eat, drink or smoke.
Vapor may ignite on pumping or pouring due to static electricity.
DO NOT use plastic buckets. Ground and secure metal containers when dispensing or pouring product. Use spark-free tools when handling.
Avoid contact with incompatible materials.
Keep containers securely sealed. Avoid physical damage to containers.
Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.

Storage Requirements: Store in original containers in approved flame-proof area.
No smoking, bare lights, heat or ignition sources.
DO NOT store in pits, depressions, basements or areas where vapors may be trapped. Keep containers securely sealed.
Store away from incompatible materials in a cool, dry well ventilated area.
Protect containers against physical damage and check regularly for leaks.
Observe manufacturer's storing and handling recommendations.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area. Local exhaust ventilation usually required.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection. NIOSH-approved self contained breathing apparatus (SCBA) may be required in some situations.
Provide adequate ventilation in warehouse or closed storage area.

Personal Protective Clothing/Equipment:

Eyes: Chemical goggles. Full face shield.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Nitrile gloves; Neoprene gloves.
Safety footwear.
Do NOT use this product to clean the skin.

Respiratory Protection:
Exposure Range >1 to 10 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range >10 to 100 ppm: Air Purifying, Negative Pressure, Full Face
Exposure Range >100 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face
Exposure Range >1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black
Note: must change cartridge at beginning of each shift

Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream.

Glove Selection Index:
PE/EVAL/PE ..... Best selection
PVA ..... Best selection
TEFLON ..... Best selection

VITON ..... Best selection
VITON/NEOPRENE ..... Best selection
NITRILE+PVC ..... Poor to dangerous choice for other than short-term immersion
BUTYL ..... Poor to dangerous choice for other than short-term immersion
NITRILE ..... Poor to dangerous choice for other than short-term immersion
NEOPRENE ..... Poor to dangerous choice for other than short-term immersion
PVC ..... Poor to dangerous choice for other than short-term immersion
NATURAL RUBBER ..... Poor to dangerous choice for other than short-term immersion
BUTYL/NEOPRENE ..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear, highly flammable liquid; floats on water. Characteristic aromatic odor. Highly volatile. Mixes with alcohol, chloroform, ether, carbon disulfide, carbon tetrachloride, glacial acetic acid, acetone and oils.

Physical State: Liquid
Odor Threshold: 4.68 ppm
Vapor Pressure (kPa): 9.95 at 20 °C
Vapor Density (Air=1): 2.77
Formula Weight: 78.12
Specific Gravity (H_2O=1, at 4 °C): 0.879 at 20 °C
Evaporation Rate: Fast

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 80.1 °C (176 °F)
Freezing/Melting Point: 5.5 °C (41.9 °F)
Volatile Component (% Vol): 100
Water Solubility: 0.18 g/100 g of water at 25 °C

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid reaction with oxidizing agents.

Section 11 - Toxicological Information

Toxicity
Oral (man) LD_{Lo}: 50 mg/kg
Oral (rat) LD_{50}: 930 mg/kg
Inhalation (rat) LC_{50}: 10000 ppm/7h
Inhalation (human) LC_{Lo}: 2000 ppm/5m
Inhalation (man) TC_{Lo}: 150 ppm/1y - I
Inhalation (human) TC_{Lo}: 100 ppm
Reproductive effector in rats

Irritation
Skin (rabbit): 20 mg/24 hr - mod
Eye (rabbit): 2 mg/24 hr - SEVERE

See *RTECS* CY 1400000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil, it will be subject to rapid volatilization near the surface and that which does not evaporate will be highly to very highly mobile in the soil and may leach to groundwater. It may be subject to biodegradation based on reported biodegradation of 24% and 47% of the initial 20 ppm in a base-rich para-brownish soil in 1 and 10 weeks, respectively. It may be subject to biodegradation in shallow, aerobic groundwaters, but probably not under anaerobic conditions. If released to water, it will be subject to rapid volatilization; the half-life for evaporation in a wind-wave tank with a moderate wind speed of 7.09 m/sec was 5.23 hours; the estimated half-life for volatilization from a model river one meter deep flowing 1 m/sec with a wind velocity of 3 m/sec is estimated to be 2.7 hours at 20 °C. It will not be expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms or hydrolyze. It may be subject to biodegradation based on a reported biodegradation half-life of 16 days in an aerobic river die-away test. In a marine ecosystem biodegradation occurred in 2 days after an acclimation period of 2 days and 2 weeks in the summer and spring, respectively, whereas no degradation occurred in winter. According to one experiment, it has a half-life of 17 days due to photodegradation which could contribute to removal in situations of cold water, poor nutrients, or other conditions less conductive to microbial degradation. If released to the atmosphere, it will exist predominantly in the vapor phase. Gas-phase will not be subject to direct photolysis but it will react with photochemically produced hydroxyl radicals with a half-life of 13.4 days calculated using an experimental rate constant for the reaction. The reaction time in polluted atmospheres which contain nitrogen oxides or sulfur dioxide is accelerated with the half-life being reported as 4-6 hours. Products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid, and peroxyacetyl nitrate. It is fairly soluble in water and is removed from the atmosphere in rain.

Ecotoxicity: LC_{50} Clawed toad (3-4 wk after hatching) 190 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Morone saxatilis (bass) 5.8 to 10.9 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Poecilia reticulata (guppy) 63 ppm/14 days /Conditions of bioassay not specified; LC_{50} Salmo trutta (brown trout yearlings) 12 mg/l/1 hr (static bioassay); LD_{50} Lepomis macrochirus (bluegill sunfish) 20 mg/l/24 to 48 hr /Conditions of bioassay not specified; LC_{100} Tetrahymena pyriformis (ciliate) 12.8 mmole/l/24 hr /Conditions of bioassay not specified; LC_{50} Cancer magister (crab larvae) stage 1, 108 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Crangon franciscorum (shrimp) 20 ppm/96 hr /Conditions of bioassay not specified

Henry's Law Constant: 5.3×10^{-3}

BCF: eels 3.5

Biochemical Oxygen Demand (BOD): 1.2 lb/lb, 10 days

Octanol/Water Partition Coefficient: log K_{ow} = 2.13

Soil Sorption Partition Coefficient: K_{oc} = woodburn silt loam 31 to 143

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Benzene
ID: UN1114
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:** 40

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U019 Toxic Waste, Ignitable Waste
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001, per CWA Section 307(a), per CAA Section 112 10 lb (4.535 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Ethylbenzene **CAS Number:** 100-41-4
Chemical Formula: C_8H_{10}
Structural Chemical Formula: $C_6H_5 \cdot C_2H_5$
EINECS Number: 202-849-4
ACX Number: X1003016-1
Synonyms: AETHYLBENZOL; BENZENE,ETHYL-; EB; ETHYL BENZENE; ETHYLBENZEEN; ETHYLBENZENE; ETHYLBENZOL; ETILBENZENE; ETYLOBENZEN; PHENYLETHANE
General Use: Used in the manufacture of cellulose acetate, styrene and synthetic rubber; solvent or diluent; component of automotive and aviation gasoline.
Component of many petroleum hydrocarbon solvents, thinners.
The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
ethylbenzene	100-41-4	>95

OSHA PEL
TWA: 100 ppm; 435 mg/m^3.

ACGIH TLV
TWA: 100 ppm; STEL: 125 ppm.

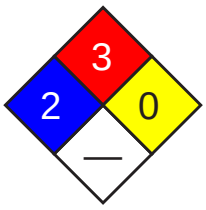
EU OEL
TWA: 100 ppm; STEL: 200 ppm.

NIOSH REL
TWA: 100 ppm (435 mg/m^3); STEL: 125 ppm (545 mg/m^3).

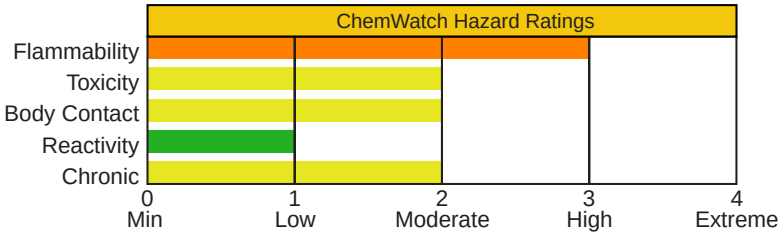
IDLH Level
800 ppm (10% LEL).

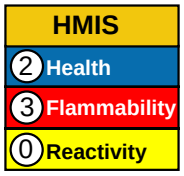
DFG (Germany) MAK
Skin.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; pungent odor. Irritating to eyes/skin/respiratory tract. Other Acute Effects: chest constriction, vertigo, narcosis, cramps, respiratory paralysis. Chronic Effects: fatigue, sleepiness, headache, blood disorders, lymphocytosis. Flammable.

Potential Health Effects

Target Organs: eyes, respiratory system, skin, central nervous system (CNS), blood
Primary Entry Routes: inhalation, skin contact, eye contact
Acute Effects
Inhalation: The vapor is discomforting to the upper respiratory tract.
Inhalation hazard is increased at higher temperatures.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.

If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Inhalation of vapor may aggravate a pre-existing respiratory condition such as asthma, bronchitis, emphysema.
When humans were exposed to the 100 and 200 ppm for 8 hours about 45-65% is retained in the body. Only traces of unchanged ethyl benzene are excreted in expired air following termination of inhalation exposure.
Humans exposed to concentrations of 23-85 ppm excreted most of the retained dose in the urine (mainly as metabolites).
Guinea pigs that died from exposure had intense congestion of the lungs and generalized visceral hyperemia. Rats exposed for three days at 8700 mg/m^3 (2000 ppm) showed changes in the levels of dopamine and noradrenaline in various parts of the brain.

Eye: The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is discomforting to the eyes.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Two drops of the material in to the conjunctival sac produced only slight irritation of the conjunctival membrane but no corneal injury.

Skin: The liquid is discomforting to the skin if exposure is prolonged and is capable of causing skin reactions which may lead to dermatitis.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.
The mean rate of absorption of liquid ethyl benzene applied to 17.3 cm2 area of the forearm of seven volunteers for 10-15 minutes was determined to be 38 mg/cm2/hr. Immersion of the whole hand in aqueous solutions of ethyl benzene (112-156 mg/l) for 1 hour yielded mean absorption rates of 118 and 215.7 ug/cm2/hr. The rate of absorption is thus greater than that of aniline, benzene, nitrobenzene, carbon disulfide and styrene.
Repeated application of the undiluted product to the abdominal area of rabbits (10-20 applications over 2-4 weeks) resulted in erythema, edema and superficial necrosis. The material did not appear to be absorbed through the skin in sufficient quantity to produce outward signs of toxicity.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid may produce considerable gastrointestinal discomfort and may be harmful or toxic if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.
Industrial workers exposed to a maximum level of ethyl benzene of 0.06 mg/l (14 ppm) reported headaches and irritability and tired quickly. Functional nervous system disturbances were found in some workers employed for over 7 years whilst other workers had enlarged livers.

Section 4 - First Aid Measures

See DOT ERG

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Rinse mouth out with plenty of water. DO NOT induce vomiting.
Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
Give water (or milk) to rinse out mouth. Then provide liquid slowly and as much as casualty can comfortably drink.
Transport to hospital or doctor without delay.

After first aid, get appropriate in-plant, paramedic, or community medical support.

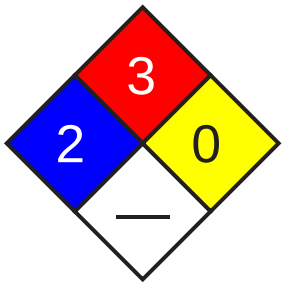
Note to Physicians: For acute or short-term repeated exposures to petroleum distillates or related hydrocarbons:

1. Primary threat to life from pure petroleum distillate ingestion and/or inhalation is respiratory failure.
2.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
3.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance
4.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
5.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
6.Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients.

Section 5 - Fire-Fighting Measures

Flash Point: 12.8 °C Closed Cup
Autoignition Temperature: 432 °C
LEL: 1.6% v/v
UEL: 7% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are flammable.
Moderate fire hazard when exposed to heat or flame.
Vapor forms an explosive mixture with air.
Moderate explosion hazard when exposed to heat or flame.
Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion or decomposition leading to violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).
May emit clouds of acrid smoke.

See DOT ERG



Fire Diamond

Fire Incompatibility: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

See DOT ERG

Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist. Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights, heat or ignition sources.
When handling, DO NOT eat, drink or smoke.
Vapor may ignite on pumping or pouring due to static electricity.
DO NOT use plastic buckets. Ground and secure metal containers when dispensing or pouring product. Use spark-free tools when handling.
Avoid contact with incompatible materials.
Keep containers securely sealed. Avoid physical damage to containers.
Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear. Use in a well-ventilated area.
General exhaust is adequate under normal operating conditions.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
Personal Protective Clothing/Equipment:
Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.
Hands/Feet: Barrier cream with polyethylene gloves or Nitrile gloves.
Protective footwear.
Respiratory Protection:
Exposure Range >100 to <800 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range 800 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black
Other: Overalls. Eyewash unit.
Glove Selection Index:
VITON ..... Best selection
TEFLON ..... Best selection

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear highly flammable liquid; floats on water. Aromatic solvent odor. Soluble in alcohol, benzene, carbon tetrachloride and ether.

Physical State: Liquid
Odor Threshold: 8.7 to 870.0 mg/m^3
Vapor Pressure (kPa): 1.333 at 25.9 °C
Vapor Density (Air=1): 3.66
Formula Weight: 106.17
Specific Gravity (H_2O=1, at 4 °C): 0.8670 at 20 °C
Evaporation Rate: Fast

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 136.2 °C (277 °F) at 760 mm Hg
Freezing/Melting Point: -95 °C (-139 °F)
Volatile Component (% Vol): 100
Water Solubility: 0.01% by weight

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid storage with oxidizers.

Section 11 - Toxicological Information

Toxicity

Oral (rat) LD_{50}: 3500 mg/kg
Inhalation (human) TC_{Lo}: 100 ppm/8h
Inhalation (rat) LC_{Lo}: 4000 ppm/4h
Intraperitoneal (mouse) LD_{50}: 2642 mg/kg~
Dermal (rabbit) LD_{50}: 17800 mg/kg~
Liver changes, utheral tract, effects on fertility, specific developmental abnormalities (musculoskeletal system) recorded.
NOTE: Substance has been shown to be mutagenic in various assays, or belongs to a family of chemicals producing damage or change to cellular DNA.

Irritation

Skin (rabbit): 15 mg/24h mild
Eye (rabbit): 500 mg - SEVERE

See *RTECS* DA 0700000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to the atmosphere, it exist predominantly in the vapor phase based on its vapor pressure where it will photochemically degrade by reaction with hydroxyl radicals (half-life 0.5 to 2 days) and partially return to earth in rain. It will not be subject to direct photolysis. Releases into water will decrease in concentration by evaporation and biodegradation. The time for this decrease and the primary loss processes will depend on the season, and the turbulence and microbial populations in the particular body of water. Representative half-lives are several days to 2 weeks. Some may be adsorbed by sediment but significant bioconcentration in fish is not expected to occur based upon its octanol/water partition coefficient. It is only adsorbed moderately by soil. It will not significantly hydrolyze in water or soil.

Ecotoxicity: LC_{50} Cyprinodon variegatus (sheepshead minnow) 275 mg/l 96 hr in a static unmeasured bioassay; LC_{50} Pimephales promelas (fathead minnow) 12.1 mg/l/96 hr (confidence limit 11.5 - 12.7 mg/l), flow-through bioassay with measured concentrations, 26.1 °C, dissolved oxygen 7.0 mg/l, hardness 45.6 mg/l calcium carbonate, alkalinity 43.0 mg/l; Toxicity threshold (cell multiplication inhibition test): Pseudomonas putida (bacteria) 12 mg/l ; LC_{50} Palaemonetes pugio (grass shrimp, adult) 14,400 ug/l/24 hr in a static unmeasured bioassay; LC_{50} Palaemonetes pugio (grass shrimp, larva) 10,200 ug/l/24 hr in a static unmeasured bioassay; Toxicity threshold (cell multiplication inhibition test): Microcystis aeruginosa (algae) 33 mg/l; Scenedesmus quadricauda (green algae) > 160 mg/l

Henry's Law Constant: 8.44×10^{-3}

BCF: goldfish 1.9

Biochemical Oxygen Demand (BOD): theoretical 2.8%, 5 days

Octanol/Water Partition Coefficient: log $K_{ow} = 3.15$

Soil Sorption Partition Coefficient: $K_{oc} = 164$

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Ethylbenzene
ID: UN1175
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per CWA Section 307(a) 1000 lb (453.5 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Toluene
TOL2320

Section 1 - Chemical Product and Company Identification 61

Material Name: Toluene
CAS Number: 108-88-3
Chemical Formula: C_7H_8
Structural Chemical Formula: $C_6H_5CH_3$
EINECS Number: 203-625-9
ACX Number: X1001512-0
Synonyms: ANTISAL 1A; BENZENE,METHYL-; CP 25; METHACIDE; METHANE,PHENYL-; METHYL BENZENE; METHYL BENZOL; METHYLBENZENE; METHYLBENZOL; PHENYL METHANE; PHENYLMETHANE; TOLUEEN; TOLUEN; TOLUENE; TOLUENO; TOLUOL; TOLUOLO; TOLU-SOL
General Use: Used as a solvent for paint, resins, lacquers inks & adhesives. Component of solvent blends and thinners; in gasoline and aviation fuel. Used in the manufacture of chemicals, dyes, explosives, benzoic acid.
Some grades of toluene may contain traces of xylene and benzene.
Odor threshold: 2 ppm approx. Odor is not a reliable warning property due to olfactory fatigue.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
toluene	108-88-3	> 99.5

OSHA PEL
TWA: 200 ppm; Ceiling: 300 ppm; 500 ppm, 10-minute maximum peak.

ACGIH TLV
TWA: 50 ppm; skin.

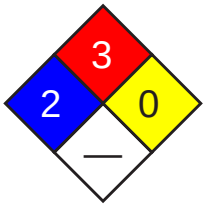
EU OEL
TWA: 192 mg/m^3 (50 ppm); STEL: 384 mg/m^3 (100 ppm).

NIOSH REL
TWA: 100 ppm (375 mg/m^3); STEL: 150 ppm (560 mg/m^3).

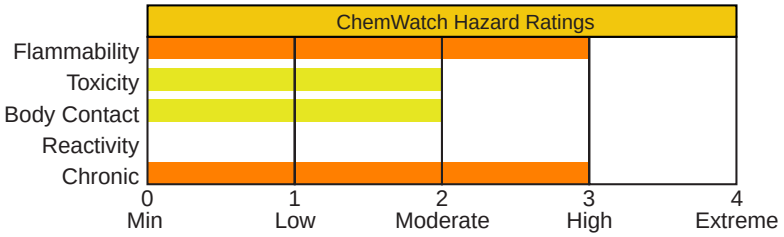
IDLH Level
500 ppm.

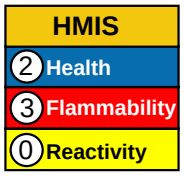
DFG (Germany) MAK
TWA: 50 ppm; PEAK: 200 ppm; skin.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Danger!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; sickly, sweet odor. Irritating to eyes/skin/respiratory tract. Other Acute Effects: weakness, headache, dizziness, confusion, insomnia. Chronic Effects: liver/kidney damage, may cause birth defects. Flammable.

Potential Health Effects

Target Organs: Skin, liver, kidneys, central nervous system.
Primary Entry Routes: Inhalation, skin contact/absorbtion.
Acute Effects
Inhalation: The vapor is highly discomforting to the upper respiratory tract. Inhalation hazard is increased at higher temperatures.

Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Central nervous system (CNS) depression may include nonspecific discomfort, symptoms of giddiness, headache, dizziness, nausea, anesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness.
Serious poisonings may result in respiratory depression and may be fatal.

Eye: The liquid produces a high level of eye discomfort and is capable of causing pain and severe conjunctivitis.
Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.
The vapor is discomforting to the eyes if exposure is prolonged.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: The liquid may produce skin discomfort following prolonged contact.
Defatting and/or drying of the skin may lead to dermatitis and it is absorbed by skin.
Toxic effects may result from skin absorption.
Open cuts, abraded or irritated skin should not be exposed to this material.
The material may accentuate any pre-existing skin condition.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A4, Not classifiable as a human carcinogen; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Chronic toluene habituation occurs following intentional abuse (glue-sniffing) or from occupational exposure. Ataxia, incoordination and tremors of the hands and feet (as a consequence of diffuse cerebral atrophy), headache, abnormal speech, transient memory loss, convulsions, coma, drowsiness, reduced color perception, frank blindness, nystagmus (rapid, involuntary eye-movements), decreased hearing leading to deafness and mild dementia have all been associated with chronic abuse.
Peripheral nerve damage, encephalopathy, giant axonopathy, electrolyte disturbances in the cerebrospinal fluid and abnormal computer tomographic (CT) scans are common amongst toluene addicts. Although toluene abuse has been linked with kidney disease, this does not commonly appear in cases of occupational toluene exposures. Cardiac and hematological toxicity are however associated with chronic toluene exposure. Cardiac arrhythmia, multifocal and premature ventricular contractions and supraventricular tachycardia are present in 20% of patients who abused toluene-containing paints.
Previous suggestions that chronic toluene inhalation produced human peripheral neuropathy have largely been discounted. However central nervous system (CNS) depression is well documented where blood toluene levels exceed 2.2 mg%. Toluene abusers can achieve transient circulating concentrations of 6.5 mg%. Amongst workers exposed for a median time of 29 years to toluene no subacute effects on neurasthenic complaints and pyschometric test results could be established.
The prenatal toxicity of very high toluene concentrations has been documented for several animal species and man. Malformations indicative of specific teratogenicity have not generally been found. The toxicity described in the literature takes the form of embryo death or delayed fetal growth and delayed skeletal system development. Permanent damage of children has been seen only when mothers had suffered from chronic intoxication as a result of "sniffing".

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.
After first aid, get appropriate in-plant, paramedic, or community medical support.

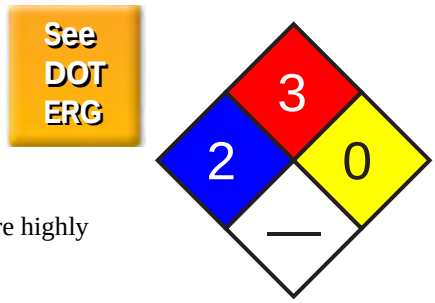
Note to Physicians: Following acute or short-term repeated exposures to toluene:
1. Toluene is absorbed across to alveolar barrier, the blood/air mixture being 11.2/15.6 (at 37 °C) The order of toluene, in expired breath, is of the order of 18 ppm following sustained exposure to 100 ppm.
The tissue/blood proportion is 1/3 except in adipose where the proportion is 8/10.
2.Metabolism by microsomal mono-oxygenation, results in the production of hippuric acid. This may be detected in the urine in amounts between 0.5 and 2.5 g/24hr which represents, on average 0.8 gm/gm of creatinine.
The biological half life of hippuric acid is in the order of 1-2 hours.
3.Primary threat to life from ingestion and/or inhalation is respiratory failure.
4.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
5.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
6.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
7.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
8.Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients.
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Hippuric acid in urine	2.5 gm/gm creatinine	End of shift Last 4 hrs of shift	B,NS
Toluene in venous blood	1 mg/L	End of shift	SQ
Toluene in end-exhaled air		End of shift	SQ

NS: Non-specific determinant; also observed after exposure to other material
SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.
B: Background levels occur in specimens collected from subjects NOT exposed.

Section 5 - Fire-Fighting Measures

Flash Point: 4 °C Closed Cup
Autoignition Temperature: 480 °C
LEL: 1.2% v/v
UEL: 7.1% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are highly flammable.
Severe fire hazard when exposed to heat, flame and/or oxidizers.
Vapor forms an explosive mixture with air.
Severe explosion hazard, in the form of vapor, when exposed to flame or spark. Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion/decomposition with violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO) and carbon dioxide (CO_2).



Fire Diamond

Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.
Nitric acid with toluene, produces nitrated compounds which are explosive.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
Fight fire from a safe distance, with adequate cover.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control the fire and cool adjacent area. Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protective location.
If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

See DOT ERG

Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights, heat or ignition sources.
When handling, DO NOT eat, drink or smoke.
Vapor may ignite on pumping or pouring due to static electricity.
DO NOT use plastic buckets. Ground and secure metal containers when dispensing or pouring product. Use spark-free tools when handling.
Avoid contact with incompatible materials.
Keep containers securely sealed. Avoid physical damage to containers.
Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Metal can; Metal drum; Metal safety cans. Packing as supplied by manufacturer.
Plastic containers may only be used if approved for flammable liquid.
Check that containers are clearly labeled and free from leaks.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area; local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
General exhaust is adequate under normal operating conditions.
Local exhaust ventilation may be required in special circumstances.
If risk of overexposure exists, wear NIOSH-approved respirator. Correct fit is essential to ensure adequate protection.
Provide adequate ventilation in warehouses and enclosed storage areas.

In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields; chemical goggles. Full face shield.
DO NOT wear contact lenses. Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Wear chemical protective gloves, eg. PVC. Wear safety footwear.

Respiratory Protection:

Exposure Range >200 to <500 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range 500 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black

Other: Overalls. Barrier cream. Eyewash unit.

Glove Selection Index:

PE/EVAL/PE ..... Best selection
VITON/CHLOROBUTYL ..... Best selection
VITON ..... Best selection
PVA ..... Best selection
TEFLON ..... Satisfactory; may degrade after 4 hours continuous immersion
SARANEX-23 2-PLY..... Poor to dangerous choice for other than short-term immersion
CPE ..... Poor to dangerous choice for other than short-term immersion
VITON/NEOPRENE ..... Poor to dangerous choice for other than short-term immersion
SARANEX-23 ..... Poor to dangerous choice for other than short-term immersion
NEOPRENE/NATURAL..... Poor to dangerous choice for other than short-term immersion
NITRILE+PVC ..... Poor to dangerous choice for other than short-term immersion
NITRILE ..... Poor to dangerous choice for other than short-term immersion
BUTYL ..... Poor to dangerous choice for other than short-term immersion
PVC..... Poor to dangerous choice for other than short-term immersion
NEOPRENE..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear highly flammable liquid with a strong aromatic odor; floats on water. Mixes with most organic solvents.

Physical State: Liquid
Odor Threshold: 2.14 ppm
Vapor Pressure (kPa): 2.93 at 20 °C
Vapor Density (Air=1): 3.2
Formula Weight: 92.14
Specific Gravity (H_2O=1, at 4 °C): 0.87 at 20 °C
Evaporation Rate: 2.4 (BuAc=1)

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 111 °C (232 °F) at 760 mm Hg
Freezing/Melting Point: -95 °C (-139 °F)
Volatile Component (% Vol): 100
Water Solubility: < 1 mg/mL at 18 °C

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Segregate from strong oxidizers.

Section 11 - Toxicological Information

Toxicity

Oral (human) LD_{Lo}: 50 mg/kg
Oral (rat) LD_{50}: 636 mg/kg
Inhalation (human) TC_{Lo}: 100 ppm
Inhalation (man) TC_{Lo}: 200 ppm
Inhalation (rat) LC_{50}: > 26700 ppm/1h
Dermal (rabbit) LD_{50}: 12124 mg/kg
Reproductive effector in rats

Irritation

Skin (rabbit): 20 mg/24h-moderate
Skin (rabbit): 500 mg - moderate
Eye (rabbit): 0.87 mg - mild
Eye (rabbit): 2 mg/24h - SEVERE
Eye (rabbit): 100 mg/30sec - mild

See *RTECS* XS 5250000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil, it will be lost by evaporation from near-surface soil and by leaching to the groundwater. Biodegradation occurs both in soil and groundwater, but it is apt to be slow especially at high concentrations, which may be toxic to microorganisms. The presence of acclimated microbial populations may allow rapid biodegradation. It will not significantly hydrolyze in soil or water under normal environmental conditions. If released into water, its concentration will decrease due to evaporation and biodegradation. This removal can be rapid or take several weeks, depending on temperature, mixing conditions, and acclimation of microorganisms. It will not significantly adsorb to sediment or bioconcentrate in aquatic organisms. If released to the atmosphere, it will degrade by reaction with photochemically produced hydroxyl radicals (half-life 3 hr to slightly over 1 day) or be washed out in rain. It will not be subject to direct photolysis.

Ecotoxicity: LC_{50} Aedes aegypti-4th instar (mosquito larvae) 22 mg/l /Conditions of bioassay not specified; LC_{50} Cyprinodon variegatus (sheepshead minnow) 277-485 mg/l 96 hr /Conditions of bioassay not specified; LC_{50} Calandra granaria (grain weevil) 210 mg/l /in air; LC_{50} Cancer magister (crab larvae stage I) 28 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Crangon franciscorum (shrimp) 4.3 ppm 96 hr /Conditions of bioassay not specified; LC_{50} Artemia salina (brine shrimp) 33 mg/l 24 hr /Conditions of bioassay not specified; LC_{50} Morone saxatilis (striped bass) 7.3 mg/l 96 hr /Conditions of bioassay not specified; LC_{50} Pimephales promelas (fathead minnows) 55-72 mg/l (embryos), 25-36 mg/l (1-day posthatch protolarvae), and 26-31 mg/l (30-day-old minnows)/ 96 hour /Conditions of bioassay not specified

Henry's Law Constant: 0.0067

BCF: eels 13.2

Biochemical Oxygen Demand (BOD): 0%, 5 days

Octanol/Water Partition Coefficient: log K_{ow} = 2.69

Soil Sorption Partition Coefficient: K_{oc} = silty loam 37

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Toluene
ID: UN1294
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U220 Toxic Waste
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001, per CWA Section 307(a) 1000 lb (453.5 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Xylene **CAS Number:** 1330-20-7
Chemical Formula: C_8H_{10}
Structural Chemical Formula: $C_6H_4(CH_3)_2$
EINECS Number: 215-535-7
ACX Number: X1001166-8
Synonyms: BENZENE,DIMETHYL-; COMPONENT 1 (83%): XYLENES; COMPONENT 2 (17%): ETHYL BENZENE; DIMETHYLBENZENE; DIMETHYLBENZENES; EPA PESTICIDE CHEMICAL CODE 086802; KSYLEN; METHYL TOLUENE; METHYLTOLUENE; VIOLET 3; XILOLI; XYLENE; XYLENEN; XYLOL; XYLOLE
General Use: A strong solvent for general use in the manufacture of paints, varnishes, lacquers, thinners, inks, rubber, pesticides, herbicides and paint strippers.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
xylene	1330-20-7	> 95

OSHA PEL
TWA: 100 ppm; 435 mg/m^3.

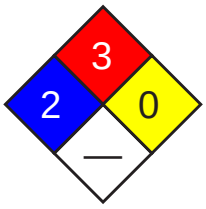
NIOSH REL
TWA: 100 ppm, 435 mg/m^3; STEL: 150 ppm, 655 mg/m^3.

DFG (Germany) MAK
TWA: 100 ppm; PEAK: 200 ppm; skin.

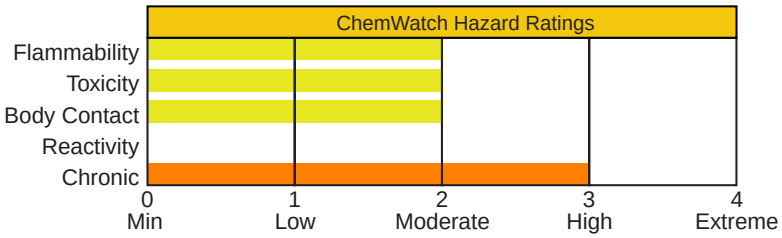
ACGIH TLV
TWA: 100 ppm; STEL: 150 ppm.

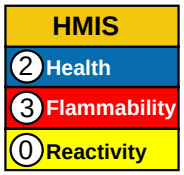
EU OEL
TWA: 50 ppm; STEL: 100 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear, sweet smelling liquid. Irritating to eyes/skin/respiratory tract. Other Acute Effects: dizziness, nausea, drowsiness. Chronic Effects: dermatitis, kidney/liver/peripheral nerve damage. May cause birth defects (animal data). Flammable.

Potential Health Effects

Target Organs: central nervous system (CNS), eyes, gastrointestinal (GI) tract, liver, kidneys, skin
Primary Entry Routes: inhalation, skin absorption (slight), eye contact, ingestion
Acute Effects
Inhalation: Xylene is a central nervous system depressant. The vapor is discomforting to the upper respiratory tract and may be harmful if inhaled.
Inhalation hazard is increased at higher temperatures.
Toxic effects are increased by consumption of alcohol.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.

If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Headache, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g., nausea, anorexia and flatulence) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted among workers. Transient memory loss, renal impairment, temporary confusion and some evidence of disturbance of liver function was reported in three workers overcome by gross exposure to xylene (10000 ppm). One worker died and autopsy revealed pulmonary congestion, edema, and focal alveolar hemorrhage.
Volunteers inhaling xylene at 100 ppm for 5 to 6 hours showed changes in manual coordination, reaction time and slight ataxia. Tolerance developed during the workweek but was lost over the weekend. Physical exercise may antagonize this effect. Xylene body burden in humans exposed to 100 or 200 ppm xylene in air depends on the amount of body fat with 4% to 8% of total absorbed xylene accumulating in human adipose tissues.

Eye: The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is highly discomforting to the eyes.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Corneal changes have been reported in furniture polishers exposed to xylene.

Skin: The liquid is highly discomforting to the skin and may cause drying of the skin, which may lead to dermatitis and it is absorbed by the skin.
Toxic effects may result from skin absorption.
Open cuts, abraded or irritated skin should not be exposed to this material.
The material may accentuate any pre-existing skin condition.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.
Small excess risks of spontaneous abortion and congenital malformation was reported amongst women exposed to xylene in the first trimester of pregnancy. In all cases however the women had also been exposed to other substances.
Evaluation of workers chronically exposed to xylene has demonstrated a lack of genotoxicity. Exposure to xylene has been associated with increased risks of hemopoietic malignancies but, again simultaneous exposure to other substances (including benzene) complicate the picture. A long-term gavage study of mixed xylenes (containing 17% ethyl benzene) found no evidence of carcinogenic activity in rats and mice of either sex.
Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If available, administer medical oxygen by trained personnel.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to xylene:
1.Gastrointestinal absorption is significant with ingestions.

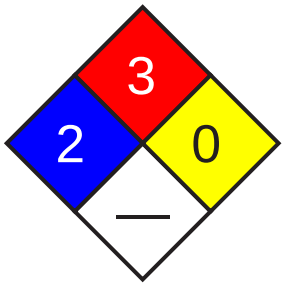
For ingestions exceeding 1-2 mL (xylene)/kg, intubation and lavage with cuffed endotracheal tube is recommended. The use of charcoal and cathartics is equivocal.
2.Pulmonary absorption is rapid with about 60-65% retained at rest.
3.Primary threat to life from ingestion and/or inhalation is respiratory failure.
4.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
5.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
6.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
7.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Methylhippuric acids in urine	1.5 gm/gm creatinine	End of shift	
	2 mg/min	Last 4 hrs of shift.	

Section 5 - Fire-Fighting Measures

Flash Point: 25.6 °C
Autoignition Temperature: 241 °C
LEL: 1.0% v/v
UEL: 7.0% v/v
Extinguishing Media: Alcohol stable foam; dry chemical powder; carbon dioxide.
Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are flammable.
Moderate fire hazard when exposed to heat or flame.
Vapor forms an explosive mixture with air.
Moderate explosion hazard when exposed to heat or flame.
Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion or decomposition leading to violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).
Other combustion products include carbon dioxide (CO_2).
Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

See DOT ERG



Fire Diamond

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.
Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.

See DOT ERG

Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of overexposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights or ignition sources.
Avoid generation of static electricity. DO NOT use plastic buckets.
Ground all lines and equipment. Use spark-free tools when handling.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.
Plastic containers may only be used if approved for flammable liquids.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear.
General exhaust is adequate under normal operating conditions.
Local exhaust ventilation may be required in specific circumstances.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.
Personal Protective Clothing/Equipment:
Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.
Hands/Feet: Barrier cream with polyethylene gloves; Butyl rubber gloves or Neoprene gloves or PVC gloves.
Safety footwear.
Do NOT use this product to clean the skin.
Other: Overalls. Impervious protective clothing.
Eyewash unit.
Ensure there is ready access to an emergency shower.
Glove Selection Index:
PE/EVAL/PE ..... Best selection
PVA ..... Best selection
VITON ..... Best selection
TEFLON ..... Best selection
PVDC/PE/PVDC ..... Poor to dangerous choice for other than short-term immersion
NATURAL+NEOPRENE..... Poor to dangerous choice for other than short-term immersion
NEOPRENE/NATURAL..... Poor to dangerous choice for other than short-term immersion
NITRILE+PVC ..... Poor to dangerous choice for other than short-term immersion
HYPALON ..... Poor to dangerous choice for other than short-term immersion
NAT+NEOPR+NITRILE ..... Poor to dangerous choice for other than short-term immersion
BUTYL ..... Poor to dangerous choice for other than short-term immersion
BUTYL/NEOPRENE ..... Poor to dangerous choice for other than short-term immersion

NITRILE..... Poor to dangerous choice for other than short-term immersion
NEOPRENE..... Poor to dangerous choice for other than short-term immersion
PVC..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear colorless flammable liquid with a strong aromatic odor; floats on water. Mixes with most organic solvents.

Physical State: Liquid
Odor Threshold: 5.00 x10^{-5} ppm
Vapor Pressure (kPa): 0.5 at 15 °C
Vapor Density (Air=1): 3.66 at 15 °C
Formula Weight: 106.18
Specific Gravity (H_2O=1, at 4 °C): 0.87 at 15 °C
Evaporation Rate: 0.7 Bu Ac=1

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 137 °C (279 °F) to 140 °C (284 °F)
Freezing/Melting Point: -47 °C (-53 °F)
Volatile Component (% Vol): 100
Water Solubility: Practically insoluble in water

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid storage with oxidizers.

Section 11 - Toxicological Information

Toxicity
Oral (human) LD_{Lo}: 50 mg/kg
Oral (rat) LD_{50}: 4300 mg/kg
Inhalation (human) TC_{Lo}: 200 ppm
Inhalation (man) LC_{Lo}: 10000 ppm/6h
Inhalation (rat) LC_{50}: 5000 ppm/4h
Reproductive effector in rats

Irritation
Skin (rabbit):500 mg/24h moderate
Eye (human): 200 ppm irritant
Eye (rabbit): 87 mg mild
Eye (rabbit): 5 mg/24h SEVERE

See *RTECS* ZE 2100000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Most of the xylenes are released into the atmosphere where they may photochemically degrade by reaction with hydroxyl radicals (half-life 1-18 hr). The dominant removal process in water is volatilization. Xylenes are moderately mobile in soil and may leach into groundwater where they are known to persist for several years, despite some evidence that they biodegrade in both soil and groundwater. Bioconcentration is not expected to be significant.

Ecotoxicity: LC_{50} Rainbow trout 13.5 mg/l/96 hr /Conditions of bioassay not specified; LD_{50} Goldfish 13 mg/l/24 hr /Conditions of bioassay not specified

Henry's Law Constant: 0.22

BCF: estimated at 2.14 to 2.20

Octanol/Water Partition Coefficient: log K_{ow} = 3.12 to 3.20

Soil Sorption Partition Coefficient: K_{OC} = 48 to 68

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: III - Minor Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: B1, IB3, T2, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 203 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 60 L **Cargo aircraft only:** 220 L
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U239 Ignitable Waste
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: m-Xylene **CAS Number:** 108-38-3
Chemical Formula: C_8H_{10}
Structural Chemical Formula: $C_6H_4(CH_3)_2$
EINECS Number: 203-576-3
ACX Number: X1001540-4
Synonyms: BENZENE,1,3-DIMETHYL-; 1,3-DIMETHYLBENZENE; M-DIMETHYLBENZENE; M-METHYLTOLUENE; 1,3-XYLENE; M-XYLENE; M-XYLENE; META-XYLENE; M-XYLOL
General Use: Used as a general solvent in the manufacture of paints, varnishes, lacquers, thinners, inks, rubber, pesticides, herbicides and paint strippers.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
m-xylene	108-38-3	>95

OSHA PEL
TWA: 100 ppm; 435 mg/m^3.

ACGIH TLV
TWA: 100 ppm; STEL: 150 ppm.

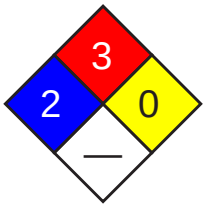
EU OEL
TWA: 50 ppm; STEL: 100 ppm.

NIOSH REL
TWA: 100 ppm (435 mg/m^3); STEL: 150 ppm (655 mg/m^3).

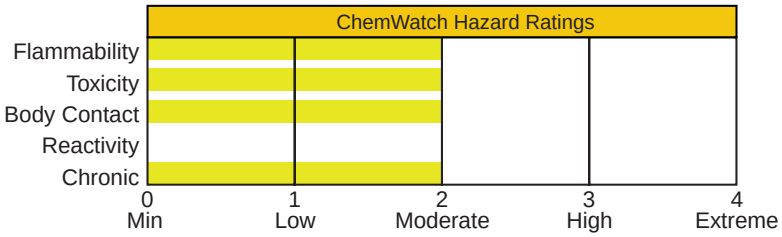
IDLH Level
900 ppm.

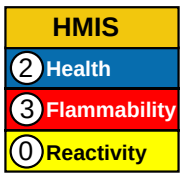
DFG (Germany) MAK
TWA: 100 ppm; PEAK: 200 ppm; skin.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear, sweet smelling liquid. Irritating to eyes/skin/respiratory tract. Other Acute Effects: dizziness, nausea, drowsiness. Chronic Effects: dermatitis, kidney/liver/peripheral nerve damage. May cause birth defects (animal data). Flammable.

Potential Health Effects

Target Organs: central nervous system (CNS), eyes, gastrointestinal (GI) tract, liver, kidneys, skin
Primary Entry Routes: inhalation, skin absorption (slight), eye contact, ingestion
Acute Effects

Inhalation: Xylene is a central nervous system depressant. The vapor is discomforting to the upper respiratory tract and may be harmful if inhaled.
Inhalation hazard is increased at higher temperatures.
Toxic effects are increased by consumption of alcohol.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.

Headache, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g., nausea, anorexia and flatulence) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted amongst workers. Transient memory loss, renal impairment, temporary confusion and some evidence of disturbance of liver function was reported in three workers overcome by gross exposure to xylene (10000 ppm). One worker died and autopsy revealed pulmonary congestion, edema, and focal alveolar hemorrhage.
Volunteers inhaling xylene at 100 ppm for 5 to 6 hours showed changes in manual coordination, reaction time and slight ataxia. Tolerance developed during the workweek but was lost over the weekend. Physical exercise may antagonize this effect. Xylene body burden in humans exposed to 100 or 200 ppm xylene in air depends on the amount of body fat with 4% to 8% of total absorbed xylene accumulating in human adipose tissues.

Eye: The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is highly discomforting to the eyes.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Corneal changes have been reported in furniture polishers exposed to xylene.

Skin: The liquid is highly discomforting to the skin and may cause drying of the skin, which may lead to dermatitis and it is absorbed by the skin.
Toxic effects may result from skin absorption.
Open cuts, abraded or irritated skin should not be exposed to this material.
The material may accentuate any pre-existing skin condition.
The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic).
This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis.
Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.
Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid is highly discomforting and toxic if swallowed.
Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A4, Not classifiable as a human carcinogen; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.
Small excess risks of spontaneous abortion and congenital malformation was reported among women exposed to xylene in the first trimester of pregnancy. In all cases however the women had also been exposed to other substances.
Evaluation of workers chronically exposed to xylene has demonstrated a lack of genotoxicity. Exposure to xylene has been associated with increased risks of hemopoietic malignancies but, again simultaneous exposure to other substances (including benzene) complicate the picture. A long-term gavage study of mixed xylenes (containing 17% ethyl benzene) found no evidence of carcinogenic activity in rats and mice of either sex.

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Lay patient down. Keep warm and rested.
If available, administer medical oxygen by trained personnel.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to xylene:
1. Gastrointestinal absorption is significant with ingestions.
For ingestions exceeding 1-2 mL (xylene)/kg, intubation and lavage with cuffed endotracheal tube is recommended.
The use of charcoal and cathartics is equivocal.

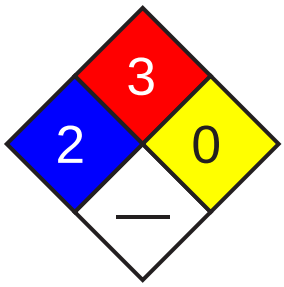
2.Pulmonary absorption is rapid with about 60-65% retained at rest.
3.Primary threat to life from ingestion and/or inhalation is respiratory failure.
4.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
5.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
6.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
7.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Methylhippuric acids in urine	1.5 gm/gm creatinine	End of shift	
	2 mg/min	Last 4 hrs of shift.	

Section 5 - Fire-Fighting Measures

Flash Point: 27 °C Closed Cup
Autoignition Temperature: 527 °C
LEL: 1.1% v/v
UEL: 7.0% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.

See DOT ERG



Fire Diamond

General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are flammable.
Moderate fire hazard when exposed to heat or flame.
Vapor forms an explosive mixture with air.
Moderate explosion hazard when exposed to heat or flame.
Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion or decomposition leading to violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).
Other combustion products include carbon dioxide (CO_2).
Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

See DOT ERG

Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.

Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of overexposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights or ignition sources.
Avoid generation of static electricity. DO NOT use plastic buckets.
Ground all lines and equipment. Use spark-free tools when handling.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.
Plastic containers may only be used if approved for flammable liquids.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear.
General exhaust is adequate under normal operating conditions.
Local exhaust ventilation may be required in specific circumstances.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Barrier cream with polyethylene gloves; Butyl rubber gloves or Neoprene gloves or PVC gloves.
Safety footwear.
Do NOT use this product to clean the skin.

Respiratory Protection:
Exposure Range >100 to <900 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range 900 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black

Other: Overalls. Impervious protective clothing.
Eyewash unit.
Ensure there is ready access to an emergency shower.

Glove Selection Index:
PVA ..... Best selection
VITON ..... Best selection

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear, colorless flammable liquid with aromatic odor. Miscible in most organic solvents. Odor threshold: 0.2 to 2 ppm. Vapor is heavier than air.

Physical State: Liquid
Odor Threshold: 4.00 x10^{13} mol/cc
Vapor Pressure (kPa): 0.5 at 15 °C
Vapor Density (Air=1): 3.66 at 15 °C
Formula Weight: 106.18
Specific Gravity (H_2O=1, at 4 °C): 0.87 at 15 °C

Evaporation Rate: 0.7 Bu Ac=1
pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 139.3 °C (283 °F)
Freezing/Melting Point: -47.8 °C (-54.04 °F)
Volatile Component (% Vol): 100
Water Solubility: Slight

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid storage with oxidizers.

Section 11 - Toxicological Information

Toxicity
Oral (rat) LD_{50}: 5000 mg/kg
Intraperitoneal (mouse) LD_{50}: 1739 mg/kg
Dermal (rabbit) LD_{50}: 14100 mg/kg

Effects on fertility, specific developmental abnormalities (craniofacial) recorded.

Irritation
Skin (rabbit): 0.01 mg/24h(open)
SEVERE
Skin (rabbit): 20 mg/24h - mod
Eye (rabbit): 5 mg/24h - SEVERE

See *RTECS* ZE 2275000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Most is released into the atmosphere where it may photochemically degrade by reaction with hydroxyl radicals (half-life 1-10 hr). The dominant removal process in water is volatilization. It is moderately mobile in soil and may leach into groundwater where it is known to persist for several years despite some evidence that it biodegrades in both soil and groundwater. Bioconcentration is not expected to be significant.
Ecotoxicity: LC_{50} Poecilia reticulata (guppy) 38 ppm/14 days /Conditions of bioassay not specified; LC_{100} Tetrahymena pyriformis (ciliate) 3.77 mmole/l/24 hr /Conditions of bioassay not specified; LC_{50} Crangon franciscorum (shrimp) 3.7 ppm/96 hr /Conditions of bioassay not specified; LD_{50} Goldfish 16 mg/l/24 hr /Modified ASTM D 1345 method; LC_{50} Morone saxatilis (striped bass) 9.2 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Cancer magister (crab larvae-stage I) 12 ppm/96 hr /Conditions of bioassay not specified
Henry's Law Constant: 0.314
BCF: eels 1.37
Biochemical Oxygen Demand (BOD): 0 lb/lb, 5 days
Octanol/Water Partition Coefficient: log K_{ow} = 3.20

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L

Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: III - Minor Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: B1, IB3, T2, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 203 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 60 L **Cargo aircraft only:** 220 L
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001 1000 lb (453.5 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: o-Xylene **CAS Number:** 95-47-6
Chemical Formula: C_8H_{10}
Structural Chemical Formula: $C_6H_4(CH_3)_2$
EINECS Number: 202-422-2
ACX Number: X1001538-4
Synonyms: BENZENE,1,2-DIMETHYL-; 1,2-DIMETHYLBENZENE; O-DIMETHYLBENZENE; O-METHYLTOLUENE; 1,2-XYLENE; O-XYLENE; 2-XYLENE; O-XYLENE; ORTHO-XYLENE; O-XYLOL
General Use: Used as a general solvent in the manufacture of paints, varnishes, lacquers, thinners, inks, rubber, pesticides, herbicides and paint strippers.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
o-xylene	95-47-6	>95

OSHA PEL
TWA: 100 ppm; 435 mg/m^3.

ACGIH TLV
TWA: 100 ppm; STEL: 150 ppm.

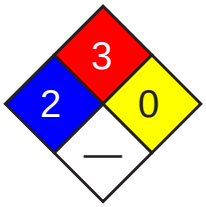
EU OEL
TWA: 50 ppm; STEL: 100 ppm.

NIOSH REL
TWA: 100 ppm (435 mg/m^3); STEL: 150 ppm (655 mg/m^3).

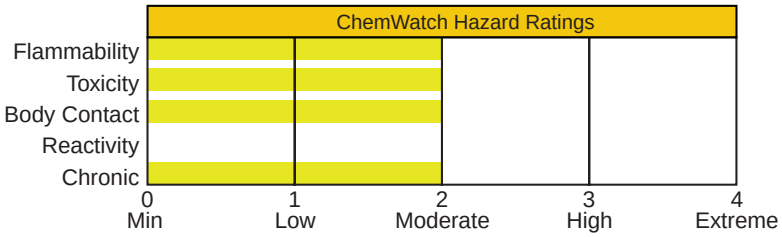
IDLH Level
900 ppm.

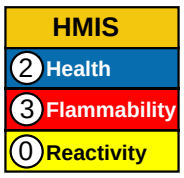
DFG (Germany) MAK
TWA: 100 ppm; PEAK: 200 ppm; skin.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear, sweet smelling liquid. Irritating to eyes/skin/respiratory tract. Other Acute Effects: dizziness, nausea, drowsiness. Chronic Effects: dermatitis, kidney/liver/peripheral nerve damage. May cause birth defects based on animal data. Flammable.

Potential Health Effects

Target Organs: central nervous system (CNS), eyes, gastrointestinal (GI) tract, liver, kidneys, skin
Primary Entry Routes: inhalation, skin absorption (slight), eye contact, ingestion
Acute Effects

Inhalation: Xylene is a central nervous system depressant. The vapor is discomforting to the upper respiratory tract and may be harmful if inhaled.
Inhalation hazard is increased at higher temperatures.
Toxic effects are increased by consumption of alcohol.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.

Headache, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g., nausea, anorexia and flatulence) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted among workers. Transient memory loss, renal impairment, temporary confusion and some evidence of disturbance of liver function was reported in three workers overcome by gross exposure to xylene (10000 ppm). One worker died and autopsy revealed pulmonary congestion, edema, and focal alveolar hemorrhage.
Volunteers inhaling xylene at 100 ppm for 5 to 6 hours showed changes in manual coordination, reaction time and slight ataxia. Tolerance developed during the workweek but was lost over the weekend. Physical exercise may antagonize this effect. Xylene body burden in humans exposed to 100 or 200 ppm xylene in air depends on the amount of body fat with 4% to 8% of total absorbed xylene accumulating in human adipose tissues.

Eye: The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is highly discomforting to the eyes.
Corneal changes have been reported in furniture polishers exposed to xylene.

Skin: The liquid is highly discomforting to the skin and may cause drying of the skin, which may lead to dermatitis and it is absorbed by the skin.
Toxic effects may result from skin absorption.
Open cuts, abraded or irritated skin should not be exposed to this material.
The material may accentuate any pre-existing skin condition.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid is highly discomforting and toxic if swallowed.
Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A4, Not classifiable as a human carcinogen; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.
Small excess risks of spontaneous abortion and congenital malformation was reported among women exposed to xylene in the first trimester of pregnancy. In all cases however the women had also been exposed to other substances.
Evaluation of workers chronically exposed to xylene has demonstrated a lack of genotoxicity. Exposure to xylene has been associated with increased risks of hemopoietic malignancies but, again simultaneous exposure to other substances (including benzene) complicate the picture. A long-term gavage study of mixed xylenes (containing 17% ethyl benzene) found no evidence of carcinogenic activity in rats and mice of either sex.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If available, administer medical oxygen by trained personnel.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center. Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to xylene:
1.Gastrointestinal absorption is significant with ingestions.
For ingestions exceeding 1-2 mL (xylene)/kg, intubation and lavage with cuffed endotracheal tube is recommended.
The use of charcoal and cathartics is equivocal.
2. Pulmonary absorption is rapid with about 60-65% retained at rest.
3. Primary threat to life from ingestion and/or inhalation is respiratory failure.
4. Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
5. Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.

6. A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
7. Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.

BIOLOGICAL EXPOSURE INDEX - BEI

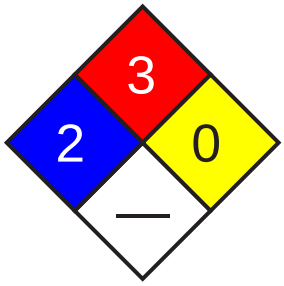
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Methylhippuric acids in urine	1.5 gm/gm creatinine	End of shift	
	2 mg/min	Last 4 hrs of shift.	

Section 5 - Fire-Fighting Measures

Flash Point: 32 °C Closed Cup
Autoignition Temperature: 463 °C
LEL: 1.0% v/v
UEL: 7% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are flammable.
Moderate fire hazard when exposed to heat or flame.
Vapor forms an explosive mixture with air.
Moderate explosion hazard when exposed to heat or flame.
Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion or decomposition leading to violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).
Other combustion products include carbon dioxide (CO_2).
Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

See DOT ERG



Fire Diamond

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.
Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

See DOT ERG

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of overexposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights or ignition sources.
Avoid generation of static electricity. DO NOT use plastic buckets.
Ground all lines and equipment. Use spark-free tools when handling.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.
Plastic containers may only be used if approved for flammable liquids.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear.
General exhaust is adequate under normal operating conditions.
Local exhaust ventilation may be required in specific circumstances.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.
Personal Protective Clothing/Equipment:
Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.
Hands/Feet: Barrier cream with polyethylene gloves; Butyl rubber gloves or Neoprene gloves or PVC gloves.
Safety footwear.
Do NOT use this product to clean the skin.
Other: Overalls. Impervious protective clothing.
Eyewash unit.
Ensure there is ready access to an emergency shower.
Glove Selection Index:
PVA ..... Best selection
VITON ..... Best selection

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear, colorless flammable liquid with aromatic odor. Miscible in most organic solvents.
Odor threshold: 0.2 to 2 ppm.

Physical State: Liquid
Odor Threshold: 0.05 ppm
Vapor Pressure (kPa): 0.5 at 15 °C
Vapor Density (Air=1): 3.66 at 15 °C
Formula Weight: 106.18
Specific Gravity (H_2O=1, at 4 °C): 0.87 at 15 °C
Evaporation Rate: 0.7 Bu Ac=1

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 144.4 °C (292 °F) at 760 mm Hg
Freezing/Melting Point: -25 °C (-13 °F)
Volatile Component (% Vol): 100
Water Solubility: 0.02% by weight

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid storage with oxidizers.

Section 11 - Toxicological Information

Toxicity
Inhalation (human) LC_{Lo}: 6125 ppm/12h
Intraperitoneal (mouse) LD_{50}: 1364 mg/kg
Paternal effects recorded.

Irritation
Nil reported

See *RTECS* ZE 2450000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Most is released into the atmosphere where it may photochemically degrade by reaction with hydroxyl radicals (half-life 1.5-15 hr). The dominant removal process in water is volatilization. It is moderately mobile in soil and may leach into groundwater where it has been known to be detectable for several years, although there is some evidence that it biodegrades in both soil and groundwater. Bioconcentration is not expected to be significant.
Ecotoxicity: LC_{50} Poecilia reticulata (guppy) 35 ppm/7 days /Conditions of bioassay not specified; LC_{50} Morone saxatilis (bass) 11.0 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Cancer magister (crab larvae stage I) 6 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Crangon franciscorum (shrimp) 1.3 ppm/96 hr /Conditions of bioassay not specified
Henry's Law Constant: 5.1×10^{-3}
BCF: eels 1.33
Biochemical Oxygen Demand (BOD): 0 lb/lb, 5 days
Octanol/Water Partition Coefficient: log K_{ow} = 3.12
Soil Sorption Partition Coefficient: K_{oc} = soils 48 to 68

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: III - Minor Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: B1, IB3, T2, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 203 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 60 L **Cargo aircraft only:** 220 L
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001 1000 lb (453.5 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: p-Xylene
CAS Number: 106-42-3
Chemical Formula: C_8H_{10}
Structural Chemical Formula: $C_6H_4(CH_3)_2$
EINECS Number: 203-396-5
ACX Number: X1001539-1
Synonyms: BENZENE,1,4-DIMETHYL-; CHROMAR; 1,4-DIMETHYLBENZENE; P-DIMETHYLBENZENE; P-METHYLTOLUENE; SCINTILLAR; 1,4-XYLENE; P-XYLENE; 4-XYLENE; P-XYLENE; PARA-XYLENE; P-XYLOL
General Use: Used as a general solvent.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
p-xylene	106-42-3	100

OSHA PEL
TWA: 100 ppm; 435 mg/m^3.

ACGIH TLV
TWA: 100 ppm; STEL: 150 ppm.

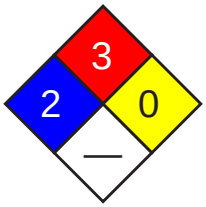
EU OEL
TWA: 50 ppm; STEL: 100 ppm.

NIOSH REL
TWA: 100 ppm (435 mg/m^3); STEL: 150 ppm (655 mg/m^3).

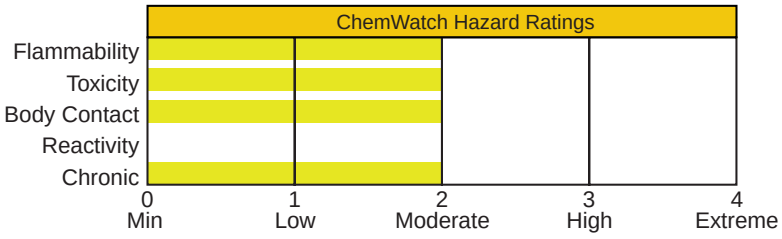
IDLH Level
900 ppm.

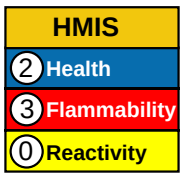
DFG (Germany) MAK
TWA: 100 ppm; PEAK: 200 ppm; skin.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear, sweet smelling liquid. Irritating to eyes/skin/respiratory tract. Other Acute Effects: dizziness, nausea, drowsiness. Chronic Effects: dermatitis, kidney/liver/peripheral nerve damage, may cause birth defects (animal data). Flammable.

Potential Health Effects

Target Organs: central nervous system (CNS), eyes, gastrointestinal (GI) tract, liver, kidneys, skin
Primary Entry Routes: inhalation, skin absorption (slight), eye contact, ingestion
Acute Effects

Inhalation: Xylene is a central nervous system depressant. The vapor is discomforting to the upper respiratory tract and may be harmful if inhaled.
Inhalation hazard is increased at higher temperatures.
Toxic effects are increased by consumption of alcohol.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.

Headache, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g., nausea, anorexia and flatulence) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted among workers. Transient memory loss, renal impairment, temporary confusion and some evidence of disturbance of liver function was reported in three workers overcome by gross exposure to xylene (10000 ppm). One worker died and autopsy revealed pulmonary congestion, edema, and focal alveolar hemorrhage.
Volunteers inhaling xylene at 100 ppm for 5 to 6 hours showed changes in manual coordination, reaction time and slight ataxia. Tolerance developed during the workweek but was lost over the weekend. Physical exercise may antagonize this effect. Xylene body burden in humans exposed to 100 or 200 ppm xylene in air depends on the amount of body fat with 4% to 8% of total absorbed xylene accumulating in human adipose tissues.

Eye: The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is highly discomforting to the eyes.
Corneal changes have been reported in furniture polishers exposed to xylene.

Skin: The liquid is highly discomforting to the skin and may cause drying of the skin, which may lead to dermatitis and it is absorbed by the skin.
Toxic effects may result from skin absorption.
Open cuts, abraded or irritated skin should not be exposed to this material.
The material may accentuate any pre-existing skin condition.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid is highly discomforting and toxic if swallowed.
Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A4, Not classifiable as a human carcinogen; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.
Small excess risks of spontaneous abortion and congenital malformation was reported among women exposed to xylene in the first trimester of pregnancy. In all cases however the women had also been exposed to other substances.
Evaluation of workers chronically exposed to xylene has demonstrated a lack of genotoxicity. Exposure to xylene has been associated with increased risks of hemopoietic malignancies but, again simultaneous exposure to other substances (including benzene) complicate the picture. A long-term gavage study of mixed xylenes (containing 17% ethyl benzene) found no evidence of carcinogenic activity in rats and mice of either sex.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If available, administer medical oxygen by trained personnel.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.

See DOT ERG

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center. Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to xylene:
1. Gastrointestinal absorption is significant with ingestions.
For ingestions exceeding 1-2 mL (xylene)/kg, intubation and lavage with cuffed endotracheal tube is recommended.
The use of charcoal and cathartics is equivocal.
2.Pulmonary absorption is rapid with about 60-65% retained at rest.
3.Primary threat to life from ingestion and/or inhalation is respiratory failure.
4.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
5.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.

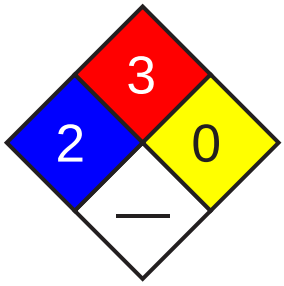
6.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
7.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Methylhippuric acids in urine	1.5 gm/gm creatinine	End of shift	
	2 mg/min	Last 4 hrs of shift.	

Section 5 - Fire-Fighting Measures

Flash Point: 27 °C Closed Cup
Autoignition Temperature: 528 °C
LEL: 1.1% v/v
UEL: 7.0% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are flammable.
Moderate fire hazard when exposed to heat or flame.
Vapor forms an explosive mixture with air.
Moderate explosion hazard when exposed to heat or flame.
Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion or decomposition leading to violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).
Other combustion products include carbon dioxide (CO_2).
Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

See DOT ERG



Fire Diamond

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.
Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

See DOT ERG

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of overexposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights or ignition sources.
Avoid generation of static electricity. DO NOT use plastic buckets.
Ground all lines and equipment. Use spark-free tools when handling.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.
Plastic containers may only be used if approved for flammable liquids.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear.
General exhaust is adequate under normal operating conditions.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.
Personal Protective Clothing/Equipment:
Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.
Hands/Feet: Barrier cream with polyethylene gloves; Butyl rubber gloves or Neoprene gloves or PVC gloves.
Safety footwear.
Do NOT use this product to clean the skin.
Respiratory Protection:
Exposure Range >100 to <900 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range 900 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black
Other: Overalls. Impervious protective clothing.
Eyewash unit.
Ensure there is ready access to an emergency shower.
Glove Selection Index:
PVA ..... Best selection
VITON ..... Best selection
NITRILE ..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear, colorless liquid with sweet, aromatic odor. Miscible in most organic solvents. Odor threshold 0.05 ppm.
Physical State: Liquid
Odor Threshold: Detection 0.05 ppm
Vapor Pressure (kPa): 0.90 at 20 °C
Vapor Density (Air=1): 3.66 at 15 °C
Formula Weight: 106.18
Specific Gravity (H_2O=1, at 4 °C): 0.86
Evaporation Rate: 9.9 Ether=1
pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 138.37 °C (281 °F)
Freezing/Melting Point: 13.3 °C (55.94 °F)
Volatile Component (% Vol): 100
Water Solubility: Insoluble in water

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.

Storage Incompatibilities: Avoid storage with oxidizers.

Section 11 - Toxicological Information

Toxicity
Oral (rat) LD_{50}: 5000 mg/kg
Inhalation (rat) LC_{50}: 4550 ppm/4h

Irritation
Nil reported

See *RTECS* ZE 2625000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Most is released into the atmosphere where it may photochemically degrade by reaction with hydroxyl radicals (half-life 1.7-18 hr). The dominant removal process in water is volatilization. It is moderately mobile in soil and may leach into groundwater where it is known to persist for several years despite some evidence that it biodegrades in both soil and groundwater. Bioconcentration is not expected to be significant.

Ecotoxicity: LC_{50} Poecilia reticulata (guppy) 35 ppm/7 day /Conditions of bioassay not specified; LC_{50} Morone saxatilis (bass) 2.0 ppm/96 hr /Conditions of bioassay not specified; LC_{100} Tetrahymena pyriformis (ciliate) 3.77 mmole/l/24 hr /Conditions of bioassay not specified; LD_{50} Goldfish 18 mg/l/24 hr /Modified ASTM D 1345 method; LC_{50} Crangon franciscorum (shrimp) 2.0 ppm/96 hr /Conditions of bioassay not specified

Henry's Law Constant: 0.314

BCF: eels 1.37

Biochemical Oxygen Demand (BOD): 0 lb/lb, 5 days

Octanol/Water Partition Coefficient: log K_{ow} = 3.15

Soil Sorption Partition Coefficient: K_{oc} = 3.15

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: III - Minor Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: B1, IB3, T2, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 203 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 60 L **Cargo aircraft only:** 220 L
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111
Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Acenaphthene **CAS Number:** 83-32-9
Chemical Formula: $C_{12}H_{10}$
Structural Chemical Formula: $C_{10}H_6(CH_2)_2$
EINECS Number: 201-469-6
ACX Number: X1001052-9
Synonyms: ACENAPHTHENE; ACENAPHTHYLENE,1,2-DIHYDRO-; 1,8-DIHYDROACENAPHTHALENE; 1,2-DIHYDROACENAPHTHYLENE; 1,8-DIHYDROACENAPHTHYLENE; 1,8-ETHYLENENAPHTHALENE; ETHYLENENAPHTHALENE; NAPHTHYLENEETHYLENE; PERI-ETHYLENE NAPHTHALENE; PERIETHYLENENAPHTHALENE
Derivation: By passing ethylene and benzene or naphthalene through a red hot tube; by heating tetrahydroacenaphthene with sulfur to 356 °F (180 °C); or by reacting acenaphthenone or acenaphthenequinone by high-pressure hydrogenation in decalin with nickel at 356 to 464 °F (180 to 240 °C). Occurs as a by-product in coal tar production during the high-temperature carbonization or coking of coal.
General Use: Used as an intermediate for dyes, pharmaceuticals, insecticides, fungicides, and plastics.

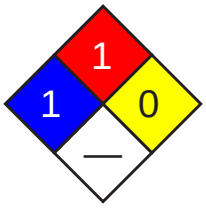
Section 2 - Composition / Information on Ingredients

Name	CAS	%
Acenaphthene	83-32-9	ca 98% wt

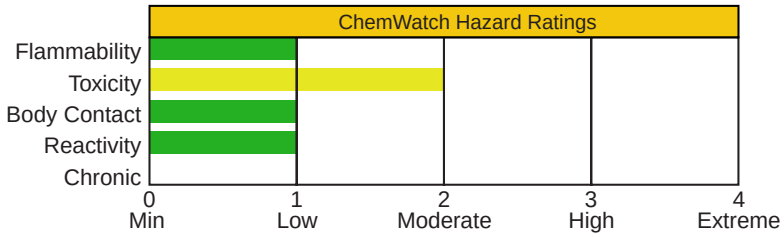
OSHA PEL **NIOSH REL**

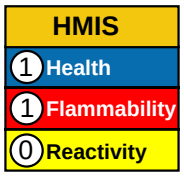
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

White, needle-like crystals. Irritating to eyes/skin/respiratory tract. Also causes: vomiting if large amounts are ingested. Chronic: possible mutagenic activity (animal studies). Combustible.

Potential Health Effects

Target Organs: Eyes, skin, respiratory tract.
Primary Entry Routes: Inhalation, skin and eye contact.
Acute Effects
Inhalation: Irritation of the respiratory tract may occur.
Eye: Irritation may occur.
Skin: Irritation may occur.
Ingestion: Ingestion of large amounts may cause vomiting. Irritation of the gastrointestinal tract may occur.
Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.
Medical Conditions Aggravated by Long-Term Exposure: Pre-existing skin disorders.
Chronic Effects: None reported.

Section 4 - First Aid Measures

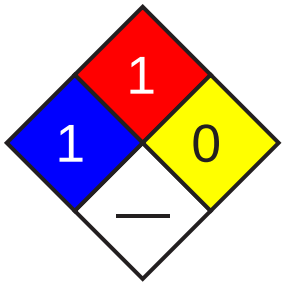
Inhalation: Remove exposed person to fresh air and support breathing as needed.
Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water. Consult a physician or ophthalmologist if pain or irritation persist.
Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water followed by a thorough soap and water wash.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water to dilute. Vomiting may be spontaneuos if large amounts are ingested.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: Treatment is symptomatic and supportive.

See DOT ERG

Section 5 - Fire-Fighting Measures

Flash Point: Combustible
Autoignition Temperature: None reported.
LEL: None reported.
UEL: None reported.
Flammability Classification: Combustible Solid
Extinguishing Media: Use dry chemical, carbon dioxide, water spray, fog, or foam.
General Fire Hazards/Hazardous Combustion Products: Carbon oxide(s).
Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

See DOT ERG



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel, isolate and ventilate area.
Small Spills: *Do not* sweep! Carefully scoop up or vacuum (with appropriate filter) and place in suitable containers.
Large Spills: Flush spills with water to containment area for later disposal. *Do not* release into sewers or waterways. Damp mop any residue.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

See DOT ERG

Section 7 - Handling and Storage

Handling Precautions: Use only with ventilation adequate to prevent airborne hazards. *Do not* use near heat and ignition sources.
Never eat, drink, or smoke in work areas. Practice good personal hygiene after using acenaphthene, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.
Recommended Storage Methods: Store in a cool, dry, well-ventilated area away from heat, ignition sources and incompatibles (Sec. 10).
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Where possible, enclose all processes to prevent dust dispersion into work area. To prevent static sparks, electrically ground and bond all equipment used with and around acenaphthene. Provide general or local exhaust ventilation systems to maintain airborne concentrations at least as low as those given for *nuisance dusts*. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.
Administrative Controls: Consider periodic medical exams to determine if any irritation upon exposure to acenaphthene has occurred.
Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove acenaphthene from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: White, needle-like crystals.
Physical State: Solid
Odor Threshold: 0.5048 mg/m^3
Vapor Pressure (kPa): < 0.02 mm Hg at 68 °F (20 °C); 10 mm Hg at 268 °F (131 °C)
Formula Weight: 154.21
Specific Gravity (H_2O=1, at 4 °C): 1.0242 at (194 °F) 90 °C
Refractive Index: 1.6048 at 212 °F (100 °C)
Boiling Point: 531.5 °F (277.5 °C)
Freezing/Melting Point: 200.5 °F (93.6 °C)
Water Solubility: 100 mg/L
Other Solubilities: Soluble as 1 g/ 31 mL (ethanol), 56 mL (methanol), 25 mL (propanol), 2.5 mL (chloroform), 5 mL (benzene & toluene); 3.2 g/100 mL glacial acetic acid.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Acenaphthene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization does not occur. Exposure to heat, ignition sources, and incompatibles.

Storage Incompatibilities: Acenaphthene reacts with molecular oxygen in the presence of alkali-earth metal bromides to form acenaphthequinone; reacts with ozone in the presence of alkali-earth metal hydroxides to form 1,8-naphthaldehyde carboxylic acid; and is oxidized to aromatic alcohols and ketones by reaction with transition metal catalysts.

Hazardous Decomposition Products: Thermal oxidative decomposition of acenaphthene can produce carbon oxide(s) and thick, acrid smoke.

Section 11 - Toxicological Information

Other Effects:

Microorganisms (species unspecified): 3 mg (-S9) caused mutation.
Rat, intraperitoneal, LD_{50}: 600 mg/kg.

See *RTECS* AB1000000, for additional data.

Section 12 - Ecological Information

Environmental Fate: In soil, acenaphthene will biodegrade under aerobic conditions with a half-life of 10 to 60 days. A soil absorption coefficient of 2065 to 3230 indicates slight mobility. In water, biodegradation will occur under aerobic conditions with a half-life of 1 to 25 days, as well as photolysis in direct sunlight. Volatilization is another means of removal with half- lives of 11 hr from a model river and 39 days from a model pond which considers the effect of adsorption. In air, acenaphthene reacts with photochemically-produced hydroxyl radicals with a half-life of 7.2 hr.

Ecotoxicity: *Pimephales promelas* (fathead minnow), LC_{50} = 1700 µg/L/72 hr, 1600 µg/L/96 hr; *Salmo gairdneri* (rainbow trout), LC_{50} = 1570 µg/L/24 hr, 1130 µg/l/48 hr, 800 µg/L/72 hr, 670 µg/L/96 hr.

Henry's Law Constant: 1.55 x 10^{-4} atm/m^3/mole at 77 °F (25 °C)

Octanol/Water Partition Coefficient: log K_{ow} = 3.92

Section 13 - Disposal Considerations

Disposal: Acenaphthene is a good candidate for rotary-kiln incineration. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Environmentally hazardous substances, solid, n.o.s.
ID: UN3077
Hazard Class: 9 - Miscellaneous hazardous material
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 9 - Class 9
Special Provisions: 8, 146, B54, IB8, N20
Packaging: **Exceptions:** 155 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** No limit **Cargo aircraft only:** No limit
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 100 lb (45.35 kg)
SARA 40 CFR 372.65: Not listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Acenaphthylene **CAS Number:** 208-96-8
Chemical Formula: $C_{12}H_8$
EINECS Number: 205-917-1
ACX Number: X1001734-6
Synonyms: ACENAPHTHYLENE; CYCLOPENTA(DE)NAPHTHALENE
Derivation: Acenaphthylene is formed upon catalytic dehydration of acenaphthene. It was also extracted from oil furnace black. Not produced commercially.
General Use: Acenaphthylene is a constituent of coal tar and crude oil, a product of combustion, and can be released to the environment via natural fires associated with lightning, volcanic activity, and spontaneous combustion.

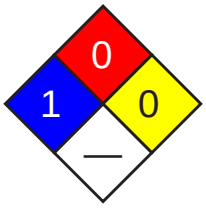
Section 2 - Composition / Information on Ingredients

Name	CAS	%
Acenaphthylene	208-96-8	ca 99+% wt

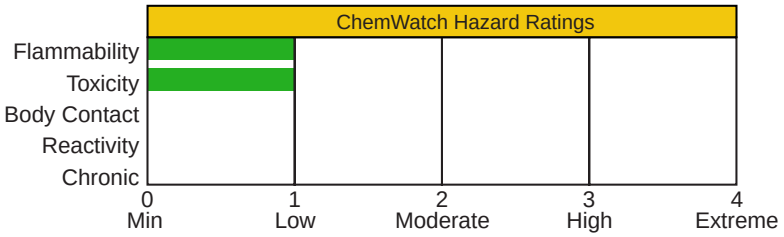
OSHA PEL **NIOSH REL**

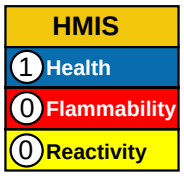
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Yellow crystalline solid. Irritating to eyes/skin/respiratory tract. Chronic: mutation effects, possible kidney and bladder cancer.

Potential Health Effects

Target Organs: Skin, eyes, blood, and respiratory and autonomic nervous systems
Primary Entry Routes: Inhalation, ingestion, skin/eye contact
Acute Effects
Inhalation: Causes irritation of the respiratory system and mucous membranes.
Eye: Contact causes irritation.
Skin: Contact causes irritation and burning.
Ingestion: No acute effects reported.
Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.
Medical Conditions Aggravated by Long-Term Exposure: Liver, kidney, and bladder damage.
Chronic Effects: Polycyclic aromatic hydrocarbons (PAH's) may cause coughing and bronchitis, eye photosensitivity, coal tar warts, erythema, dermal burns, acneiform lesions, and photosensitization of the skin. They may also cause leukoplakia, mild hepatotoxicity or mild nephrotoxicity (in animals), hematuria, and in rats - agranulocytosis, anemia, and pancytopenia. PAH's have been associated with kidney, bladder, lung, gastrointestinal tract, and skin cancer. PAH's may cross the placenta and are excreted in breast milk. Laboratory experiments have shown mutagenic effects.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult a physician or ophthalmologist if pain, irritation, swelling, lacrimation, or photophobia persist.

Skin Contact: Quickly remove contaminated clothing. Rinse with flooding amounts of water. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water. *Do not* induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Arterial blood gases, pulmonary function, chest x-ray, and other monitoring may be indicated, based on the patient's presentation and the exposure characteristics. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. Inhalation exposure to PAH's may be complicated by exposure to other substances which produce acute respiratory and systemic effects. Treat according to clinical presentation and exposure history. If bronchospasm and wheezing occur, consider treatment with inhaled sympathomimetic agent. Carefully observe patients with inhalation exposure for the developments of any systemic signs or symptoms and administer symptomatic treatment as necessary.

Section 5 - Fire-Fighting Measures

Flash Point: Data not found.

Autoignition Temperature: Data not found.

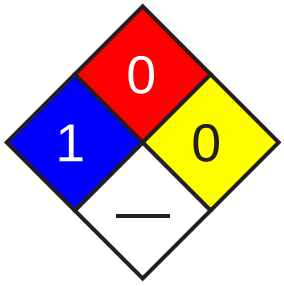
LEL: Data not found.

UEL: Data not found.

Extinguishing Media: Extinguish with water spray, carbon dioxide, dry chemical powder or appropriate foam.

General Fire Hazards/Hazardous Combustion Products: Toxic fumes of carbon monoxide and carbon dioxide can be released.

Fire-Fighting Instructions: *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources. Isolate and ventilate area, deny entry, stay upwind. Cleanup personnel should protect against exposure (Sec. 8). Most commonly produced as a product of incineration or combustion.

Small Spills: Carefully sweep, scoop up, or vacuum (with a HEPA filter). Avoid raising dust.

Large Spills: For large spills, dike far ahead of spill for later disposal. *Do not* release into sewers or waterways.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Wear personal protective clothing and equipment to prevent vapor inhalation and contact with skin or eyes (Sec. 8). Avoid prolonged or repeated exposure.

Never eat, drink, or smoke in work areas. Workers subjected to skin contact with acenaphthylene should wash any areas of the body that may have contacted the material, whether or not contact actually occurred. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed containers in a cool, well-ventilated area away from heat, light, ignition sources, and incompatibles.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Where feasible, enclose operations to avoid dispersion into the work area. Provide general or local exhaust ventilation systems to maintain airborne concentrations as low as possible (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Educate workers about the health and safety hazards associated with this material. Train in work practices which minimize exposure. Identify areas in which exposure to acenaphthylene may occur by signs or other appropriate means and restrict access to these areas to authorized persons only. Routine monitoring and physical assessments (e.g., complete blood count, hepatic and renal function tests, chest x-ray and pulmonary function tests, dermal assessments) of individuals with significant exposure is recommended. Make available to employees exposed to acenaphthylene a complete history and physical examination with emphasis on the oral cavity, respiratory tract, bladder, and kidneys. Examine the skin for evidence of chronic disorders, for premalignant and malignant lesions, and evidence of hyperpigmentation or photosensitivity. Obtain a urinalysis including specific gravity, albumin, glucose, and a microscopic examination of centrifuged sediment, as well as a test for red blood cells. Also perform a complete blood count to search for leukemia and aplastic anemia. Employees having 5 or more years of exposure or who are 45 years of age or older should have a urinary cytology exam. Employees having 10 or more years of exposure or who are 45 year of age or older should have a sputum cytology examination, a 14" x 17" chest roentgenogram, and periodic measure of FVC and FEV (1 sec).

Personal Protective Clothing/Equipment: Wear chemically protective gloves, rubber boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear splash-proof chemical safety goggles with face shield (8 in. min), per OSHA eye- and face- protection regulations (29 CFR 1910.133). Contact lenses are not protective eye devices. Appropriate eye protection must be worn in conjunction with, or instead of, contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. The following recommendations are for coal tar pitch volatiles: For exposure to concentrations <= 2 mg/m^3, wear a chemical cartridge respirator with an organic vapor cartridge(s) and with a fume or high efficiency filter or any supplied-air respirator or any SCBA; for exposure to concentrations <= 10 mg/m^3, wear a chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s) and with a fume or high efficiency filter, or a gas mask with a chin style or a front- or back- mounted organic vapor canister and with a full facepiece and a fume or high efficiency filter, or any supplied-air respirator with a full facepiece, helmet, or hood or any SCBA with a full facepiece; for exposure to concentrations <= 200 mg/m^3, wear a type C supplied-air respirator operated in pressure-demand or other positive-pressure or continuous flow mode, or a powered air-purifying respirator with an organic vapor cartridge and a high efficiency particulate filter; for exposure to concentrations <= 400 mg/m^3, wear a type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive-pressure mode, or with a full facepiece, helmet, or hood operated in continuous flow mode. For exposure to concentrations >= 400 mg/m^3 or for emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Place clothing contaminated with acenaphthylene in closed containers for storage until it can be discarded or laundered by someone informed of the hazards of working with acenaphthylene. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Yellow

Physical State: Crystalline solid; prisms from ether; plates from alcohol

Vapor Pressure (kPa): $9.12x10^{-4}$ mm Hg at 77 °F (25 °C)

Formula Weight: 152.20

Density: 0.8988 g/cm^3 at 16 °C/2°C

Boiling Point: 509 °F (265 °C) to 527 °F (275 °C)

Freezing/Melting Point: 194 °F (90 °C) to 197.6 °F (92 °C)

Ionization Potential (eV): 8.22 +/- 0.2 eV

Water Solubility: Slightly soluble; 3.93 mg/L distilled water at 77 °F (25 °C)

Other Solubilities: Very soluble in 95% ethanol, benzene, and ether.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Acenaphthylene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Avoid contact with chemical incompatibles, heat, and sources of ignition.

Storage Incompatibilities: Include strong oxidizing agents.

Hazardous Decomposition Products: Thermal oxidative decomposition of acenaphthylene can produce toxic fumes of carbon monoxide and carbon dioxide.

Section 11 - Toxicological Information

Acute Oral Effects:

Mouse, oral, LD_{50}: 1760 mg/kg produced toxic effects of parasympathomimetic, respiratory depression, hemorrhage.

Other Effects:

Multiple Dose Toxicity Effects: Rat, inhalation, 500 µg/m^3 administered for 4 hours over 17 weeks intermittently produced toxic effects: lung, thorax, or respiration - structural or functional change in trachea or bronchi; lung, thorax, or respiration - bronchiolar dilation; nutritional and gross metabolic - weight loss or decreased weight gain.

Genetic Effects: Bacteria - *S Typhimurium*, 1 mmol/L/2 hr (-S9) induced mutations in microorganisms.

Human, lymphocyte, 15 mg/L induced mutations in mammalian somatic cells.

Rat, intraperitoneal, LD_{50}: 1700 mg/kg.

See *RTECS* AB1254000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Acenaphthylene is expected to biodegrade in the environment. It is not expected to hydrolyze or bioconcentrate in the environment, yet may undergo direct photolysis in sunlit environmental media. Volatilization from environmental waters may be important. It is expected to exist entirely in the vapor phase in ambient air. In the atmosphere, reactions with photochemically-produced hydroxyl radicals and ozone are likely to be important fate processes. Acenaphthylene is expected to have a low to slight mobility in soil. It could adsorb to, run off with, and bioaccumulate in, soil. In aquatic systems, it may partition from the water column to organic matter contained in sediments and suspended solids.

Ecotoxicity: Data not found.

Henry's Law Constant: $1.13x10^{-5}$ (calculated)

BCF: 2.11 (estimated)

Octanol/Water Partition Coefficient: log K_{ow} = 4.07

Soil Sorption Partition Coefficient: K_{oc} = 950 to 3315 (estimated)

Section 13 - Disposal Considerations

Disposal: Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber or consider chemical precipitation. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable federal, state, and local regulations. Handle empty containers carefully as hazardous residues may still remain. Triple rinse containers and dispose of wash wastewater appropriately.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Not specifically listed.

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed

CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 5000 lb (2268 kg)

SARA 40 CFR 372.65: Not listed

SARA EHS 40 CFR 355: Not listed

TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111
Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Anthracene **CAS Number:** 120-12-7
Chemical Formula: $C_{14}H_{10}$
Structural Chemical Formula: $(C_6H_4CH)_2$
EINECS Number: 204-371-1
ACX Number: X1001589-1
Synonyms: ANTHRACEN; ANTHRACENE; ANTHRACENE OIL; ANTHRACIN; COAL TAR PITCH VOLATILES:ANTHRACENE; GREEN OIL; P-NAPHTHALENE; PARANAPHTHALENE; PARANAPTHALENE; TETRA OLIVE N2G
Derivation: Occurs naturally in smoke (gasoline, coal, cigarette, etc.), charbroiled foods, and coal tar pitch volatiles. Obtained by distilling crude anthracene oil with alkali carbonate in iron retorts (phenanthrene is removed via carbon disulfide) *or* by salting out from crude anthracene oil and draining; the crude salts are then purified by pressing and the use of various solvents (phen-anthrene and carbazole are removed).
General Use: Used in chemical manufacture (phenanthrene, carbazole, anthraquinone), in calico printing; as a component of dyes, scintillation fluid, smoke screens; and in organic semi-conductor research.

Section 2 - Composition / Information on Ingredients

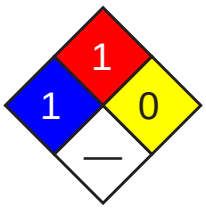
Name	CAS	%
Anthracene	120-12-7	ca 90 to 95% wt (commercial grade); 90 to 98% wt (technical grade)

Trace Impurities: phenanthrene, carbazole, chrysene, pyridine (0.2%), iron (0.03%)

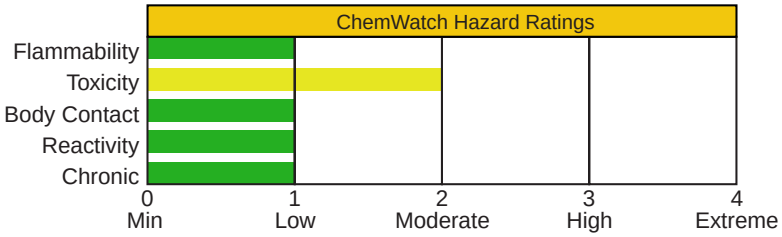
OSHA PEL **NIOSH REL**

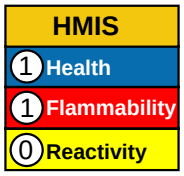
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless crystals with violet fluorescence (pure) or yellow crystals with green fluorescence. Irritating to eyes/skin/respiratory tract. Other Acute Effects: sun exposure can aggravate skin irritation and cause dermatitis. Combustible.

Potential Health Effects

Target Organs: Eyes, skin, respiratory and digestive tracts.
Primary Entry Routes: Inhalation, skin/eye contact
Acute Effects
Inhalation: Symptoms include irritation of the respiratory tract, headache, nausea and vomiting, loss of appetite, slowed reactions, and adynamia (lack or loss of strength due to disease or other outside agent). Acute symptoms disappear within several days of last exposure.
Eye: Irritation of the conjunctiva with burning, itching and watering.

Skin: Irritation with burning, itching, and edema (fluid build-up). Volunteers with a 2% crude tar solution applied to the skin showed anthracene absorption via blood tests.

Ingestion: Gastrointestinal tract irritation.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Medical Conditions Aggravated by Long-Term Exposure: Dermatitis.

Chronic Effects: Repeated skin contact can cause pigmentation of the skin with cornification of surface layers and telangioectasis (an abnormal dilatation of capillary vessels that often form small, raised, red, wart-like spots). Sensitization (including photo- sensitization) may also occur. Anthracene appears to concentrate in the fat and liver.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 minutes. Consult an ophthalmologist if pain and irritation persist.

See DOT ERG

Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water to dilute. Vomiting may be spontaneous.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Treatment is symptomatic and supportive.

Section 5 - Fire-Fighting Measures

Flash Point: 250 °F (121 °C), Closed Cup

Autoignition Temperature: 1004 °F (540 °C)

LEL: 0.6% v/v

UEL: Not reported.

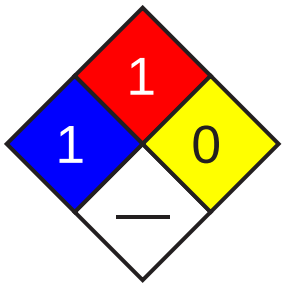
Flammability Classification: Combustible

See DOT ERG

Extinguishing Media: Use water spray, carbon dioxide, dry chemical, or foam.

General Fire Hazards/Hazardous Combustion Products: Include carbon oxide(s) and irritating, acrid smoke. May explode in air.

Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Cleanup personnel should protect against inhalation and skin/eye contact.

See DOT ERG

Small Spills: Carefully scoop up or vacuum (with appropriate filter) and place in suitable containers for disposal.

Large Spills: Use water to flush large spills to containment area for later disposal. Do not release into sewers or waterways. Damp mop any residue.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: *Do not* use near heat or flame. Wear appropriate PPE. Never eat, drink, or smoke in work areas. Practice good personal hygiene after using anthracene, especially before eating, drinking, smoking, using the toilet, or applying cosmetics. Skin cleansers (ex. 55% kaolin, 25% neutral soap, 20% bran) are recommended.

Recommended Storage Methods: Store in a cool, dry, well-ventilated area away from heat, ignition sources, and incompatibles (Sec. 10).

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: To prevent static sparks, electrically ground and bond equipment used with and around anthracene. Enclosure of equipment and mechanization of processes will aid in exposure control. Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Consider preplacement and periodic medical exams of exposed workers with emphasis on the skin.

Personal Protective Clothing/Equipment: Limit work in sunlight as much as possible to prevent photosensitization. Photoprotective creams or pastes must be applied to bare skin regions. Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Polyvinyl chloride is a suitable material for PPE. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For any detectable concentration, use a SCBA or supplied-air respirator with a full facepiece and operated in pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes and place in closed containers until laundered. Remove anthracene from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless crystals with a violet fluorescence (pure), yellow crystals with a green fluorescence (due to tetracene and naphthacene).

Physical State: Solid

Vapor Pressure (kPa): 1mm Hg at 293 °F (145 °C)

Formula Weight: 178.22

Density: 1.25 g/cm^3 at 80.6 °F (27 °C)

Boiling Point: 644 °F (340 °C)

Freezing/Melting Point: 423 °F (217 °C)

Water Solubility: 1.29 mg/L at 77 °F/25 °C (*distilled water*), 0.6 mg/L at 77 °F/25 °C (*salt water*)

Other Solubilities: 1 g in 67 mL absolute alcohol, 70 mL methanol, 62 mL benzene, 85 mL chloroform, 200 mL ether, 31 mL carbon disulfide, 86 mL carbon tetrachloride, and 125 mL toluene. Also soluble in acetone.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Anthracene darkens upon exposure to sunlight (transformed to *para*-anthracene). Hazardous polymerization *does not* occur. Exposure to heat, ignition sources, sunlight, and incompatibles.

Storage Incompatibilities: Include calcium hypochlorite (exothermic), fluorine (explodes), chromic acid, and calcium oxychloride.

Hazardous Decomposition Products: Thermal oxidative decomposition of anthracene can produce carbon oxide(s) and acrid, irritating smoke.

Section 11 - Toxicological Information

Acute Oral Effects:

Mouse, oral, LD: > 17 g/kg caused fatty liver degeneration.

Irritation Effects:

Mouse, skin: 118 µg caused mild irritation.

Other Effects:

Rat, oral: 20 g/kg intermittently for 79 weeks caused liver tumors.

Genetic Effects - Rat, liver cell: 300 µmoL caused DNA damage.

See *RTECS* CA9350000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil, anthracene is expected to absorb strongly and not leach to groundwater. It will not hydrolyze, but may be subject to biodegradation, the rate of which depends on soil type. In water, anthracene is subject to direct photolysis near the surface and undergoes significant biodegradation. Biodegradation in water is faster with increased temperature, increased oxygen, and acclimated microbes. Evaporation may also be significant with an estimated half-life range of 4.3 to 5.9 days from a river 1 m deep, flowing 1 m/sec, with a wind velocity of 3 m/sec. In the air, photolysis and reaction with photochemically-produced hydroxyl radicals (half-life: 1.67 days). Vapor phase anthracene is expected to degrade faster than particle-sorbed anthracene. A K_{oc} of 26,000 suggests anthracene is relatively immobile in soil and unlikely to leach to groundwater; it will absorb strongly to soil.

Ecotoxicity: *Leponis macrochirus* (bluegill sunfish), LC_{50} = 11.9 µg/L/96 hr; *Rana pipiens* (leopard frog), LC_{50} = 0.065 ppm/30 min & 0.025 ppm/5 hr. BCF (bioconcentration factor): goldfish (162), rainbow trout (4400-9200). Bioconcentration occurs most heavily in organisms which lack the enzyme microsomal oxidase. Anthracene can become concentrated on the waxy surface of some plant leaves and fruits.
Octanol/Water Partition Coefficient: log K_{ow} = 4.45 (calc.)

Section 13 - Disposal Considerations

Disposal: Anthracene is a waste chemical stream constituent which may be subjected to ultimate disposal by controlled incineration. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Environmentally hazardous substances, solid, n.o.s.
ID: UN3077
Hazard Class: 9 - Miscellaneous hazardous material
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 9 - Class 9
Special Provisions: 8, 146, B54, IB8, N20
Packaging: **Exceptions:** 155 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** No limit **Cargo aircraft only:** No limit
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 5000 lb (2268 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Benz[a]anthracene **CAS Number:** 56-55-3
Chemical Formula: $C_{18}H_{12}$
EINECS Number: 200-280-6
ACX Number: X1002793-9
Synonyms: B(A)A; BA; BAA; 1,2-BENZ(A)ANTHRACENE; 1,2-BENZANTHRACENE; BENZ(A)ANTHRACENE; BENZANTHRACENE; BENZ[A]ANTHRACENE; 1,2-BENZANTHRAZEN; 1,2-BENZANTHRENE; BENZANTHRENE; 1,2-BENZOANTHRACENE; BENZO(A)ANTHRACENE; BENZOANTHRACENE; 2,3-BENZOPHENANTHRENE; BENZO(A)PHENANTHRENE; BENZO(B)PHENANTHRENE; 2,3-BENZPHENANTHRENE; NAPHTHANTHRACENE; TETRAPHENE
General Use: research chemistry

Section 2 - Composition / Information on Ingredients

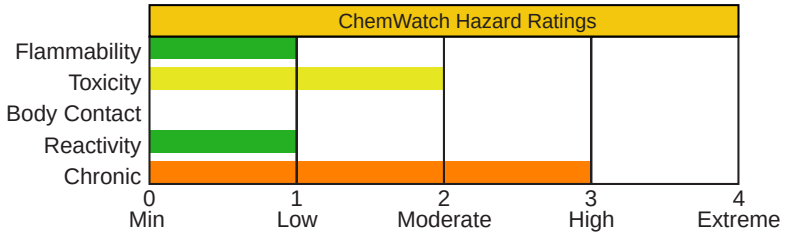
Name	CAS	%
benz[a]anthracene	56-55-3	>98

OSHA PEL

NIOSH REL

ACGIH TLV
Exposure by all routes should be carefully controlled to levels as low as possible.

Section 3 - Hazards Identification



ANSI Signal Word

Danger!


Poison

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless plates. May cause irritation. Poison. Other Acute Effects: may be fatal if inhaled, swallowed, or absorbed through skin. Chronic Effects: may cause heritable genetic damage; may alter genetic material. Carcinogen. Will burn.

Potential Health Effects

Target Organs: No data found.
Primary Entry Routes: accidental skin and eye contact, inhalation of generated dusts
Acute Effects

Inhalation: The dust is harmful and discomforting to the upper respiratory tract. Persons with impaired respiratory function, airway diseases, or conditions such as emphysema or chronic bronchitis may incur further disability if excessive concentrations of particulate are inhaled.

Eye: The dust may be discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/ or other transient eye damage/ ulceration.

Skin: The material may be mildly discomforting to the skin. Open cuts and abraded or irritated skin should not be exposed to this material. Toxic effects may result from skin absorption.

Ingestion: The solid/dust is discomforting to the gastrointestinal tract and harmful if swallowed. Considered an unlikely route of entry in commercial/industrial environments.

Carcinogenicity: NTP - Class 2B, Reasonably anticipated to be a carcinogen, sufficient evidence of carcinogenicity from studies in experimental animals; IARC - Group 2A, Probably carcinogenic to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A2, Suspected human carcinogen; EPA - Class B2, Probable human carcinogen based on animal studies; MAK - Class A2, Unmistakably carcinogenic in animal experimentation only.

Chronic Effects: Cited in many publications and by a number of regulatory authorities as a suspected human carcinogen. Subcutaneous injection produces sarcomas (soft tissue growths) in rats and mice. When administered by gavage benz[a]anthracene induced papillomas to the forestomach in mice and hamsters and mammary tumors in female rats.

Section 4 - First Aid Measures

Inhalation: • If dust is inhaled, remove to fresh air.
• Encourage patient to blow nose to ensure clear breathing passages.
• Rinse mouth with water. Consider drinking water to remove dust from throat.
• Seek medical attention if irritation or discomfort persist.
• If fumes or combustion products are inhaled, remove to fresh air.
• Lay patient down. Keep warm and rested.
• Other measures are usually unnecessary.

Eye Contact: • Immediately hold the eyes open and flush with fresh running water.
• Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
• Seek medical attention if pain persists or recurs.
• Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: • Immediately remove all contaminated clothing, including footwear (after rinsing with water).
• Wash affected areas thoroughly with water (and soap if available).
• Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center. If more than 15 minutes from a hospital:
• INDUCE vomiting with IPECAC SYRUP, or fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. NOTE: Wear a protective glove when inducing vomiting by mechanical means.
• SEEK MEDICAL ATTENTION WITHOUT DELAY.
• In the meantime, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
• If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided.
• If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Treat symptomatically.

Section 5 - Fire-Fighting Measures

Flash Point: Not available; probably combustible

Extinguishing Media: Foam. Dry chemical powder. BCF (where regulations permit). Carbon dioxide. Water spray or fog - Large fires only.

General Fire Hazards/Hazardous Combustion Products: • Solid which exhibits difficult combustion or is difficult to ignite.
• Avoid generating dust, particularly clouds of dust in a confined or unventilated space, as dust may form an explosive mixture with air and any source of ignition, e.g., flame or spark, will cause fire or explosion.
• Dry dust can also be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
• Build-up of electrostatic charge may be prevented by bonding and grounding.
• Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Fire Incompatibility: Avoid contamination with oxidizing agents i.e., nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Fire-Fighting Instructions: • Contact fire department and tell them location and nature of hazard.
• Wear breathing apparatus plus protective gloves for fire only.
• Prevent, by any means available, spillage from entering drains or waterways.
• Use fire fighting procedures suitable for surrounding fire.
• Do not approach containers suspected to be hot.
• Cool fire-exposed containers with water spray from a protected location.
• If safe to do so, remove containers from path of fire.

• Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: • Clean up all spills immediately.
• Avoid contact with skin and eyes.
• Wear protective clothing, gloves, safety glasses and dust respirator.
• Use dry clean up procedures and avoid generating dust.
• Vacuum up or sweep up.
• Place in clean drum then flush area with water.

See DOT ERG

Large Spills: • Clear area of personnel and move upwind.
• Contact fire department and tell them location and nature of hazard.
• Wear breathing apparatus plus protective gloves.
• Prevent, by any means available, spillage from entering drains or waterways.
• No smoking, bare lights or ignition sources.
• Increase ventilation.
• Stop leak if safe to do so.
• Water spray or fog may be used to disperse/absorb vapor.
• Contain or absorb spill with sand, earth or vermiculite.
• Collect recoverable product into labeled containers for recycling.
• Collect solid residues and seal in labeled drums for disposal.
• Wash area and prevent runoff into drains.
• After clean up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.
• If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: • Avoid all personal contact, including inhalation.
• Wear protective clothing when risk of overexposure occurs.
• Use in a well-ventilated area.
• Prevent concentration in hollows and sumps.
• DO NOT enter confined spaces until atmosphere has been checked.
• Do not allow material to contact humans, exposed food or food utensils.
• Avoid smoking, bare lights or ignition sources.
• When handling, DO NOT eat, drink or smoke.
• Avoid contact with incompatible materials.
• Keep containers securely sealed when not in used.
• Avoid physical damage to containers.
• Always wash hands with soap and water after handling.
• Working clothes should be laundered separately. Launder contaminated clothing before reuse.
• Follow good occupational work practices.
• Observe manufacturer's storage/handling recommendations.
• Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Recommended Storage Methods: Glass container. Plastic container. Metal can. Metal drum. Check that all containers are clearly labeled and free from leaks.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Local exhaust ventilation usually required. If risk of overexposure exists, wear NIOSH-approved respirator. Provide adequate ventilation in warehouse or closed storage area.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields or chemical goggles. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Wear chemical protective gloves, e.g. PVC. Wear safety footwear.

Other: • Overalls.
• PVC Apron.
• PVC protective suit may be required if exposure severe.
• Eyewash unit.
• Ensure there is ready access to a safety shower.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Light yellow to tan crystalline powder.
Physical State: colorless plates
Vapor Pressure (kPa): 5 x10^{-9} torr at 20 °C
Formula Weight: 228.29
Evaporation Rate: Half life 89 hours
Boiling Point: Sublimes at 435 °C (815 °F)
Freezing/Melting Point: 162 °C (323.6 °F)
Volatile Component (% Vol): Negligible
Water Solubility: 0.014 mg/L in Water at 25 °C

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid reaction with oxidizing agents.

Section 11 - Toxicological Information

Toxicity
Intravenous (rat) LD_{50}: > 200 mg/kg

Irritation
Nil reported

See *RTECS* CV9275000, for additional data.

Section 12 - Ecological Information

Environmental Fate: When released into water it will rapidly become adsorbed to sediment or particulate matter in the water column, and bioconcentrate into aquatic organisms. In the unadsorbed state, it will degrade by photolysis in a matter of hours to days. Its slow desorption from sediment and particulate matter will maintain a low concentration in the water. Because it is strongly adsorbed to soil it will remain in the upper few centimeters of soil and not leach into groundwater. It will very slowly biodegrade when colonies of microorganisms are acclimated but this is too slow a process (half-life ca 1 year to be significant). In the atmosphere it will be transported long distances and will probably be subject to photolysis and photooxidation although there is little documentation about the rate of these processes in the literature.
Ecotoxicity: Algae: Anabaena flos-aquae 2w EC_{50} growth +0.014 mg/l NOEC growth +0.003 mg/l
BCF: daphnia 4.0
Octanol/Water Partition Coefficient: log K_{ow} = 5.61
Soil Sorption Partition Coefficient: K_{oc} = sediments 55 to 1.87 x10^{6}

Section 13 - Disposal Considerations

Disposal: • Recycle wherever possible or consult manufacturer for recycling options.
• Follow applicable local, state, and federal regulations.
• Bury residue in an authorized landfill.
• Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: I - Great Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB7
Packaging: **Exceptions:** None **Non-bulk:** 211 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 kg **Cargo aircraft only:** 50 kg
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: II - Medium Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP2, IP4
Packaging: **Exceptions:** None **Non-bulk:** 212 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 25 kg **Cargo aircraft only:** 100 kg
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP3
Packaging: **Exceptions:** 153 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** 100 kg **Cargo aircraft only:** 200 kg
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U018 Toxic Waste
CERCLA 40 CFR 302.4: Listed per RCRA Section 3001, per CWA Section 307(a) 10 lb (4.535 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Benzo[%i/**i%]fluoranthene** **CAS Number:** 205-99-2
Chemical Formula: $C_{20}H_{12}$
EINECS Number: 205-911-9
ACX Number: X1004486-7
Synonyms: B B F; B E F; B (B) F; B(B)F; B(E)F; BBF; BEF; 3,4-BENZ(E)ACEPHENANTHRYLENE; BENZ(E)ACEPHENANTHRYLENE; 2,3-BENZFLUORANTHENE; 3,4-BENZFLUORANTHENE; BENZO(B) FLUORANTHENE; BENZO[%I/**I%]FLUORANTHENE; 2,3-BENZOFLUORANTHENE; 3,4-BENZOFLUORANTHENE; BENZO(B)FLUORANTHENE; BENZO(E)FLUORANTHENE; BENZO[B]FLUORANTHENE; 2,3-BENZOFLUORANTHRENE**
Derivation: No manufacturing information available; found in coal tar, coke oven emissions, cigarette smoke and automobile exhaust. There is no commercial production of this compound in the U.S.
General Use: Used as a research chemical.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
Benzo[%i/**i%]fluoranthene	**205-99-2**	**ca 100% wt**

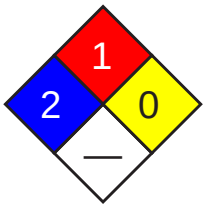
(Note that, except when in the form of a laboratory research chemical, benzo[%i/i%]fluoranthene is typically found in mixtures with other PAHs (polycyclic aromatic hydrocarbons), such as coal tar pitch).

OSHA PEL

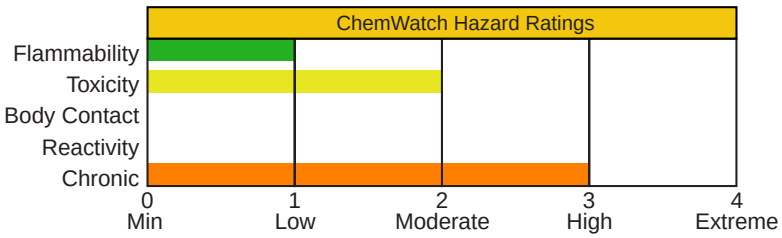
NIOSH REL

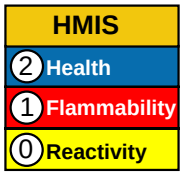
ACGIH TLV
Exposure by all routes should be carefully controlled to levels as low as possible.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless needles. May be irritating to eyes/skin/respiratory tract. Possible human carcinogen and mutagen.

Potential Health Effects

Target Organs: Eyes, skin, respiratory system, gastrointestinal (GI) system, blood, liver, kidneys
Primary Entry Routes: Inhalation, ingestion, skin and/or eye contact/absorption
Acute Effects
Inhalation: Irritation may result from inhalation of benzo[%i/**i%]fluoranthene dust or fumes.**
Eye: Contact may result in irritation.
Skin: Contact may cause irritation.
Ingestion: None reported.

Carcinogenicity: NTP - Class 2B, Reasonably anticipated to be a carcinogen, sufficient evidence of carcinogenicity from studies in experimental animals; IARC - Group 2B, Possibly carcinogenic to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A2, Suspected human carcinogen; EPA - Class B2, Probable human carcinogen based on animal studies; MAK - Class A2, Unmistakably carcinogenic in animal experimentation only.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Chronic Effects: Although there is no direct epidemiological evidence linking benzo[%i/**i%]fluoranthene with cancer, it is frequently a component of mixtures associated with human cancer. Epidemiological studies demonstrate increased incidence of cancer (skin, lung, urinary tract, GI system) with exposure to mixed PAHs and substances that contain them. Coal tar pitch volatiles are reported to cause an excess of bronchitis. In animal studies, benzo[%i/i%]fluoranthene has been found to be tumorigenic and mutagenic.**

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 minutes. Consult a physician or ophthalmologist if pain and/or irritation develop.

See DOT ERG

Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Treat overexposure symptomatically and supportively. Medical surveillance may be necessary for high exposures (skin, mouth, GI, respiratory system). Animal testing suggests a synergism (combined effect greater than sum of parts) of mutagenicity between benzo[%i/**i%]fluoranthene and other PAHs.**

Section 5 - Fire-Fighting Measures

Flash Point: Probable combustible solid

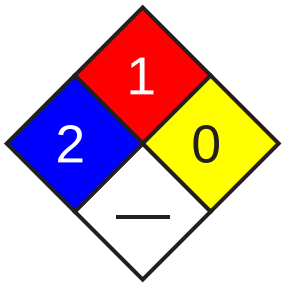
Autoignition Temperature: None reported.

LEL: None reported.

UEL: None reported.

Flammability Classification: Probable combustible solid

See DOT ERG



Fire Diamond

Extinguishing Media: Use water spray; carbon dioxide, dry chemical powder or appropriate foam.

General Fire Hazards/Hazardous Combustion Products: Heating benzo[%i/**i%]fluoranthene to decomposition can produce carbon monoxide (CO) and carbon dioxide (CO_2).**

Fire-Fighting Instructions: *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel, isolate area and deny entry. Remove sources of ignition, and provide maximum ventilation.

See DOT ERG

Small Spills: Vacuum or carefully scoop up material and deposit in sealed containers. Absorb liquid containing benzo[%i/**i%]fluoranthene with vermiculite, earth, sand or similar material.**

Large Spills: Dike far ahead of liquid spill for later disposal. *Do not* release into sewers or waterways. Stay upwind and have cleanup personnel protect against inhalation and contact.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid dust inhalation, and skin and eye contact. Avoid sunlight exposure of contaminated skin. Use only with ventilation sufficient to reduce airborne concentrations as low as possible. Wear protective gloves, goggles, and clothing (see Sec. 8). Keep away from heat and ignition sources.
Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed container in cool, well-ventilated area, away from heat, ignition sources and incompatibles (see Sec. 10). Periodically inspect stored materials.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Work with benzo[%i/**i%]fluoranthene only under an exhaust hood. Provide general or local exhaust ventilation systems to maintain airborne concentrations as low as possible. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.**

Administrative Controls: Have employees with potential for exposure submit to preplacement and periodic medical examinations with emphasis on oral cavity (including sputum cytology), respiratory tract, skin (chronic disorders, lesions), blood (complete count), bladder and kidneys (urinalysis: specific gravity, albumin, glucose, microscopic examination of sediment; urinary cytology). Repeat medical exam on an annual basis, or on a semi-annual basis for employees 45 years or older or with 10 or more years of exposure to pitch volatiles. Periodically inspect lab atmospheres, and surfaces such as walls, floors, and benches and interior of fume hoods and air ducts for contamination. Post appropriate signs and labels on doors leading to areas where benzo[%i/**i%]fluoranthene is used.**

Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent skin contact. Wear splash-proof chemical safety goggles, and face shield (8-inch minimum), per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For any detectable concentration (of coal tar pitch volatiles) use SCBA with full facepiece operated in pressure-demand or other positive pressure mode, or supplied-air respirator with full facepiece operated in pressure-demand or other positive pressure mode in combination with auxiliary SCBA operated in pressure-demand or other positive pressure mode; escape, air purifying full face respirator (gas mask) with a chin-style or a front- or back-mounted organic vapor canister and with a full facepiece and a fume or high-efficiency filter, or escape-type SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless needles
Physical State: Solid
Vapor Pressure (kPa): 5 x10^{-7} mm Hg at 68 °F (20 °C)
Formula Weight: 252.32
Freezing/Melting Point: 334.4 °F (168 °C)
Water Solubility: 0.0012 mg/L

Other Solubilities: 95% ethanol: <1 mg/mL at 66 °F (19 °C); acetone: 10-50 mg/mL at 66 °F (19 °C); benzene: slightly soluble; DMSO: 10-50 mg/mL at 66 °F (19 °C).

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Benzo[%i/**i%]fluoranthene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Heat, sunlight.**

Storage Incompatibilities: Include strong oxidizing agents.

Hazardous Decomposition Products: Thermal oxidative decomposition of benzo[%i/**i%]fluoranthene will produce carbon monoxide (CO) and carbon dioxide (CO_2).**

Section 11 - Toxicological Information

Other Effects:

Tumorgenicity, mouse, skin: 88 ng/kg/120 weeks intermittently produced toxic effects: tumorigenic - carcinogenic by RTECS criteria; skin and appendages - tumors; tumorigenic - tumors at site of application.

Hamster, lung cells: 100 µg/L produced morphological transformation.

Mouse, skin: 4037 µg/kg/20 days intermittently produced toxic effects: tumorigenic - equivocal tumorigenic agent by RTECS criteria; skin and appendages - tumors.

Rat, intraperitoneal: 100 mg/kg resulted in DNA adducts.

Mouse, skin: 72 mg/kg/60 weeks intermittently produced toxic effects: tumorigenic - equivocal tumorigenic agent by RTECS criteria; skin and appendages - tumors; tumorigenic - tumors at site of application.

Rat, intraperitoneal: 100 mg/kg induced sister chromatid exchange.

Rat, implant: 5 mg/kg produced toxic effects: tumorigenic - equivocal tumorigenic agent by RTECS criteria; lungs, thorax, or respiration - tumors; tumorigenic - tumors at site of application.

Human, lymphocyte cells: 55 µg/L produced mutation.

See *RTECS* CU1400000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Benzo[%i/**i%]fluoranthene has a low vapor pressure and Henry's Law Constant, and will not readily evaporate from water or soil. In surface water, it will partition from the water column to suspended sediments. Limited bioconcentration in aquatic organisms may occur (polychaete worms, BCF = 9.1); however, fish have an enzyme (microsomal oxidase) capable of rapidly metabolizing PAHs. Photolysis, photo-oxidation, and volatilization of dissolved benzo[%i/i%]fluoranthene may occur, but adsorption to suspended sediments is expected to inhibit these processes. Release to the soil may result in some biodegradation. Photolysis is not expected to be significant after release to soil. In the atmosphere it is likely to be adsorbed to particulate matter, and will be subject to wet and dry deposition. In the atmosphere, benzo[%i/i%]fluoranthene will rapidly degrade by reaction with photochemically produced hydroxyl radicals (half life 1.00 day). A high K_{oc} indicates significant sorption and low mobility in the soil column.**

Ecotoxicity: Evidence suggests that PAHs in lake bottom sediments may cause tumors in fish.

Henry's Law Constant: 1.38 x10^{-4} atm-m^3/mole, estimated

Octanol/Water Partition Coefficient: log K_{ow} = 6.124

Soil Sorption Partition Coefficient: K_{oc} = 5.88, estimated

Section 13 - Disposal Considerations

Disposal: Benzo[%i/**i%]fluoranthene is a good candidate for rotary kiln incineration. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.**

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Environmentally hazardous substances, solid, n.o.s.
ID: UN3077
Hazard Class: 9 - Miscellaneous hazardous material
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 9 - Class 9
Special Provisions: 8, 146, B54, IB8, N20
Packaging: **Exceptions:** 155 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** No limit **Cargo aircraft only:** No limit
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed
CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 1 lb (0.454 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Not listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Benzo(a)pyrene
BEN5560

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Benzo(a)pyrene **CAS Number:** 50-32-8
Chemical Formula: $C_{20}H_{12}$
EINECS Number: 200-028-5
ACX Number: X1002798-4
Synonyms: B(A)P; BAP; BENZO(D,E,F)CHRYSENE; 3,4-BENZOPIRENE; 1,2-BENZOPYRENE; 3,4-BENZOPYRENE; 6,7-BENZOPYRENE; BENZO(A)PYRENE; 3,4-BENZPYREN; 3,4-BENZ(A)PYRENE; 3,4-BENZPYRENE; BENZ(A)PYRENE; BENZ[A]PYRENE; 3,4-BENZYLPYRENE; 3,4-BENZYPYRENE; 3,4-BP; BP; COAL TAR PITCH VOLATILES: BENZO(A)PYRENE
Derivation: Synthesized from pyrene and succinic anhydride.
General Use: Benzo(a)pyrene is no longer used or produced commercially in the US. In its pure form, benzo(a)pyrene may be used as a research laboratory reagent. It also occurs in combustion products of coal, oil, petroleum, wood and other biological matter; in motor vehicle and other gasoline and diesel engine exhaust; in charcoal-broiled foods; in cigarette smoke and general soot and smoke of industrial, municipal, and domestic origin. It occurs naturally in crude oils, shale oils, coal tars, gases and fly ash from active volcanoes and forest fires.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
Benzo(a)pyrene	50-32-8	ca 100% wt

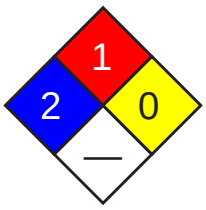
Except in laboratories, benzo(a)pyrene is usually mixed with other coal tar pitch chemicals. Consider exposure limits for coal tar pitch volatiles as a guideline. However, because benzo(a)pyrene is considered a probable carcinogen to humans, it is recommended that exposures to carcinogens be limited to the lowest feasible concentration.

OSHA PEL
TWA: 0.2 mg/m^3.

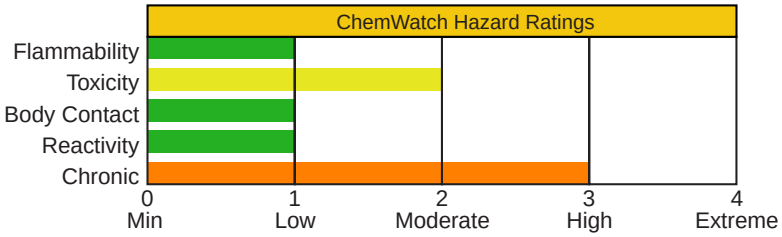
NIOSH REL

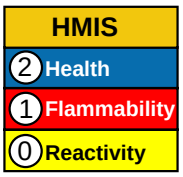
ACGIH TLV
Exposure by all routes should be carefully controlled to levels as low as possible.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Warning!

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Pale yellow, crystalline solid or powder. Irritating to skin, eyes, respiratory tract. Chronic Effects: carcinogen, mutagen. Handle with extreme caution!

Potential Health Effects

Target Organs: Respiratory system, bladder, kidneys, skin.
Primary Entry Routes: Inhalation, ingestion.

Acute Effects

Inhalation: Respiratory tract irritation. Pregnant women may be especially susceptible to exposure effects of benzo(a)pyrene; exposure may damage the fetus. In general, polyaromatic hydrocarbons such as benzo(a)pyrene tend to localize primarily in body fat and fatty tissues (for ex. breasts) and are excreted in breast milk. Benzo(a)pyrene may also affect the male reproductive system (testes and sperm).

Eye: Irritation and/or burns on contact.

Skin: Irritation with burning sensation, rash, and redness; dermatitis on prolonged exposure. Sunlight enhances effects (photosensitization).

Ingestion: None reported.

Carcinogenicity: NTP - Class 2B, Reasonably anticipated to be a carcinogen, sufficient evidence of carcinogenicity from studies in experimental animals; IARC - Group 2A, Probably carcinogenic to humans; OSHA - Not listed; NIOSH - Listed as carcinogen; ACGIH - Class A2, Suspected human carcinogen; EPA - Class B2, Probable human carcinogen based on animal studies; MAK - Class A2, Unmistakably carcinogenic in animal experimentation only.

Medical Conditions Aggravated by Long-Term Exposure: Respiratory system, bladder, kidney, and skin disorders.

Chronic Effects: Inhalation: Cough and bronchitis. Eye: Photosensitivity and irritation. Skin: Skin changes such as thickening, darkening, pimples, loss of color, reddish areas, thinning of the skin, and warts. Sunlight enhances effects (photosensitization). Other: Gastrointestinal (GI) effects include leukoplakia (a pre-cancerous condition characterized by thickened white patches of epithelium on mucous membranes, especially of the mouth). Cancer of the lung, skin, kidneys, bladder, or GI tract is also possible. Smoking in combination with exposure to benzo(a)pyrene increases the chances of developing lung cancer. Persons with a high degree of inducibility of the enzyme aryl hydrocarbon hydroxylase may be a high risk population.

Section 4 - First Aid Measures

See DOT ERG

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of tepid water for at least 15 min. Consult an ophthalmologist if irritation or pain persist.

Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water (less than 15 min). Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water to dilute. Inducing vomiting is not necessary since benzo(a)pyrene has a low acute toxicity and therefore, is generally an unnecessary procedure. Consider activated charcoal/cathartic.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Monitor CBC and arterial blood gases, conduct liver, renal, and pulmonary function tests (if respiratory tract irritation is present), and urinalysis. Biological monitoring techniques testing for metabolites in blood or urine, or DNA adducts in blood or tissues are useful for epidemiological studies that determine if exposure has occurred. Because neither normal nor toxic levels have been established, those techniques may not be useful for evaluating individual patients.

Special Precautions/Procedures: Emergency personnel should protect against exposure.

Section 5 - Fire-Fighting Measures

See DOT ERG

Flash Point: None reported. Benzo(a)pyrene may burn, but does *not* readily ignite.

Autoignition Temperature: None reported.

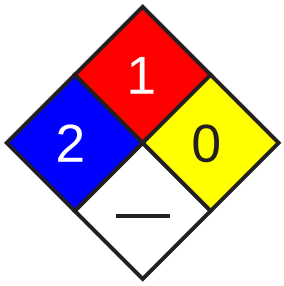
LEL: None reported.

UEL: None reported.

Extinguishing Media: For small fires, use dry chemical, sand, water spray, or foam. For large fires, use water spray, fog, or foam.

General Fire Hazards/Hazardous Combustion Products: Carbon monoxide and carbon dioxide.

Fire-Fighting Instructions: Isolate hazard and deny entry. If feasible and without undue risk, move containers from fire hazard area. Otherwise, cool fire-exposed containers with water spray until well after fire is extinguished. Do not release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode and full protective clothing.



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel of large spills, remove heat and ignition sources, and provide adequate ventilation. Cleanup personnel should protect against dust inhalation and skin or eye contact. Clean up spills promptly.

See DOT ERG

Small Spills: Carefully scoop up spilled material and place into appropriate containers for disposal. For liquid spills, take up with a noncombustible, inert absorbent and place into appropriate containers for disposal.

Large Spills: For large spills, dike far ahead of liquid spill or contain dry spill for later disposal. Do not release into sewers or waterways. *Do not* dry sweep! Use a vacuum with a HEPA filter or a wet method to reduce dust. After cleanup is complete, thoroughly decontaminate all surfaces. *Do not* reuse contaminated cleaning materials.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Handle with extreme caution and take all necessary measures to avoid exposure to benzo(a)pyrene because it is a carcinogen and mutagen. Follow good personal hygiene procedures and thoroughly wash hands with soap and water after handling. Use safety pipettes for all pipetting.

Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed and properly labeled containers in a cool, well-ventilated area.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use a Class I, Type B, biological safety hood when working with benzo(a)pyrene in a laboratory. Decrease the rate of air extraction, so that benzo(a)pyrene can be handled without powder being blown around the hood. Keep glove boxes under negative pressure. Use vertical laminar-flow, 100% exhaust, biological safety cabinets for containment of in vitro procedures. The exhaust air flow should be sufficient to provide an inward air flow at the face opening of the cabinet. Ensure contaminated air sheaths that are under positive pressure are leak-tight. Never use horizontal laminar-flow hoods or safety cabinets where filtered air is blown across the working area towards the operator. Test cabinets before work begins to ensure they are functioning properly. Provide general or local exhaust ventilation systems to maintain airborne concentrations as low as possible. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Consider preplacement and periodic medical examinations with emphasis on the oral cavity, bladder, kidneys, skin, and respiratory tract. Conduct urinalysis including specific gravity, albumin, glucose, and microscopic examination of centrifuged sediment for red blood cells. Also, include 14" x 17" chest roentgenogram, FVC + FEV1, and CBC to detect any leukemia or aplastic anemia. It is recommended that this exam be repeated on an annual basis and semiannual basis for employees 45 yr of age or older or with 10 or more years of exposure to coal tar pitch volatiles. Train workers about the hazards of benzo(a)pyrene and the necessary protective measures to prevent exposure. Periodically inspect lab atmospheres, surfaces such as walls, floors, and benches, and interior of fume hoods and air ducts for contamination. Post appropriate signs and labels on doors leading into areas where benzo(a)pyrene is used.

Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. In animal laboratories, wear protective suits (disposable, one-piece and close-fitting at ankles and wrists), gloves, hair covering, and overshoes. In chemical laboratories, wear gloves and gowns. Wear protective eyeglasses or chemical safety, gas-proof goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. The following respirator recommendations are for coal tar pitch volatiles. For any unknown concentration, wear any SCBA with a full facepiece and operated in a pressure- demand or other positive pressure mode, or any supplied-air respirator with a full facepiece and operated in a pressure-demand or other positive pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive pressure mode. For escape, wear any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister having a high-efficiency particulate filter, or any appropriate escape-type SCBA. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Shower and change clothes after exposure or at the end of the workshift. Separate contaminated work clothes from street clothes. Launder before reuse. Remove benzo(a)pyrene from your shoes and clean personal protective equipment. Use procedures to ensure laundry personnel are not exposed. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Pale yellow monoclinic needles with a faint, aromatic odor.
Physical State: Solid
Vapor Pressure (kPa): >1 mm Hg at 68 °F (20 °C)
Formula Weight: 252.30
Specific Gravity (H_2O=1, at 4 °C): 1.351
Boiling Point: >680 °F (>360 °C); 590 °F (310 °C) at 10 mm Hg
Freezing/Melting Point: 354 °F (179 °C)
Water Solubility: Insoluble; 0.0038 mg (+/- 0.00031 mg) in 1 L at 77 °F (25 °C)
Other Solubilities: Ether, benzene, toluene, xylene, concentrated hydrosulfuric acid; sparingly soluble in alcohol, methanol.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Benzo(a)pyrene is stable at room temperature in closed containers under normal storage and handling conditions. It undergoes photo-oxidation when exposed to sunlight or light in organic solvents and is also oxidized by chromic acid and ozone. Hazardous polymerization cannot occur. Avoid heat and ignition sources and incompatibles.
Storage Incompatibilities: Strong oxidizers (chlorine, bromine, fluorine) and oxidizing chemicals (chlorates, perchlorates, permanganates, and nitrates).
Hazardous Decomposition Products: Thermal oxidative decomposition of benzo(a)pyrene can produce carbon monoxide and carbon dioxide.

Section 11 - Toxicological Information

Acute Oral Effects:
Rat, oral: 15 mg/kg produced gastrointestinal and musculoskeletal tumors.
Irritation Effects:
Mouse: 14 µg caused mild irritation.
Other Effects:
Rat, oral: 40 mg/kg on the 14th day of pregnancy caused changes in the extra embryonic structures.
Rat, oral: 2 g/kg administered 28 days prior to mating and 1-22 days of pregnancy produced a stillbirth.
Tumorgenicity, mouse, oral: 75 mg/kg administered to the female during the 12- 14 day of pregnancy produced biochemical and metabolic effects on the newborn.
Mouse, inhalation: 200 ng/m^3/6 hr administered intermittently over 13 weeks produced tumors of the lungs.
Human, HeLa cell: 1500 nmol/L caused DNA inhibition.
Human, lung cell: 1 µmol/L caused DNA damage.
Human, liver cell: 100 nmol/L caused DNA damage.
Rabbit, skin: 17 mg/kg administered intermittently over 57 weeks produced tumors of the skin and appendages.

See *RTECS* DJ3675000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to water, benzo(a)pyrene adsorbs very strongly to particulate matter and sediments, bioconcentrates in aquatic organisms which cannot metabolize it, but does not hydrolyze. Direct photolysis at the water surface, evaporation, or biodegradation may be important, but adsorption may significantly retard these processes. Adsorption to particulates may also retard direct photolysis when benzo(a)pyrene is released to air. Benzo(a)pyrene may be removed from air by reaction with nitrogen dioxide (half-life, 7 days) or ozone (half-life, 37 min), or photochemically produced hydroxyl radicals (estimated half-life, 21.49 hr). It will adsorb very strongly to the soil. Although it is not expected to appreciably leach to the groundwater, groundwater samples indicate that it can be transported there. It is not expected to significantly evaporate or hydrolyze from soils and surfaces. However, it may be subject to appreciable biodegradation in soils. It will adsorb very strongly to the soil. Although it is not expected to appreciably leach to the groundwater, groundwater samples indicate that it can be transported there. It is not expected to significantly evaporate or hydrolyze from soils and surfaces. However, it may be subject to appreciable biodegradation in soils.
Ecotoxicity: Oysters, BCF (bioconcentration factor): 3000; rainbow trout, BCF: 920; *Daphnia pulex*, BCF: 13,000.
BCF: Some marine organisms such as phytoplankton, certain zooplankton, scallops (*Placopecten sp*), snails (*Litternia littorea*), and mussels (*Mytilus edulis*) lack a metabolic detoxification enzyme system to metabolize benzo(a)pyrene and therefore, tend to accumulate benzo(a)pyrene. Humic acid in solution may decrease bioconcentration.
Octanol/Water Partition Coefficient: log K_{ow} = 6.04

Section 13 - Disposal Considerations

Disposal: Small quantities: 10 mL of a solution containing 0.3 mol/L of potassium permanganate and 3 mol/L of sulfuric acid will degrade 5 mg of benzo(a)pyrene. Also, can treat with sodium dichromate in strong sulfuric acid (1-2 days). Benzo(a)pyrene is also a good candidate for fluidized bed incineration at a temperature range of 842 to 1796 °F (450 to 980 °C) or rotary kiln incineration at 820 to 1600°C. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Environmentally hazardous substances, solid, n.o.s.
ID: UN3077
Hazard Class: 9 - Miscellaneous hazardous material
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 9 - Class 9
Special Provisions: 8, 146, B54, IB8, N20
Packaging: **Exceptions:** 155 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** No limit **Cargo aircraft only:** No limit
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U022 Toxic Waste
CERCLA 40 CFR 302.4: Listed per RCRA Section 3001, per CWA Section 307(a) 1 lb (0.454 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Benzo(g,h,i)perylene
BEN5400

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Benzo(g,h,i)perylene **CAS Number:** 191-24-2
Chemical Formula: $C_{22}H_{12}$
EINECS Number: 205-883-8
ACX Number: X1007822-5
Synonyms: BENZO (G,H,I) PERYLENE; BENZO(GHI)PERYLENE; BENZO[GHI]PERYLENE; 1,12-BENZOPERYLENE; BENZO(G,H,I)PERYLENE; 1,12-BENZPERYLENE
Derivation: Combustion product of wood, coal, oil, propane, and diesel fuels.
General Use: Used for scientific research. There is no commercial production of this compound.

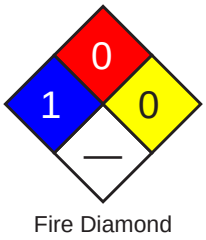
Section 2 - Composition / Information on Ingredients

Name	CAS	%
Benzo(g,h,i)perylene	191-24-2	

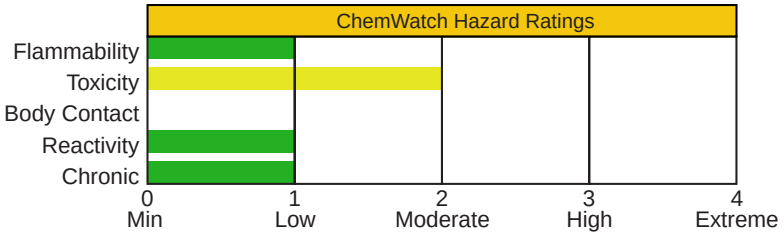
OSHA PEL **NIOSH REL**

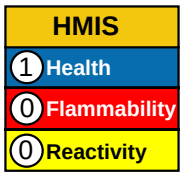
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Yellowish-green leaflets or plates. Acute toxicity is probably low in humans but it may produce chronic effects. Questionable carcinogen. Mutation data reported.

Potential Health Effects

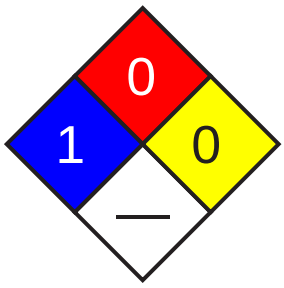
Target Organs: Skin, eyes
Primary Entry Routes: Inhalation, skin/eye contact, skin absorption, ingestion
Acute Effects
Inhalation: The toxicological properties of benzo(g,h,i)perylene have not been thoroughly investigated. In general, polynuclear aromatic hydrocarbons (PAHs) have a low order of acute toxicity in humans, but can produce a variety of non-cancer effects with chronic exposure.
Eye: Effects unknown.
Skin: May be absorbed through skin.
Ingestion: Effects unknown.
Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.
Medical Conditions Aggravated by Long-Term Exposure: None reported.
Chronic Effects: Polynuclear aromatic hydrocarbons (PAH's) may produce chronic effects such as eye photosensitivity and irritation; respiratory irritation with cough and bronchitis; leukoplakia; skin irritation, "coal tar warts" (precancerous lesions enhanced by UV light exposure), redness, dermal burns, photosensitivity, and acneiform lesions; mild kidney and liver toxicity (animals). Some, but not all, PAHs are carcinogens.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.
Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 minutes. Consult a physician or ophthalmologist if pain or irritation persist.
Skin Contact: Quickly remove contaminated clothing. Rinse with flooding amounts of water. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water. *Do not* induce vomiting.
After first aid, get appropriate in-plant, paramedic, or community medical support.

Section 5 - Fire-Fighting Measures

Flash Point: Data not found.
Autoignition Temperature: Data not found.
Extinguishing Media: Extinguish with water spray, carbon dioxide, dry chemical powder or appropriate foam.
General Fire Hazards/Hazardous Combustion Products: Toxic fumes of carbon monoxide and carbon dioxide.
Fire-Fighting Instructions: *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources. Isolate and ventilate area, deny entry, stay upwind. Cleanup personnel should protect against exposure (Sec. 8).
Small Spills: If in solid form, *do not* sweep! Carefully scoop up or vacuum (with a HEPA filter). Avoid raising dust. Absorb liquid spill with an inert, noncombustible absorbent such as sand or vermiculite.
Large Spills: For large spills, dike far ahead of liquid spill for later disposal. *Do not* release into sewers or waterways.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Wear personal protective clothing and equipment to prevent dust inhalation and contact with skin or eyes (Sec. 8).
Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.
Recommended Storage Methods: Store in tightly closed containers in a cool, well-ventilated area away from heat, light, ignition sources, and incompatibles.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Where feasible, enclose operations to avoid dust dispersion into the work area. Provide general or local exhaust ventilation systems to maintain airborne concentrations as low as possible. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.
Administrative Controls: Educate workers about the health and safety hazards associated with this material. Train in work practices which minimize exposure. Consider preplacement and periodic medical exams with emphasis on liver and kidney functions, complete blood count, chest X-ray, pulmonary function tests, and skin and oral cavity examinations.
Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not protective eye devices. Appropriate eye protection must be worn instead of, or in conjunction with, contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, cartridge change schedules, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Yellowish-green; fluorescent
Physical State: Solid; leaflets or plates
Vapor Pressure (kPa): 1 x 10^{-10} mm Hg at 77 °F (25 °C)
Formula Weight: 276.34
Boiling Point: 1022 °F (550 °C)
Freezing/Melting Point: 530.6 °F (277 °C)
Ionization Potential (eV): 7.15 eV

Water Solubility: Insoluble; 2.5 - 2.7 x 10^{-4} mg/L at 77 °F (25 °C)
Other Solubilities: Soluble in 1,4-dioxane, dichloromethane, benzene, and acetone

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Benzo(g,h,i)perylene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Avoid contact with chemical incompatibles, heat, and sources of ignition.
Storage Incompatibilities: Include strong oxidizing agents. Reacts with NO and NO_2 to form nitro derivatives.
Hazardous Decomposition Products: Thermal oxidative decomposition of benzo(g,h,i)perylene can produce toxic fumes of carbon dioxide and carbon monoxide.

Section 11 - Toxicological Information

Other Effects:
Genetic Effects: *S Typhimurium*, 2 µg/plate/48 hours (-S9) induced mutation.
Mouse, skin, 40 µmol/kg induced DNA damage.
Human, lymphocyte cell, 80 µg/L induced mutations in mammalian somatic cells.

See *RTECS* DI6200500, for additional data.

Section 12 - Ecological Information

Environmental Fate: Benzo(g,h,i)perylene biodegrades slowly in the environment, with a half-life range in aerobic soil from 600 to 650 days. It is not expected to hydrolyze. In aquatic systems it partitions from the water column to organic matter contained in sediments and suspended solids. It also has the potential to bioconcentrate in aquatic systems. Volatilization from shallow, fast-moving waters may be important. In the atmosphere, the vapor phase reaction with photochemically-produced hydroxyl radicals with a half-life of 2 hours may be an important fate process. However, benzo(g,h,i)perylene is expected to exist almost entirely in the particulate phase in ambient air, though it may undergo direct photolysis in the atmosphere. Benzo(g,h,i)perylene is expected to be highly immobile in soil. Log K_{ow}: 6.58 - 6.63
Ecotoxicity: Data not found.
Henry's Law Constant: 2.66 x 10^{-7} atm-m^3/mol
BCF: 64,000, estimated
Soil Sorption Partition Coefficient: K_{OC} = > 1 x 10^6

Section 13 - Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable federal, state, and local regulations. Handle empty containers carefully as hazardous residues may still remain. Triple rinse containers and dispose of wash wastewater appropriately.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Not specifically listed.

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 5000 lb (2268 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Not listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Benzo[k]fluoranthene **CAS Number:** 207-08-9
Chemical Formula: $C_{20}H_{12}$
EINECS Number: 205-916-6
ACX Number: X1004488-1
Synonyms: B; B (K) F; B K F; 8,9-BENZFLUORANTHENE; BENZO(K) FLUORANTHENE; 11,12-BENZO(K)FLUORANTHENE; 11,12-BENZOFLUORANTHENE; 8,9-BENZOFLUORANTHENE; BENZO(K)FLUORANTHENE; BENZO[K]FLUORANTHENE; 11,12-BENZOFLURANTHENE; 2,3,1',8'-BINAPHTHYLENE; 2,3,1',8'-BINAPTHYLENE; BKF; DIBENZO(B,JK)FLUORENE
General Use: there is no commerical use of this compound

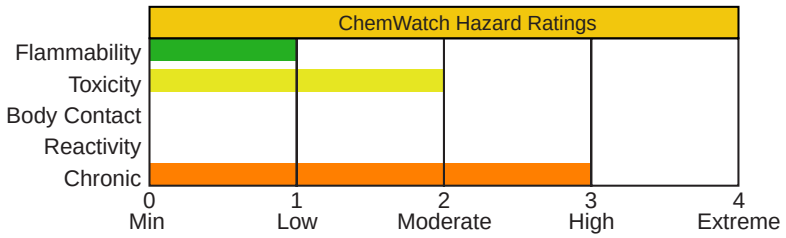
Section 2 - Composition / Information on Ingredients

Name	CAS	%
benzo[k]fluoranthene	207-08-9	>98

OSHA PEL **NIOSH REL**

ACGIH TLV

Section 3 - Hazards Identification



ANSI Signal Word

Warning!

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Pale yellow needles. Irritating to eyes/skin/respiratory tract. Toxic. Probable human carcinogen. Will burn.

Potential Health Effects

Target Organs: eyes, skin, respiratory system
Primary Entry Routes: skin contact/absorption, inhalation of generated dust
Acute Effects

Inhalation: The dust may be discomforting to the upper respiratory tract. Persons with impaired respiratory function, airway diseases, or conditions such as emphysema or chronic bronchitis may incur further disability if excessive concentrations of particulate are inhaled.

Eye: The material is moderately discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/ or other transient eye damage/ ulceration.

Skin: The material may be mildly discomforting to the skin. Open cuts and abraded or irritated skin should not be exposed to this material. The material may accentuate any pre-existing skin condition.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments. The material is moderately discomforting and harmful if swallowed in large quantity.

Carcinogenicity: NTP - Listed; IARC - Group 2B, Possibly carcinogenic to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class B2, Probable human carcinogen based on animal studies; MAK - Not listed.

Chronic Effects: When injected into pulmonary tissue of female rats benzo[k]fluoranthene induced squamous cell carcinomas. Topical administration initiated skin tumors in female mice whilst subcutaneous injection induced local sarcomas in mice of both sexes. Although there is no adequate data available to evaluate carcinogenicity of PAHs in

humans, there are a number of epidemiologic and mortality studies to show increased incidences of cancer in humans exposed to mixtures of PAHs. Lung and genitourinary cancer mortality amongst coke oven workers and skin tumors in workers exposed to creosote are examples.

Section 4 - First Aid Measures

Inhalation: • If dust is inhaled, remove to fresh air.
• Encourage patient to blow nose to ensure clear breathing passages.
• Rinse mouth with water. Consider drinking water to remove dust from throat.
• Seek medical attention if irritation or discomfort persist.
Eye Contact: • Immediately hold the eyes open and flush with fresh running water.
• Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
• Seek medical attention if pain persists or recurs.
• Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact: • Immediately remove all contaminated clothing, including footwear (after rinsing with water).
• Wash affected areas thoroughly with water (and soap if available).
• Seek medical attention in event of irritation.
Ingestion: Contact a Poison Control Center. If more than 15 minutes from a hospital:
• INDUCE vomiting with IPECAC SYRUP, or fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. NOTE: Wear a protective glove when inducing vomiting by mechanical means.
• SEEK MEDICAL ATTENTION WITHOUT DELAY.
• In the meantime, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
• If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided.
• If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: Treat symptomatically.

Section 5 - Fire-Fighting Measures

Flash Point: Not available; probably combustible
Extinguishing Media: Foam. Dry chemical powder. BCF (where regulations permit). Carbon dioxide. Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: • Solid which exhibits difficult combustion or is difficult to ignite.
• Avoid generating dust, particularly clouds of dust in a confined or unventilated space, as dust may form an explosive mixture with air and any source of ignition, e.g., flame or spark, will cause fire or explosion.
• Dry dust can also be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
• Build-up of electrostatic charge may be prevented by bonding and grounding.
• Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting. Combustion products include carbon dioxide (CO_2).
Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.
Fire-Fighting Instructions: • Use water delivered as a fine spray to control fire and cool adjacent area.
• Do not approach containers suspected to be hot.
• Cool fire-exposed containers with water spray from a protected location.
• If safe to do so, remove containers from path of fire.
• Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: • Clean up all spills immediately.
• Avoid contact with skin and eyes.
• Wear impervious gloves and safety glasses.
• Use dry clean up procedures and avoid generating dust.
• Vacuum up or sweep up.
• Place spilled material in clean, dry, sealable, labeled container.
Large Spills: • Clear area of personnel and move upwind.
• Contact fire department and tell them location and nature of hazard.
• Wear breathing apparatus plus protective gloves.
• Prevent, by any means available, spillage from entering drains or waterways.

- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers for recycling.
- Neutralize/decontaminate residue.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.
- If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: • Avoid all personal contact, including inhalation.
• Wear protective clothing when risk of exposure occurs.
• Use in a well-ventilated area.
• Prevent concentration in hollows and sumps.
• DO NOT enter confined spaces until atmosphere has been checked.
• Avoid smoking, bare lights or ignition sources.
• Avoid contact with incompatible materials.
• When handling, DO NOT eat, drink or smoke.
• Keep containers securely sealed when not in use.
• Avoid physical damage to containers.
• Always wash hands with soap and water after handling.
• Work clothes should be laundered separately.
• Follow good occupational work practices.
• Observe manufacturer's storage and handling recommendations.
• Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Metal can. Metal drum. Check that all containers are clearly labeled and free from leaks.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear NIOSH-approved respirator. Provide adequate ventilation in warehouse or closed storage areas.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses, safety glasses with side shields, or chemical goggles. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Wear general protective gloves, e.g. light weight rubber gloves.

Other: Overalls; impervious protective clothing. Eyewash unit.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Yellow powder.
Physical State: pale yellow needles
Vapor Pressure (kPa): 0.0000000000959 mm Hg at 25 °C
Vapor Density (Air=1): > 1
Formula Weight: 252.32

Boiling Point: 480 °C (896 °F) at 760 mm Hg
Freezing/Melting Point: 217 °C (422.6 °F)
Water Solubility: Insoluble in Water

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid storage with oxidizers.

Section 11 - Toxicological Information

Tumors at site of application.
NOTE: Substance has been shown to be mutagenic in various assays, or belongs to a family of chemicals producing damage or change to cellular DNA.

See *RTECS* DF6350000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Its presence in distant places indicates that it is reasonably stable in the atmosphere and capable of long distant transport. Atmospheric losses are caused by gravitational settling and rainout. On land it is strongly adsorbed to soil and remains in the upper soil layers and should not leach into groundwater. Biodegradation may occur but will be very slow (half-life ca 2 years with acclimated microorganisms). It will get into surface water from dust and precipitation in addition to runoff and effluents. In the water it will sorb to sediment and particulate matter in the water column. It would be expected to bioconcentrate in fish and seafood.
Ecotoxicity: No data found.
Henry's Law Constant: estimated at 4.2×10^{8}
BCF: fish 4.97
Octanol/Water Partition Coefficient: log K_{ow} = 6.84
Soil Sorption Partition Coefficient: K_{oc} = nearly 1×10^{6}

Section 13 - Disposal Considerations

Disposal: • Consult manufacturer for recycling options and recycle where possible.
• Follow applicable local, state, and federal regulations.
• Incinerate residue at an approved site.
• Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: I - Great Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB7
Packaging: **Exceptions:** None **Non-bulk:** 211 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 kg **Cargo aircraft only:** 50 kg
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: II - Medium Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP2, IP4
Packaging: **Exceptions:** None **Non-bulk:** 212 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 25 kg **Cargo aircraft only:** 100 kg
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP3
Packaging: **Exceptions:** 153 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** 100 kg **Cargo aircraft only:** 200 kg
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Listed

CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 5000 lb (2268 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Not listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111
Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Chrysene **CAS Number:** 218-01-9
Chemical Formula: $C_{18}H_{12}$
EINECS Number: 205-923-4
ACX Number: X1001743-5
Synonyms: BENZO (A) PHENANTHRENE; BENZO[A|PHENANTHRENE; 1,2-BENZOPHENANTHRENE; BENZO(A)PHENANTHRENE; 1,2-BENZPHENANTHRENE; BENZ(A)PHENANTHRENE; CHRYSENE; COAL TAR PITCH VOLATILES: CHRYSENE; 1,2,5,6-DIBENZONAPHTHALENE
Derivation: Distilled from coal tar, coal tar pitch. A small amount is produced from the distillation or pyrolysis of many fats and oils. By heating hydrogen and acetylene. Chrysene is not produced commercially in the U.S. (except as a laboratory research chemical).
General Use: Used in organic synthesis; as a research chemical. Occurs in cigarette smoke.

Section 2 - Composition / Information on Ingredients

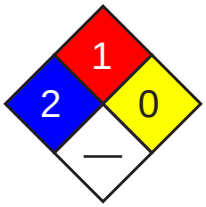
Name	CAS	%
No data found.		

OSHA PEL
TWA: 0.2 mg/m^3.

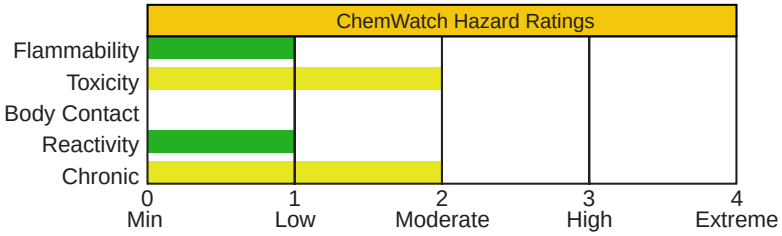
NIOSH REL

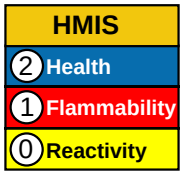
ACGIH TLV
Exposure by all routes should be carefully controlled to levels as low as possible.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless to white crystals with reddish-blue fluorescence. May be irritating to eyes/skin/respiratory tract. Also causes: may be absorbed through skin. May be cancer-causing in humans. Combustible.

Potential Health Effects

Target Organs: Eyes, skin, respiratory system
Primary Entry Routes: Skin absorption
Acute Effects *There is no human evidence available for the acute health effects of chrysene alone. There is, however, considerable data indicating that it is carcinogenic in humans. Based on the chemical properties of chrysene, as a polynuclear aromatic hydrocarbon, the following acute effects may occur.*
Inhalation: May cause irritation.
Eye: . May cause irritation.
Skin: May cause irritation or be absorbed.
Ingestion: None reported.
Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Listed as carcinogen; ACGIH - Class A3, Animal carcinogen; EPA - Class B2, Probable human carcinogen based on animal studies; MAK - Class A2, Unmistakably carcinogenic in animal experimentation only.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Chronic Effects: Animal data indicate that chronic exposure to chrysene and other coal tar pitch volatiles probably causes cancer. May also cause respiratory, skin, or eye irritation; cough, bronchitis, photosensitivity, "coal tar warts" (precancerous lesions enhanced by UV light exposure), erythema (skin inflammation), dermal burns, acneiform lesions, hematuria (blood in urine). May alter genetic material. Exposure to PAH's is believed to cause leukoplakia (precancerous patches on the tongue), lip and oral cavity cancers, and bladder cancer.

Section 4 - First Aid Measures

See DOT ERG

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult a physician or ophthalmologist if pain, irritation, swelling, or photophobia persist.

Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For high exposures, medical surveillance (skin, mouth, GI tract, respiratory system) may be necessary.

Section 5 - Fire-Fighting Measures

See DOT ERG

Flash Point: Combustible solid

Autoignition Temperature: None reported.

LEL: None reported.

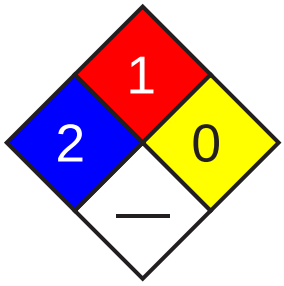
UEL: None reported.

Flammability Classification: Combustible solid

Extinguishing Media: Use water spray, carbon dioxide, dry chemical powder or appropriate foam.

General Fire Hazards/Hazardous Combustion Products: Acrid smoke and fumes, including carbon monoxide and carbon dioxide.

Fire-Fighting Instructions: *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.



Fire Diamond

Section 6 - Accidental Release Measures

See DOT ERG

Spill/Leak Procedures: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources. Isolate and ventilate area, deny entry, stay upwind. Tag container as defective and return to supplier. Use spark-proof tools and explosion-proof equipment.

Small Spills: *Do not* sweep! Carefully scoop up or vacuum (with a HEPA filter). Absorb liquid spill with an inert, noncombustible absorbent such as sand or vermiculite.

Large Spills: Large spills of chrysene are unlikely. *Do not* release into sewers or waterways.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid dust inhalation and skin and eye contact. Use only with adequate ventilation to maintain concentrations at nonhazardous levels (see Sec. 2). Wear personal protective clothing and equipment to prevent contact with skin and eyes (see Sec. 8). Practice good personal hygiene procedures to prevent inadvertently ingesting this material.

Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed containers in a cool, well-ventilated area away from heat, ignition sources, and incompatibles.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Where feasible, enclose operations to avoid dust dispersion into the work area. Ventilate at the site of chemical release. To prevent static sparks, electrically ground and bond all containers and equipment. Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PEL (see Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Educate workers about the health and safety hazards associated with this material. Train in work practices which minimize exposure. Consider preplacement and periodic medical exams with emphasis on the skin and lungs.

Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Air purifying respirators may be adequate for handling small amounts of chrysene in a laboratory setting. For unlimited exposure ranges, wear a pressure-demand, full-face SCBA. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder clothing separately before reuse. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless to white rhombic plates with reddish-blue fluorescence.

Physical State: Solid

Vapor Pressure (kPa): 6.3 x10^{-7} mm Hg; 6.3 x10^{-9} mm Hg at 68 °F (20 °C)

Formula Weight: 228.28

Specific Gravity (H_2O=1, at 4 °C): 1.274 at 20 °C/4 °C

Refractive Index: 2610

Boiling Point: 838 °F (448 °C); sublimes easily in a vacuum

Freezing/Melting Point: 489 °F (254 °C) to 496 °F (258 °C)

Ionization Potential (eV): 7.59 +/- 0.2 eV

Water Solubility: Insoluble (0.0018 mg/kg)

Other Solubilities: Slightly soluble in 95% ethanol, acetone, carbon disulfide, ether, glacial acetic acid. Soluble in hot benzene, toluene.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Chrysene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Avoid contact with chemical incompatibles, heat and ignition sources.

Storage Incompatibilities: Include strong oxidizers.

Hazardous Decomposition Products: Thermal oxidative decomposition of chrysene can produce acrid smoke and fumes, including carbon monoxide and carbon dioxide.

Section 11 - Toxicological Information

Acute Skin Effects:

Mouse, skin: 192 µmol/kg produced DNA adducts.

Mouse, skin, TD_{Lo}: 3600 µg/kg.

Other Effects:

Tumorgenicity, mouse, skin: 23 mg/kg; toxic effects: tumorigenic - neoplastic by RTECS criteria; skin and appendages - tumors.

Human, lymphocyte: 6 µmol/L produced mutation.

Mouse, intraperitoneal, LD_{50}: >320 mg/kg.

Tumorigenic Effects: Mouse, skin, 3600 mg/kg for 30 weeks, intermittent; toxic effects: tumorigenic - equivocal tumorigenic agent by RTECS criteria; skin and appendages - tumors.

Hamster, intraperitoneal: 900 mg/24 hr induced sister chromatid exchange.

Bacteria, *S typhimurium*: 5 mg/plate (-S9) produced mutation.

See *RTECS* GC0700000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to water, it will adsorb very strongly to sediments and particulate matter, but will not hydrolyze or appreciably evaporate. It will bioconcentrate in species which lack microsomal oxidase. Calculated BCF: 4,230. K_{ow} indicates bioaccumulation, which could cause food-chain contamination. It will not hydrolyze or appreciably evaporate from soils or surfaces. The estimated biodegradation half-life in soil is 7 years. The estimated half-life of any gas phase in the atmosphere is 1.25 hours as a result of reaction with photochemically produced hydroxyl radicals. It will be subject to near-surface, direct photolysis with a half-life of 4.4 hours computed for exposure to sunlight at mid-day in midsummer at latitude 40°N. If released to air, it will be subject to direct photolysis, although adsorption to particulates may affect the rate of this process. If released to soil it will be expected to adsorb very strongly to the soil and will not be expected to leach appreciably to groundwater.

Ecotoxicity: *Anabaena flos-aquae* (algae), 2 weeks, EC_{35} growth: +/- 0.002 mg/L. *Daphnia magna* (crustaceans), 2 hr, LC_{50}: 1.9 mg/L. *Rana pipiens* (amphibians), 24 hr, LC_{50}: >6.7 mg/L. *Neanthes arenaceodentata* (fishes), 96 hr, LC_{50}: >1 mg/L.

Henry's Law Constant: 9.4×10^{-8}

Octanol/Water Partition Coefficient: log K_{ow} = 5.61 to 5.91

Section 13 - Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations. One method is to dissolve or mix the material with a combustible solvent and burn in an incinerator equipped with an afterburner and scrubber. Handle empty containers carefully as hazardous residues may still remain. Triple rinse containers and dispose of wash wastewater appropriately.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Environmentally hazardous substances, solid, n.o.s.
ID: UN3077
Hazard Class: 9 - Miscellaneous hazardous material
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 9 - Class 9
Special Provisions: 8, 146, B54, IB8, N20
Packaging: **Exceptions:** 155 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** No limit **Cargo aircraft only:** No limit
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U050 Toxic Waste
CERCLA 40 CFR 302.4: Listed per RCRA Section 3001, per CWA Section 307(a) 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111
Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Fluoranthene **CAS Number:** 206-44-0
Chemical Formula: $C_{16}H_{10}$
EINECS Number: 205-912-4
ACX Number: X1001738-4
Synonyms: 1,2-BENZACENAPHTHENE; BENZENE,1,2-(1,8-NAPHTHALENEDIYL)-; BENZENE,1,2-(1,8-NAPHTHYLENE)-; BENZO (J,K) FLUORENE; BENZO(J,K)FLUORENE; BENZO(JK)FLUORENE; FLUORANTHENE; IDRYL; 1,2-(1,8-NAPHTHALENE)BENZENE; 1,2-(1,8-NAPHTHALENEDIYL)BENZENE; 1,2-(1,8-NAPHTHYLENE)BENZENE
Derivation: Fluoranthene is derived from coal tar and from the pyrolytic processing of organic raw materials such as coal or petroleum at high temperatures.
General Use: Fluoranthene is a constituent of coal tar and petroleum derived asphalt used as a lining material to protect the interior of steel and ductile-iron potable water pipes and storage tanks; used as a research chemical and medication.

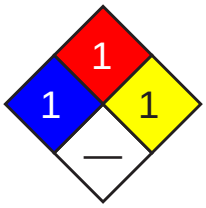
Section 2 - Composition / Information on Ingredients

Name	CAS	%
Fluoranthene	206-44-0	ca 98% wt

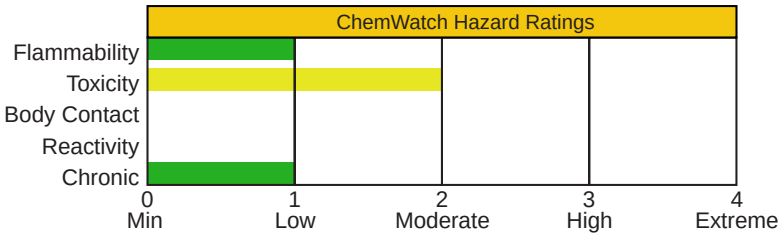
OSHA PEL **NIOSH REL**

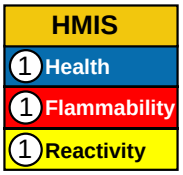
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless to pale yellow solid. Irritating to eyes/skin/respiratory tract. Chronic: mutagenic and tumorigenic effects, possible kidney/bladder cancer. Combustible.

Potential Health Effects

Target Organs: Eyes, skin, and respiratory system
Primary Entry Routes: Inhalation, skin/eye contact, ingestion
Acute Effects Note: In general, polynuclear aromatic hydrocarbons (PAH's) have a low order of acute toxicity in humans. The following effects from exposure are based on analogy to phenol and coal tar.
Inhalation: Causes irritation of the mucous membranes and upper respiratory tract.
Eye: Contact causes eye irritation and burning.
Skin: Contact causes skin irritation and burning.
Ingestion: Causes nausea, tachycardia, cardiac arrhythmias, pulmonary edema, and respiratory arrest.
Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.
Medical Conditions Aggravated by Long-Term Exposure: Persons with existing skin disorders may be more susceptible to the effects of coal tar pitches.

Chronic Effects: Cough and bronchitis, photosensitivity of the eyes and skin, coal tar warts, erythema, and acneiform lesions, leukoplakia, mild hepatotoxicity, and hematuria. Laboratory experiments have shown mutagenic and tumorigenic effects. Some PAH's have been associated with kidney, skin, bladder, lung, and gastrointestinal cancers. PAH's may cross the placenta and are excreted in breast milk in animals.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult a physician or ophthalmologist if pain, irritation, swelling, lacrimation, or photophobia persist.

Skin Contact: Quickly remove contaminated clothing. Rinse with flooding amounts of water. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water. *Do not* induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Monitor arterial blood gases, pulmonary function, and chest x-ray for patients with significant exposure. If cough or difficulty breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. If bronchospasm and wheezing occur, consider treatment with inhaled sympathomimetic agents. Inhalation exposure to PAH's may be complicated by exposure to other substances which produce acute respiratory and systemic effects. Treat according to clinical presentation and exposure history. Treat dermal irritation or burns with standard topical therapy. Patients developing dermal hypersensitivity may require treatment with systemic or topical corticosteroids or antihistamines.

Section 5 - Fire-Fighting Measures

Flash Point: Data not found.

Autoignition Temperature: Data not found.

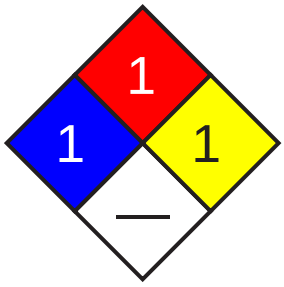
LEL: Data not found.

UEL: Data not found.

Extinguishing Media: Extinguish with water spray, carbon dioxide, dry chemical powder or appropriate foam.

General Fire Hazards/Hazardous Combustion Products: Emits toxic fumes of carbon monoxide and carbon dioxide.

Fire-Fighting Instructions: *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources. Isolate and ventilate area, deny entry, stay upwind. Cleanup personnel should protect against exposure (Sec. 8).

Small Spills: If in solid form, *do not* sweep! Spills of hot coal tar may be covered with sand. Carefully scoop up or vacuum (with a HEPA filter).

Large Spills: For large spills, dike far ahead of spill for later disposal. *Do not* release into sewers or waterways.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Wear personal protective clothing and equipment to prevent vapor inhalation and contact with skin or eyes (Sec. 8). To prevent skin absorption of coal tar products, *do not* use solvents to clean hands. Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed containers in a cool, well-ventilated area away from heat, light, ignition sources, and incompatibles. Control storage conditions to prevent overheating and pressure buildup in containers of coal tar products. Design and operate transfer and storage systems to prevent blockage by condensed coal tar products.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Where feasible, enclose operations to avoid vapor dispersion into the work area. Provide general or local exhaust ventilation systems to maintain airborne concentrations as low as possible. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Educate workers about the health and safety hazards associated with this material. Train in work practices which minimize exposure. Institute a complete respiratory protection program which includes regular training, maintenance, inspection, cleaning, and evaluation. Make available to employees exposed to coal tar pitch volatiles a complete history and physical examination with emphasis on the oral cavity, respiratory tract, bladder, and kidneys. Examine the skin for evidence of chronic disorders, for premalignant and malignant lesions, and evidence of hyperpigmentation or photosensitivity. Obtain a urinalysis including specific gravity, albumin, glucose, and a microscopic examination of centrifuged sediment, as well as a test for red blood cells. Also perform a complete blood count to search for leukemia and aplastic anemia. Employees having 5 or more years of exposure or who are 45 years of age or older should have a urinary cytology exam. Employees having 10 or more years of exposure or who are 45 year of age or older should have a sputum cytology examination, a 14" x 17" chest roentgenogram, and periodic measure of FVC and FEV (1 sec).

Personal Protective Clothing/Equipment: Wear chemically protective gloves, aprons, and gauntlets to prevent any skin contact. Employees handling drums, cans, or other large containers of coal tar products shall wear impervious shoes or boots with safety toe caps. Protect leather safety shoes with impervious coverings such as rubbers. Wear cup type or rubber-framed chemical safety goggles with a full length, plastic face shield (20 cm min.), per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not protective eye devices. Appropriate eye protection must be worn instead of contact lenses. *Do not* wear contacts while working with fluoranthene.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For exposure to concentrations <= 2 mg/m^3, wear a chemical cartridge respirator with an organic vapor cartridge(s) and with a fume or high efficiency filter or any supplied-air respirator or any SCBA; for exposure to concentrations <= 10 mg/m^3, wear a chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s) and with a fume or high efficiency filter, or a gas mask with a chin style or a front- or back- mounted organic vapor canister and with a full facepiece and a fume or high efficiency filter, or any supplied-air respirator with a full facepiece, helmet, or hood or any SCBA with a full facepiece; for exposure to concentrations <= 200 mg/m^3, wear a type C supplied-air respirator operated in pressure-demand or other positive-pressure or continuous flow mode, or a powered air- purifying respirator with an organic vapor cartridge and a high efficiency particulate filter; for exposure to concentrations <= 400 mg/m^3 , wear a type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive-pressure mode, or with a full facepiece, helmet, or hood operated in continuous flow mode. For exposure to concentrations >= 400 mg/m^3 or for emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes and place in a closed container in the change room. Launder daily before reuse. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless to pale yellow
Physical State: Solid; needles or plates from alcohol
Vapor Pressure (kPa): 0.01 mm Hg at 68 °F (20 °C)
Formula Weight: 202.2
Density: 1.252 g/mL at 0°C/4°C
Specific Gravity (H_2O=1, at 4 °C): 1.252
Boiling Point: 707 °F (375 °C)
Freezing/Melting Point: 230 °F (110 °C)
Ionization Potential (eV): 7.95 +/- 0.3 eV
Water Solubility: Insoluble; 0.20 to 0.26 mg/L
Other Solubilities: Soluble in acetic acid, benzene, carbon disulfide, chloroform, and ether; at 72 °F (22 °C): 5-10 mg/mL 95% ethanol, >= 100 mg/mL acetone, and >= 100 mg/mL DMSO

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Fluoranthene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Avoid contact with chemical incompatibles, heat, and sources of ignition.

Storage Incompatibilities: Include strong oxidizing agents.

Hazardous Decomposition Products: Thermal oxidative decomposition of fluoranthene can produce toxic fumes of carbon monoxide and carbon dioxide.

Section 11 - Toxicological Information

Acute Oral Effects:
Rat, oral, LD_{50}: 2 g/kg.
Acute Skin Effects:
Rabbit, skin, LD_{50}: 3180 mg/kg.
Other Effects:
Multiple Dose Toxicity Effects: Rat, oral, 67500 mg/kg administered for 90 days intermittently produced toxic effects: kidney, ureter, and bladder - changes in tubules (including acute renal failure, acute tubular necrosis); blood - normocytic anemia, changes in leukocyte (WBC) count.
Genetic Effects: Bacteria, *S Typhimurium*, 5 µg/plate (-S9) induced mutations in microorganisms.
Human, lymphocyte, 2 µmol/L induced mutations in mammalian somatic cells.
Hamster, ovary, 9 mg/L induced sister chromatid exchange.
Rat, embryo, 50 mg/L induced morphological transformation.
Mouse, skin, 280 mg/kg administered for 58 weeks intermittently produced toxic effects: tumorigenic - equivocal tumorigenic agent by RTECS criteria; skin and appendages - tumors; tumorigenic - tumors at site of application.

See *RTECS* LL4025000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Fluoranthene degrades slowly in soil. When released to water, fluoranthene is expected to bioconcentrate into aquatic organisms. In the unadsorbed state it will degrade by photolysis. It appears to be stable in sediment for decades or more. Biodegradation in a few years in the presence of acclimated organisms is expected to occur. Fluoranthene released in the atmosphere will photodegrade in the free state. Fluoranthene will rapidly become adsorbed to sediment and particulate matter in the water column. Fluoranthene adsorbs strongly to soil. It is expected to remain in the upper layers of soil. However, it has been detected in groundwater samples, which demonstrates that it can be transported there by some other process. log K_{ow}: 4.90
Ecotoxicity: *Lepomis macrochirus*/ LC_{50}: 4.0 mg/L/96 hr
BCF: 2.58 (rainbow trout)
Soil Sorption Partition Coefficient: $K_{OC} = 6.6x10^4$

Section 13 - Disposal Considerations

Disposal: Fluoranthene is a good candidate for disposal by rotary kiln or fluidized bed forms of incineration. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable federal, state, and local regulations. Handle empty containers carefully as hazardous residues may still remain. Triple rinse containers and dispose of wash wastewater appropriately.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Not specifically listed.

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Listed U120 Toxic Waste
CERCLA 40 CFR 302.4: Listed per RCRA Section 3001, per CWA Section 307(a) 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111
Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Fluorene **CAS Number:** 86-73-7
Chemical Formula: $C_{13}H_{10}$
EINECS Number: 201-695-5
ACX Number: X1003048-3
Synonyms: 2,3-BENZINDENE; O-BIPHENYLENEMETHANE; O-BIPHENYLMETHANE; ALPHA-DIPHENYLENEMETHANE; DIPHENYLENEMETHANE; ALPHA-DIPHENYLENEMETHANE-9H-FLUORENE; 9H-FLUORENE; FLUORENE; METHANE,DIPHENYLENE-; 2,2'-METHYLENEBIPHENYL
Derivation: Fluorene is derived from coal tar; from acetylene and hydrogen in a red-hot tube; from charcoal by boiling and fuming with HNO_3; from 2,2'-dibromodiphenylmethane on boiling with hydrazine hydrate in the presence of palladium; or by reduction of diphenylene ketone with zinc.
General Use: Fluorene is used in the formation of polyradicals for resins, and in resinous products and dyestuffs. Derivatives of fluorene show activity as herbicides and growth regulators.

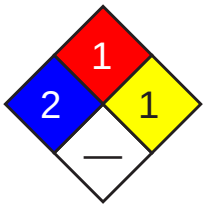
Section 2 - Composition / Information on Ingredients

Name	CAS	%
Fluorene	86-73-7	ca 98% wt

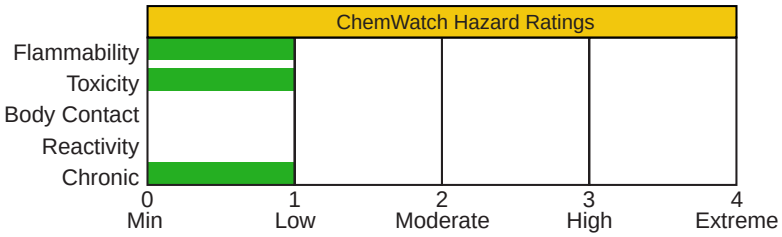
OSHA PEL **NIOSH REL**

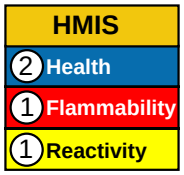
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

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Dazzling white leaflets or flakes, fluorescent when impure. Irritating to eyes/skin/respiratory tract. Chronic effects: mutation effects. Combustible.

Potential Health Effects

Target Organs: Skin, eyes, respiratory system
Primary Entry Routes: Inhalation and skin/eye contact
Acute Effects The toxicological properties of fluorene have not been thoroughly investigated. The following effects are for those of polycyclic aromatic hydrocarbons (PAHs) in general.
Inhalation: Causes irritation to the respiratory system.
Eye: Contact causes irritation.
Skin: Contact causes irritation.
Ingestion: Causes irritation.
Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.
Medical Conditions Aggravated by Long-Term Exposure: None reported.

Chronic Effects: Include photosensitivity and irritation of the eyes; irritation of the respiratory system with cough, bronchitis, and chance of bronchogenic cancer; leukoplakia and cancers of the lip and oral cavity; dermal burns, "coal tar warts" (precancerous lesions enhanced by UV light exposure), erythema, acneiform lesions, and irritation; mild hepatoxicity; hematuria; and an increased chance of cancer of the skin, kidney, bladder, lung and gastrointestinal tract. Fluorinated PAHs may cross the placenta.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. Administer 100% humidified supplemental oxygen with assisted ventilation as required. If bronchospasm and wheezing occur, consider treatment with inhaled sympathomimetic agents.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult a physician or ophthalmologist if pain, irritation, swelling, lacrimation or photophobia persist.

Skin Contact: Quickly remove contaminated clothing. Rinse with flooding amounts of water. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician. Treat dermal irritation or burns with a standard topical therapy. Patients developing dermal hypersensitivity reactions may require treatment with systemic or topical corticosteroids or antihistamines. Avoid direct exposure of affected skin to sunlight and UV sources.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water. *Do not* induce vomiting. Gastric lavage and routine use of cathartics are not recommended.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Chronic effects, particularly cancer, are more common than acute toxicity. Acute respiratory effects in persons are typically due to other toxic agents at the worksite. Carefully observe patients with inhalation exposure for the development of any systemic signs or symptoms and administer symptomatic treatment as necessary. Monitor arterial blood gases, pulmonary function, and chest x-ray for patients with significant exposure.

Section 5 - Fire-Fighting Measures

Flash Point: Data not found; combustible

Autoignition Temperature: Data not found.

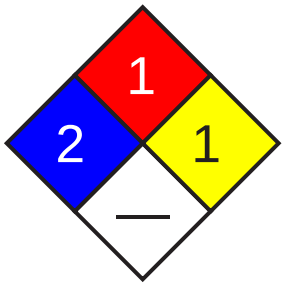
LEL: Data not found.

UEL: Data not found.

Extinguishing Media: Extinguish with water spray, carbon dioxide, dry chemical or appropriate foam.

General Fire Hazards/Hazardous Combustion Products: When heated to decomposition it emits acrid smoke and toxic fumes of carbon monoxide and carbon dioxide.

Fire-Fighting Instructions: *Do not* breathe the dust. *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Wear protective clothing including rubber boots and heavy rubber gloves to prevent contact with skin and eyes.



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources. Isolate and ventilate area, deny entry, stay upwind. Cleanup personnel should protect against exposure (Sec. 8).

Small Spills: If in solid form, *do not* sweep! Avoid raising dust. Carefully scoop up or vacuum (with a HEPA filter). Absorb liquid spill with an inert, noncombustible absorbent such as sand or vermiculite. Wash spill site after material pickup is complete.

Large Spills: For large spills, dike far ahead of liquid spill for later disposal. *Do not* release into sewers or waterways.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Wear personal protective clothing and equipment to prevent dust inhalation and contact of solid or liquid with skin or eyes (Sec. 8).

Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed containers in a cool, well-ventilated area away from heat, light, ignition sources, and incompatibles.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Where feasible, enclose operations to avoid dust dispersion into the work area. Provide local exhaust ventilation systems to maintain airborne concentrations as low as possible. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Educate workers about the health and safety hazards associated with this material. Train in work practices which minimize exposure. Consider preplacement and periodic medical exams including a complete blood count, hepatic and renal function test, dermal assessments, chest x-ray and pulmonary function tests.

Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not protective eye devices. Appropriate eye protection must be worn instead of, or in conjunction with, contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For 'normal' uses an air-purifying toxic dust* mask for particulates, and an organic vapor with toxic dust* pre-filters for vapors, dusts, and mists (* = purple or magenta color cartridge). Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: White. Fluorescent when impure.

Physical State: Solid; crystalline powder or small crystalline plates; leaflets or flakes from alcohol. Sublimes easily in high vacuum.

Vapor Pressure (kPa): 0.013 mm Hg at 68 °F (20 °C)

Formula Weight: 166.21

Density: 1.202 g/mL

Specific Gravity (H_2O=1, at 4 °C): 1.203 at 0 °C/4 °C

Boiling Point: 563 °F (295 °C) (decomposes)

Freezing/Melting Point: 237 to 241 °F (114 to 116 °C)

Ionization Potential (eV): 7.89 +/-0.2 eV

Water Solubility: Insoluble; 1.98 mg/kg

Other Solubilities: Freely soluble in glacial acetic acid; soluble in hot 95% ethanol, acetone, benzene, carbon disulfide, carbon tetrachloride, ether, pyridine, and toluene.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Fluorene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Avoid contact with chemical incompatibles, heat, and sources of ignition. Avoid heating to decomposition.

Storage Incompatibilities: Include strong oxidizing agents.

Hazardous Decomposition Products: Thermal oxidative decomposition of fluorene can produce acrid smoke and toxic fumes of carbon monoxide and carbon dioxide.

Section 11 - Toxicological Information

Other Effects:

Genetic Effects: Mouse, lymphocyte, 150 µmol/L induced DNA damage.
Mouse, lymphocyte, 19500 nmol/L (+S9) induced mutations in microorganisms.
Mouse, lymphocyte, 584 µmol/L induced mutations in mammalian somatic cells.
Hamster, lung, 25 mg/L induced cytogenetic analysis.
Mouse, mammary gland, 1 µg/L induced morphological transformation.
Mouse, intraperitoneal, LD_{50}: >2 g/kg.

See *RTECS* LL5670000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to the atmosphere, fluorene will exist primarily in the vapor phase where it will degrade readily by photochemically produced hydroxyl radicals (estimated half-life of 29 hr). If released to soil or water, fluorene will biodegrade readily (aerobically) in the presence of acclimated microbes; microbial adaptation is an important fate process. Biodegradation can be slow in pristine soils or waters (or under conditions of limited oxygen). Strong adsorption to soil and water sediment is an important transport process. Log K_{ow}: 4.18 to 4.38

Ecotoxicity: TL_m *Neanthes arenaceodentata* LC_{50}/1.0 ppm/96 hr at 72 °F (22 °C) in a static bioassay, seawater
Henry's Law Constant: 0.0001
BCF: 1288 (fathead minnow)
Soil Sorption Partition Coefficient: K_{oc} = log 3.70 to 4.21

Section 13 - Disposal Considerations

Disposal: Dissolve or mix fluorene with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. The particle-bound portion of polycyclic aromatic hydrocarbons (PAH) can be removed by sedimentation, flocculation, and filtration processes. The remaining dissolved polynuclear aromatic hydrocarbons usually require oxidation for partial removal/transformation. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable federal, state, and local regulations. Handle empty containers carefully as hazardous residues may still remain. Triple rinse containers and dispose of wash wastewater appropriately.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Not specifically listed.

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 5000 lb (2268 kg)
SARA 40 CFR 372.65: Not listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Indeno[1,2,3-cd]pyrene **CAS Number:** 193-39-5
Chemical Formula: $C_{22}H_{12}$
EINECS Number: 205-893-2
ACX Number: X1004975-9
Synonyms: IDENO(1,2,3-CD)PYRENE; INDENO(1,2,3-C,D) PYRENE; INDENO(1,2,3-CD)PYRENE; INDENO[1,2,3-CD]PYRENE; INDENO(1,2,3-C,D)PYRENE; INDENOPYRENE; IP; 1,10-(1,2-PHENYLENE)PYRENE; 1,10-(O-PHENYLENE)PYRENE; 1,10-(ORTHO-PHENYLENE)PYRENE; 2,3-O-PHENYLENEPYRENE; 2,3-ORTHO-PHENYLENEPYRENE; 2,3-PHENYLENEPYRENE; O-PHENYLENEPYRENE; ORTHO-PHENYLENEPYRENE
General Use: Laboratory standard used in cancer research. Found in automotive and diesel exhaust, cigarette smoke condensate, benzene and pyrene pyrolysis products, soot, coal tar and coal tar pitch and petroleum asphalt.

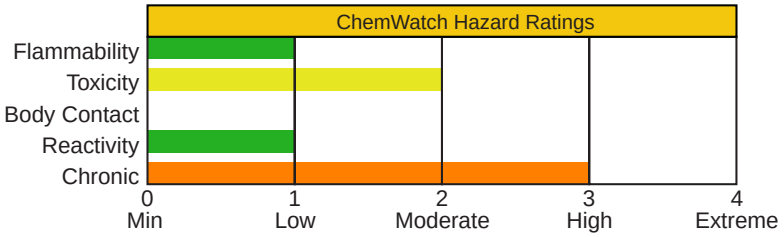
Section 2 - Composition / Information on Ingredients

Name	CAS	%
indeno[1,2,3-cd]pyrene	193-39-5	>98

OSHA PEL **NIOSH REL**

ACGIH TLV

Section 3 - Hazards Identification



☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Yellow plates or needles. May cause irritation to eyes/skin. Also causes: may be harmful by inhalation, ingestion, or skin absorption.

Potential Health Effects

Target Organs: No data found.
Primary Entry Routes: accidental skin and eye contact and inhalation of generated dusts
Acute Effects
Inhalation: The dust is harmful and discomforting to the upper respiratory tract.
Persons with impaired respiratory function, airway diseases, or conditions such as emphysema or chronic bronchitis may incur further disability if excessive concentrations of particulate are inhaled.
Eye: The dust may be discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to windburn), temporary impairment of vision and/ or other transient eye damage/ ulceration.
Skin: The material may be mildly discomforting to the skin. Open cuts and abraded or irritated skin should not be exposed to this material.
Toxic effects may result from skin absorption.
Ingestion: The solid/dust is discomforting to the gastrointestinal tract and harmful if swallowed.
Considered an unlikely route of entry in commercial/industrial environments.
Carcinogenicity: NTP - Listed; IARC - Group 2B, Possibly carcinogenic to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class B2, Probable human carcinogen based on animal studies; MAK - Not listed.

Chronic Effects: The so-called polycyclic aromatic hydrocarbons (PAHs) comprise a large family; some members occur in coal tar, tobacco smoke, petroleum and air pollution. Some substituted derivatives have been identified, in animal studies, as amongst the most highly active carcinogens.

Section 4 - First Aid Measures

Inhalation: • If dust is inhaled, remove to fresh air.
• Encourage patient to blow nose to ensure clear breathing passages.
• Rinse mouth with water. Consider drinking water to remove dust from throat.
• Seek medical attention if irritation or discomfort persist.
• If fumes or combustion products are inhaled, remove to fresh air.
• Lay patient down. Keep warm and rested.
• Other measures are usually unnecessary.

Eye Contact: If this product comes in contact with the eyes:
• Immediately hold the eyes open and flush with fresh running water.
• Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
• Seek medical attention if pain persists or recurs.
• Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: If product comes in contact with the skin:
• Immediately remove all contaminated clothing, including footwear (after rinsing with water).
• Wash affected areas thoroughly with water (and soap if available).
• Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center. If swallowed, and if more than 15 minutes from a hospital:
• Induce vomiting with Ipecac syrup, or fingers down the back of the throat, only if conscious. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. Note: Wear a protective glove when inducing vomiting by mechanical means.
• Seek medical attention without delay.
• In the meantime, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
• If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
• If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Treat symptomatically.

Section 5 - Fire-Fighting Measures

Extinguishing Media: Foam. Dry chemical powder. BCF (where regulations permit). Carbon dioxide. Water spray or fog - Large fires only.

General Fire Hazards/Hazardous Combustion Products: • Solid which exhibits difficult combustion or is difficult to ignite.
• Avoid generating dust, particularly clouds of dust in a confined or unventilated space, as dust may form an explosive mixture with air and any source of ignition, i.e., flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited
• Dry dust can also be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
• Build-up of electrostatic charge may be prevented by bonding and grounding.
• Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Fire Incompatibility: Avoid contamination with oxidizing agents i.e., nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Fire-Fighting Instructions: • Contact fire department and tell them location and nature of hazard.
• Wear breathing apparatus plus protective gloves for fire only.
• Prevent, by any means available, spillage from entering drains or waterways.
• Use fire fighting procedures suitable for surrounding fire.
• Do not approach containers suspected to be hot.
• Cool fire-exposed containers with water spray from a protected location.
• If safe to do so, remove containers from path of fire.
• Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: • Clean up all spills immediately.
• Avoid contact with skin and eyes.
• Wear protective clothing, gloves, safety glasses and dust respirator.
• Use dry clean up procedures and avoid generating dust.
• Vacuum up or sweep up.
• Place in clean drum then flush area with water.
Large Spills: • Clear area of personnel and move upwind.
• Contact fire department and tell them location and nature of hazard.
• Wear breathing apparatus plus protective gloves.
• Prevent, by any means available, spillage from entering drains or waterways.
• No smoking, bare lights or ignition sources.
• Increase ventilation.
• Stop leak if safe to do so.
• Water spray or fog may be used to disperse/absorb vapor.
• Contain or absorb spill with sand, earth or vermiculite.
• Collect recoverable product into labeled containers for recycling.
• Collect solid residues and seal in labeled drums for disposal.
• Wash area and prevent runoff into drains.
• After clean up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.
• If contamination of drains or waterways occurs, advise emergency services.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: • Avoid all personal contact, including inhalation.
• Wear protective clothing when risk of overexposure occurs.
• Use in a well-ventilated area.
• Prevent concentration in hollows and sumps.
• Do not enter confined spaces until atmosphere has been checked.
• Do not allow material to contact humans, exposed food or food utensils.
• Avoid smoking, bare lights or ignition sources.
• When handling, do not eat, drink or smoke.
• Avoid contact with incompatible materials.
• Keep containers securely sealed when not in used.
• Avoid physical damage to containers.
• Always wash hands with soap and water after handling.
• Work clothes should be laundered separately. Launder contaminated clothing before reuse.
• Observe manufacturer's storage/handling recommendations.
• Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Recommended Storage Methods: Glass container. Plastic container. Metal can. Metal drum. Packing as recommended by manufacturer. Check that all containers are clearly labeled and free from leaks.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Supplied-air type respirator may be required in special circumstances. An approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area.
Personal Protective Clothing/Equipment:
Eyes: Safety glasses with side shields. Chemical goggles. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.
Hands/Feet: Wear chemical protective gloves, e.g. PVC. Wear safety footwear.
Other: • Overalls.
• PVC Apron.
• PVC protective suit may be required if exposure severe.
• Eyewash unit.
• Ensure there is ready access to a safety shower.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Off-white powder.
Physical State: yellow plates or needles
Vapor Pressure (kPa): 1.0 $x10^{-1}$ mm Hg
Vapor Density (Air=1): not applicable
Formula Weight: 276.34
Evaporation Rate: not applicable
pH: not applicable
pH (1% Solution): not applicable
Boiling Point: 530 °C (986 °F)
Freezing/Melting Point: 162.5 °C (324.5 °F) to 164 °C (327.2 °F)
Volatile Component (% Vol): negligible
Water Solubility: 0.062 mg/L water

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid reaction with oxidizing agents.

Section 11 - Toxicological Information

Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.

See *RTECS* NK9300000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil it will sorb strongly (estimated K_{oc}= 20,146) and hence is not expected to leach. No information was found about volatilization from, hydrolysis in, or biodegradation in soil. Released to water it will sorb strongly to suspended particulate matter, biota and sediments. Although there is a high potential to bioconcentrate in most aquatic organisms, it may not in fish since fish contain microsomal oxidase, which allows polyaromatic hydrocarbons to be metabolized. No information was found about volatilization, photolysis, hydrolysis, or biodegradation in water. It will probably be persistent in the aquatic environment and concentrate in sediments. Almost all released to the atmosphere will be sorbed to particulate matter; thus its atmospheric fate will primarily depend on physical processes such as dry and wet deposition. However, a computer-estimated half-life in the vapor phase is about 20 hours due to reaction with photochemically produced hydroxyl radicals.
Ecotoxicity: No data found.
Henry's Law Constant: 5.89 $x10^{-10}$
BCF: estimated at 5.9407 $x10^{4}$
Octanol/Water Partition Coefficient: log K_{ow} = 6.584
Soil Sorption Partition Coefficient: K_{oc} = 2.0146 $x10^{4}$

Section 13 - Disposal Considerations

Disposal: • Recycle wherever possible or consult manufacturer for recycling options.
• Follow applicable local, state, and federal regulations.
• Bury residue in an authorized landfill.
• Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: I - Great Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB7
Packaging: **Exceptions:** None **Non-bulk:** 211 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 kg **Cargo aircraft only:** 50 kg
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: II - Medium Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP2, IP4
Packaging: **Exceptions:** None **Non-bulk:** 212 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 25 kg **Cargo aircraft only:** 100 kg
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP3
Packaging: **Exceptions:** 153 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** 100 kg **Cargo aircraft only:** 200 kg
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U137 Toxic Waste
CERCLA 40 CFR 302.4: Listed per RCRA Section 3001, per CWA Section 307(a) 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Naphthalene
NAP1620

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Naphthalene **CAS Number:** 91-20-3
Chemical Formula: $C_{10}H_8$
EINECS Number: 202-049-5
ACX Number: X1001294-7
Synonyms: ALBOCARBON; CAMPHOR TAR; DEZODORATOR; FAULDING NAPHTHALENE FLAKES; MIGHTY 150; MIGHTY RD1; MOTH BALLS; MOTH FLAKES; MOTHBALLS; NAFTALEN; NAPHTHALENE; NAPHTHALIN; NAPHTHALINE; NAPHTHENE; TAR CAMPHOR; WHITE TAR
Derivation: From coal tar; from petroleum fractions after various catalytic processing operations.
General Use: Used as a moth repellent, an antiseptic, toilet bowl deodorant, heat transfer agent, fungicide, smokeless powder, cutting fluid, lubricant, wood preservative; an intermediate for naphthol, phthalic anhydride, chlorinated naphthalenes, Tertralin, Decalin, naphthyl and naphthol derivatives, and dyes; in synthetic resins, synthetic tanning, textile chemicals, scintillation counters, and emulsion breakers.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
Naphthalene	91-20-3	ca 100% wt.

Grade - By melting point, 165 °F (74 °C) min (crude) to greater than 174 °F (79 °C) (refined); scintillation 176-177 °F (80-81 °C)

OSHA PEL
TWA: 10 ppm; 50 mg/m^3.

NIOSH REL
TWA: 10 ppm (50 mg/m^3); STEL: 15 ppm (75 mg/m^3).

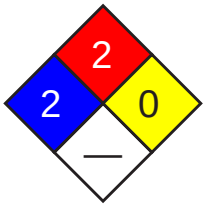
DFG (Germany) MAK
Skin.

ACGIH TLV
TWA: 10 ppm; STEL: 15 ppm; skin.

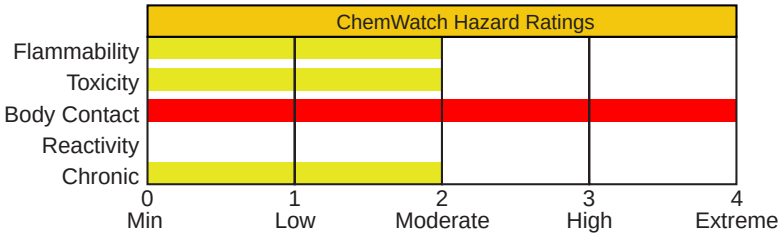
IDLH Level
250 ppm.

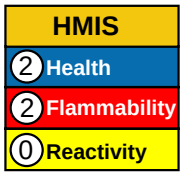
EU OEL
TWA: 10 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Warning!

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

White crystalline solid; "moth ball" or coal-tar odor. Irritating to eyes/skin/respiratory tract. Toxic by ingestion. Combustible solid. Dust may form explosive mixtures in air.

Potential Health Effects

Target Organs: Blood (red blood cell effects), eyes, skin, central nervous system (CNS), liver and kidneys
Primary Entry Routes: Inhalation, skin absorption, skin and/or eye contact
Acute Effects
Inhalation: Vapor inhalation causes headache, confusion, nausea, sometimes vomiting, loss of appetite, extensive sweating, dysuria (painful urination), hematuria (blood in the urine), and hemolysis (destruction of red blood cells).
Eye: Irritation, conjunctivitis, and corneal injury upon prolonged contact.
Skin: Irritation and hypersensitivity dermatitis.

Ingestion: Unlikely. However, ingestion causes irritation of the mouth and stomach, hemolytic anemia with hepatic and renal lesions and vesical congestion, kidney failure, hematuria, jaundice, depression of CNS, nausea, vomiting, abdominal pain, blue face, lips, or hands, rapid and difficult breathing, headache, confusion, excitement, malaise, fever, perspiration, urinary tract pain, dizziness, convulsions, coma, and death. Symptoms may appear 2 to 4 hours after exposure.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A4, Not classifiable as a human carcinogen; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Medical Conditions Aggravated by Long-Term Exposure: Diseases of the blood, liver and kidneys; individuals with a hereditary deficiency of the enzyme glucose-6-phosphate dehydrogenase in red blood cells are particularly susceptible to the hemolytic properties of naphthalene metabolites.

Chronic Effects: May cause optical neuritis, corneal injuries, cataracts, kidney damage. There are two reports of naphthalene crossing the placenta in humans.

Section 4 - First Aid Measures

See DOT ERG

Inhalation: Remove exposed person to fresh air and support breathing as needed. Contact a physician immediately if symptoms of systemic poisoning are present.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult a physician or ophthalmologist if pain, irritation, swelling, or photophobia persist.

Skin Contact: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area thoroughly with soap and water. For reddened or blistered skin, consult a physician. Contact a physician immediately if symptoms of systemic poisoning are present.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the conscious and alert person drink 1 to 2 glasses of water, then induce vomiting. Contact a physician immediately.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Obtain baseline CBC, electrolytes, liver and renal function rests, glucose-6-phosphatase dehydrogenase level, urinalysis, and benzidine dipstick to check for hemoglobinuria. Urinary metabolite, 1-naphthol or mercapturic acid, may help confirm the diagnosis.

Section 5 - Fire-Fighting Measures

See DOT ERG

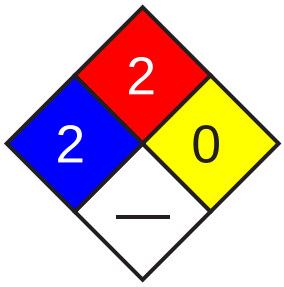
Flash Point: 174 °F (79 °C) OC; 190 °F (88 °C) CC

Autoignition Temperature: 979 °F (526 °C)

LEL: 0.9% v/v

UEL: 5.9% v/v

Flammability Classification: Combustible solid



Fire Diamond

Extinguishing Media: Use dry chemical, foam, carbon dioxide (CO_2), or water spray. Water or foam may cause frothing. Use water spray to keep fire-exposed containers cool.

General Fire Hazards/Hazardous Combustion Products: Toxic vapors including carbon monoxide. Volatile solid that gives off flammable vapors when heated. Dust may explode in air if an ignition source is provided.

Fire-Fighting Instructions: Move containers from the fire area if it can be done without risk. Otherwise cool fire-exposed containers until well after the fire is extinguished. Do not release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Wear full protective clothing. Structural clothing is permeable, remain clear of smoke, water fall out, and water run off.

Section 6 - Accidental Release Measures

See DOT ERG

Spill/Leak Procedures: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources. Isolate and ventilate area, deny entry, stay upwind. Stop leak if you can do it without risk. Use spark-proof tools and explosion proof equipment. Cleanup personnel should wear personal protective equipment to protect against exposure.

Small Spills: Do not sweep! Carefully scoop up or vacuum (with a HEPA filter). Absorb liquid spill with an inert, noncombustible absorbent such as sand or vermiculite.

Large Spills: For large spills, dike far ahead of liquid spill for later disposal. Do not release into sewers or waterways.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: To avoid vapor inhalation use only with ventilation sufficient to reduce airborne concentrations to nonhazardous levels. Avoid skin and eye contact. Wear personal protective clothing and equipment to prevent any contact with skin and eyes (see Sec. 8). Practice good personal hygiene procedures to prevent inadvertently ingesting this material.

Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed, explosion-proof containers in a cool, well-ventilated area away from heat, ignition sources, and incompatibles (see Sec. 10). May be stored under nitrogen gas. Protect containers against physical damage. Use monitoring equipment to measure the extent of vapor present in any storage facility containing naphthalene because of potential fire and explosion hazards.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Where feasible, enclose operations to avoid vapor and dust dispersion into the work area. Ventilate at the site of chemical release. During the fractional distillation of naphthalene and in any operation entailing the heating or volatilization of naphthalene, enclosed apparatus should be employed. Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Educate workers about the health and safety hazards associated with naphthalene. Train in work practices which minimize exposure. Consider preplacement and periodic medical exams with emphasis on the eyes, skin, liver, kidneys, CBC (RBC count, WBC count, differential count of a stained smear, hemoglobin, and hematocrit), and urinalysis including at a minimum specific gravity, albumin, glucose, and a microscopic examination on centrifuged sediment.

Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent skin contact. Teflon is recommended. *Do not* use butyl rubber, natural rubber, neoprene or polyvinyl chloride. Wear chemical dust-proof safety goggles and face shield, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove naphthalene from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: White volatile flakes, cakes, cubes, spheres, or powder; strong coal-tar or moth ball odor.

Physical State: Crystalline solid

Odor Threshold: < 0.3 ppm

Vapor Pressure (kPa): 0.05 mm Hg at 68 °F (20 °C); 1.0 mm Hg at 127 °F (53 °C)

Formula Weight: 128.2

Density: 1.145 g/cm^3 at 68 °F (20 °C)

Boiling Point: 424 °F (218 °C)

Freezing/Melting Point: 176 °F (80.2 °C)

Water Solubility: Insoluble [31.7 mg/L at 68 °F (20 °C)]

Other Solubilities: Benzene, absolute alcohol; very soluble in ether, chloroform, carbon disulfide, hydronaphthalenes, fixed and volatile oils

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Naphthalene is stable at room temperature in closed containers under normal storage and handling conditions. It volatilizes at room temperature. Hazardous polymerization cannot occur. Exposure to heat and ignition sources, incompatibles.

Storage Incompatibilities: Include aluminum chloride, benzoyl chloride, chromic acid, chromium trioxide, oxidizers. Explosive reaction with dinitrogen pentaoxide. Melted naphthalene will attack some forms of plastics.

Hazardous Decomposition Products: Thermal oxidative decomposition of naphthalene can produce toxic fumes including carbon monoxide.

Section 11 - Toxicological Information

Acute Oral Effects:
Rat, oral, LD_{50}: 490 mg/kg.
Mouse, oral, LD_{50}: 533 mg/kg.
Human (child), oral, LD_{Lo}: 100 mg/kg.

Acute Inhalation Effects:
Rat, inhalation, LC_{50}: >340 mg/m^3 produced lacrimation and somnolence.

Irritation Effects:
Rabbit, eye, standard Draize test: 100 mg produced mild irritation.
Rabbit, skin, open Draize test: 495 mg produced mild irritation.

Other Effects:
Rat, oral: 4500 mg/kg administered on gestational days 6-15 produced fetotoxicity and other developmental abnormalities.
Man, unreported, LD_{Lo}: 74 mg/kg.
Mouse, inhalation: 30 ppm/6 hr/2 yr administered intermittently produced toxic effects: tumorigenic - neoplastic by RTECS criteria; lungs, thorax, or respiration - tumors.
Hamster, ovary: 15 mg/L induced sister chromatid exchange.

See *RTECS* QJ0525000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to the atmosphere, naphthalene rapidly photodegrades with a half-life of 3-8 hr. Volatilization, photolysis, adsorption, and biodegradation are important loss mechanisms for naphthalene discharged into water. Depending on local conditions, the half-lives range from a couple of days to a few months. If released on land, it is adsorbed moderately to soil, undergoes biodegradation; but in some cases biodegradation may still occur if conditions are aerobic. Bioconcentration occurs to a moderate extent, but is a temporary problem since depuration and metabolism readily proceed in aquatic organisms.

Ecotoxicity: *Oncorhynchus gorbuscha* (pink salmon): 1.37 ppm/96 hr at 39 °F (4 °C). *Pimephales promelas* (fathead minnow): 7.76 mg/L/24 hr.

Octanol/Water Partition Coefficient: log K_{ow} = 3.30

Section 13 - Disposal Considerations

Disposal: Consider rotary kiln or fluidized bed incineration. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations. Handle empty containers carefully as hazardous residues may still remain.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Naphthalene, crude *or* Naphthalene, refined
ID: UN1334
Hazard Class: 4.1 - Flammable solid
Packing Group: III - Minor Danger
Symbols:
Label Codes: 4.1 - Flammable Solid
Special Provisions: A1, IB8, IP3
Packaging: **Exceptions:** 151 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** 25 kg **Cargo aircraft only:** 100 kg
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Listed U165 Toxic Waste
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001, per CWA Section 307(a) 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Phenanthrene **CAS Number:** 85-01-8
Chemical Formula: $C_{14}H_{10}$
Structural Chemical Formula: $(C_6H_4CH)_2$
EINECS Number: 201-581-5
ACX Number: X1001897-8
Synonyms: COAL TAR PITCH VOLATILES: PHENANTHRENE; PHENANTHREN; PHENANTHRENE; PHENANTRIN
Derivation: A polynuclear aromatic hydrocarbon found as a component of coal tar pitch volatiles (products of bituminous coal distillation). Produced from toluene, bibenzil, 9-methyl fluorene or stilbene by passage through red hot tubes or by diene synthesis of 1-vinyl naphthalene and maleic anhydride.
General Use: Used in the manufacture of dyestuffs and explosives; in biological research or drug synthesis.

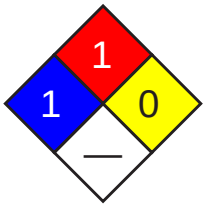
Section 2 - Composition / Information on Ingredients

Name	CAS	%
Phenanthrene	85-01-8	ca 100 % wt

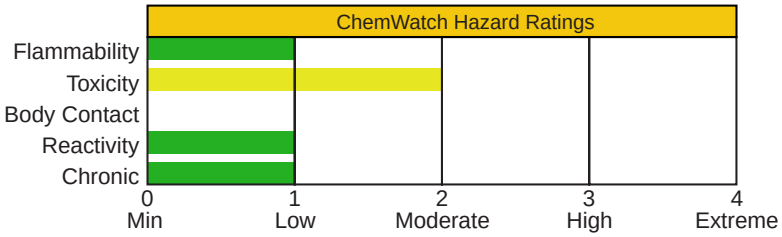
OSHA PEL **NIOSH REL**

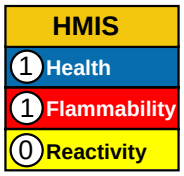
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Shiny crystals; faint, aromatic odor. Acute Effects: skin photosensitization. Combustible. Reacts dangerously with oxidizers.

Potential Health Effects

Target Organs: Skin.
Primary Entry Routes: Skin contact.
Acute Effects
Inhalation: Effects not reported.
Eye: Effects not reported.
Skin: Can cause photosensitization of the skin.
Ingestion: Effects not reported.
Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.
Medical Conditions Aggravated by Long-Term Exposure: Skin disorders.
Chronic Effects: None reported.

Section 4 - First Aid Measures

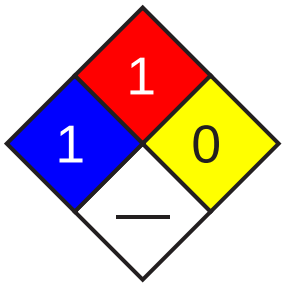
Inhalation: Remove exposed person to fresh air and support breathing as needed.
Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.
Skin Contact: *Quickly* remove contaminated clothing. Rinse exposed area with flooding amounts of water to remove loose material and then move quickly to a soap and water wash. For reddened or blistered skin, consult a physician.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: Treatment is symptomatic and supportive.

See DOT ERG

Section 5 - Fire-Fighting Measures

Flash Point: 340 °F (171 °C), Open Cup
LEL: Not reported.
UEL: Not reported.
Flammability Classification: Class IIIB Combustible liquid
Extinguishing Media: Use dry chemical or carbon dioxide; water spray or foam may cause frothing.
General Fire Hazards/Hazardous Combustion Products: Carbon oxides (CO_x) and acrid smoke
Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

See DOT ERG



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Shut off ignition sources. Cleanup personnel should protect against skin contact.
Small Spills: To avoid dust generation, *do not* sweep! Carefully scoop up or vacuum (with appropriate filter). Damp mop residue.
Large Spills: Flush large spill to containment area for later disposal. Do not release into sewers or waterways. Mop up any residue.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

See DOT ERG

Section 7 - Handling and Storage

Handling Precautions: Use nonsparking tools to open containers.
Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.
Recommended Storage Methods: Prevent physical damage to containers. Store in a cool, dry, well-ventilated area away from heat, ignition sources, and strong oxidizers.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: To prevent static sparks, electrically ground and bond all equipment used with and around phenanthrene. Provide general or local exhaust ventilation systems to maintain airborne concentrations below the OSHA PEL (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.
Administrative Controls: Consider preplacement and periodic medical exams of exposed workers with emphasis on the skin.
Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. The following respirator recommendation is for *coal-tar pitch volatiles*: For any detectable concentration, use a SCBA or supplied-air respirator (with auxiliary SCBA) with a full facepiece and operated in pressure-demand or other positive pressure mode. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless, shiny crystals with a faint, aromatic odor.
Physical State: Solid
Odor Threshold: 0.055 to 0.06 mg/m^3
Vapor Pressure (kPa): 1 mm Hg at 244.76 °F (118.2 °C); 400 mm Hg at 586.4 (308 °C)
Formula Weight: 178.22
Density: 1.179 g/L at 77 °F (25 °C)
Refractive Index: 1.59427
Boiling Point: 644 °F (340 °C)
Freezing/Melting Point: 213 °F (101 °C)
Water Solubility: 1.6 mg/L at 59 °F (15 °C)
Other Solubilities: 1 g in: 2.4 mL toluene, 2.4 mL carbon tetrachloride, 2 mL benzene, 1 mL carbon disulfide, 25 mL absolute alcohol, 60 mL cold 95% alcohol, 10 mL boiling 95% alcohol and 3.3 mL anhydrous ether. Also soluble in glacial acetic acid, chloroform, and hot pyridine.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Phenanthrene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization does not occur. Phenanthrene dust generation and exposure to heat ignition sources, or oxidizers.
Storage Incompatibilities: Strong oxidizers.
Hazardous Decomposition Products: Thermal oxidative decomposition of phenanthrene can produce carbon oxide(s).

Section 11 - Toxicological Information

Acute Oral Effects:
Mouse, oral, LD_{50}: 700 mg/kg.
Other Effects:
Tumorgenicity, mouse, skin: 71 mg/kg produced tumors at site of application.
Genetic Effects - Rat, liver cell: 3 mmol/L caused DNA damage.
Human, lymphocyte: 100 µmol/L caused mutation.

See *RTECS* SF7175000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil, some phenanthrene may biodegrade but the majority will bind to the soil without much leaching to groundwater. Volatilization is not expected to be significant. In water, it will adhere to particulates and sediment. Photolysis may occur near the surface producing toxic substances. Photolysis/photooxidation half-life = 8.4 hr. In the air, it will react with photochemically generated hydroxyl radicals (half-life = 1.67 days). Phenanthrene absorbs strongly to soil and sediment in water.
Ecotoxicity: *Neanhes arenaceodentata*, TL_m = 0.6 ppm/96 hr, sea water at 71.6 °F (22 °C)
Octanol/Water Partition Coefficient: log K_{ow} = 4.57

Section 13 - Disposal Considerations

Disposal: For treatment of phenanthrene contaminated water, the particulate bound portion can be removed by sedimentation, flocculation, and filtration. Chlorination is not recommended as it has been shown to produce mutagenic substances. The dissolved portion requires oxidation for partial removal. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Shipping Name and Description: Environmentally hazardous substances, solid, n.o.s.
ID: UN3077
Hazard Class: 9 - Miscellaneous hazardous material
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 9 - Class 9
Special Provisions: 8, 146, B54, IB8, N20
Packaging: **Exceptions:** 155 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** No limit **Cargo aircraft only:** No limit
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 5000 lb (2268 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Pyrene **CAS Number:** 129-00-0
Chemical Formula: $C_{16}H_{10}$
EINECS Number: 204-927-3
ACX Number: X1001901-7
Synonyms: BENZO(DEF)PHENANTHRENE; BENZO(D,E,F)PHENANTHRENE; COAL TAR PITCH VOLATILES:PYRENE; PYREN; BETA-PYRENE; PYRENE; PYRENE
General Use: Laboratory reference standard.
Occurs in coal tar or in destructive hydrogenation of hard coals.

Section 2 - Composition / Information on Ingredients

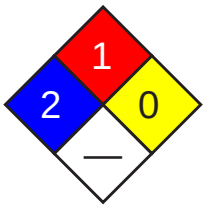
Name	CAS	%
pyrene	129-00-0	>98

OSHA PEL
TWA: 0.2 mg/m^3; as particulate polycyclical aromatic hydrocarbon.

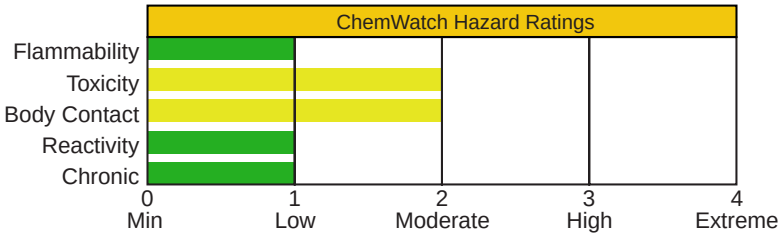
NIOSH REL
TWA: 0.1 mg/m^3, cyclohexane-extractable fraction; as particulate polycyclic aromatic hydrocarbon.

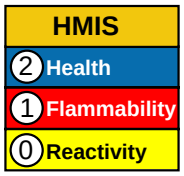
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless solid. Irritating to eyes/skin/respiratory tract. Also causes: conjunctival irritation, dermal irritation, ingestion may irritate and burn esophagus/gastrointestinal tract.

Potential Health Effects

Target Organs: skin, eyes, respiratory system
Primary Entry Routes: inhalation, ingestion, skin contact
Acute Effects

Inhalation: The dust may be discomforting to the upper respiratory tract and may be fatal if inhaled.
Persons with impaired respiratory function, airway diseases, and conditions such as emphysema or chronic bronchitis may incur further disability if excessive concentrations of particulate are inhaled.
Animal inhalation studies have demonstrated hepatic, pulmonary and intragastric pathologic changes. The levels of neutrophil, leukocyte and erythrocytes decreased.

Eye: The dust may be discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.

Skin: The material may be mildly discomforting to the skin.
Open cuts, abraded or irritated skin should not be exposed to this material.
Toxic effects may result from skin absorption.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.
Skin application resulted in hyperemia (blood engorgement), weight loss and hematopoietic (blood cell development) changes. Contact dermatitis was also evident.

Ingestion: The solid/dust is discomforting to the gastrointestinal tract and harmful if swallowed.
Considered an unlikely route of entry in commercial/industrial environments.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic exposure to pyrene results increase in blood leukocytes (leukocytosis).
The so-called polycyclic aromatic hydrocarbons (PAHs) comprise a large family; some members occur in coal tar, tobacco smoke, petroleum and air pollution. Some substituted derivatives have been identified, in animal studies, as amongst the most highly active carcinogens.
Rodent species are sensitive to some PAHs with skin application producing cancerous growths. Injection produces soft tissue tumors (sarcomas) in rats and mice.
Administration of PAHs to Rhesus monkey on the other hand has not yet proved successful in yielding tumors and there is inadequate date to support the proposition that individual PAHs produce cancer in humans. There are however a number of epidemiology and mortality studies that show increased incidence of cancer in humans exposed to mixtures of PAHs. Evidence exists of lung and genito-urinary cancer mortality amongst coke-oven workers and skin tumors in workers exposed to creosote. Exposures to other chemical mixtures containing PAHs such as cigarette smoke, coal tar, coal tar pitch and bitumens, have been associated with increased incidences of lung cancer in humans. Anthracene, the basic unit on which most PAHs are built, is not carcinogenic whereas benz[a]anthracene appears to have weak carcinogenicity. Additions of other benzene rings to select positions on the benz[a]anthracene skeleton results in agents with powerful carcinogenicity (e.g. dibenz[a,h]anthracene and benz[a]pyrene). Further substitution of methyl groups in position on the rings enhances carcinogenicity (7,12 dimethylbenz[a]anthracene is one of the most powerful PAH carcinogens known). Biotransformation to produce soluble metabolites suitable for excretion appears to transform some PAHs to reactive electrophiles (as epoxides) which bind to DNA. Initiation of carcinogenesis is thought to rely upon such interactions.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Encourage patient to blow nose to ensure clear breathing passages. Rinse mouth with water.
Consider drinking water to remove dust from throat.
Lay patient down. Keep warm and rested.
Seek medical attention if irritation or discomfort persist.

See DOT ERG

Eye Contact: Immediately hold the eyes open and flush with fresh running water.
Ensure irrigation under the eyelids by occasionally lifting upper and lower lids. If pain persists or recurs seek medical attention.
Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.
If more than 15 minutes from a hospital, induce vomiting, preferably using Ipecac Syrup APF.
Note: DO NOT INDUCE VOMITING in an unconscious person.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Treat symptomatically.

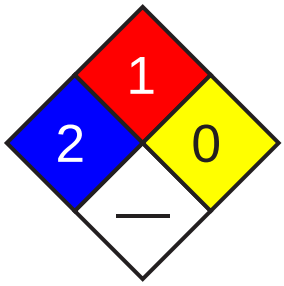
Section 5 - Fire-Fighting Measures

Flash Point: Not available; probably combustible

Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.

See DOT ERG

General Fire Hazards/Hazardous Combustion Products: Solid which exhibits difficult combustion or is difficult to ignite.
Avoid generating dust, particularly clouds of dust in a confined or unventilated space.
Dust may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion.
Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport. Build-up of electrostatic charge may be prevented by bonding and grounding.



Fire Diamond

Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Fire Incompatibility: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
Wear breathing apparatus plus protective gloves for fire only. Prevent, by any means available, spillage from entering drains or waterways.
Use fire fighting procedures suitable for surrounding area.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.
Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: Clean up all spills immediately. Avoid contact with skin and eyes.
Wear protective clothing, gloves, safety glasses and dust respirator.
Use dry clean-up procedures and avoid generating dust.
Vacuum up or sweep up. Place in clean drum then flush area with water.

See DOT ERG

Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so.
Water spray or fog may be used to disperse/absorb vapor.
Contain or absorb spill with sand, earth or vermiculite.
Collect recoverable product into labeled containers for recycling.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.
If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of overexposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
DO NOT allow material to contact humans, exposed food or food utensils.
Avoid smoking, bare lights or ignition sources. When handling, DO NOT eat, drink or smoke. Avoid contact with incompatible materials.
Keep containers securely sealed when not in used. Avoid physical damage to containers. Always wash hands with soap and water after handling. Working clothes should be laundered separately.
Launder contaminated clothing before reuse.
Use good occupational work practices. Observe manufacturer's storing/handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Recommended Storage Methods: Glass container; plastic container.
Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Local exhaust ventilation usually required.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection. NIOSH-approved self contained breathing apparatus (SCBA) may be required in some situations.
Provide adequate ventilation in warehouse or closed storage area.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields; chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Wear chemical protective gloves, eg. PVC. Wear safety footwear.

Other: Overalls. PVC apron. PVC protective suit may be required if exposure severe.
Eyewash unit. Ensure there is ready access to a safety shower.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless crystalline solid when pure. Contamination by tetracene results in slight yellowing. Solid and solutions have slight blue fluorescence.

Physical State: Divided solid
Vapor Pressure (kPa): Negligible
Formula Weight: 202.24
Specific Gravity (H_2O=1, at 4 °C): 1.271
pH: Not applicable
pH (1% Solution): Not applicable
Boiling Point: 393 °C (739 °F) at 760 mm Hg
Freezing/Melting Point: 156 °C (312.8 °F)
Volatile Component (% Vol): Negligible
Water Solubility: 0.135 mg/L (+ or - 0005 mg/L) in water

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid reaction with oxidizing agents.

Section 11 - Toxicological Information

Toxicity
Oral (rat) LD_{50}: 2700 mg/kg
Inhalation (rat) LC_{50}: 170 mg/m^3
Oral (mouse) LD_{50}: 800 mg/kg
Intraperitoneal (mouse) LD_{50}: 514 mg/kg
Conjunctival irritation, excitement and muscle contraction recorded.
NOTE: Substance has been shown to be mutagenic in various assays, or belongs to a family of chemicals producing damage or change to cellular DNA.

Irritation
Skin (rabbit): 500 mg/24h - mild

See *RTECS* UR 2450000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Although environmental concentrations are highest near sources, its presence in places distant from primary sources indicates that it is reasonably stable in the atmosphere and capable of long distance transport. When released to air it may be subject to direct photolysis, although adsorption to particulates apparently can retard this process. Half-lives for reaction of vapor phase with atmospheric pollutants are: O3, 0.67 days, NO2, 14 days; estimated half-life for reaction with photochemically produced hydroxyl radicals is 1.12 days. If released to water, it will adsorb very strongly to sediments and particulate matter, bioconcentrate in aquatic organisms slightly to moderately, but will not hydrolyze. It may be subject to significant biodegradation, and direct photolysis may be important near the surface of waters. Evaporation may be important with a half-life of 4.8 to 39.2 days predicted for evaporation from a river 1 m deep, flowing at 1 m/sec with a wind velocity of 3 m/sec; half-life for evaporation from a model pond was 1176 days. Adsorption to sediments and particulates will limit evaporation. If released to soil it will be expected to adsorb very strongly to the soil and will not be expected to appreciably leach to the groundwater, although its presence in groundwater illustrates that it can be transported there. It will not be expected to hydrolyze or significantly evaporate from soils and surfaces. It may be subject to appreciable biodegradation in soils.
Ecotoxicity: TL_m (Median threshold limit) Mosquito fish 0.0026 mg/l/96 hr at 24-27 °C in a static bioassay
Henry's Law Constant: calculated at 5.42 x10^{-5}
BCF: rainbow trout 72
Octanol/Water Partition Coefficient: log K_{ow} = 4.88
Soil Sorption Partition Coefficient: K_{oc} = soils 57 to 764

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible or consult manufacturer for recycling options.
Follow applicable federal, state, and local regulations.
Bury residue in an authorized landfill.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: I - Great Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB7
Packaging: **Exceptions:** None **Non-bulk:** 211 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 kg **Cargo aircraft only:** 50 kg
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: II - Medium Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP2, IP4
Packaging: **Exceptions:** None **Non-bulk:** 212 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 25 kg **Cargo aircraft only:** 100 kg
Vessel Stowage: **Location:** B **Other:**

Shipping Name and Description: Toxic solids, organic, n.o.s.
ID: UN2811
Hazard Class: 6.1 - Poisonous materials
Packing Group: III - Minor Danger
Symbols: G - Technical Name Required
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP3
Packaging: **Exceptions:** 153 **Non-bulk:** 213 **Bulk:** 240
Quantity Limitations: **Passenger aircraft/rail:** 100 kg **Cargo aircraft only:** 200 kg
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 307(a)
SARA 40 CFR 372.65: Not listed
SARA EHS 40 CFR 355: Listed
RQ: 5000 lb
TPQ: 1000/10000 lb
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

APPENDIX F

Site Management Form

APPENDIX F
Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

SITE MANAGEMENT FORM

Institutional and Engineering Control (IC/EC) Certification Checklist

Site No. V00531
Site Name: West 42nd Street Former MGP Site
Site Location: West 42nd Street, Manhattan, New York
Reporting Period:

Certification Checklist

#	Item	Yes	No
1	Is the information above correct? If NO, include handwritten update above or on a separate sheet.		
2	Has any or all of the site property been sold, subdivided, merged or undergone a tax map amendment during this Reporting Period?		
3	Have any federal, state, and/or local permits (e.g., building permit) been issued at the MTA Bus Depot (Tax Block 1088 Lot 1) property, West 41st Street, West 42nd Street, NYS Route 9A or Hudson River Greenway during this Reporting Period?		
4	Has there been any actual or pending zoning or land-use changes to the Site Management Plan area during this Reporting Period?		
5	Has the periodic site inspection identified any excavation or other disturbance activities that have taken place within the Site Management Plan area during this Reporting Period?		
6	Is any or all of the site currently undergoing development?		
7	Is the current site uses for each of the site properties consistent with the use(s) listed below? A. MTA Bus Depot: Industrial B. Hudson River Park, Hudson River Greenway, NYS Route 9A, West 41st Street and West 42nd Street: Public Right-of-Way		
8	Are all ICs/ECs in place and functioning as designed?		

Notes:
A. If you answered Yes to questions 2 thru 7 above, include documentation or evidence that documentation has been previously submitted included with this certification form.
B. A Corrective Measures Work Plan must be submitted along with this form to address any issues identified.

APPENDIX F
Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

SITE MANAGEMENT FORM (CONT'D.)

Control Certification Statement

For each Institutional or Engineering Control listed above, I certify by checking "Yes" below that all of the following statements are true:

A. The institutional and/or engineering controls employed at the site are:

   i. Unchanged since the date that the control was put in place, or was last approved by the Department;

   ii. In place and effective;

   iii. Performing as designed;

   iv. Nothing has occurred that would impair the ability of the controls to protect public health and environment; and

   v. Nothing has occurred that constitutes a violation or failure to comply with any operation and maintenance plan for such controls.

B. Access to the site will be provided to the Department to evaluate the remedy and verify continued maintenance of such controls.

Yes	No
☐	☐

APPENDIX F
Site Management Plan
Consolidated Edison Company of New York, Inc.
West 42nd Street Former MGP Site
New York, New York

SITE MANAGEMENT FORM (CONT'D.)

IC/EC Certifications
Site No. V00531

Site Owner or Designated Representative Signature

I _____ at _____
(print name) (print business address)

am certifying as Owner (Owner or Remedial Party) for the Site named in the Site Information Section of this form

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Qualified Environmental Professional (QEP) Signature

I _____ at _____
(print name) (print business address)

am certifying as a Qualified Environmental Professional for the

_____
(Owner or Remedial Party)

for the Site named in the Site Information Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, Owner or Remedial Party, Rendering Certification Stamp (if Required) Date

Arcadis of New York, Inc.

27-01 Queens Plaza North

Suite 800

Long Island City, New York 11101

Tel 718 446 0116

Fax 718 446 4020

www.arcadis.com