

28 March 2014

Cavy Chu, P.E.  
Assistant Director  
New York City Office of Environmental Remediation  
100 Gold Street, 2<sup>nd</sup> Floor  
New York, NY 10038  
cavyc@dep.nyc.gov

**Re: Notice of No Objection Request – Public CSO Relocation  
Greenpoint Landing - OER 13EHAN466K  
Brooklyn, New York  
Langan Project No.: 170229002**

Dear Ms. Chu:

Langan Engineering, Environmental, Survey and Landscape Architecture, D.P.C (Langan) has prepared this Notice of No Objection (NNO) request on behalf of Greenpoint Storage Terminal, LLC (GST). As previously discussed with the New York City Office of Environmental Remediation (OER), the NNO is limited to the relocation of a public NYC Department of Environmental Protection (DEP) combined sewer overflow (CSO) and outfall. The CSO will be relocated from Parcel G to Parcel F of the Greenpoint Landing property in Brooklyn, New York. Parcels F and G comprise the site, which is also referred to as the CSO site (Figure 1). The CSO relocation will facilitate the construction of an affordable housing building on Parcel G. It is anticipated that construction of the affordable housing building will proceed immediately following the CSO relocation. This work is on file with the Department of Buildings (DOB) under Job Number #320613234 (Alteration Type 2).

## **BACKGROUND**

### **Site Description**

The proposed CSO will be located on Parcel F. Parcel F is currently vacant and encompasses an asphalt-paved area of 73,634 square feet on the upland part of Block 2472 Lot 100. Parcel F is bound by Commercial Street to the south, Newtown Barge Playground to the west, Parcel G to the east, and the East River and Newtown Creek to the north. Current site grade within the

footprint of the proposed CSO ranges from about el. 6 to 11 BBHD<sup>1</sup>. The existing CSO is located in Parcel G and will be abandoned in place until a portion of it is removed as part of foundation construction for the proposed redevelopment on Parcel G.

## **Proposed CSO Project**

The proposed project involves relocating a public 24-inch NYCDEP CSO from Parcel G to Parcel F (Figure 2). The CSO relocation allows for the construction of an affordable housing building on Parcel G. The construction of the affordable housing building on Parcel G will proceed immediately after the CSO relocation is completed.

The existing CSO drains the regulating chamber at the intersection of Commercial and Franklin streets. The new CSO will drain the same regulating chamber, but will be rerouted to Parcel F to accommodate the future development on Parcel G. The new CSO will be approximately 500 linear feet of 24-inch reinforced concrete pipe set in a concrete cradle supported by driven timber piles and will discharge to the East River through a new precast concrete outfall approved and permitted by the United States Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (NYSDEC). A copy of the USACE CSO permit is provided as Attachment A. A copy of the NYSDEC CSO permit is provided as Attachment B.

The first approximately 100 feet of the CSO will be installed in the sidewalk of the public right-of-way (ROW) on Commercial Street; the remaining approximately 400 feet of the CSO will be installed within Parcel F. The segment of the CSO in the sidewalk will be restored to Department of Transportation (DOT) specifications, which requires a 4-inch thick concrete sidewalk. The segment of the CSO within Parcel F will be backfilled with excavated soil/fill from the CSO trench in Parcel F and/or imported fill material, temporarily covered with quarry gravel or RCA from a Part 360 registered facility to protect the ground surface from erosion. Excavated soil from the sidewalk portion of the CSO will not be used as backfill in Parcel F, but may be used as backfill in the sidewalk portion of the CSO provided it also meets geotechnical requirements and DEP specifications for backfill material. Langan will meet DEP requirements and specifications for reusing excavated soil as backfill in the new CSO trench. A private, asphalt-paved driveway will be built over the CSO in the future. The existing CSO within Parcel

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<sup>1</sup> All elevations referenced herein are with respect to the Borough of Brooklyn Highway Datum (BBHD), which is 2.56 feet above mean sea level datum at Sandy Hook New Jersey as defined by the United States Geologic Survey (USGS NGVD 1929).

G will be capped at the Commercial Street sidewalk and will be abandoned in place until a portion of it is removed as part of foundation construction for the proposed redevelopment on Parcel G. The abandonment of the existing CSO will be performed in accordance with DEP approvals. Additional design information and details for the new CSO can be found in Langan's Replacement Sewer Plan, which was filed with the NYCDEP and is provided here as Attachment C. The entire CSO relocation project is subject to DEP approval.

Construction of the Parcel F CSO will require excavating a 400-foot long 10-foot wide trench to a depth of 10 feet below surface grade. Trench boxes may be used for safety and to minimize soil disturbance. We estimate about 1,600 cubic yards of subsurface material will be excavated during construction. This subsurface material was characterized in-situ in September 2013. The subsurface material was characterized at a frequency of 500 cubic yards. A memo providing an overview of the investigation, including sampling methodology and analytical results, was previously provided to the OER (the waste characterization memo is provided as an appendix to the *Soil-Fill and Groundwater Management Plan* in Attachment D). The quality of the soil and fill material meets Track 4 Soil Cleanup Objectives (SCOs)<sup>2</sup> commonly accepted on E-Designation projects.

Excavated soil/fill material from within Parcel F will be reused as backfill in the CSO trench provided it meets geotechnical requirements and DEP specifications for backfill material. Langan will meet DEP requirements and specifications for reusing excavated soil as backfill in the new CSO trench. Excavated soil from the sidewalk portion of the CSO will not be used as backfill in Parcel F, but may be used as backfill in the sidewalk portion of the CSO provided it also meets geotechnical requirements and DEP specifications for backfill material. The soil/fill material to be excavated in Parcel F was characterized and is non-hazardous with characteristics typical of historic fill. Excavated soil/fill material that cannot be reused as backfill in the CSO trench or excess excavated soil/fill material will be either transported off-site for disposal at a receiving facility with a permit authorizing it to receive the excavated soil/fill material or placed in one or more covered roll-offs for up to 60 days. During this 60-day period, and commencing promptly after issuance of the NNO, the Applicant will work with the New York State Department of Conservation (NYSDEC) and the OER with regard to any on-site disposition of excavated material from the project that is not used as backfill in the CSO trench.

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<sup>2</sup> Commonly used Track 4 SCOs include total SVOCs (250 mg/kg), arsenic (25 mg/kg), copper (1000 mg/kg), lead (1200 mg/kg), and mercury (2.8 mg/kg).

Excavated soil/fill material generated during CSO construction will be visually screened by a Langan geotechnical field engineer to determine its potential for reuse as backfill in the CSO trench. Backfill material shall meet the specifications for “Approved Excavated Suitable Fill” as described in the DEP’s Standard Sewer Specifications (2009) Sections 2.24.2(C) and 4.06.2. According to the DEP specifications, approved excavated suitable fill shall be earth, free of bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign matter, shall not contain oversized material, and shall exhibit a fines content equal to or less than 20 percent (portion of material passing a No. 200 sieve). If excavated soil/fill material is found to contain any of the non-complaint, oversized materials referenced above, the excavated soil/fill material may be screened as a standard construction measure using small soil screener (i.e., Screen Pro 200XL manufactured by CWM, Inc., or equivalent) to remove oversized material. Screening out oversized material and objects will consist of an excavator or front-end loader placing excavated soil/fill material into the hopper of the soil screener, allowing the finer soil/fill material to fall through the screen, and then placing the screened soil/fill material directly back into the CSO trench as backfill or staged in temporary stockpiles (no more than 900 cubic yards in total for up to 60 days, on a rolling basis, unless otherwise approved by the DEC) or in covered roll-off containers for up to 60 days pending a decision on its reuse by the DEC. Screened-out materials will be managed in accordance with applicable federal, state and local regulations. Potential locations for temporary stockpiles are illustrated on Figure 2.

During soil/fill material screening operations, Langan environmental field staff will implement a Community Air Monitoring Plan (CAMP) in accordance with the *Soil-Fill and Groundwater Management Plan* and the site-specific *Construction Health and Safety Plan (CHASP)* (Attachment E). Fugitive dust emissions from screening operations will be managed in accordance with Section 5.7.2 of the *Soil-Fill and Groundwater Management Plan*.

The excavation and construction work for the new CSO will also require temporary dewatering. The groundwater surface in the vicinity of the proposed excavation area is about 6 to 8 feet below ground surface (about el. 2 to el. 0 BBHD). The groundwater surface is expected to be shallower towards the East River and deeper towards Commercial Street. Based on the local hydrogeological conditions and proximity to the East River/Newtown Creek, a temporary dewatering effort is required to facilitate construction of CSO pipe platform, concrete placement and curing, pipe laying and placement, and backfilling. Dewatering fluids will be managed by the Contractor in accordance with the *Soil-Fill and Groundwater Management Plan* and applicable laws and regulations.

## Site History and Regulatory Framework

The CSO site comprises Parcels F and G. Parcel F comprises Lot 50 of Block 2472 and Parcel G comprises Lots 60 and 65 of Block 2472. The E-Designations for Hazardous Materials and Noise (E-138) pursuant to the May 11, 2005 Greenpoint-Williamsburg Rezoning (04DCP003K) apply to Lots 50 and 65 of Block 2472. The site is currently under the regulatory oversight of the OER.

The CSO site was subjected to three environmental studies since 2001. The previous environmental site assessments indicated the site was historically and primarily used for low-impact industrial activities, including the transfer and storage of lumber, coal, and construction materials and equipment. The previous environmental site investigations confirmed the presence of historic fill material on the site, a finding consistent with urban waterfront property across New York City. In addition, previous subsurface investigations did not identify significant soil and groundwater contamination. The results of six previous site assessments and investigations on the CSO site and the larger Greenpoint Landing property are presented and summarized in Langan's *Remedial Investigation Work Plan* (RIWP) dated July 24, 2013, which is on file with the OER.

Langan is currently implementing a supplemental environmental site investigation in accordance with the OER-approved RIWP on Parcel F and G (as well as Parcels E3, D1, D2, and H). These parcels are identified on Figure 1. The objectives of the remedial investigation are to supplement the findings of previous environmental studies and to evaluate soil, groundwater and soil vapor quality across these parcels to satisfy the requirements of the Hazardous Materials E-Designation Program. Langan was also retained by GST to perform a waste characterization investigation of the proposed CSO. A memo providing an overview of the investigation is included as an attachment to the *Soil-Fill and Groundwater Management Plan*.

## CONCLUSIONS

Langan requests a Notice of No Objection for the proposed CSO relocation project. The handling of soil and fill material will be limited to the excavation of a construction trench for the new CSO. Excavated soil and fill material and dewatering fluids will be managed in accordance with a *Soil and Fill Material and Groundwater Management Plan* (Attachment D) and a *Site-Specific Construction Health and Safety Plan* (Attachment E). In addition, Greenpoint Storage Terminal, LLC will commit to the following:

- Assignment of Langan environmental field staff, under the direction of a Professional Engineer (PE) or qualified environmental professional (QEP), to be on-site to monitor excavation, earthwork, screening of soil/fill material, and soil disturbance activities on a full-time basis;
- Implementation of the Community Air Monitoring Program (CAMP) for VOCs and particular matter during excavation, earthwork, screening of soil/fill material, and soil disturbance activities;
- Preparation and submission of daily reports to the NYCOER presenting summaries of daily activities, photographs of daily activities, and CAMP data; and
- Preparation and submission of a brief closure report to document the site activities associated with construction of the new CSO. The interim report will present a concise summary of work activities and a narrative on the management of excavated soil/fill material and dewatering fluids, and will include, as appendices, copies of daily reports, CAMP data, and supporting documentation related to the management of excavated soil/fill material and dewatering fluids.

If you have any questions, please call me at 212-479-5441. We look forward to receiving the Notice of No Objection at your earliest convenience.

Sincerely,  
**Langan Engineering, Environmental, Surveying  
and Landscape Architecture, D.P.C.**



Mimi S. Raygorodetsky  
Senior Project Scientist



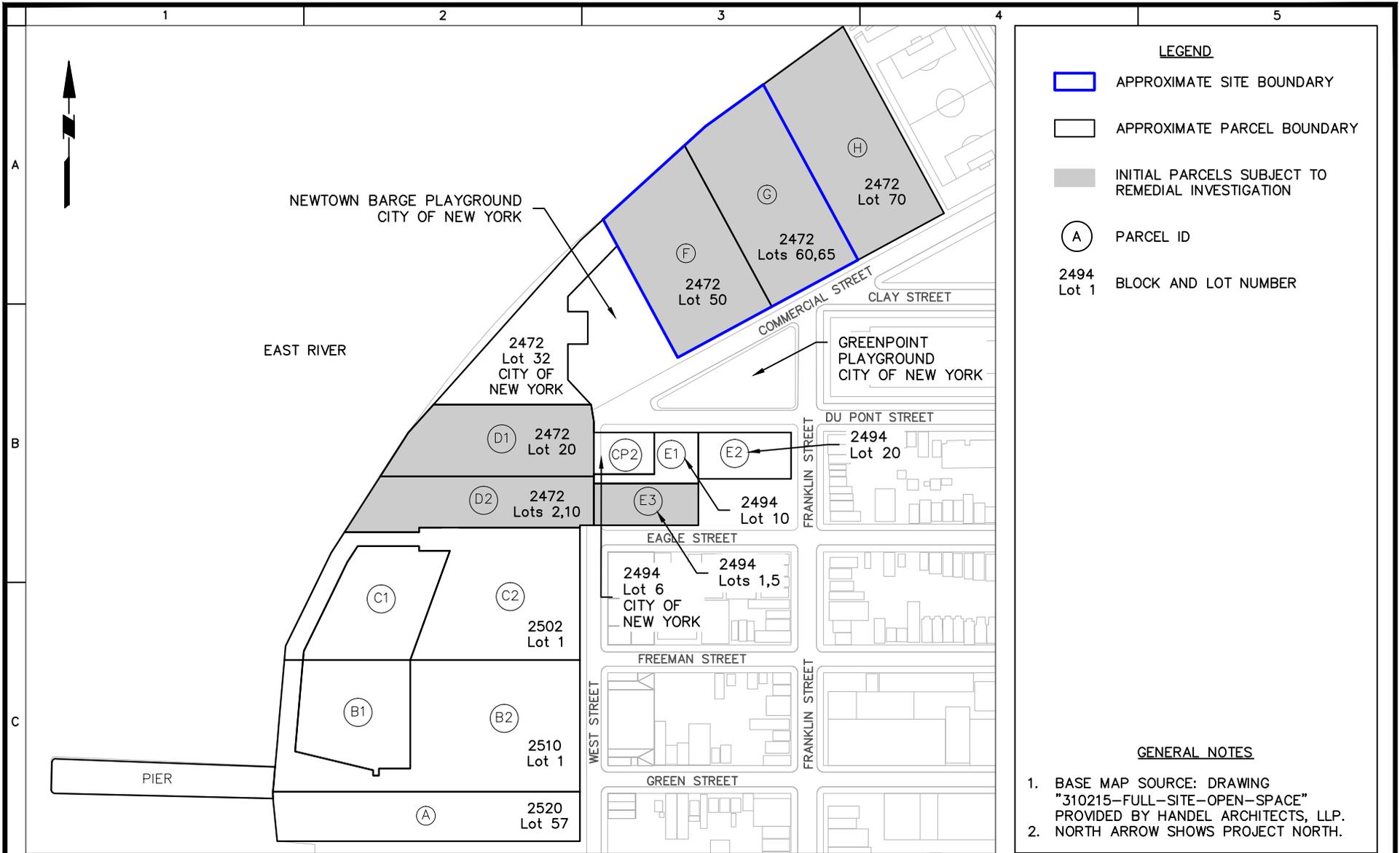
Joel B. Landes, P.E.  
Senior Consultant/Vice President



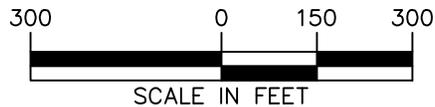
cc: A. Bradshaw (GST)  
M.Chertok (SPR)  
G.Wyka (Langan)

Enclosures: Figure 1: Site Plan  
Figure 2: Proposed CSO and Outfall Plan  
Attachment A: USACE CSO Permit  
Attachment B: NYSDEC CSO Permit  
Attachment C: Sewer Relocation Plan and Profiles  
Attachment D: Soil and Fill Material and Groundwater Management Plan  
Attachment E: Construction Health and Safety Plan

## FIGURES



WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.



**LANGAN**

21 Penn Plaza, 360 West 31st Street, 8th Floor  
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Langan Engineering, Environmental, Surveying and  
Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan International LLC

Collectively known as Langan

Project

GREENPOINT  
LANDING

BROOKLYN

KINGS

NEW YORK

Drawing Title

SITE PLAN

Project No.

170229002

Date

3/28/2014

Scale

1" = 300'

Drawn By

GCW

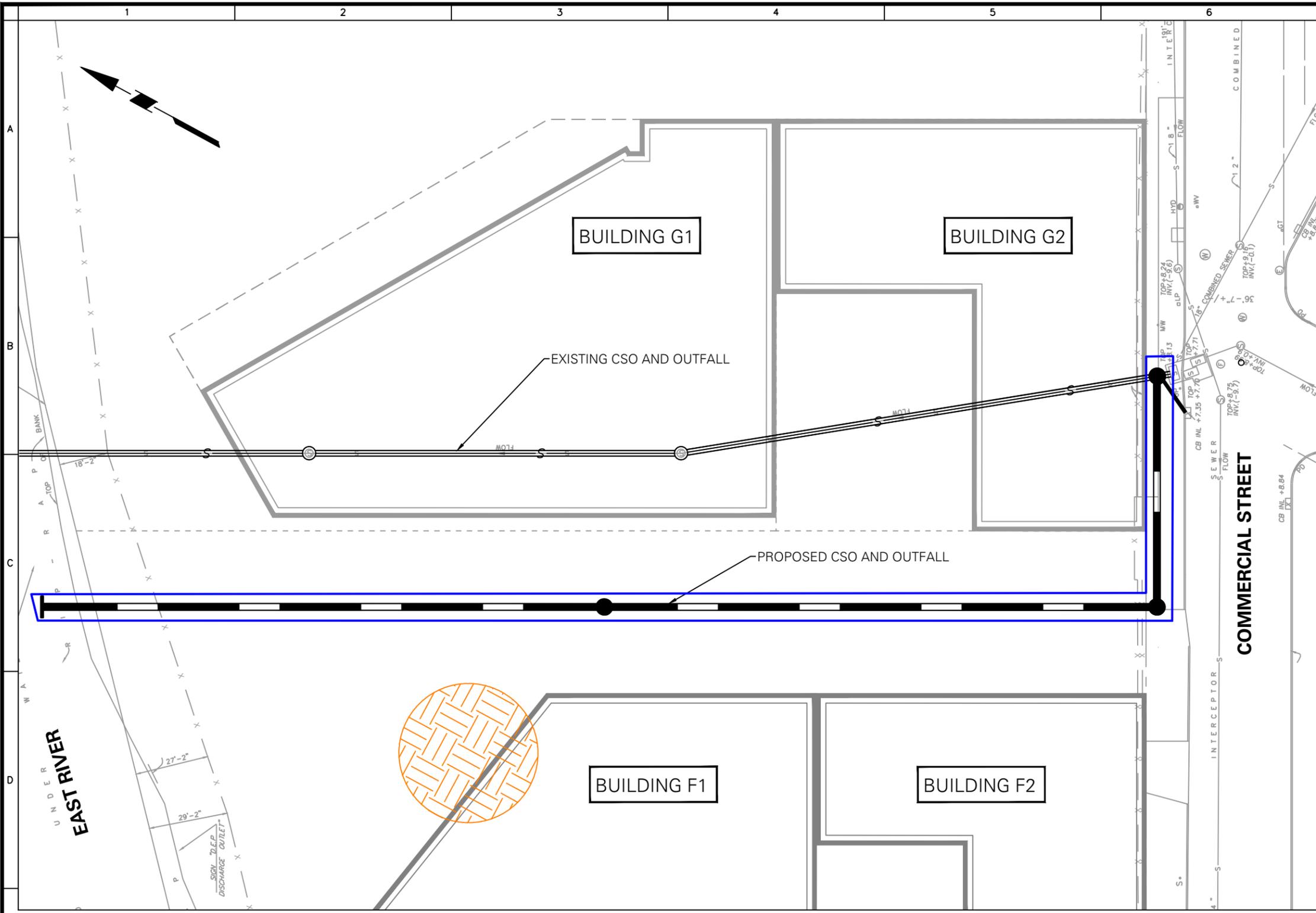
Submission Date

3/28/2014

Drawing No.

1

Sheet 1 of 2



**LEGEND**

 APPROXIMATE LOCATION OF POTENTIAL TEMPORARY STOCKPILES OF EXCAVATED SOIL/FILL FOR REUSE AS BACKFILL IN THE CSO TRENCH

 APPROXIMATE EXTENT OF CSO TRENCH EXCAVATION AREA

**GENERAL NOTES**

1. BASE PLANS TAKEN FROM LANGAN DRAWINGS: UTILITY DRAWING "170229001-C-UI0101," SITE SURVEY "170229001-V-EX0101," AND 170229001-C-RSK PLANS - BBSD.
2. NORTH ARROW SHOWS TRUE NORTH.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

  
 SCALE IN FEET

**LANGAN**

21 Penn Plaza, 360 West 31st Street, 8th Floor  
New York, NY 10001  
T: 212.479.5400 F: 212.479.5444 www.langan.com

Langan Engineering, Environmental, Surveying and  
Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan International LLC  
Collectively known as Langan

Project  
**GREENPOINT LANDING**  
BROOKLYN  
KINGS NEW YORK

Drawing Title  
**PROPOSED CSO AND OUTFALL PLAN**

Project No. 170229002	Drawing No.
Date 3/28/2014	2
Scale 1" = 40'	
Drawn By GCW	Checked By GCW
Submission Date 3/28/2014	Sheet 2 of 2

**ATTACHMENT A**  
**USACE CSO PERMIT**



**DEPARTMENT OF THE ARMY**  
NEW YORK DISTRICT, CORPS OF ENGINEERS  
JACOB K. JAVITS FEDERAL BUILDING  
NEW YORK, N.Y. 10278-0090

REPLY TO  
ATTENTION OF

Regulatory Branch - Eastern Section

**JAN 31 2014**

Subject: Permit Application Number NAN-2013-01514-ETA  
By Greenpoint Landing Developers, LLC

Greenpoint Landing Developers, LLC  
535 Madison Avenue  
New York, NY 10022

Ladies/Gentlemen:

On December 21, 2013, the New York District of the U.S. Army Corps of Engineers received a request for Department of the Army authorization to replace an existing CSO outfall structure in the Newtown Creek in the East River at Brooklyn, Kings County, New York.

Based on the information submitted to this office, our review of the project indicates that an individual permit is not required. It appears that the activities within the jurisdiction of this office could be accomplished under Department of the Army Nationwide General Permit Number 3. The nationwide permits are prescribed as a Reissuance of Nationwide Permits in the Federal Register dated February 21, 2012 (77 FR 10184). The work may be performed without further authorization from this office provided the activity complies with the permit conditions listed in Section B, No. 3; Section C; any applicable New York District regional conditions; the following special condition; and any applicable regional conditions added by the State of New York, copies enclosed.

**Special Condition**

(A) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural

**work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.**

This determination covers only the work described in the submitted material. Any major changes in the project may require additional authorizations from the New York District.

Care should be taken so that construction materials, including debris, do not enter any waterway to become drift or pollution hazards. You are to contact the appropriate state and local government officials to ensure that the subject work is performed in compliance with their requirements.

Please note that this nationwide permit (NWP) verification is based on a preliminary jurisdictional determination (JD). A preliminary JD is not appealable. If you wish, prior to commencement of the authorized work you may request an approved JD, which may be appealed, by contacting the New York District, U.S. Army Corps of Engineers for further instruction. To assist you in this decision and address any questions you may have on the differences between preliminary and approved jurisdictional determinations, please review U.S. Army Corps of Engineers Regulatory Guidance Letter No. 08-02, which can be found at: <http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl08-02.pdf>

Attached to this verification that your project is authorized by NWP is an approved jurisdictional determination. If you are not in agreement with that approved jurisdictional determination, you can make an administrative appeal under 33 CFR Part 331.

This verification is valid until March 18, 2017, unless the nationwide permit is modified, reissued, or revoked; and provided the activity complies with the terms of any subsequent modifications of the nationwide permit authorization. If the nationwide permits are suspended, revoked, or modified in such a way that the activity would no longer comply with the terms and conditions of a nationwide permit, and the proposed activity has commenced, or is under contract to commence, the permittee shall have 12 months from the date of such action to complete the activity.

This authorization is conditional on the applicant's receipt of the required water quality certificate or waiver from the New York State Department of Environmental Conservation (NYSDEC). No work may be accomplished until the required approval from NYSDEC has been obtained.

This authorization is conditional on the applicant's receipt of the required coastal zone management concurrence or waiver from the New York State Department of State (NYSDOS). No work may be accomplished until the required approval from NYSDOS has been obtained.

This authorization is conditional on the applicant's receipt of approval or waiver from the New York City Department of Environmental Protection (NYCDEP). No work may be accomplished until the required approval from NYCDEP has been obtained.

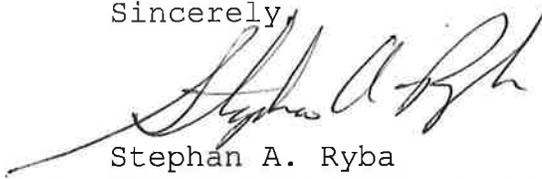
Within 30 days of the completion of the activity authorized by this permit and any mitigation required by this permit, you are to sign and submit the attached compliance certification form to this office.

In order for us to better serve you, please complete our Customer Service Survey located at:  
[http://corpsmapu.usace.army.mil/cm\\_f?p=regulatory\\_survey](http://corpsmapu.usace.army.mil/cm_f?p=regulatory_survey)

A copy of this letter is being sent to NYSDEC Region 2; City of New York; and McLaren Engineering Group, 100 Snake Hill Road, West Nyack, NY 10944.

If you have any questions about this letter, please contact Frank Tangorra, of my staff, at 917-790-8521.

Sincerely,



Stephan A. Ryba  
Chief, Eastern Section

Enclosures

## NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Greenpoint Landing Developers, LLC	File Number: NAN-2013-01514-ETA	Date: <b>JAN 31 2014</b>
Attached is:		See Section Below
<input type="checkbox"/>	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
<input type="checkbox"/>	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
<input type="checkbox"/>	PERMIT DENIAL	C
<input type="checkbox"/>	APPROVED JURISDICTIONAL DETERMINATION	D
<input checked="" type="checkbox"/>	PRELIMINARY JURISDICTIONAL DETERMINATION	E

**SECTION I -** The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at [http://www.usace.army.mil/CECW/Pages/reg\\_permit.aspx](http://www.usace.army.mil/CECW/Pages/reg_permit.aspx) or Corps regulations at 33 CFR Part 331.

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the New York District Engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations (JD) associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the New York District Engineer. Your objections must be received by the New York District Engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the New York District Engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the New York District Engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the New York District Engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the North Atlantic Division Engineer, ATTN: CENAD-PD-PSD-O, Fort Hamilton Military Community, Building 301, General Lee Avenue, Brooklyn, NY 11252-6700. This form must be received by the Division Engineer within 60 days of the date of this notice.

**C: PERMIT DENIAL:** You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the North Atlantic Division Engineer, ATTN: CENAD-PD-PSD-O, Fort Hamilton Military Community, Building 301, General Lee Avenue, Brooklyn, NY 11252-6700. This form must be received by the Division Engineer within 60 days of the date of this notice.

**D: APPROVED JURISDICTIONAL DETERMINATION:** You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the North Atlantic Division Engineer within 60 days of the date of this notice with a copy furnished to the New York District Engineer.

**E: PRELIMINARY JURISDICTIONAL DETERMINATION:** You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

**SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

If you have questions regarding this decision and/or the appeal process you may contact:

Jodi M. McDonald  
U.S. Army Corps of Engineers, New York District  
Jacob K. Javits Federal Building  
New York, NY 10278-0090  
(917) 790-8720

If you only have questions regarding the appeal process you may also contact:

Michael G. Vissichelli, Administrative Appeals Review  
Officer, CENAD-PD-OR  
North Atlantic Division, U.S. Army Engineer Division  
Fort Hamilton Military Community  
General Lee Avenue, Building 301  
Brooklyn, NY 11252-6700  
(347) 370-4663  
E-mail: Michael.G.Vissichelli@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:
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**ATTACHMENT**

**PRELIMINARY JURISDICTIONAL DETERMINATION FORM**

**BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): 21 December 2013**

**B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:**  
Greenpoint Landing Developers, LLC, 535 Madison Avenue, New York, New York 10022

**C. DISTRICT OFFICE, FILE NAME, AND NUMBER: CENAN-OP-RE, Greenpoint Landing developers, LLC, NAN-2013-01514-ETA**

**D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: 171 West Street**

**(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)**

State: New York County/parish/borough: Kings City: Brooklyn

Center coordinates of site (lat/long in degree decimal format):

Lat. 40.73285°N, Long. -73.96196°W.

Universal Transverse Mercator:

Name of nearest waterbody: Newtown Creek, East River

Identify (estimate) amount of waters in the review area:

Non-wetland waters: linear feet: width (ft) and/or 0.1 acres.

Cowardin Class: Navigable Waters of the US

Stream Flow: Tidal

Wetlands: 0 acres.

Cowardin Class:

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: Newtown Creek, East River

Non-Tidal:

**E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

Office (Desk) Determination. Date: 21 December 2013

Field Determination. Date(s):

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

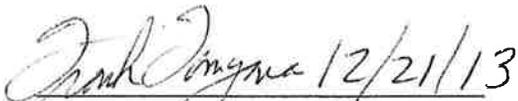
This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

**SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply)**

- checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - Office concurs with data sheets/delineation report.
  - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps:
- Corps navigable waters' study:
- U.S. Geological Survey Hydrologic Atlas:
  - USGS NHD data.
  - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite scale & quad name:
- USDA Natural Resources Conservation Service Soil Survey. Citation:
  
- National wetlands inventory map(s). Cite name:
- State/Local wetland inventory map(s):
- FEMA/FIRM maps:
- 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- Photographs:  Aerial (Name & Date):  
or  Other (Name & Date):
- Previous determination(s). File no. and date of response letter:
- Other information (please specify):

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**

 12/21/13

Signature and date of  
Regulatory Project Manager  
(REQUIRED)

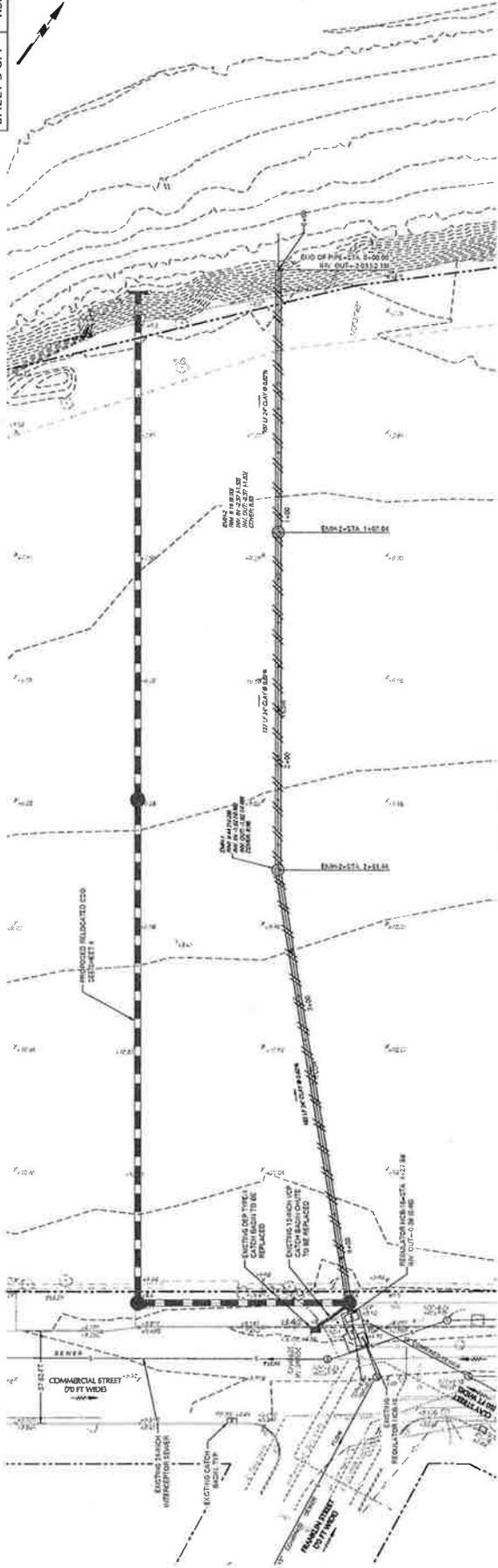
\_\_\_\_\_  
Signature and date of  
person requesting preliminary JD  
(REQUIRED, unless obtaining  
the signature is impracticable)



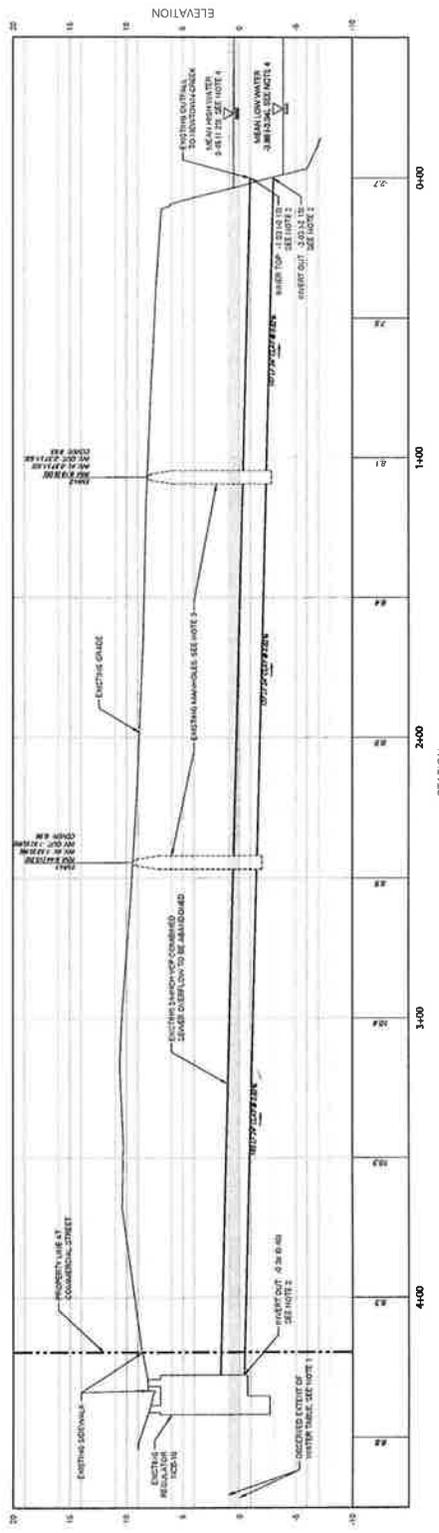
JAN 31 2014

SHEET 3 of 7 RSK 003/13

LANGAN



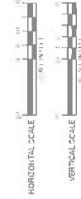
PLAN VIEW  
SCALE 1" = 20'



PROFILE VIEW  
SCALE 1" = 4'

- NOTES
1. LIMITS OF PLANT TABLE AS SHOWN IN PROFILE VIEW PREPARED BY LANGAN ENGINEERING ENVIRONMENTAL CONSULTING ENGINEERS AND DATED 23 MAY 2013. P.C. TYPED 'COMMERCIAL' BUT FRANKLIN STREETS COULDED SEWER (GEOGRAPHICAL).
  2. EXISTING 12" AND 18" DIAMETER SEWER LINES SHOWN IN PLAN VIEW ARE LOCATED IN BRACKETED (1) IN WHICH INFORMATION ON EXISTING COULDED SEWERS OBTAINED FROM AVAILABLE RECORD DRAWINGS AND FIELD SURVEY DATA.
  3. MEAN HIGH AND LOW WATER ESTIMATE OBTAINED FROM NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION STATION DATA AT QUEBEC/ROUSH BRIDGE STATION 0 61 81 81.

NAN-2013-01514-ETA



EXISTING SEWER PLAN AND PROFILE

**LANGAN**  
 311 King Street West, Suite 2000  
 Toronto, Ontario M5X 1C4  
 Tel: 416.593.9333  
 Fax: 416.593.9334  
 www.langan.com

SHEET 3 of 7 RSK 003/13





DEPARTMENT OF THE ARMY  
NEW YORK DISTRICT, CORPS OF ENGINEERS  
JACOB K. JAVITS FEDERAL BUILDING  
26 FEDERAL PLAZA  
NEW YORK, NEW YORK 10278-0090

CENAN-OP-R

**NATIONWIDE PERMIT COMPLIANCE CERTIFICATION AND REPORT FORM**

Permittee: Greenpoint Landing Developers, LLC

Permit No.: NAN-2013-01514

Date Permit Issued: JAN 31 2014

Location: Brooklyn, New York

Within 30 days of the completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the address at the bottom of this form.

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification or revocation.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of said permit, and required mitigation was completed in accordance with the permit conditions.

\_\_\_\_\_  
Signature of Permittee

\_\_\_\_\_  
Date

Fold this form into thirds, with the bottom third facing outward. Tape it together and mail to the address below or FAX to (212) 264-4260.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Place Stamp  
Here

Department of the Army  
New York District Corps of Engineers  
Jacob K. Javits Federal Building  
26 Federal Plaza, Room 1937  
ATTN: CENAN-OP-R  
New York, New York 10278-0090

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**NOTE:** This document is derived from the New York District Public Notice dated May 30, 2012, which listed all the Nationwide Permits (NWP) and their regional conditions for all of New York State. That document can be obtained from the New York District web site, located at:

<http://www.nan.usace.army.mil/Missions/Regulatory/NationwidePermits.aspx>

This document focuses specifically on NWP 3 (Maintenance) and the regional conditions applicable to the counties within the New York District Corps of Engineers.

**Table of Contents:**

- A. Nationwide Permits Index**
- B. Nationwide Permit 3 - Maintenance**
  - **Specific NWP terms and notification requirements**
  - **District Specific NWP Regional Conditions**
  - **NYSDEC Specific NWP Water Quality Certification**
  - **NYSDOS Specific NWP Coastal Zone Consistency Determination**
- C. Nationwide Permit General Conditions**
- D. District Engineer's Decision**
- E. Further Information**
- F. Definitions**
- G. New York District Regional General Conditions (applicable to all NWPs)**
- H. NYSDEC General Water Quality Conditions (applicable to all NWPs for which Water Quality Certification has been provided)**
- I. NYSDOS Coastal Zone Management Consistency Determinations (applicable to all projects located within the NYS Coastal Zone)**
- J. Information on Nationwide Permit Verification**
- K. Agency Contact Information**

**ENCLOSURE 1: New York State Regulatory District Boundary Map**

**ENCLOSURE 2: NYC Water Supply – East of Hudson Watershed**

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**A. Nationwide Permits Index:**

1. Aids to Navigation
2. Structures in Artificial Canals
3. Maintenance
4. Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities
5. Scientific Measurement Devices
6. Survey Activities
7. Outfall Structures and Associated Intake Structures
8. Oil and Gas Structures on the Outer Continental Shelf
9. Structures in Fleeting and Anchorage Areas
10. Mooring Buoys
11. Temporary Recreational Structures
12. Utility Line Activities
13. Bank Stabilization
14. Linear Transportation Projects
15. U.S. Coast Guard Approved Bridges
16. Return Water from Upland Contained Disposal Areas
17. Hydropower Projects
18. Minor Discharges
19. Minor Dredging
20. Response Operations for Oil and Hazardous Substances
21. Surface Coal Mining Activities
22. Removal of Vessels
23. Approved Categorical Exclusions
24. Indian Tribe or State Administered Section 404 Programs
25. Structural Discharges
26. [Reserved]
27. Aquatic Habitat Restoration, Establishment, and Enhancement Activities
28. Modifications of Existing Marinas
29. Residential Developments
30. Moist Soil Management for Wildlife
31. Maintenance of Existing Flood Control Facilities
32. Completed Enforcement Actions
33. Temporary Construction, Access, and Dewatering
34. Cranberry Production Activities
35. Maintenance Dredging of Existing Basins
36. Boat Ramps
37. Emergency Watershed Protection and Rehabilitation
38. Cleanup of Hazardous and Toxic Waste
39. Commercial and Institutional Developments
40. Agricultural Activities
41. Reshaping Existing Drainage Ditches
42. Recreational Facilities
43. Stormwater Management Facilities
44. Mining Activities
45. Repair of Uplands Damaged by Discrete Events
46. Discharges in Ditches
47. [Reserved]
48. Commercial Shellfish Aquaculture Activities
49. Coal Remining Activities
50. Underground Coal Mining Activities
51. Land-Based Renewable Energy Generation Facilities
52. Water-Based Renewable Energy Generation Pilot Projects

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**B. Nationwide Permits**

**3. Maintenance.** (a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

(b) This NWP also authorizes the removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap to protect the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization. The placement of new or additional riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the district engineer.

(c) This NWP also authorizes temporary structures, fills, and work necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

(d) This NWP does not authorize maintenance dredging for the primary purpose of navigation. This NWP does not authorize beach restoration. This NWP does not authorize new stream channelization or stream relocation projects.

**Notification:** For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

**Note:** This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**Permit-specific Regional Conditions:**

- a. The Nationwide General Permit Condition No. 31 – Pre-Construction Notification (PCN) for activities proposed under NWP 3.b. involving the removal of accumulated sediments and debris in the vicinity of existing structures to restore the waterway to previously existing depths, must include evidence of such depths. Such evidence may include but is not limited to: construction drawings of the original structure; or project drawings of past excavation activities in the vicinity. If this information is not available, the PCN must include evidence of the existing depths immediately outside the proposed work area.
- b. Every effort should be made to prevent additional encroachment into the beds of New York waterbodies. All repair or rehabilitation activities should focus on using the area immediately landward of the existing structure. Bulkhead replacement shall be completed in-place or landward of the existing structure where practicable. When that is not practicable, a PCN shall be required for any encroachment proposed within tidal waters of the U.S. or any extensions that exceed 18 inches waterward of the existing bulkhead within non-tidal waters. The PCN must include justification for a waterward extension of the bulkhead (e.g geologic conditions, engineering requirements, etc).
- c. For those activities that require a PCN to the Corps of Engineers, and are located within Essential Fish Habitat waters as defined in Section G-D.8. below, to the maximum extent practicable, no in-water work shall occur between March 1 and June 30.

**REMINDER TO APPLICANT: For projects involving culvert maintenance or replacement, please take particular note of the requirements of General Regional Conditions A.11. and A.12., below.**

**Section 401 Water Quality Certification:**

The New York State Department of Environmental Conservation (NYSDEC) has granted blanket Section 401 Water Quality Certification in New York State provided that the project complies with **all** the General Conditions listed below in Section H. Any party conducting the activities authorized by this NWP that cannot comply with **all** these conditions must apply for and obtain an individual Section 401 Water Quality Certification from the NYSDEC.

**New York State Department of State Coastal Zone Management Consistency Determination:**

Pursuant to 15 CFR Part 930.41, the New York State Department of State (NYSDOS) concurs with the USACE consistency determination for this NWP with which all general and all Buffalo and New York District regional conditions are complied and with the additional condition(s), as follows:

The NYSDOS concurs with the Corps' consistency determination for NWP 3 anywhere in the New York coastal area where the activities to be authorized would:

- involve the repair/replacement in-place or landward, with no seaward expansion or increase in footprint; or
- for those activities proposed within the artificial canals located in Nassau and Suffolk Counties identified as "DOS Identified Canals" on the NYS Coastal Consistency map located at: [http://appext9.dos.state.ny.us/coastal\\_map\\_public/map.aspx](http://appext9.dos.state.ny.us/coastal_map_public/map.aspx).

**For activities that do not comply** with the above condition, the NYSDOS objects to the Corps' consistency determination and therefore, an individual consistency concurrence determination from NYSDOS is required for this NWP to be valid in the New York coastal area. See Section I below for further information.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**C. Nationwide Permit General Conditions**

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR §§ 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR § 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.  
(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.  
(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.
2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.
3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.
4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.
6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).
7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.noaa.gov/fisheries.html> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.

(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However,

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWP.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWP does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

\_\_\_\_\_  
(Transferee)

\_\_\_\_\_  
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(1)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

31. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWP's 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

- (1) Name, address and telephone numbers of the prospective permittee;
- (2) Location of the proposed project;
- (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);
- (4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;
- (5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.
- (6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and
- (7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWP and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

**D. District Engineer's Decision**

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

**E. Further Information**

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

# Final Regional Conditions, Water Quality Certification and Coastal Zone Concurrence for Nationwide Permit 3 (Maintenance) within the New York District's Portion of the State of New York

## Expiration March 18, 2017

### F. Definitions

**Best management practices (BMPs):** Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

**Compensatory mitigation:** The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

**Currently serviceable:** Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

**Direct effects:** Effects that are caused by the activity and occur at the same time and place.

**Discharge:** The term "discharge" means any discharge of dredged or fill material.

**Enhancement:** The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

**Ephemeral stream:** An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

**Establishment (creation):** The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

**High Tide Line:** The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

**Historic Property:** Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

**Independent utility:** A test to determine what constitutes a single and complete non-linear project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

**Indirect effects:** Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

**Intermittent stream:** An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

**Loss of waters of the United States:** Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

**Non-tidal wetland:** A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

**Open water:** For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

**Ordinary High Water Mark:** An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

**Perennial stream:** A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

**Practicable:** Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

**Pre-construction notification:** A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

**Preservation:** The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

**Re-establishment:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

**Rehabilitation:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

**Restoration:** The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

**Riffle and pool complex:** Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**Riparian areas:** Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

**Shellfish seeding:** The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

**Single and complete linear project:** A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

**Single and complete non-linear project:** For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

**Stormwater management:** Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

**Stormwater management facilities:** Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

**Stream bed:** The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

**Stream channelization:** The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

**Structure:** An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

**Tidal wetland:** A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

**Vegetated shallows:** Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

Waterbody: For purposes of the NWP's, a waterbody is a jurisdictional water of the United States. If a jurisdictional wetland is adjacent – meaning bordering, contiguous, or neighboring – to a waterbody determined to be a water of the United States under 33 CFR 328.3(a)(1)-(6), that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of “waterbodies” include streams, rivers, lakes, ponds, and wetlands.

**G. General Regional Conditions**

These conditions apply to ALL Nationwide Permits.

**G-A. Construction Best Management Practices (BMP's):** Unless specifically approved otherwise through issuance of a waiver by the District Engineer, the following BMP's must be implemented to the maximum degree practicable, to minimize erosion, migration of sediments, and adverse environmental impacts. Note that at a minimum, all erosion and sediment control and stormwater management practices must be designed, installed and maintained in accordance with the latest version of the “New York Standards and Specifications for Erosion and Sediment Control” and the “New York State Stormwater Management Design Manual”. These documents are available at: <http://www.dec.ny.gov/chemical/29066.html> and <http://www.dec.ny.gov/chemical/29072.html>, respectively.

1. All synthetic erosion control features (e.g., silt fencing, netting, mats), which are intended for temporary use during construction, shall be completely removed and properly disposed of after their initial purpose has been served. Only natural fiber materials, which will degrade over time, may be abandoned in place.
2. Materials resulting from trench excavation for utility line installation or ditch reshaping activities which are temporarily sidecast or stockpiled into waters of the United States must be backfilled or removed to an upland area within 30 days of the date of deposition. Note: upland options shall be utilized prior to temporary placement within waters of the U.S., unless it can be demonstrated that it would not be practicable or if the impacts of complying with this upland option requirement would result in more adverse impacts to the aquatic environment.
3. For trenching activities in wetlands the applicant shall install impermeable trench dams or trench breakers at the wetland boundaries and every 100 feet within wetland areas to prevent inadvertent drainage of wetlands or other waters of the United States.
4. Dry stream crossing methods (e.g., diversion, dam and pump, flume, bore) shall be utilized for culvert or other pipe, or utility installations to reduce downstream impacts from turbidity and sedimentation. This may require piping or pumping the stream flow around the work area and the use of cofferdams.
5. No in-stream work shall occur during periods of high flow, except for work that occurs in dewatered areas behind temporary diversions, cofferdams or causeways.
6. Construction access shall be by means that avoid or minimize impacts to aquatic sites (e.g. upland access, floating barges, mats, etc.). Discharges of fill material associated with the construction of temporary access roads and work pads in wetlands shall be placed on filter fabric. All temporary fills shall be removed upon completion of the work and the disturbed area restored to pre-construction contours, elevations and wetland conditions.
7. All return flow from dredge material disposal areas shall not result in an increase in turbidity in the receiving water body that will cause a substantial visible contrast to natural conditions. (See NWP #16)

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

8. For activities involving the placement of concrete into waters of the U.S., the permittee must employ watertight forms. The forms shall be dewatered prior to the placement of the concrete. The use of tremie concrete is allowed, provided that it complies with New York State water quality standards.

9. New stormwater management facilities shall be located outside of waters of the U.S. A waiver of this requirement may be requested with the submission of a PCN. The PCN must include justification which demonstrates that avoidance and minimization efforts have been met.

10. To the maximum extent practicable, the placement of fill in wetlands must be designed to maintain pre-construction surface water flows/conditions between remaining on or off-site waters. This may require the use of culverts and/or other measures. Furthermore, the activity must not restrict or impede the passage of normal or expected high flows (unless the primary purpose of the fill is to impound waters). The activity may alter the pre-construction flows/conditions if it can be shown that it benefits the aquatic environment (i.e. wetland restoration and/or enhancement).

11. In order to ensure compliance with NWP General Condition #2 – Aquatic Life Movement and #9 Management of Water Flows, all new or replacement culverts shall be constructed/installed in accordance with the following:

**General Information:**

- a. Use of the following requirements and recommendations alone will not satisfy the need for proper engineering and design. In particular, appropriate engineering is required to ensure structures are sized and designed to provide adequate capacity (to pass various flood flows) and stability (bed, bed forms, footings and abutments).
- b. Site specific information (i.e. stream bed slope, type and size of stream bed material, stream type, existing natural or manmade barriers, etc.) should be assessed to determine appropriate culvert design and to ensure management of water flows and aquatic life movement.
- c. Before replacing a culvert or other crossing structure with a larger structure it is essential that the replacement be evaluated for its impacts on: downstream flooding, upstream and downstream habitat (in-stream habitat, wetlands), potential for erosion and headcutting, and stream stability.
- d. Measures should be included in all culvert designs that will promote the safe passage of fish and other indigenous aquatic organisms.
- e. The dimension, pattern, and profile of the stream above and below the stream crossing should not be permanently modified by changing the width or depth of the stream channel.

**Preconstruction Notification (PCN)/Waiver Requirements:**

- A. A PCN is not required for projects that are designed to meet Requirements B and C, below, unless a PCN is otherwise required by the NWP regulations.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

- B. In order to comply with General Condition #2 Aquatic Life Movement, either a bottomless culvert or bridge must be used where practicable. If the stream cannot be spanned, the culvert must be installed with its bottom buried (embedded) below the grade of the stream bed where practicable. (Note: When not practicable to do so due to small culvert size, it is suitable to allow natural deposition to cover the interior of the culvert bed.)
- i. A minimum of three stream channel cross sections shall be taken at proximal locations to the crossing location to determine the average of the lowest points in elevation of the stream bed. This average low point shall be used to ensure low flow is maintained through the culvert and from which all embedment depths are measured.
  - ii. To ensure low flow and aquatic life movement is maintained, an embedment depth of a minimum of 20 percent of the culvert vertical rise throughout the length of the culvert is recommended. Additionally, it is recommended that the culvert bed slope remain consistent with the slope of the adjacent stream channel.
- C. In order to comply with General Condition #9 Management of Water Flows, bank-full flows shall be accommodated through maintenance of the existing bank-full channel cross sectional dimensions within the culvert. Bank-full width is generally considered to be the top width at the stage where a stream begins to overtop its banks and spread into the floodplain.
- i. An average of three measurements (project location and straight sections of the stream upstream and downstream) shall be used to determine appropriate opening width. If the project is a replacement of an existing structure then only upstream and downstream locations shall be used to compute the average.
  - ii. To ensure bank-full flow is accommodated by the culvert, it is recommended that minimum culvert widths include a minimum of 1.25 times width of the stream channel at the ordinary high water or a 2 year design storm.
- D. In summary, a PCN is required, requesting a waiver of the above requirements for projects where:
- i. both spanning the waterway and embedding are found to be not practicable;
  - ii. embedding is practicable but the recommendations for embedment depth cannot be met;
  - iii. bank-full flow will not be accommodated within the culvert;
  - iv. less than the recommended minimum culvert width is proposed
- E. In addition to the PCN requirements of General Condition #31, the PCN must include the following information:
- i. a note indicating which of the above requirements will not be met by the proposed project;
  - ii. information as to why the use of such structures or measures would not be practicable;
  - iii. a brief description of the stream discussing the items outlined in the above General Information section;
  - iv. the cross sections of the stream used to calculate the stream bed low point and bank-full width;

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

- v. an evaluation of the effects the crossing would have on aquatic life movement and/or water flows; and
- vi. mitigation measures that will be employed to minimize these effects.

A waiver of the requirement(s) will be issued if it can be demonstrated that the proposal would result in the least environmentally damaging practicable alternative (e.g. compliance with any of the requirement(s) would result in detrimental impacts to the aquatic system).

12. Culvert Rehabilitation Projects, not including culvert replacement projects:
- a. A PCN is required for culvert rehabilitation projects which will involve pipe slip lining or other activities, including concrete invert paving and concrete lining, that raise the existing invert elevation such that it causes an impediment to the passage of low flow or aquatic life movement. A PCN is not required for projects that utilize cured-in-place pipe lining. Slip lining is defined as the insertion of a smaller diameter pipe into an existing pipe by pulling pushing, or spiral winding.
  - b. Culvert rehabilitation projects shall assess the existing culvert, prior to the proposed repair, for compliance with Nationwide Permit General Conditions (GC) #2 (Aquatic Life Movements) and #9 (Management of Water Flows). If an impediment is found to exist, a PCN is required for any rehabilitation project.
  - c. For all projects requiring PCN, the applicant must provide an evaluation of the existing culvert and proposed rehabilitation project and their effects upon aquatic life movements and low/ high flow conditions in order to show compliance with GC #2 & #9. For those culverts that will impede the movement of aquatic life and water flows, the applicant must provide information as to how they will mitigate for those deficiencies. Mitigation measures may include, but are not limited to baffles, weirs, roughened channels, and grade control structures.

**G-B.** No regulated activity authorized by a Nationwide Permit can cause the loss of areas classified as a bog or fen in the State of New York, as determined by the Buffalo or the New York District Corps of Engineers, due to the scarcity of this habitat in New York State and the difficulty with in-kind mitigation. The Districts will utilize the following document in the classification:

Reschke, C. 1990. *Ecological Communities of New York State*. New York Natural Heritage Program. New York State Department of Environmental Conservation. Latham, N.Y. 96p. This document is available at the following location: <http://www.dec.ny.gov/animals/29389.html>

**G-C. National Wild and Scenic Rivers (NWSR):** The Upper Delaware River has been designated as a National Wild and Scenic River from the confluence of the East and West Branches below Hancock, New York, to the existing railroad bridge immediately downstream of Cherry Island in the vicinity of Sparrow Bush, New York. Also, the portion of the Genesee River located within Letchworth Gorge State Park, beginning at the southern boundary of the park and extending downstream to the Mt. Morris Dam, was designated by Congress as a permanent Study River in the Genesee River Protection Act of 1989. In accordance with General Condition #16, no activity may occur within a NWSR, including Study Rivers, unless the National Park Service (NPS) has determined in writing that the proposed work will not adversely affect the NWSR designation or study status. Therefore, a PCN is required for any NWP which would impact the designated portions of the Genesee River or the Upper Delaware River. (Note: the applicant may not commence work under any NWP until the NPS determines in writing that the project will not adversely affect the NWSR even if 45-days have passed since receipt of the PCN package.) Information regarding NWSR may be found at: <http://www.rivers.gov/wildriverslist.html>

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**G-D. For all proposals requiring a pre-construction notification (PCN), in addition to the requirements in General Condition 31, the applicant shall also include: (Note: the application will not be considered complete until all of the applicable information is received).**

**1. New York State/USACE Joint Application Form:** The application form shall be completed and signed and shall clearly indicate that the submission is a PCN.

**2. Drawings:** The PCN must include legible, black and white project drawings on 8.5" x 11" paper. Full size drawings may be submitted in addition to the 8.5" x 11" plans to aid in the application review. Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are a Vicinity Map (i.e. a location map such as a USGS topographical map), a Plan View and a Cross-Section Map. Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view or cross section). The Vicinity Map shall provide the location of the entire project site. In addition, each illustration should be identified with a figure or attachment number. The location map shall include the Latitude and Longitude or UTM coordinates of the project. For linear projects, the PCN shall include a map of the entire project including a delineation of all waters of the U.S. within the corridor. Aquatic resource information shall be submitted using the Cowardin Classification System mapping conventions (e.g. PFO, PEM, etc.)

**3. Color photographs:** The photos should be sufficient to accurately portray the project site, keyed to a location map and not taken when snow cover is present.

**4. Avoidance and Minimization:** The PCN must include a written narrative explaining how avoidance and minimization of temporary impacts and permanent losses of waters of the U.S. were achieved on the project site (i.e. site redesign, reduction in scope, alternate methods, etc). It should include a description of the proposed construction practices that would be implemented to perform the proposed work and a description of the reasonably foreseeable direct and indirect effects to waters of the U.S. from the proposed construction practices.

**5. Mitigation**(See General Conditions 23 & 31(b)(5)):The PCN must include at least a conceptual compensatory mitigation plan for all projects resulting in the loss of greater than 1/10<sup>th</sup> of an acre of waters of the United States; or for which a waiver of the 300 linear foot limit on intermittent and ephemeral streams is being requested. Mitigation conceptual plans submitted with the PCN must include the following information at a minimum: proposed compensation type (bank or in-lieu fee credit, restoration, creation, preservation, etc.), location and brief discussion on factors considered for site selection (i.e. soils, water source, potential for invasive species, etc.), amount proposed per resource type and a discussion of how the proposal will compensate for aquatic resource functions and services lost as a result of the project.

Note 1: All mitigation projects must comply with the Federal Regulations on compensatory mitigation (33 CFR 332) entitled "Compensatory Mitigation for Losses of Aquatic Resources: Final Rule", dated April 10, 2008, which is available at: [http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title33/33cfr332\\_main\\_02.tpl](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title33/33cfr332_main_02.tpl), and any applicable District Guidelines.

Note 2: Although a conceptual mitigation plan may be sufficient for the purposes of a PCN submission, a detailed mitigation plan must be approved by the Corps before any jurisdictional work may occur on the project site.

**6. Nationwide Rivers Inventory:** The PCN shall indicate if a river segment listed within the National Park Service Nationwide Rivers Inventory (NRI) is located within the proposed project area. For project areas containing a listed NRI segment, the PCN shall also include a statement as

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

to how adverse effects to the river have been avoided or mitigated. The list is available at:  
<http://www.nps.gov/ncrc/programs/rtca/nri/states/ny.html>.

**7. Historic or Cultural Resources:** In accordance with General Condition 20, a PCN is required for any non-federal activity which may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places. Please refer to General Condition 20 for submission requirements. In addition, all PCNs must include a written statement indicating if any such properties may be affected by the proposed project. A copy of any completed survey reports shall be provided with the PCN. If a survey has not been performed, the statement shall include a list of resources checked in the determination. Copies of any available correspondence from the New York State Office of Parks, Recreation, and Historic Preservation State Historic Preservation Officer (SHPO) regarding historic properties shall be provided with the PCN. Information regarding cultural resources may be found at: <http://nysparks.state.ny.us/shpo/>. In addition, assistance regarding the determination of the presence of historic or cultural resources at or near the project site should be directed to SHPO. NOTE: as stated in General Condition 20, if any listed, eligible or potentially eligible properties are present, the applicant shall not begin the activity until notified by the district engineer in writing either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

**8. Endangered Species (See General Condition 18) and Essential Fish Habitat:** The PCN must include a written statement and documentation concerning any Essential Fish Habitat (EFH) and any federally listed Threatened and Endangered (T&E) species or designated critical habitat that might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat. The PCN must include a copy of any correspondence from the U.S. Fish and Wildlife Service (USFWS) and/or National Oceanic and Atmospheric Administration Fisheries Service (NOAA-Fisheries) formerly National Marine Fisheries Service (NMFS), regarding the presence of T&E species or evidence that the applicant has utilized the USFWS T&E website: <http://www.fws.gov/northeast/nyfo/es/section7.htm>. Information on NOAA-Fisheries (NMFS) species (both T&E and EFH) can be found at: <http://www.nero.noaa.gov/nero>. Website evidence shall include a County list of T&E species. For projects located in counties containing T&E species, the PCN shall also include a discussion of potential T&E habitat within the project site. If there is potential habitat for any Federally listed species within the project site the following should be submitted:

- a. The results of any habitat surveys and presence/absence surveys. Note: all surveys should be coordinated with the USFWS and/or NOAA-Fisheries(NMFS) prior to initiation.
- b. A detailed description of the proposed project, including secondary impacts and approximate proposed project construction schedule of project activities (e.g. land clearing, utilities, stormwater management).
- c. A description of the natural characteristics of the property and surrounding area (e.g. forested areas, freshwater wetlands, open waters, and soils). Additionally, please include a description of surrounding land use (residential, agricultural, or commercial).
- d. A description of the area to be impacted by the proposed project, including the species and number or acres of trees to be removed.
- e. The location of the above referenced property and extent of any project related activities or discharges clearly indicated on a copy of a USGS 7.5 minute topographic quadrangle (quad) with the name of the quad(s) and latitude/longitude clearly labeled.
- f. A description of conservation measures to avoid or minimize impacts to listed species.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

Please note that there are no known threatened or endangered (T&E) species or EFH species under the jurisdiction of the NOAA-Fisheries (NMFS) within the Buffalo District. Therefore, all Buffalo District requests for information regarding the presence of T&E species should be directed to the USFWS.

General Condition #18 is emphasized, ..."In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed work will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed."

**9. 100 Year Floodplain:** For permanent fills within waters of the United States within the 100 year floodplain, documentation of compliance with FEMA-approved state or local floodplain management requirements.

**10. Submission of Multiple Copies of PCN:**

- a) One (1) additional copy of the PCN package shall be provided to USACE for coordination with National Oceanic and Atmospheric Administration (NOAA) for utility lines to be constructed or installed in navigable waters of the U.S. proposed under NWP #12, (See Note 1 of NWP #12)
- b) One (1) additional copy of the PCN package shall be provided to USACE for coordination with Department of Defense Siting Clearinghouse (See NWP #12, 39, 51 & 52 Notes) for:
  - i. overhead utility lines proposed under NWP #12 and
  - ii. any activity that involves the construction of a wind energy generating structure, solar tower, or overhead transmission lines proposed under NWP #39, 51 or 52
- c) Two (2) additional copies of the PCN package shall be provided to USACE when the project is located within the New York City Watershed, for coordination with the New York City Department of Environmental Protection.
- d) Five (5) additional copies of the PCN package shall be submitted to USACE for agency coordination in accordance with General Condition # 31(d)(2) for:
  - i. All NWP activities that result in the loss of greater than 1/2-acre of waters of the United States,
  - ii. NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed,
  - iii. All NWP 48 activities requiring pre-construction notification.

**G-E. Critical Resource Waters**

In accordance with NWP General Condition (GC) #22, certain activities in Critical Resource Waters cannot be authorized under the NWP program or would require a PCN (see GC #22 for a list of the NWP activities that are either excluded or require a PCN).

Critical Resource Waters in New York State include the following:

1. **East-of-Hudson portion of the New York City Water Supply:** This area includes portions of Dutchess, Putnam and Westchester Counties as delineated on Enclosure 2.
2. **Hudson River National Estuarine Research Reserves (NERR):** The Hudson River NERR consists of four components: Piermont Marsh, Iona Island, Tivoli Bay, and Stockport Flats.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**H. NYSDEC General Water Quality Certification (WQC) Conditions applicable to  
all NWP's for which WQC has been provided are as follows:**

***1. Non-contamination of Waters:***

- All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, resins, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

***2. Installation and Maintenance of Culverts:***

- This certification does not authorize the installation of any culverts that are not embedded beneath the existing grade of the stream channel.
- This certification does not authorize culvert rehabilitation projects that involve slip lining, invert paving, or similar treatments that can result in an impediment to the passage of aquatic life movement through the culvert.
- This certification does authorize the rehabilitation of culverts utilizing Cure in Place Pipe Lining (CIPP) or concrete spray lining for culverts which currently meet Nationwide Permit General Condition # 2 - Aquatic Life Movements.

***3. Discharges and Disturbances:***

- Except for Nationwide Permit # 3, 4, 20, 22, 27, 30, 33, 37, 41 and maintenance activities under Nationwide Permit 43, this certification does not authorize discharges greater than 1/4 acre in size or more than 300 feet of stream disturbance.

***4. Maintenance of Water Levels:***

- Except for Nationwide Permit 27, this certification does not authorize any activity that results in a permanent water level alteration in waters of the United States, such as draining or impounding.

***5. Dewatering:***

- Authorized dewatering is limited to immediate work areas that are cofferdammed or otherwise isolated from the larger water body or waters of the United States. Dewatering must be localized and not drain extensive areas of a water body or reduce the water level such that fish and other aquatic vertebrates are killed, or their eggs and nests are exposed to desiccation, freezing or depredation in areas outside of the immediate work site.
- Cofferdams or diversions shall not be constructed in a manner that causes or exacerbates erosion of the bed or banks of a watercourse.
- All dewatering structures must be permanently removed when construction is completed.

***6. Endangered or Threatened Species:***

- Applicants must certify that the proposed activity will not jeopardize the existence of an endangered species or threatened species listed in 6 NYCRR Part 182, or likely to destroy or adversely modify the habitat of such species. Information on New York State endangered or threatened species may be obtained from the NYS Department of Environmental regional offices, the New York Natural Heritage Program in Albany, New York or on the NYSDEC website at <http://www.dec.ny.gov/animals/29338.html>. If it is determined that there is a species of concern that may be impacted by the proposed activity, this blanket water quality certification is not applicable, and the applicant will need an individual water quality certification from the Department.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

***7. Prohibition Period/or In-stream Work:***

Unless approved in writing by the Regional Natural Resources Supervisor or their designee, in-stream work is prohibited during the following time periods:

- in cold water trout fisheries (waters classified under Article 15 of New York's Environmental Conservation Law with a "t" or "ts" designation), beginning October 1 and ending May 31
- in perennial warm water fisheries, (non- trout waters classified under Article 15 of New York's Environmental Conservation Law as "A, B or C"), beginning March 1 and ending July 15.

To determine which prohibition period is in effect for a particular water, contact the Regional Natural Resources Supervisor in the appropriate NYSDEC regional office.

***8. Significant Coastal Fish and Wildlife Habitat:***

• This certification does not authorize any discharge occurring in a designated Significant Coastal Fish and Wildlife Habitat area pursuant to 19 NYCRR Part 602 ; Title 19 Chapter 13, Waterfront Revitalization and Coastal Resources.

***9. Coastal Erosion Hazard Areas:***

• This certification does not authorize projects in Coastal Erosion Hazard Areas, as identified in NYS Environmental Conservation Law (ECL) Article 34, and its implementing regulations, 6 NYCRR Part 505.

***10. State-owned Underwater Lands:***

• Prior to undertaking any Nationwide Permit activity that will involve or occupy state owned lands now or formerly under the waters of New York State, the party proposing the activity must first obtain all necessary approvals from:

NYS Office of General Services  
Division of Real Estate Development  
Corning Tower Building, 26th Floor  
Empire State Plaza  
Albany, NY 12242  
Tel. (518) 474-2195

***11. Tidal Wetlands:***

• This authorization does not authorize any activities in tidal wetlands as defined in Article 25 of NYS ECL, with the exception of NWP # 4, 20 and 48.

***12. Wild, Scenic and Recreational Rivers:***

• This certification does not authorize activities in any Wild, Scenic or Recreational River or state designated WSR corridors.

***13. Floodplains:***

• Authorized projects must be in compliance with State and Local Floodplain Regulations.

***14. Combined use of permits:***

• This authorization does not allow the stacking of NWP's so that in combination they exceed 1/4 of an acre of fill or 300 linear feet of stream disturbance. When used in combination, the most restrictive conditions apply.

***15. Public Service Commission:***

• This certification does not authorize activities regulated pursuant to Article VII of the New York State Public Service Law. For such projects, Section 401 Water Quality Certification is obtained from the New York State Public Service Commission.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**16. Utility Projects:**

- This certification does not authorize maintenance or other activities associated with hydropower projects.
- This certification does not authorize the construction of substation facilities or permanent access roads in wetlands or within the FEMA mapped 100 year floodplain.
- Excess materials resulting from trench excavation must be moved out of the wetland and contained so that they do not re-enter any waters of the United States.

**I. New York State Department of State (NYSDOS) Coastal Zone Management  
Consistency Determination applicable to all NWPs located within or affecting the  
NYS Coastal Zone:**

**To ensure that the NWPs and activities authorized by USACE would be consistent with the NYS Coastal Management Program and approved LWRPs, the following conditions will apply to NWPs where NYSDOS has objected to the USACE consistency determination or where the project will not comply with the NYSDOS NWP specific condition(s):**

The applicant will submit a request for an individual consistency determination to NYSDOS. Within thirty (30) days of receipt by NYSDOS of an applicant's submission, which should include a complete joint New York State Department of Environmental Conservation and U.S. Army Corps of Engineers Permit Application, completed Federal Consistency Assessment Form, and all information and data necessary to assess the effects of the proposed activity on and its consistency with the CMP, including location maps and photographs of the site where the activity is proposed, NYSDOS will inform the applicant and the Corps whether:

- 1) Necessary data and information is missing from the applicant's submission. If so, the NYSDOS will notify the applicant and the Corps of the missing necessary data and information, and state that the NYSDOS review will not commence until the date the necessary data and information is provided;
- 2) The activity meets the General Concurrence criteria set forth in the CMP and therefore, further review of the proposed activity by the NYSDOS, and the NYSDOS concurrence with an individual consistency certification for the proposed activity, are not required; or
- 3) NYSDOS review of the proposed activity and NYSDOS concurrence with the applicant's consistency certification is necessary. If NYSDOS indicates review of the activity and a consistency certification for it is necessary, the activity shall not be authorized by NWP or other form of Corps authorization unless NYSDOS concurs with an applicant's consistency certification, in accordance with 15 CFR Part 930, Subpart D, or unless NYSDOS indicates the activity meets CMP General Concurrence criteria (see item 2 above).

NYSDOS concurrence with an applicant's consistency certification shall not be presumed unless NYSDOS fails to concur with or object to an applicant's consistency certification within six (6) months of commencement of NYSDOS review of an applicant's consistency certification and all necessary data and information in accordance with 15 CFR Parts 930.62 or 930.63.

**Notes:**

- Unless NYSDOS issues consistency concurrence or USACE has determined that NYSDOS concurrence is presumed, NWPs are not valid within the Coastal Zone.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

- Limits of the coastal zone, including the CMP special management area designations of Significant Coastal Fish and Wildlife Habitats (SCFWH), can be viewed at:  
<http://www.dos.ny.gov/communitieswaterfronts/atlas/index.html> Local Waterfront Revitalization Program information can be viewed at:  
[http://www.dos.ny.gov/communitieswaterfronts/WFRevitalization/LWRP\\_status.html](http://www.dos.ny.gov/communitieswaterfronts/WFRevitalization/LWRP_status.html)
- All consistency concurrence determination requests must be submitted directly to NYSDOS.
- Details regarding NYSDOS submission requirements can be obtained at:  
<http://www.dos.ny.gov/communitieswaterfronts/consistency/federal.html>

**J. INFORMATION ON NATIONWIDE PERMIT VERIFICATION**

Verification of the applicability of a Nationwide Permit is generally valid for two years from the date of written verification unless the Nationwide Permit is modified, suspended or revoked, or the activity complies with any subsequent permit modification. Absent any changes to the current Nationwide Permits, reverification of the applicability of the project under the Nationwide Permit is not required if work is completed prior to March 19, 2017.

It is the applicant's responsibility to remain informed of changes to the Nationwide Permit program. A public notice announcing any changes will be issued when they occur. Please note that if you commence or are under contract to commence an activity in reliance of the permit prior to the date this Nationwide permit is suspended or revoked, or is modified such that the activity no longer complies with the terms and conditions, you have twelve months from the date of permit modification, expiration, or revocation to complete the activity under the present terms and conditions of the permit, unless the permit has been subject to the provisions of discretionary authority.

Possession of this permit does not obviate you of the need to contact all appropriate state and/or local governmental officials to insure that the project complies with their requirements.

**Final Regional Conditions, Water Quality Certification and Coastal  
Zone Concurrence for Nationwide Permit 3 (Maintenance) within the  
New York District's Portion of the State of New York  
Expiration March 18, 2017**

**K. AGENCY CONTACT INFORMATION**

**NYS Department of Environmental Conservation**

[www.dec.ny.gov](http://www.dec.ny.gov)

**NYS DEC REGION 1**

Regional Permit Administrator  
SUNY @ Stony Brook  
50 Circle Road  
Stony Brook, NY 11790-3409  
(631) 444-0365

**NYS DEC REGION 2**

Regional Permit Administrator  
1 Hunter's Point Plaza  
47-40 21st Street  
Long Island City, NY 11101-5407  
(718) 482-4997

**NYS DEC REGION 3**

Regional Permit Administrator  
21 South Putt Corners Road  
New Paltz, NY 12561-1620  
(845) 256-3054

**NYS DEC REGION 4**

Regional Permit Administrator  
1130 North Westcott Road  
Schenectady, NY 12306-2014  
(518) 357-2069

**NYS DEC REGION 4 Sub-Office**

Regional Permit Administrator  
65561 State Hwy 10  
Stamford, NY 12167-9503  
(607) 652-7741

**NYS DEC REGION 5**

Regional Permit Administrator  
PO Box 296  
1115 Route 86  
Ray Brook, NY 12977-0296  
(518) 897-1234

**NYS DEC REGION 5 Sub-Office**

Regional Permit Administrator  
PO Box 220  
232 Golf Course Rd  
Warrensburg, NY 12885-0220  
(518) 623-1281

**NYS DEC REGION 6**

Regional Permit Administrator  
317 Washington Street  
Watertown, NY 13601-3787  
(315) 785-2245

**NYS DEC REGION 6 Sub-Office**

Regional Permit Administrator  
207 Genesee Street  
Utica, NY 13501-2885  
(315) 793-2555

**NYS DEC REGION 7**

Regional Permit Administrator  
615 Erie Blvd West  
Syracuse, NY 13204-2400  
(315) 426-7438

**NYS DEC REGION 7 Sub-Office**

Regional Permit Administrator  
1285 Fisher Avenue  
Cortland, NY 13045-1090  
(607) 753-3095

**NYS DEC REGION 8**

Regional Permit Administrator  
6274 E. Avon - Lima Road  
Avon, NY 14414-9519  
(585) 226-2466

**NYS DEC REGION 9**

Regional Permit Administrator  
270 Michigan Avenue  
Buffalo, NY 14203-2915  
(716) 851-7165

**NYS DEC REGION 9 Sub-Office**

Regional Permit Administrator  
182 East Union Street  
Allegany, NY 14706-1328  
(716) 372-0645

**US Army Corps of Engineers**

[www.usace.army.mil](http://www.usace.army.mil)

For DEC Regions 1, 2 and 3

**US Army Corps of Engineers NY District**

ATTN: Regulatory Branch  
26 Federal Plaza, Room 1937  
New York, NY 10278-0090

Email: [CENAN.PublicNotice@usace.army.mil](mailto:CENAN.PublicNotice@usace.army.mil)

For DEC Regions 1, 2, Westchester County and Rockland County  
(917) 790-8511

For the other counties of DEC Region 3 -  
(917) 790-8411

For DEC Regions 4, 5

**Department of the Army**

ATTN: CENAN-OP-R

**NY District, Corps of Engineers**

1 Buffington Street  
Building 10, 3rd Floor  
Watervliet, NY 12189-4000  
(518) 266-6350 - Permits team  
(518) 266-6360 - Compliance Team  
Email: [cenan\\_rfo@usace.army.mil](mailto:cenan_rfo@usace.army.mil)

For DEC Regions 6, 7, 8, 9

**US Army Corps of Engineers**

**Buffalo District**

ATTN: Regulatory Branch

1776 Niagara Street  
Buffalo, NY 14207-3199  
(716) 879-4330

Email: [L.RB.Regulatory@usace.army.mil](mailto:L.RB.Regulatory@usace.army.mil)

[www.lrb.usace.army.mil](http://www.lrb.usace.army.mil)

**NYS Department of State**

Division of Coastal Resources

Consistency Review Unit

One Commerce Plaza

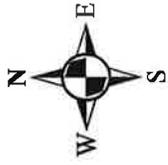
99 Washington Avenue, Suite 1010

Albany, NY 12231-0001

(518) 474-6000

[www.nyswaterfronts.com](http://www.nyswaterfronts.com)

# U.S. Army Corps of Engineers Regulatory Districts in New York State



## Buffalo District

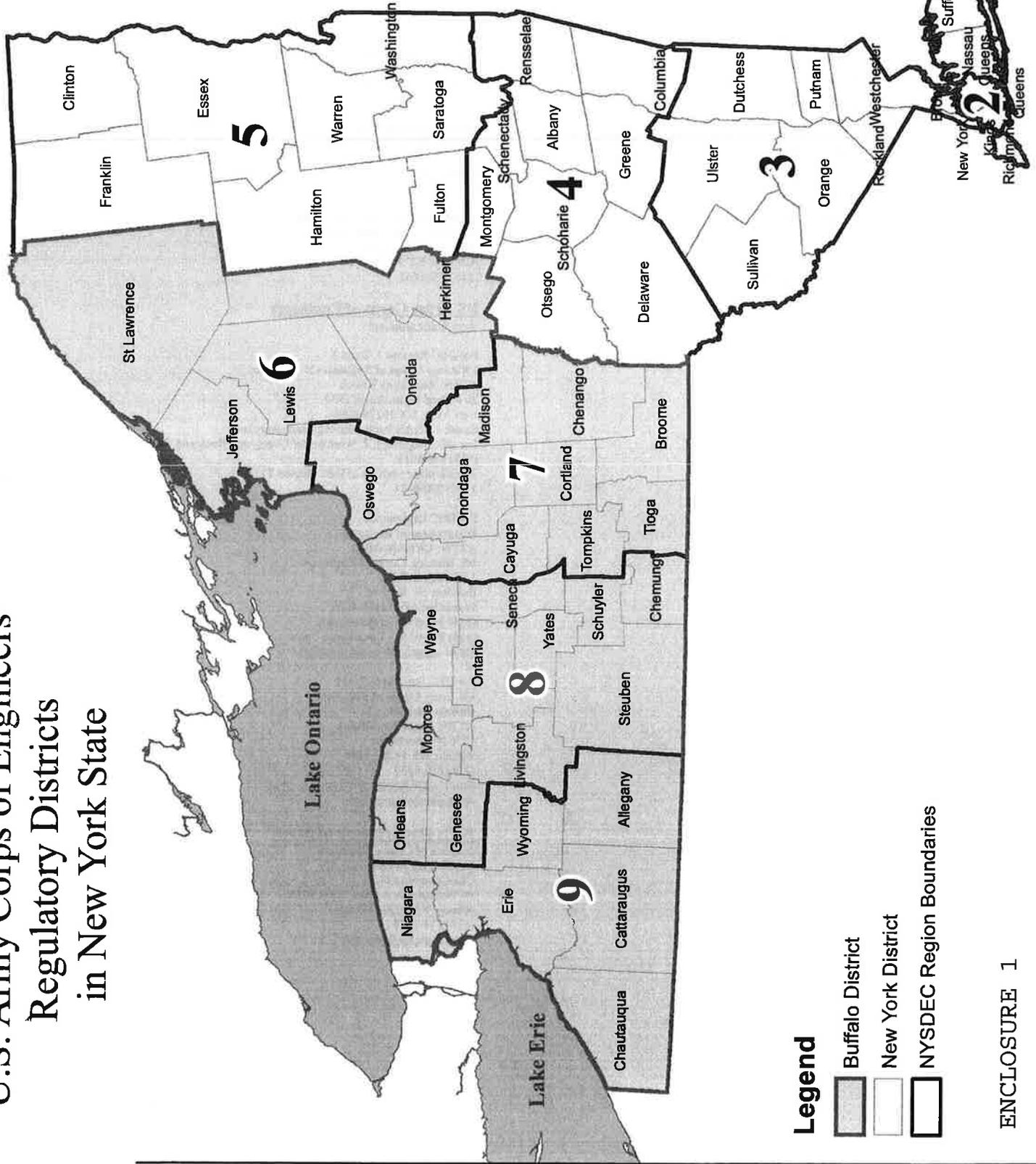
Regulatory Branch, District Office  
1776 Niagara Street  
Buffalo, New York 14207  
(716) 879-4330

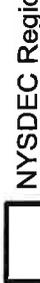
Regulatory Branch, Auburn Field Office  
7413 County House Road  
Auburn, New York 13021  
(315) 255-8090

## New York District

Regulatory Branch, District Office  
26 Federal Plaza  
New York, New York 10278-0090  
(917) 790-8411

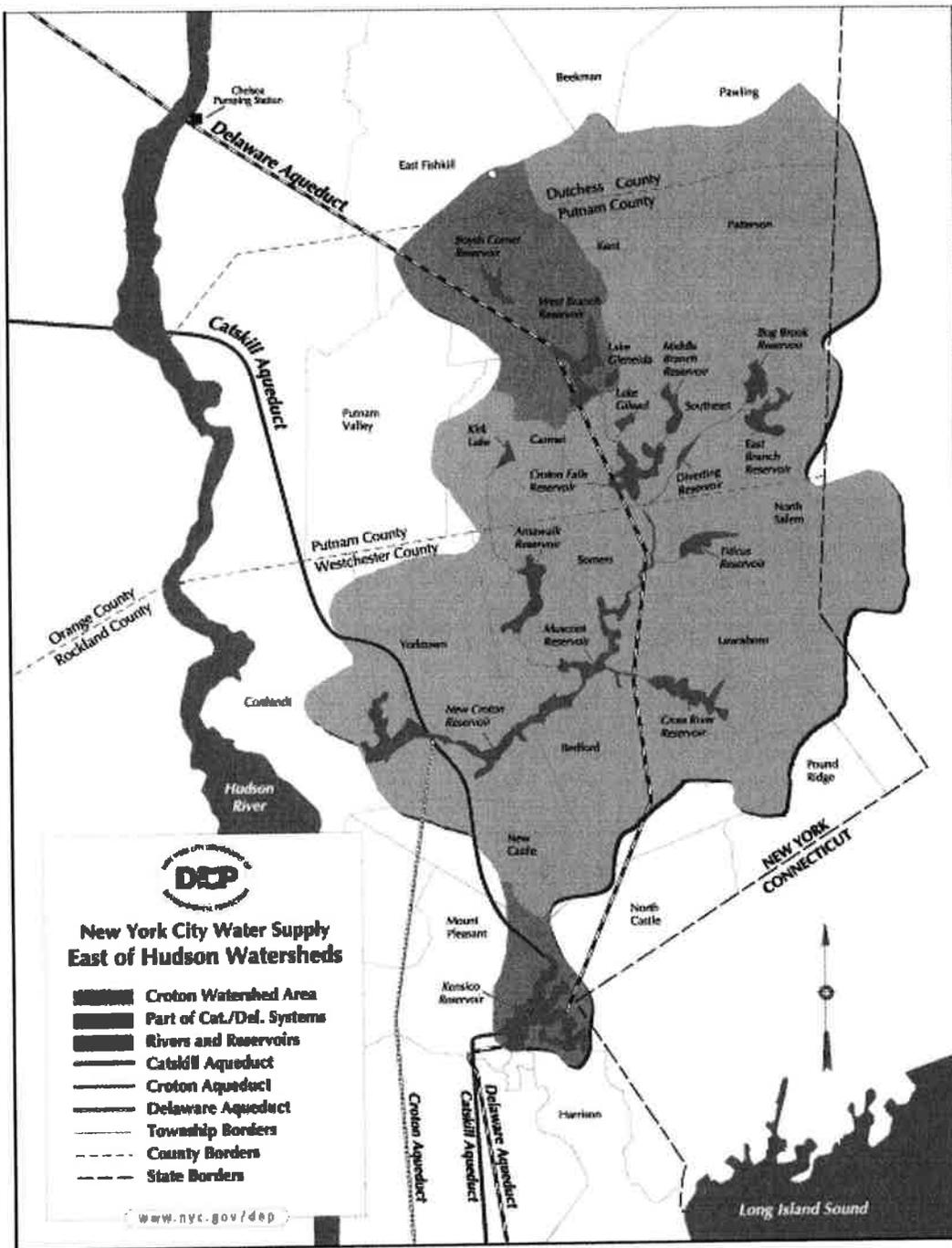
Regulatory Branch, Upstate Field Office  
1 Buffington Street  
Watervliet, New York 12189-4000  
(518) 266-6350



- Legend**
-  Buffalo District
  -  New York District
  -  NYSDEC Region Boundaries



U.S. Army  
Corps of Engineers



ENCLOSURE 2

**ATTACHMENT B**

**NYSDEC CSO PERMIT**

**New York State Department of Environmental Conservation**

**Division of Environmental Permits, Region 2**

47-40 21<sup>ST</sup> Street, Long Island City, NY 11101-5407

Phone: (718) 482-4997 \$ FAX: (718) 482-4975

Website: www.dec.state.ny.us



Joe Martens  
Commissioner

March 5, 2014

Mr. Christopher Vitolano, PE, LEED AP  
Langan Engineering, Environmental, Surveying and Landscape Architecture, DPC  
21 Penn Plaza  
360 West 31st Street  
New York, NY 10001

Re: **NYSDEC Permit application #2-6101-00296/00016**  
**Facility: GREENPOINT LANDING**  
**ECL Article 25 - Tidal Wetlands**  
**ECL Article 15 - Protection of Waters**  
**6 NYCRR 608 - Water Quality Certification**  
**NOTICE OF PERMIT ISSUANCE**

Dear Mr. Vitolano:

Enclosed is your permit for the above referenced project, amended to name Greenpoint Landing Developers, LLC, as the legally responsible party. The permit is effective beginning February 27, 2014 and expires on December 31, 2017.

Please read all permit conditions carefully. All permit documents must be available upon request by Department staff and must be distributed to and understood by personnel responsible for the proper operation of the project and compliance with the permit requirements. Any violation of these permit conditions constitutes a violation of the Environmental Conservation Law.

Please note that this permit does not cover dewatering. If dewatering is part of this project, the applicant is responsible for obtaining and adhering to all city and/or state dewatering permits

Any questions concerning this matter should be directed to Sandra Reyes-Guerra in the Division of Environmental Permits at (718) 482-4969.

Very truly yours,

Sandra Reyes-Guerra  
Environmental Analyst 2

Cc: Mr. Al Bradshaw (via email)



**PERMIT**  
**Under the Environmental Conservation Law (ECL)**

**Permittee and Facility Information**

**Permit Issued To:**

GREENPOINT LANDING DEVELOPERS, LLC  
535 MADISON AVENUE  
NEW YORK, NY 10022  
(212) 355-7570

**Facility:**

GREENPOINT LANDING  
171 WEST ST  
BROOKLYN, NY 11222

**Facility Location:** in KINGS COUNTY **Village:** BROOKLYN

**Facility Principal Reference Point:** NYTM-E: 587.5 NYTM-N: 4509.6  
Latitude: 40°43'57.7" Longitude: 73°57'49.6"

**Project Location:** 171 West Street

**Authorized Activity:** Relocation of a NYC DEP Combined Sewer Outfall (CSO).

**Permit Authorizations**

**Tidal Wetlands - Under Article 25**

Permit ID 2-6101-00296/00016

New Permit

Effective Date: 2/27/2014

Expiration Date: 12/31/2017

**Water Quality Certification - Under Section 401 - Clean Water Act**

Permit ID 2-6101-00296/00017

New Permit

Effective Date: 2/27/2014

Expiration Date: 12/31/2017

**Excavation & Fill in Navigable Waters - Under Article 15, Title 5**

Permit ID 2-6101-00296/00018

New Permit

Effective Date: 2/27/2014

Expiration Date: 12/31/2017

**NYSDEC Approval**

**By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.**

Permit Administrator: JOHN F CRYAN, Regional Permit Administrator

Address: NYSDEC REGION 2 HEADQUARTERS  
47-40 21ST ST  
LONG ISLAND CITY, NY 11101 -5407

Authorized Signature:

Date 02/27/2014



## Permit Components

NATURAL RESOURCE PERMIT CONDITIONS

WATER QUALITY CERTIFICATION SPECIFIC CONDITION

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

### **NATURAL RESOURCE PERMIT CONDITIONS - Apply to the Following Permits: TIDAL WETLANDS; WATER QUALITY CERTIFICATION; EXCAVATION & FILL IN NAVIGABLE WATERS**

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such approved plans were prepared by As cited in Natural Resources Special Condition No. 2..
2. **Conformance with Plans - Addenda** In addition to plans referenced in the Condition titled "Conformance with Plans," the activities authorized by this permit must be in strict conformance with the following approved plans and/or submissions made as part of the permit application:
  - A. NYC DEP Plans prepared by Langan titled "To Relocate Combined Sewer Overflow at Intersection of Commercial and Franklin Streets Borough of Brooklyn" sheets 1,2,3,4,5 and 6, last revised January 28, 2014, and received by the NYSDEC on February 19, 2014.
  - B. Plans prepared by Langan titled "Greenpoint Landing CSO Relocation" and received by NYSDEC on February 19, 2014, including:
    1. Drawing GL-01, Location Plan, dated January 19, 2014
    2. Drawing GL-02, Site Plan, dated January 19, 2014
    3. Drawing GL-03, Proposed Plan, dated February 14, 2014
    4. Drawing GL-04, Section and Detail, dated February 14, 2014.
3. **Posting of NYSDEC Permit Sign** The attached NYSDEC permit sign shall be posted, protected from the weather, in a conspicuous outdoor location at the project site. This sign is to be posted for the duration of work authorized by this permit.
4. **Notice of Intent to Commence Work** At least five (5) days prior to the start of work. Permittee must complete and submit the attached "Notice of Intent to Commence Work" form to the NYSDEC Bureau of Marine Resources, 47-40 21<sup>st</sup> Street, Long Island City, New York 11101.
5. **Post Construction Photographs** Post-construction photographs of the work area must be submitted to the NYSDEC Bureau of Marine Resources, 47-40 21st Street, Long Island City, New York 11101 within 30 days of the completion of work.



**6. Removal of Debris and Excess Material** Any debris or excess material from construction of this project will be completely removed from the adjacent area (upland) and removed to an approved upland area for disposal. No debris is permitted in tidal wetlands or tidal wetlands adjacent area or protected buffer areas.

**7. Best Management Practices** Best management practices will be employed to prevent the loss of construction materials, debris, and sediment from entering the waterways. Such practices may include, but are not limited to silt fencing, hay bales, and floating booms.

**8. Fill Material** All fill will consist of “clean” sand, gravel, or soil. The use of material such as asphalt, slag, fly-ash, recycled concrete aggregate (RCA), broken concrete, or demolition debris is strictly prohibited.

**9. Rip Rap Work** The rip rap around the outfall shall not advanced seaward or increased in size by this permit. Any rip rap parts which are removed by this work shall be replaced with clean stones. Any incidental rip rap work shall be completed within 30 days of completion of the outfall.

**10. Cofferd Dam** If a coffer dam is used for this project, it shall be removed completely within 30 days of the final installation of the outfall.

**11. Dewatering Permit** Please note that this permit does not cover dewatering. If dewatering is part of this project, the applicant is responsible for obtaining and adhering to all city and/or state dewatering permits.

**12. No Interference With Navigation** There shall be no unreasonable interference with navigation by the work herein authorized.

**13. State Not Liable for Damage** The State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.

**14. State May Order Removal or Alteration of Work** If future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners, shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.



**15. State May Require Site Restoration** If upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may lawfully require, remove all or any portion of the uncompleted structure or fill and restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

**16. Precautions Against Contamination of Waters** All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.



## WATER QUALITY CERTIFICATION SPECIFIC CONDITIONS

**1. Water Quality Certification** The NYS Department of Environmental Conservation hereby certifies that the subject project will not contravene effluent limitations or other limitations or standards under Sections 301, 302, 303, 306 and 307 of the Clean Water Act of 1977 (PL 95-217) provided that all of the conditions listed herein are met.

## GENERAL CONDITIONS - Apply to ALL Authorized Permits:

**1. Facility Inspection by The Department** The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

**2. Relationship of this Permit to Other Department Orders and Determinations** Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

**3. Applications For Permit Renewals, Modifications or Transfers** The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator  
NYSDEC REGION 2 HEADQUARTERS  
47-40 21ST ST  
LONG ISLAND CITY, NY11101 -5407

**4. Submission of Renewal Application** The permittee must submit a renewal application at least 30 days before permit expiration for the following permit authorizations: Tidal Wetlands, Water Quality Certification, Excavation & Fill in Navigable Waters.



**5. Permit Modifications, Suspensions and Revocations by the Department** The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

- a. materially false or inaccurate statements in the permit application or supporting papers;
- b. failure by the permittee to comply with any terms or conditions of the permit;
- c. exceeding the scope of the project as described in the permit application;
- d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;
- e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

**6. Permit Transfer** Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.



## NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

### **Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification**

The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

### **Item B: Permittee's Contractors to Comply with Permit**

The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

### **Item C: Permittee Responsible for Obtaining Other Required Permits**

The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

### **Item D: No Right to Trespass or Interfere with Riparian Rights**

This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

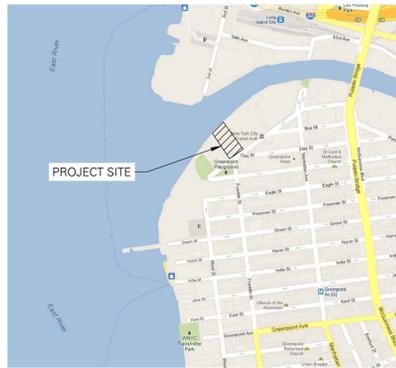
**ATTACHMENT C**

**SEWER REPLACEMENT PLANS AND PROFILES**

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



BUREAU OF WATER AND SEWER OPERATIONS  
ENGINEERING  
DIVISION OF REVIEW AND CONSTRUCTION COMPLIANCE  
RSK - 003/13  
PLAN AND PROFILE  
TO RELOCATE COMBINED SEWER OVERFLOW AT INTERSECTION  
OF COMMERCIAL AND FRANKLIN STREETS  
BOROUGH OF BROOKLYN



AREA MAP  
N.T.S.

GENERAL NOTES:

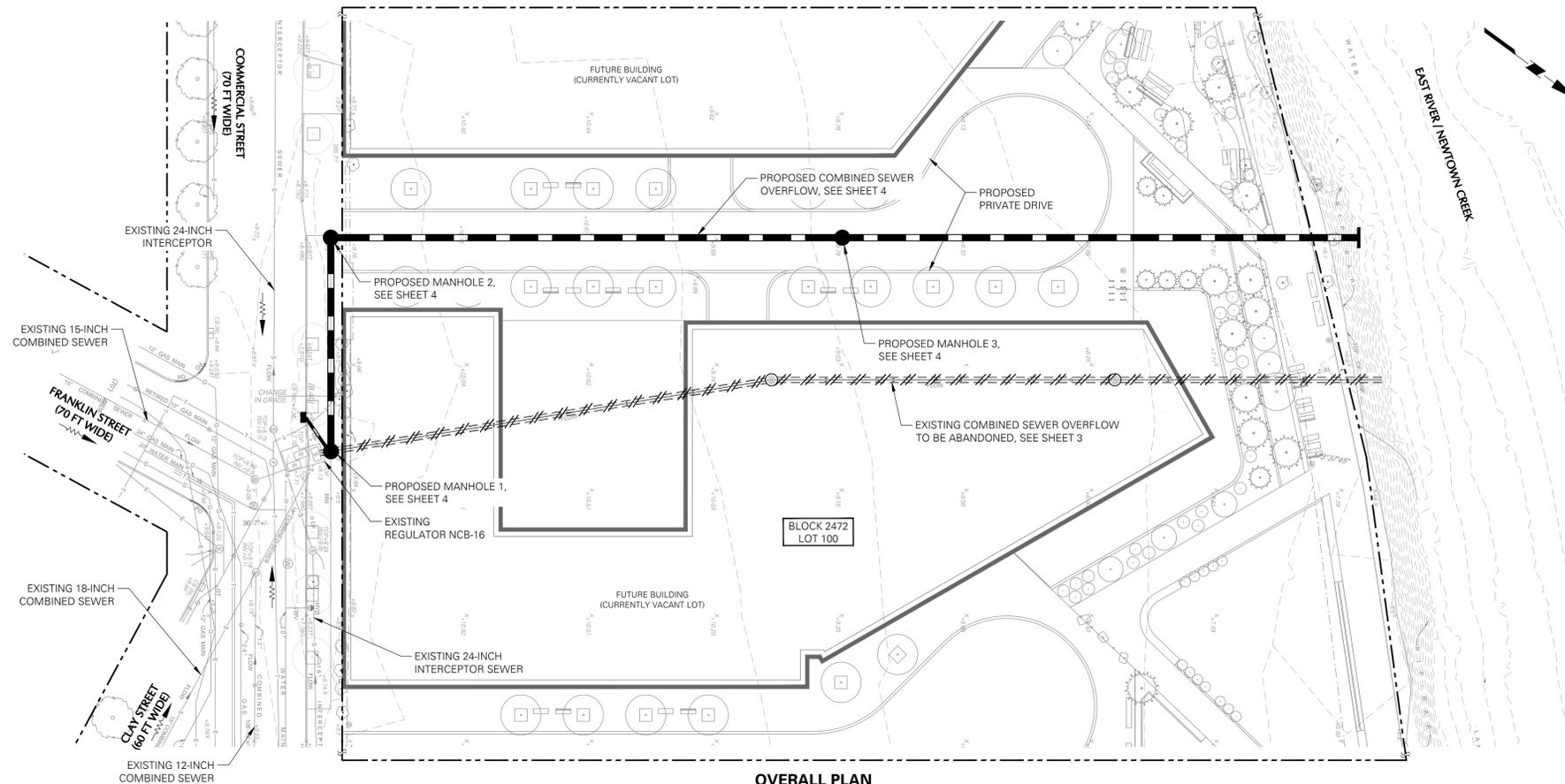
- EXISTING CONDITIONS INFORMATION OBTAINED FROM PLAN CREATED BY BARTLETT, LUDLAM, AND DILL ASSOCIATES, TITLED "SURVEY OF PROPERTY IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK", AND DATED 4 MARCH 2013.
- ELEVATIONS SHOWN HEREON, WITH THE EXCEPTION OF THOSE SHOWN IN BRACKETS [], REFER TO THE BOROUGH OF BROOKLYN HIGHWAY DATUM (BBHD) WHICH IS 2.56 FT ABOVE MEAN SEA LEVEL, AS ESTABLISHED BY THE US COAST AND GEODETIC SURVEY AT SANDY HOOK, NJ (NVGD). ELEVATIONS SHOWN IN BRACKETS [] ARE IN REFERENCE TO BROOKLYN BOROUGH SEWER DATUM (BBSO), WHICH IS 1.72 FT ABOVE MEAN SEA LEVEL AS ESTABLISHED BY THE US COAST AND GEODETIC SURVEY AT SANDY HOOK, NJ.

BBHD = NVGD - 2.56 FEET  
BBSO = NVGD - 1.72 FEET  
BBSD = [BBSO] - 0.84 FEET

- LOCATIONS OF EXISTING UTILITIES SHALL BE CONSIDERED APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY EXISTING UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND CIVIL ENGINEER OF ANY DISCREPANCIES.

LEGEND

- DIA. DIAMETER
- INV= INVERT ELEVATION
- DIP DUCTILE IRON PIPE
- RIM= MANHOLE / CATCH BASIN RIM ELEVATION
- MH MANHOLE
- CB CATCH BASIN
- STA STATION
- EX EXISTING
- EMH EXISTING MANHOLE
- PMH PROPOSED MANHOLE
- F.M. FINAL MAP DIMENSION
- T.M. TAX MAP DIMENSION
- N.T.S. NOT TO SCALE
- +7.45T EXISTING TOP OF CURB ELEVATION
- +7.05G EXISTING BOTTOM OF CURB ELEVATION
- +7.05 EXISTING SPOT ELEVATION
- [8.40] LEGAL GRADE
- TC9.45 PROPOSED TOP OF CURB ELEVATION
- BC9.00 PROPOSED BOTTOM OF CURB ELEVATION
- (TC9.45) PROPOSED TOP OF CURB ELEVATION TO MATCH EXISTING
- (BC9.00) PROPOSED BOTTOM OF CURB ELEVATION TO MATCH EXISTING
- S EXISTING COMBINED SEWER (SIZE AS NOTED)
- W EXISTING WATER MAIN (SIZE AS NOTED)
- G EXISTING GAS MAIN (SIZE AS NOTED)
- E EXISTING ELECTRIC/TELECOM CONDUIT
- ⊙ EXISTING COMBINED SEWER MANHOLE
- ⊙ EXISTING ELECTRIC/TELECOM MANHOLE
- ⊙ EXISTING WATER MANHOLE
- ⊙ EXISTING CATCH BASIN
- ⊙ EXISTING STREET LAMP
- ⊙ EXISTING FIRE HYDRANT
- ⊙ PROPOSED MANHOLE
- ⊙ PROPOSED SEWER
- ⊙ PROPOSED DEP TYPE-1 CATCH BASIN
- ⊙ CONCEPTUAL ONSITE STORM DRAIN
- ⊙ CONCEPTUAL ONSITE YARD DRAIN
- ⊙ CONCEPTUAL ONSITE GAS MAIN
- ⊙ CONCEPTUAL ONSITE WATER MAIN
- ⊙ CONCEPTUAL ONSITE UNDERGROUND WATER MAIN VAULT
- ⊙ CONCEPTUAL ONSITE ELECTRIC CONDUIT
- ⊙ CONCEPTUAL ONSITE ELECTRIC MANHOLE
- ⊙ CONCEPTUAL ONSITE VALVE
- SEWER FLOW DIRECTION
- SURFACE FLOW DIRECTION
- ABANDONED UTILITY LINE
- PROPOSED FIRST FLOOR EXTERIOR BUILDING WALL
- PROPERTY LINE



OVERALL PLAN  
SCALE: 1" = 30'  
SCALE IN FEET

**STREET STATUS**  
AS PER THE BOROUGH PRESIDENT'S LETTER DATED 20 MAY 2013:  
COMMERCIAL STREET, BETWEEN DUPONT/WEST STREET AND FRANKLIN STREET, IS SHOWN ON THE CITY MAP AT A WIDTH OF 70 FEET, AND IT IS IN CITY OWNERSHIP FOR STREET PURPOSES (TITLE FINAL DECREED ON MARCH 28, 1931). THE INTERSECTION WITH FRANKLIN STREET IS DEDICATED FOR STREET PURPOSES BY AN OPINION OF THE CORPORATION COUNSEL (CCO) ISSUED ON JULY 24, 1956.

PERMIT DRAWING ONLY  
NOT FOR CONSTRUCTION

<b>CONNECTION CHARGE:</b>	<b>FILING ENGINEER/ARCHITECT:</b>
OWNER: GREENPOINT LANDING ASSOCIATES, LLC CONTACT: MARIAN KLEIN FELDT ADDRESS: 535 MADISON AVENUE, 35TH FLOOR NEW YORK, NY 10022	NAME: CHRISTOPHER VITOLANO, P.E. ADDRESS: LANGAN ENGINEERING & ENV. SERVICES 21 PENN PLAZA, 360 WEST 31st ST., 8th FL. NEW YORK, NY 10001 TELEPHONE NO.: 212-479-5400
FINAL MAP NO.: 1	OWNER'S TELEPHONE NO.: 212-355-7570
DRAINAGE PLAN NO.: MAP "O" AND "Q"	
STREET TITLE: SEE ABOVE	

**LANGAN**  
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, NY 10001  
T: 212.479.5400 F: 212.479.5444 www.langan.com  
NEW JERSEY NEW YORK VIRGINIA CALIFORNIA  
PENNSYLVANIA CONNECTICUT FLORIDA  
ABU DHABI ATHENS DOKKA  
DUBAI ISTANBUL  
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan International LLC  
Collectively known as Langan

DATE	REVISION	NO.
03/14/14	COMMENTS FROM DEP	4
01/28/14	COMMENTS FROM DEP	3
09/30/13	COMMENTS FROM DEP	2
07/26/13	COMMENTS FROM DEP	1
05/15/13	INITIAL SUBMISSION TO DEP	0

THE COMBINED SEWER OVERFLOW OWNER HAS SUBMITTED TO THE DEPARTMENT OF ENVIRONMENTAL PROTECTION ALL THE REQUIRED LEGAL DOCUMENTS/AFFIDAVITS PERTAINING TO THE FINAL APPROVAL OF THIS COMBINED SEWER OVERFLOW PROJECT AND ATTESTS TO THE ACCURACY/VALIDITY OF THE DOCUMENTS AS LISTED.

THE COMBINED SEWER OVERFLOW OWNER'S SIGNATURE

I, CHRISTOPHER VITOLANO, A DULY LICENSED PROFESSIONAL ENGINEER, NUMBER 081589-11 IN THE STATE OF NEW YORK, DO HEREBY CERTIFY THAT THE SURVEY, FIELD AND OFFICE WORK REQUIRED IN AND SHOWN ON THIS PLAN WAS DONE BY ME OR UNDER MY DIRECT SUPERVISION AND NO PART OF SAID WORK WAS DONE BY ANY EMPLOYEE OF THE CITY OF NEW YORK.

CHRISTOPHER VITOLANO, PE  
NYS LIC. No. 081589-1

BILL OF MATERIALS

QUANTITY	UNITS	ITEM
<b>SEWER CONSTRUCTION</b>		
100	LF	24-inch precast class III RCP storm sewer including excavation, sheeting, bracing, dewatering, erosion control, backfill, stone ballast, etc.
400	LF	24-inch precast class IV RCP storm sewer including excavation, sheeting, bracing, dewatering, erosion control, backfill, stone ballast, etc.
3	ea	DEP Standard Precast Manhole and installation
1	ea	DEP Standard Type-1 Catch Basin and installation
1	item	Headwall, outfall, rip-rap, bulkhead penetration
130	CY	Concrete cradle and reinforcement
7200	VF	Timber piles
1100	LF	Temporary barricades and fencing
500	LF	TV inspection and video tape recording, 24-inch sewer
988	LF	Saw-cut and remove existing sidewalk
145	SY	Sidewalk restoration
<b>MISCELLANEOUS</b>		
1	EA	Signage
6	WEEKS	Night Watchman

DOCUMENTATION:

- SURVEY PREPARED BY BARTLETT, LUDLAM, AND DILL ASSOCIATES, TITLED "SURVEY OF PROPERTY IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS CITY AND STATE OF NEW YORK", AND DATED 4 MARCH 2013.
- COPY OF TAX MAP OBTAINED FROM NEW YORK CITY DEPARTMENT OF FINANCE
- COPY OF FINAL MAP NO. 1 OBTAINED FROM THE OFFICE THE BROOKLYN BOROUGH PRESIDENT TOPOGRAPHICAL BUREAU, DATED 10/10/89.
- COPY OF NYCDP AS-BUILT RECORD DRAWINGS TITLED "REPAIRING SEWER IN PINK ST. FROM FRANKLIN ST. TO NEWTOWN CREEK", DATED MARCH 29TH, 1911 AND TITLED "CONTRACT NO. 2A KENT AVENUE INTERCEPTING SEWER, REGULATOR B-16 CLAY ST. AND COMMERCIAL ST., PLANS AND SECTIONS", DATED MAY 5TH, 1961.
- COPY OF NYCDP DRAINAGE PLANS TITLED "CHANGE OF DRAINAGE PLAN MAPS 'O' AND 'Q'", DATED SEPT. 23RD, 1919 AND TITLED "CHANGE OF DRAINAGE PLAN MAP", DATED JULY 30TH, 1952.
- COPY OF BORING LOGS AND LOCATION PLAN CREATED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, AND LANDSCAPE ARCHITECTURE, D.P.C., TITLED "COMMERCIAL STREET AND FRANKLIN STREETS COMBINED SEWER GEOTECHNICAL STUDY", AND DATED 10 MAY 2013.
- COPY OF ENGINEER'S ESTIMATE, DATED 16 SEPTEMBER 2013.
- COPY OF TITLE POLICY, TITLED "FIDELITY NATIONAL TITLE INSURANCE COMPANY", AND DATED OCTOBER 2005.
- COPY OF DOT SCARA APPROVAL FOR SEWER INSTALLATION SIDEWALK REPAIR FOR 37 COMMERCIAL STREET.
- COPY OF DECLARATION OF EASEMENT RECORDED WITH COUNTY CLERKS' OFFICE.

LIST OF DRAWINGS	
SHEET NO.	DESCRIPTION
1	COVER SHEET
2	NOTES
3	EXISTING CSO PLAN AND PROFILE
4	PROPOSED CSO PLAN AND PROFILE
5	CSO, DETAIL PLANS AND SECTIONS
6	OUTFALL, DETAIL PLANS AND SECTIONS
7	CONCEPTUAL ONSITE UTILITY PLAN
8	LANDSCAPE FEATURES AND WATERFRONT AMENITIES

CONSTRUCTION INSPECTION FEE: 493 FEET AT \$7.00 PER FOOT = \$3,451	
APPROVED FOR THE DEPARTMENT OF ENVIRONMENTAL PROTECTION	
CHIEF, DRAINAGE REVIEW SECTION	PE DATE
CHIEF, PLAN REVIEW SECTION	PE DATE
CHIEF, DIVISION OF REVIEW AND CONSTRUCTION COMPLIANCE	PE DATE
DIRECTOR, ENGINEERING	PE DATE
DEPUTY COMMISSIONER	PE DATE
APPROVAL OF THIS PLAN IS VALID FOR ONE YEAR FROM THE DATE THE DEPUTY COMMISSIONER'S SIGNATURE IS AFFIXED HERON.	

RSK-003/13

STANDARD NOTES

- ALL SEWER WORK SHOWN ON THIS PLAN SHALL BE IN CONFORMANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF THE NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION ("DEPARTMENT").
- NO DEVIATION FROM AN APPROVED PLAN IS ALLOWED DURING CONSTRUCTION WITHOUT PRIOR WRITTEN APPROVAL OF THE DEPARTMENT.
- THE DEPARTMENT RESERVES THE RIGHT TO REQUIRE ANY CHANGE AND / OR ADDITIONAL WORK NECESSITATED BY A CHANGE AS MAY BE DIRECTED BY THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION (NYCDOT).
- NO FINAL INSPECTION, MEASUREMENTS OR ACCEPTANCE WILL BE MADE UNTIL FINISHED GRADE ABOVE SEWER CONFORMS WITH THAT SHOWN ON THE APPROVED PLANS.
- ALL SEWER CUT SHEETS MUST BE FILED WITH THE DEPARTMENT.
- SUBSURFACE INFORMATION SHOWN HEREON IS AS FURNISHED BY VARIOUS UTILITY COMPANIES AND OTHER CITY DEPARTMENTS. THE EXACT LOCATION OF EXISTING SEWERS ARE UNKNOWN, BUT IS PLOTTED FROM THE BEST AVAILABLE INFORMATION. HOWEVER, ACCURACY OF THIS INFORMATION IS NOT GUARANTEED BY THE FILING PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION IN THE FIELD PRIOR TO CONSTRUCTION.
- SITE CONNECTION SPURS ON ESWP SHALL BE INSTALLED FOR EVERY TAX LOT WITH A MAXIMUM OF 40 FEET ON BOTH SIDES OF PIPE FOR UNDEVELOPED PROPERTIES AS NOTED ON THE PLAN OR AS DIRECTED BY THE PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT. FOR BUILT-UP PROPERTIES, SPURS SHALL BE PROVIDED FOR EVERY HOUSE. SPURS FOR CONNECTIONS ON DUCTILE IRON PIPES MAY BE MADE BY APPROVED FITTINGS OR BY DRILLING.
- ALL CASTING AND HARDWARE REMOVED FROM THE EXISTING MANHOLES AND CATCH BASINS WHENEVER FOUND TO BE IN GOOD CONDITION, UPON EXAMINATION BY THE PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT SHALL REMAIN THE PROPERTY OF THE CITY AND SHALL BE DELIVERED BY THE CONTRACTOR TO A DESIGNATED CITY OWNED YARD.
- CONTRACTOR SHALL PROVIDE TEMPORARY MEANS (PIPES, PUMPS, ETC.) TO DRAIN ANY STORM WATER WHICH MAY DEVELOP WITHIN THE PROJECT LIMITS FOR THE DURATION OF CONSTRUCTION.
- ALL EXISTING SEWERS AND HOUSE CONNECTIONS SHALL BE CONTINUOUSLY MAINTAINED DURING CONSTRUCTION OF PRIVATE SEWERS OR PRIVATE DRAINS OR ASSOCIATED WATER MAIN WORK. IF ANY SEWER OR SITE CONNECTION IS TO BE DISCONNECTED FOR CONSTRUCTION PURPOSES, FLOW SHALL BE MAINTAINED BY FLUMING OR OTHER SUITABLE MEANS AS APPROVED BY THE PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT AND IN SUCH A MANNER THAT NO BACK-UPS OCCUR. EXISTING SEWERS, SITE CONNECTIONS OR OTHER SEWER APPURTENANCES WHICH ARE TO REMAIN, AND WHICH MIGHT BE DISTURBED FOR CONSTRUCTION PURPOSES, SHALL BE RESTORED TO THEIR PRESENT CONDITION AFTER COMPLETION OF WORK.
- CONSTRUCTION PERMITS AND CERTIFICATE OF INSPECTION FOR PROPOSED CATCH BASINS AND/OR SEEPAGE BASINS SYSTEM AS SHOWN ON THE APPROVED BUILDERS PAVEMENT PLAN SHALL BE ISSUED BY THE DEPARTMENT.
- WHEN CONCRETE CRADLE IS TO BE CONSTRUCTED, PIPE MUST BE SUPPORTED BY SOLID CONCRETE BLOCKS THAT SHALL FORM AN INTEGRAL PART OF THE CONCRETE CRADLE.
- CONCRETE CLASS 40 FOR THE CONCRETE CRADLE MUST BE MIXED AND PLACED IN ONE POUR.
- FORMS TO FULL HEIGHT MUST BE USED FOR CONCRETE CRADLE.
- IN NO CASE WILL MIXED CONCRETE BE PERMITTED INTO THE SEWER TRENCH WITHOUT THE BLOCKS AND FORMS BEING IN PLACE.
- PLACE PROTECTIVE BROKEN STONE COLLAR 3-FT WIDE AND 6-INCH DEEP AROUND MANHOLES IN UNPAVED STREETS.
- IN PAVED STREETS, A TEMPORARY 4-INCH ASPHALT CONCRETE PAVEMENT IS TO BE INSTALLED IMMEDIATELY AFTER BACKFILLING.
- ELEVATIONS SHOWN HEREON, EXCEPT FOR THOSE SHOWN IN BRACKETS [ ], REFER TO THE BOROUGH OF BROOKLYN HIGHWAY DATUM WHICH IS 2.56 FT ABOVE MEAN SEA LEVEL AS ESTABLISHED BY THE US COAST AND GEODETIC SURVEY AT SANDY HOOK, NJ. ELEVATIONS SHOWN IN BRACKETS [ ] REFER TO BOROUGH OF BROOKLYN SEWER DATUM WHICH IS 1.72 FT ABOVE MEAN SEA LEVEL AS ESTABLISHED BY THE US COAST AND GEODETIC SURVEY AT SANDY HOOK, NJ.
- WATER MAIN NOTES:  
WITH RESPECT TO WATER MAIN INSTALLATIONS, THIS DEPARTMENT'S BUREAU OF WATER AND SEWER OPERATIONS REQUIREMENTS, REGARDING CLEARANCES TO BE MAINTAINED DURING THE COURSE OF THIS WORK ARE AS FOLLOWS:  
  
(I) FOR WATER MAINS INSTALLED PARALLEL TO SEWERS: WHERE THE DEPTH TO THE BOTTOM OF THE SEWER CRADLE IS LESS THAN 10 FEET, THE CLEARANCE BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE CENTERLINE OF THE SEWER SHOULD BE NOT LESS THAN 6.0 FEET PLUS ONE HALF THE SEWER DIAMETER.  
  
(II) FOR WATER MAINS CROSSING OVER SEWERS: WHEREVER THE CLEARANCE BETWEEN THE TOP OF AN EXISTING SEWER AND THE BOTTOM OF THE PROPOSED WATER MAIN, AT THEIR CROSSING, IS 1.0 FOOT OR LESS, THE WATER MAIN IS TO BE SUPPORTED BY A TRUSS AND FILLED UNDERNEATH WITH LAYERS OF COMPRESSIBLE MATERIAL TO AVOID EXCESSIVE BEARING PRESSURE ON THE SEWER PIPE. IN NO CASE, HOWEVER, SHOULD THIS CLEARANCE BE LESS THAN 6 INCHES.  
  
(III) A MINIMUM HORIZONTAL CLEARANCE BETWEEN THE OUTER EDGE OF THE SHEETING FOR THE PROPOSED SEWER/DRAIN PIPE AND THE OUTER EDGE OF THE EXISTING WATER MAIN SHOULD BE 4-FT.  
  
(IV) IN CASES WHERE NEW SEWERS/DRAINS CROSS UNDER EXISTING CAST IRON WATER MAINS, THE WATER MAIN SHALL BE REPLACED WITH NEW DUCTILE IRON PIPE WITH RESTRAINED JOINTS OR STEEL PIPE. THE LENGTH OF EXISTING WATER MAIN TO BE REPLACED SHALL BE THAT INCLUDED BETWEEN POINTS LOCATED FIVE (5) FEET BEYOND THE INFLUENCE LINES ON EITHER SIDE OF THE SEWER EXCAVATION TRENCH LIMITS. THE INFLUENCE LINES SHALL BE CONSIDERED TO BE THE INTERSECTION OF THE WATER MAIN WITH DIAGONAL LINES DRAWN AT FOURTY FIVE (45) DEGREE ANGLES FROM VERTICAL, STARTING AT THE BOTTOM OF THE EXCAVATION AND AT THE OUTSIDE SHEETING LINE. SHEETING LINE TO BE DETERMINED FROM THE STRUCTURAL DRAWINGS AND OTHER PERTAINING INFORMATION.
- ALL NEW CATCH BASIN CONNECTIONS TO EXISTING SEWERS SHALL BE MADE AT MANHOLES, WITH 12-INCH DIA. DUCTILE IRON PIPE, CLASS 56, WITH "PUSH-ON" JOINTS LAID ON 9-INCHES OF BROKEN STONE FOR THE ENTIRE WIDTH OF THE TRENCH AND UP TO THE PIPE'S HORIZONTAL CENTER LINE ON ITS SIDES. THE BROKEN STONE SHALL BE HARD, UNWEATHERED STONE UNIFORMLY GRADED FROM 1/4-INCH TO 3/4-INCH IN SIEVE SIZE. IT SHALL CONFORM TO COMMERCIAL 1/4-INCH TO 3/4-INCH STONE. ALL NEW CATCH BASINS SHALL HAVE A HOOD ON THE OUTLETTING PIPE.
- ALL EXISTING SEWER MANHOLES TO BE RETAINED WITHIN THE CONTRACT LIMITS SHOULD BE ADJUSTED AS NECESSARY, SO THAT THEY WILL BE FLUSH WITH THE FINISHED GRADES AFTER COMPLETION OF THE WORK. ANY OF THESE MANHOLES WHICH HAVE DAMAGED, WORN OR NONSTANDARD FRAMES AND COVERS SHALL BE PROVIDED WITH NEW 27-INCH CASTINGS IN ACCORDANCE WITH THE LATEST STANDARDS OF NYCDEP. IN ADDITION, ANY NECESSARY MODIFICATIONS OF THE MANHOLE MASONRY TO MATCH WITH THE NEW 27-INCH CASTINGS, SHALL ALSO BE DONE FOR THE EXISTING MANHOLES TO WHICH THE PROPOSED SEWERS / DRAINS ARE TO BE CONNECTED, ANY DAMAGE TO THE MANHOLE CAUSED BY THIS WORK SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AS DIRECTED BY THE ENGINEER.
- CARE SHALL BE TAKEN NOT TO DAMAGE EXISTING SEWERS DURING CONSTRUCTION. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATION SHALL BE REPAIRED BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER.
- WHERE THE HEIGHT OF AN EXISTING MANHOLE PERMITS MORE THAN ONE BASIN CONNECTION TO BE MADE ON THE SAME WALL, SPECIAL PRECAUTION SHALL BE TAKEN TO PROTECT THE STRUCTURAL INTEGRITY OF THE MANHOLE. THE MINIMUM CLEARANCE BETWEEN THE OUTSIDE WALLS OF ANY TWO BASIN CONNECTIONS OR BETWEEN A BASIN CONNECTION AND A SEWER VERTICALLY OR HORIZONTALLY, SHALL BE 12 INCHES.
- ALL ABANDONED BASINS, INLETS AND DRAINAGE STRUCTURES AS SHOWN ON THE CONTRACT PLANS ARE TO BE BULKHEADED AND CUT DOWN TO FOUR (4) FEET BELOW THE STREET SURFACE AND FILLED WITH COMPACTED CLEAN SAND. BASIN CONNECTIONS NOT REQUIRED SHALL BE PLUGGED AT BOTH ENDS.
- ALL EXISTING SEWERS, 24-INCH OR LARGER IN THEIR LEAST DIMENSION, WHICH ARE TO BE ABANDONED, SHALL BE HYDRAULICALLY SAND FILLED.
- CATCH BASINS SHALL NOT, UNDER ANY CIRCUMSTANCES, BE CONNECTED TO A SANITARY SEWER.
- CATCH BASINS SHALL NOT BE LOCATED WITHIN PEDESTRIAN CROSSWALK LIMITS. CATCH BASINS NEAR BUS STOP PADS SHALL BE LOCATED EITHER ENTIRELY WITHIN OR OUTSIDE OF BUS STOP PADS.
- THE TOTAL DROP BETWEEN THE BASIN AND THE BASIN / MANHOLE SHALL NOT BE LESS THAN 6 INCHES.
- ALL PROPOSED SEWERS / DRAINS WITH A GROUND COVER OF FOUR (4) FEET OR LESS AND ALL PROPOSED CATCH BASIN CONNECTIONS WITH A GROUND COVER OF THREE (3) FEET OR LESS SHALL BE ENCASED IN CONCRETE IN ACCORDANCE WITH THE NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION SEWER DESIGN STANDARDS. UNDER NO CIRCUMSTANCES THE GROUND COVER ON THE PROPOSED SEWERS/DRAINS AND CATCH BASIN CONNECTIONS BE LESS THAN TWO (2) FEET. A MINIMUM GROUND COVER OF 18-INCHES WILL BE PERMITTED ON PROPOSED CATCH BASIN CONNECTIONS, PROVIDED THAT A SPECIAL SHALLOW CATCH BASIN WILL BE INSTALLED.
- ALL EXISTING CATCH BASINS IN THE PROJECT AREA SHALL BE MAINTAINED OPERABLE AT ALL TIMES. THE CONTRACTOR SHALL TAKE THE NECESSARY PRECATIONS TO AVOID FILLING THE CATCH BASINS WITH DEBRIS WITHIN THE CONTRACT LIMITS DURING THE CONTRACT OPERATIONS. IF AS A RESULT OF CONSTRUCTION, A FLOODING CONDITION OCCURS OR IN THE EVENT THE CONTRACTOR'S OPERATIONS DAMAGE OR BLOCK THE DRAINAGE SYSTEM, THE CONTRACTOR SHALL AT HIS / HER OWN EXPENSE IMMEDIATELY REPAIR OR RESTORE THE DRAINAGE SYSTEM AS DIRECTED BY THE ENGINEER.
- ALL PROPOSED DUCTILE IRON PIPE SEWERS WITHIN THIS R.S. PLAN, MUST BE SO IDENTIFIED BY USE OF COLORED PLASTIC TAPE, SPIRALLY AROUND THE DUCTILE IRON SEWER PIPE. THIS WILL AVOID ANY DIFFICULTIES IN FUTURE IDENTIFICATION.

SPECIFIC NOTES

- CONTRACTOR'S NOTE:  
  
(I) THE CONTRACTOR AT THE TIME OF TAKING OUT THE PERMIT FOR THE CONSTRUCTION OF THIS PRIVATE SEWER OR PRIVATE DRAIN SHALL FURNISH TO THE BOROUGH OF BROOKLYN LOCAL RECORDS OFFICE OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION AT 250 LIVINGSTON STREET, BROOKLYN, NEW YORK 11201 A COPY OF AN AGREEMENT BETWEEN THE OWNER AND THE CONTRACTOR AND A LIST OF CONTRACT PRICES FOR THE ITEMS IN BILL OF MATERIALS ON THE APPROVED PRIVATE SEWER OR PRIVATE DRAIN PLAN.  
  
(II) THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT CERTAIN REVISIONS HAVE BEEN MADE IN THE SEWER DESIGN STANDARDS. THE CONTRACTOR SHALL OBTAIN FROM THE DEPARTMENT LOCATED AT 59-17 JUNCTION BOULEVARD, FLUSHING, NY 11373-5108, A COPY OF THE LATEST SEWER DESIGN STANDARDS. THE CONTRACTOR IS ALSO ADVISED THAT THE LATEST DEPARTMENT SPECIFICATIONS AND STANDARDS BOOK IS AVAILABLE FROM THE CONTRACT DIVISION MANAGEMENT, LOCATED AT 59-17 JUNCTION BOULEVARD, FLUSHING, NY 11373-5108.
- PERFORMANCE BOND:  
  
THE OWNER SHALL FILE WITH THE BOROUGH OF BROOKLYN LOCAL RECORDS OFFICE OF THE DEPARTMENT OF ENVIRONMENTAL PROTECTION AT 250 LIVINGSTON STREET, BROOKLYN, NEW YORK 11201 A PERFORMANCE BOND IN THE AMOUNT OF \$1,567,106 TO SECURE THE FAITHFUL PERFORMANCE OF THIS CONTRACT. BEFORE SUBMITTING ANY FIELD CHANGES FOR THIS PROJECT, A LETTER FROM THE BONDING COMPANY INDICATING THAT THEY HAVE NO OBJECTIONS TO THIS FIELD CHANGE SHALL BE PRESENTED TO THE DEPARTMENT. THE PRIVATE SEWER OR PRIVATE DRAIN CONTRACTOR MAY, UPON WRITTEN REQUEST TO THE DEPARTMENT, SUBMIT THE PERFORMANCE BOND IN LIEU OF THE OWNER. (NOTE: THE AMOUNT OF PERFORMANCE BOND WILL BE AMOUNT OF THE ENGINEER'S COST ESTIMATE.)
- MAINTENANCE BOND:  
  
BEFORE A PERMIT IS ISSUED FOR THE WORK AS SHOWN ON THE PLAN, A MAINTENANCE BOND COVERING A TWO (2) YEAR PERIOD FROM THE DATE OF COMPLETION AND FINAL ACCEPTANCE OF THE WORK PERFORMED IN THE AMOUNT OF \$156,711 SHALL BE FILED BY THE OWNER, THE PRIVATE SEWER OR PRIVATE DRAIN CONTRACTOR MAY, UPON WRITTEN REQUEST TO THE DEPARTMENT, SUBMIT THE MAINTENANCE BOND IN LIEU OF THE OWNER. (NOTE: THE AMOUNT OF MAINTENANCE BOND SHALL BE 10% OF PERFORMANCE BOND AMOUNT.)
- INSURANCE NOTE:  
  
THE OWNER OR CONTRACTOR, PRIOR TO THE START OF CONSTRUCTION, SHALL OBTAIN AN INSURANCE POLICY INSURING THE CITY OF NEW YORK AGAINST LIABILITY FOR INJURY TO PROPERTY OR PERSONS, INCLUDING DEATH. SUCH POLICY SHALL REMAIN IN EFFECT UNTIL THE COMPLETION OF THE PROJECT WITH A MINIMUM PERIOD OF THREE (3) YEARS.
- TRAFFIC NOTE:  
  
THE CONTRACTOR SHALL NOTIFY THE OFFICE OF ENGINEERING CONTROL, MAYOR'S TRAFFIC CONSTRUCTION COORDINATING COMMITTEE (MTCOC), 51 CHAMBERS STREET, NEW YORK, NY 10017, (10 DAYS PRIOR TO THE ISSUANCE OF A CONSTRUCTION PERMIT).
- PAVEMENT RESTORATION NOTE:  
  
TO FOLLOW SPECIFIC PAVEMENT RESTORATION PROVISIONS AS STIPULATED BY THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION (NYCDOT). REFER TO NYCDOT LETTER DATED 06-23-09 (NOTE: THE CONTRACTOR SHALL RESTORE THE PAVEMENT IN ACCORDANCE WITH THE NYCDOT STIPULATION.)
- UTILITY NOTE:  
  
(I) ALL UTILITY COMPANIES MUST BE NOTIFIED AT LEAST 72 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION TO COMPLY WITH RULE 53 OF INDUSTRIAL CODE OF THE STATE OF NEW YORK, DEPARTMENT OF LABOR FOR "CONSTRUCTION, EXCAVATION AND DEMOLITION OPERATIONS AT OR NEAR UNDERGROUND FACILITIES". (CITED AS 12 NYCRR53).  
  
(II) FOR PRIVATE DEVELOPMENTS, THE SUPPORT, RELOCATION, RECONSTRUCTION OR REHABILITATION OF EXISTING UTILITIES DUE TO THE CONSTRUCTION OF THIS CONTRACT IS TO BE DONE AT THE EXPENSE OF THE OWNER OF THE PROPOSED PRIVATE SEWER OR PRIVATE DRAIN.
- APPROVAL OF MATERIALS AND MANUFACTURERS NOTE:  
  
THE NAME OF CITY APPROVED SUB-CONTRACTORS, VENDORS, MANUFACTURERS, SUPPLIERS, AND DEALERS WHO ARE TO FURNISH MATERIALS, FIXTURES, EQUIPMENT, APPLIANCES OR OTHER FITTINGS SHALL BE SUBMITTED BY THE CONTRACTOR AS EARLY AS POSSIBLE TO THE DEPARTMENT AT 59-17 JUNCTION BOULEVARD, FLUSHING NY 11373-5108 FOR APPROVAL.
- BORINGS NOTE:  
  
TAKEN BY: LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, AND LANDSCAPE ARCHITECTURE, D.P.C.  
TITLED: "COMMERCIAL AND FRANKLIN STREETS COMBINED SEWER GEOTECHNICAL STUDY"  
DATED: 15 MAY 2013  
SIGNED BY: MARC GALLAGHER, P.E.
- SOIL NOTE:  
  
WHEN ORDERED BY THE PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT THE TRENCH SHALL BE EXCAVATED TO ITS FULL DEPTH FOR AT LEAST 50 FEET IN ADVANCE OF THE PRIVATE SEWER OR PRIVATE DRAIN CONSTRUCTION. WHEN IN THE OPINION OF THE PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT, THE SUBSOIL IS DEEMED TO BE INADEQUATE, THE CONTRACTOR SHALL DRIVE PILES AS ORDERED. UNSUITABLE SOILS ENCOUNTERED AT THE SEWER SUB-GRADE LESS THAN FIVE (5) FEET THICK, SHALL BE REMOVED TO AN ACCEPTABLE STRATUM AND REPLACED WITH BROKEN STONE AS DIRECTED BY THE PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT. IN SUCH CASE, THE SHEETING PLACED SHALL BE LEFT IN PLACE BELOW THE SPRING LINE OF THE PIPE ONLY.
- SHEETING NOTE:  
  
(I) IN PERFORMING THE SHEETING OF THE PRIVATE SEWER OR PRIVATE DRAIN TRENCH FOR EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH THE PROVISIONS OF THE NEW YORK STATE LABOR LAW AND PARTICULARLY WITH RULE NUMBER 23 (AS AMENDED) OF THE INDUSTRIAL CODE AS PROMULGATED BY THE BOARD OF STANDARDS AND APPEALS, DEPARTMENT OF LABOR, STATE OF NEW YORK AND IN ACCORDANCE WITH RULES AND REGULATIONS LISTED IN FEDERAL REGISTER / VOLUME 54, NUMBER 209 / TUESDAY, OCTOBER 31, 1989, DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, 29 CFR PART 1926, [DOCKET NUMBER S-204] RIN 1218 AA 36. WHERE THE SPACING OF STRINGERS AND CROSS BRACING SPECIFIED IN RULE NUMBER 23 ARE SUCH THAT THE CONTRACTOR CAN NOT ADEQUATELY AND IN A PRACTICAL MANNER CARRY ON HIS OR HER OPERATIONS, HE OR SHE SHALL SUBMIT TO THE PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT FOR APPROVAL ALTERNATE DESIGNS FOR SHEETING OR SHORING WITH ALL BRACINGS AS MAY BE NECESSARY TO COMPLY WITH THE INTENT OF RULE NUMBER 23.  
  
(II) SHEETING AND FORMS SHALL BE REMOVED IN ACCORDANCE WITH THE LATEST DEPARTMENT'S STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE DRAWINGS OR INSTRUCTED BY THE PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT.
- STORM DRAINAGE NOTE:  
  
(I) PROVISIONS FOR THE SAFE DISPOSAL OF STORM WATER SHALL BE DETERMINED BY THE NEW YORK CITY DEPARTMENT OF BUILDINGS (NYCDOB), DEPARTMENT OF TRANSPORTATION (NYCDOT), AND THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (NYCDEP).  
  
(II) OWNER-BUILDER SHALL COMPLY WITH THE PROVISIONS OF THE LAND-CONTOUR LAW SO THAT CONSTRUCTION OPERATIONS WILL NOT CREATE NOR PERPETUATE ANY HAZARDOUS CONDITION. IN ADDITION, HE OR SHE SHALL PROVIDE THE NECESSARY MEANS TO CONTROL THE EROSION VELOCITY OF OVERLAND FLOW AND THE CONVEYANCE OF SEDIMENT TO THE SEWER OR STREET AREA.  
  
(III) SITE STORM DRAINAGE IS TO BE DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS OF THE DEPARTMENT OF BUILDINGS. SITE STORM FLOW WILL BE DISCHARGED TO THE PROPOSED OUTFALL APPROVED BY NYSDEC AND ARMY CORPS OF ENGINEERING PERMITS.  
  
(IV) STREET DRAINAGE IS TO BE DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS OF THE NYCDOT AND SUCH MEANS OF DISPOSAL SHALL BE SHOWN ON THE BUILDERS PAVEMENT PLAN AS APPROVED BY THE NYCDOT/DOB.
- DEWATERING NOTE:  
  
IF THE CONTRACTOR IS REQUIRED TO INSTALL A TEMPORARY DEWATERING SYSTEM TO LOWER THE GROUNDWATER LEVEL WITHIN THE BOROUGH OF BROOKLYN OR QUEENS, IT WILL BE NECESSARY THAT HE OR SHE OBTAIN A NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) LONG ISLAND WELL PERMIT.
- LETTER TO UTILITY COMPANIES: (ACKNOWLEDGING THAT THEY HAVE EXAMINED THE R.S. PLAN AND RELATING THEIR COMMENTS OR ACCEPTANCE:  
  
TO CON EDISON DATE SENT 05/01/13 DATE REPLY REC'D 09/10/13  
FIRE DEPARTMENT 05/01/13 11/08/13  
VERIZON/EMPIRE CITY SUBWAY 05/01/13 11/12/13  
NATIONAL GRID 05/01/13 05/21/13
- DEVELOPMENT NOTE:  
  
\*\*ANY WORK NECESSARY TO SUPPORT, RELOCATE, OR REMOVE EXISTING UTILITIES WILL BE DONE BY THE CONTRACTOR WITH NO EXPENSE TO THE NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION OR THE CITY OF NEW YORK.  
  
THE OWNER'S PROPERTY (BLOCK 2472, LOT 100) WILL BE DEVELOPED AS MIXED-USE IN A R8 ZONE AND IS SERVED BY THE NEWTOWN CREEK WASTEWATER TREATMENT PLANT. THE OWNER OF THE PROPERTY IS PARK TOWER GROUP (CONTACT: MARIAN KLEIN, 535 MADISON AVENUE, 35TH FLOOR, NEW YORK, NY 10022).

GENERAL WATER MAIN WORKS NOTES

- ALL WATER MAIN WORK AND MATERIALS SHALL BE DONE IN ACCORDANCE WITH THE CONTRACT PLANS AND IN CONFORMANCE WITH THE LATEST N.Y.C. D.E.P. STANDARD WATER MAIN SPECIFICATIONS, STANDARD DRAWINGS, AND SPECIFIC CONTRACT REQUIREMENTS.
- CONTRACTOR SHALL NOTIFY THE FIRE DEPARTMENT AND N.Y.C. D.E.P. - CONSTRUCTION AT LEAST 72 WORKING HOURS IN ADVANCE PRIOR TO SHUTTING OFF VALVES. NO REMOVAL SHALL TAKE PLACE BEFORE SHUT-OFF VALVES HAVE BEEN CLOSED BY THE D.E.P. PERSONNEL.
- THE ALIGNMENT OF THE WATER MAINS AND THE LOCATION OF THE VALVES AND HYDRANTS ARE SHOWN SCHEMATICALLY. THE EXACT ALIGNMENTS SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER, AS THE WORK PROGRESSES.
- ALL DUCTILE IRON WATER MAINS UP TO AND INCLUDING 24" DIAMETER SHALL HAVE RESTRAINED JOINTS AND SHALL BE CEMENT LINED AS PER N.Y.C. D.E.P. STANDARD SPECIFICATIONS FOR DUCTILE IRON PIPE WITH PUSH-ON JOINTS AND DUCTILE IRON FITTINGS WITH MECHANICAL JOINTS 6" THROUGH 48" IN DIAMETER, LATEST REVISIONS.
- ALL FITTINGS SHALL EMPLOY FULL BODY TYPE MECHANICAL JOINTS WITH RETAINER GLANDS AND SHALL CONFORM TO THE REQUIREMENTS OF N.Y.C. D.E.P. STANDARD SPECIFICATIONS FOR "DUCTILE-IRON AND GRAY-IRON FITTINGS, 3" - 48" DIAMETER," LATEST REVISION.
- ALL WATER MAIN VALVES SHALL BE DUCTILE IRON GATE VALVES IN ACCORDANCE WITH N.Y.C. D.E.P. STANDARD SPECIFICATIONS FOR GATE VALVES 3" - 20" IN DIAMETER, LATEST REVISION. ACCESS TO WATER VALVES WITHIN THE WORK AREA SHALL BE MAINTAINED AT ALL TIMES.
- PRIOR TO CONNECTING THE NEW MAINS TO THE EXISTING ONES, IT MUST BE MADE ABSOLUTELY CERTAIN THAT ALL THE REPLACEMENT / RESTRAINT REQUIREMENTS DUE TO NEWLY INSTALLED VALVES AND FITTINGS ARE FULLY MET. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGE TO PROPERTY AND FOR PERSONNEL INJURY CAUSED BY NEGLIGENCE OR OMISSION REGARDING COMPLIANCE WITH THE REPLACEMENT / RESTRAINT REQUIREMENTS.  
  
FOR TYPICAL MINIMUM LENGTHS OF REQUIRED PLACEMENT / RESTRAINT, SEE TABLE A8-2 IN "STANDARD SPECIFICATIONS FOR DUCTILE-IRON PIPE WITH PUSH-ON JOINTS" AND "DUCTILE-IRON FITTINGS WITH MECHANICAL JOINTS 6" THROUGH 48", LATEST REVISIONS."
- PRIOR TO BEGINNING ANY WATER MAIN WORK, THE CONTRACTOR MUST IDENTIFY THE LOCATION, SIZE, AND TYPE OF ALL EXISTING UTILITIES, INCLUDING ALL SEWER AND WATER HOUSE / SERVICE CONNECTIONS.
- ALL WATER AND SEWER HOUSE SERVICES SHOULD BE MAINTAINED AND PROTECTED AGAINST FREEZING DURING CONSTRUCTION.
- ALL TAPS AND WET CONNECTIONS ON THE EXISTING WATER MAIN SHOULD BE TRANSFERRED TO THE NEW MAIN AND ALL SERVICES SHOULD BE INSTALLED PERPENDICULAR TO THE DISTRIBUTION MAIN.
- ALL HYDRANTS SHALL BE MAINTAINED IN SERVICE AS PER NEW YORK CITY FIRE DEPARTMENT REQUIREMENTS. HYDRANTS SHALL BE "BREAKAWAY" TYPE, AND SHALL HAVE HYDRANT FENDERS AS PER N.Y.C. D.E.P. STANDARDS.
- ALL EXCAVATION SHALL BE DONE BY HAND WITHIN ONE FOOT (1'-0") OF EXISTING WATER MAINS, SEWERS, HOUSE CONNECTIONS, DRAINS AND OTHER UTILITIES.
- ALL WATER MAINS WITH A COVER LESS THAN 2'-6" SHALL BE PROTECTED BY SHALLOW COVER PROTECTION. TYPE AND SIZE OF THE SHALLOW COVER PROTECTION SHALL BE AS SPECIFIED ON THE CONTRACT PLANS.
- STEEL WATER MAINS SHALL BE USED WHERE SPECIFIED IN THE PLANS AND AS ORDERED BY THE ENGINEER. THE STEEL MAINS SHALL BE FABRICATED, TESTED, LINED, COATED AND INSTALLED IN ACCORDANCE WITH "N.Y.C. D.E.P. STANDARD SPECIFICATIONS FOR FURNISHING DELIVERING AND LAYING STEEL PIPES AND APPURTENANCES" LATEST REVISION, ALL APPLICABLE N.Y.C. D.E.P. STANDARD DRAWINGS, AND AS ORDERED BY THE ENGINEER.
- CONTRACTOR SHALL SUBMIT GEOMETRY DRAWINGS FOR FABRICATION AND LAYING OF STEEL PIPE, INCLUDING PIPE SUPPORTS AND SHALLOW COVER PROTECTION, TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
- CONTRACTOR SHALL SUBMIT ALL STEEL WATER MAIN FABRICATION SHOP DRAWINGS AND CATALOG CUTS FOR THE WATER MAIN(S) AND APPURTENANCES, ALL IN ACCORDANCE WITH APPROVED / ACCEPTED GEOMETRY OF THE PIPE, AND ALL APPLICABLE D.E.P. STANDARDS, TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
- ALL STEEL WATER MAINS UP TO AND INCLUDING 24 INCH DIAMETER SHALL HAVE FLANGED JOINTS, UNLESS OTHERWISE NOTED ON THE PLANS. JOINTS SHALL BE FORGED STEEL SLIP-ON FLANGES, CLASS E, AS PER NYCDEP STANDARD DRAWING NO. 38336-Y-A, LATEST REVISION.
- ALL BENDS ON STEEL WATER MAINS SHALL BE STANDARD WEIGHT LONG-RADIUS ELBOWS OR SHALL BE SHOP FABRICATED FROM PIPE SEGMENTS AS PER N.Y.C. D.E.P. STANDARD SPECIFICATIONS FOR FURNISHINGS DELIVERING AND LAYING STEEL PIPES AND APPURTENANCES, LATEST REVISIONS.
- THE CONNECTION BETWEEN STEEL AN DUCTILE IRON WATER MAINS, SHALL BE ACCOMPLISHED BY INSULATED FLANGED JOINTS, AS SHOWN ON N.Y.C. D.E.P. STANDARD DRAWING NO. 46104-W, LATEST REVISION.
- AFTER WATER MAIN WORK UNDER THE CONTRACT IS SATISFACTORILY COMPLETED, THE CONTRACTOR SHALL SUBMIT FIVE (5) COMPLETE SETS OF AS-BUILT DRAWINGS, APPROVED BY THE RESIDENT ENGINEER, FOR THE BUREAU'S FILES.
- THE CONTRACTOR SHALL CONTACT MR. LUIS CAMINERO OF THE DEP-BWSO, CONSTRUCTION MANAGER, AT 718-595-4204, AT LEAST TWO (2) WEEKS PRIOR TO START OF CONSTRUCTION FOR ASSIGNMENT OF AN INSPECTOR TO OVERSEE THE PROPOSED WATER MAIN WORK. COST OF HIS SERVICES WILL BE AT THE EXPENSE OF THE OWNER / DEVELOPER OF THE PROPOSED WORK.

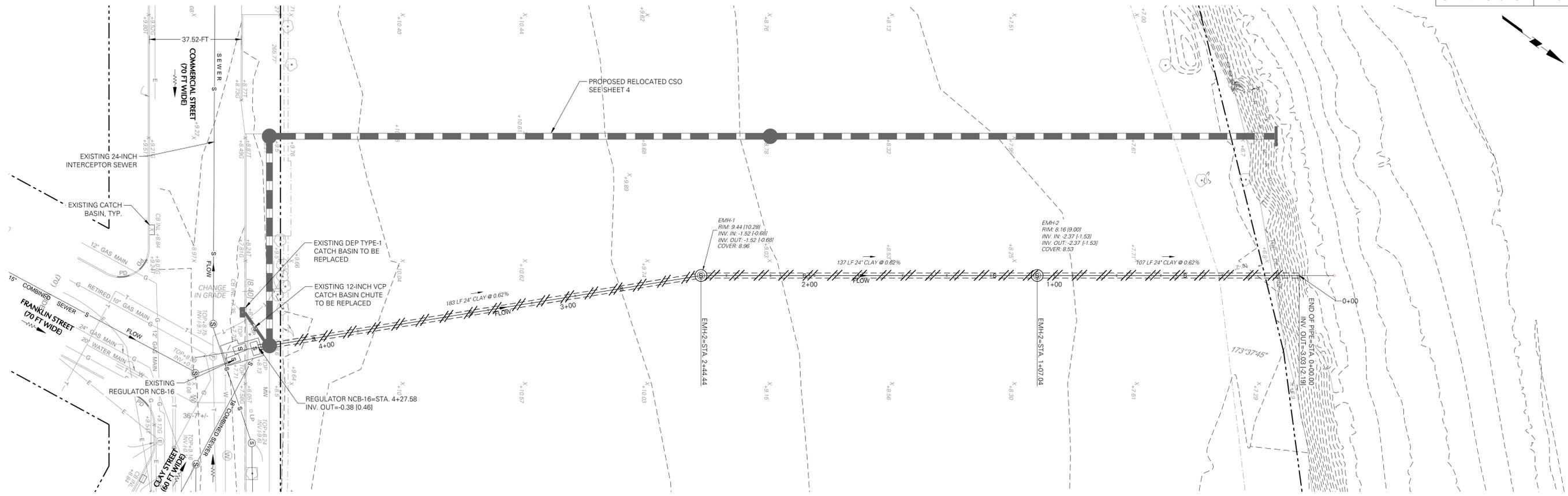
F.D.N.Y GENERAL NOTES

- THE CONTRACTOR SHALL NOTIFY THE FIRE DEPARTMENT'S BUREAU OF FIRE COMMUNICATIONS, TELEPHONE (718) 624-4194, 3752, AT LEAST ONE (1) MONTH IN ADVANCE OF STARTING CONSTRUCTION AND TO MAKE AN APPOINTMENT TO PICK UP FDNV BASE MAPS AT 87 UNION STREET, BROOKLYN, NY 11231.
- ALL EXISTING FIRE DEPARTMENT COMMUNICATION FACILITIES SHALL BE PROTECTED AND PROVISIONS MADE FOR THEIR CONTINUOUS OPERATION DURING CONSTRUCTION. ALL ALARM BOXES AND POSTS MUST REMAIN ACCESSABLE. IF, DUE TO THE CONTRACTOR'S OPERATION, FIRE ALARM SERVICE IS INADVERTENTLY INTERRUPTED OR FIRE COMMUNICATION SYSTEM EQUIPMENT OR FACILITIES ARE DAMAGED, THE CONTRACTOR WILL BE HELD RESPONSIBLE AND SHALL REPLACE THEM AT HIS/HER OWN EXPENSE AND IN ACCORDANCE WITH FIRE DEPARTMENT REQUIREMENTS.
- TO REQUEST STREET MARK OUTS OF FIRE COMMUNICATIONS UNDERGROUND FACILITIES, THE CONTRACTOR MUST CONTACT PLANT OPERATIONS ENGINEERING AT (718) 624-4194 OR (718) 624-3752 AT LEAST ONE (1) MONTH PRIOR TO COMMENCEMENT OF WORK.
- FIRE DEPARTMENT CABLES RUN IN FIRE DEPARTMENT'S CONDUIT SYSTEM UNDERGROUND. THESE FACILITIES MUST BE SUPPORTED AND PROPERLY PROTECTED DURING CONSTRUCTION. IF THIS CANNOT BE ACHIEVED, RELOCATION MUST BE PERFORMED PRIOR TO CONSTRUCTION.

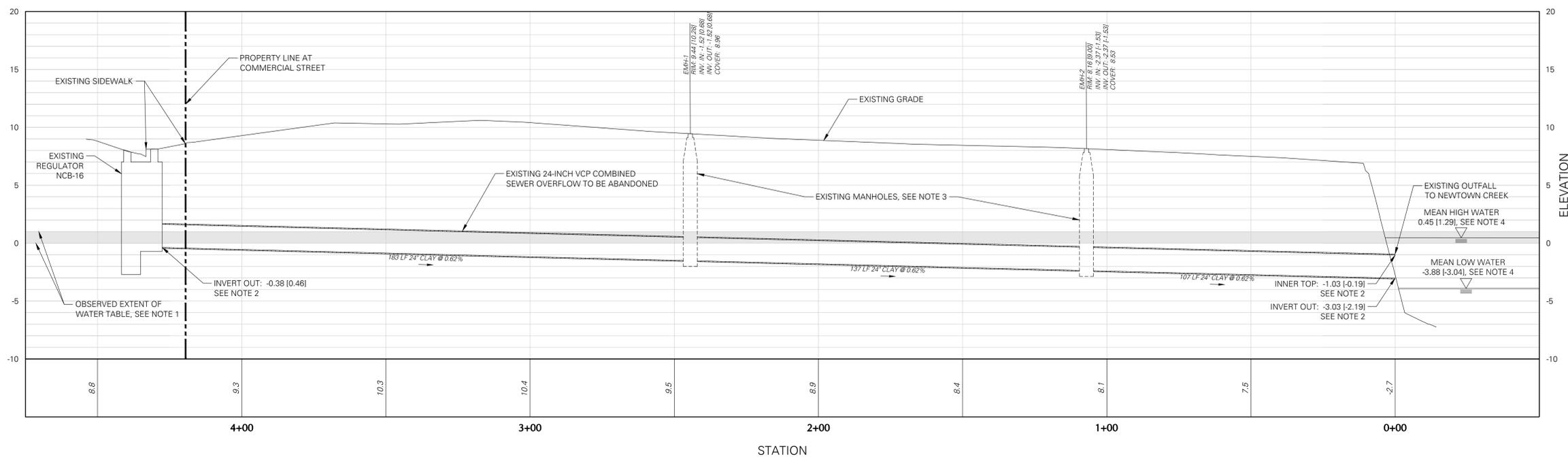
PERMIT DRAWING ONLY  
NOT FOR CONSTRUCTION

NOTES





**PLAN VIEW OF EXISTING SEWER TO BE ABANDONED**  
SCALE 1" = 20'



**PROFILE VIEW OF EXISTING SEWER TO BE ABANDONED**  
HORIZONTAL SCALE 1" = 20'  
VERTICAL SCALE 1" = 5'

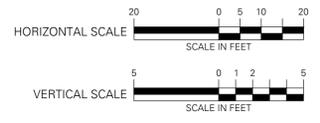
- NOTES**
- LIMITS OF WATER TABLE AS SHOWN IN BORING LOGS PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, AND LANDSCAPE ARCHITECTURE, D.P.C, TITLED "COMMERCIAL AND FRANKLIN STREETS COMBINED SEWER GEOTECHNICAL STUDY", AND DATED 10 MAY 2013.
  - ELEVATIONS ARE IN REFERENCE TO BROOKLYN BOROUGH HIGHWAY DATUM UNLESS ENCLOSED IN BRACKETS [ ] IN WHICH CASE THE ELEVATION IS IN REFERENCE TO BROOKLYN BOROUGH SEWER DATUM.
  - INFORMATION ON EXISTING COMBINED SEWER OVERFLOW AND MANHOLES OBTAINED FROM DEP RECORD DOCUMENT TITLED "REPAIRING SEWER IN PINK ST. FROM FRANKLIN ST. TO NEWTOWN CREEK", DATED MARCH 29TH, 1911.
  - MEAN HIGH AND LOW WATER ESTIMATE OBTAINED FROM NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION STATION DATA AT QUEENSBOROUGH BRIDGE (STATION ID 8518687).

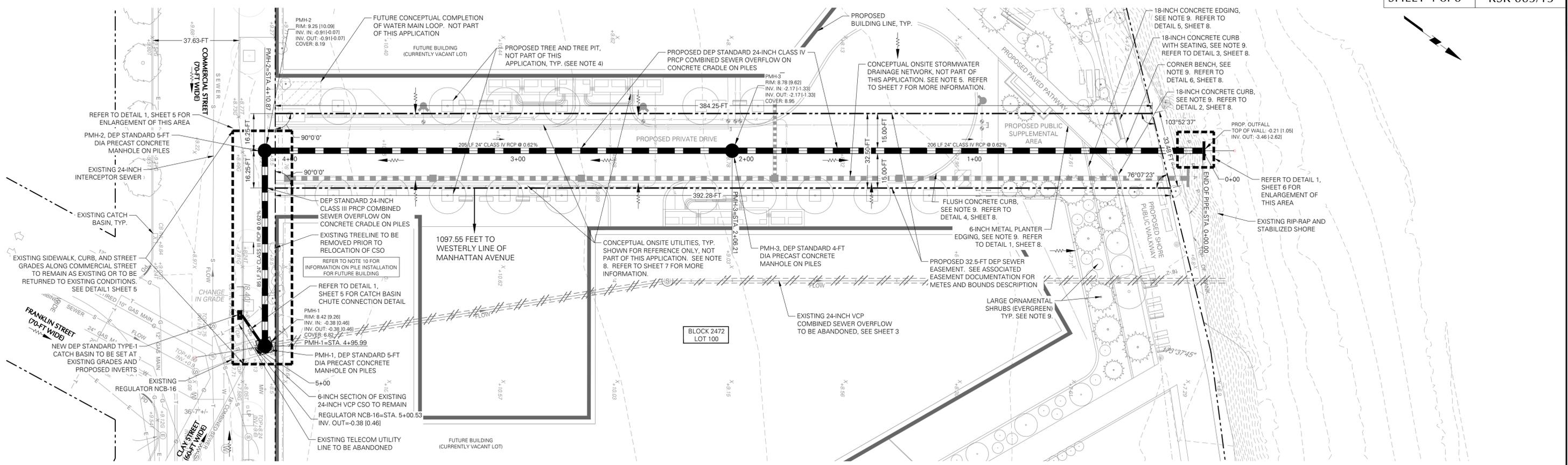
**EXISTING SEWER PLAN AND PROFILE**

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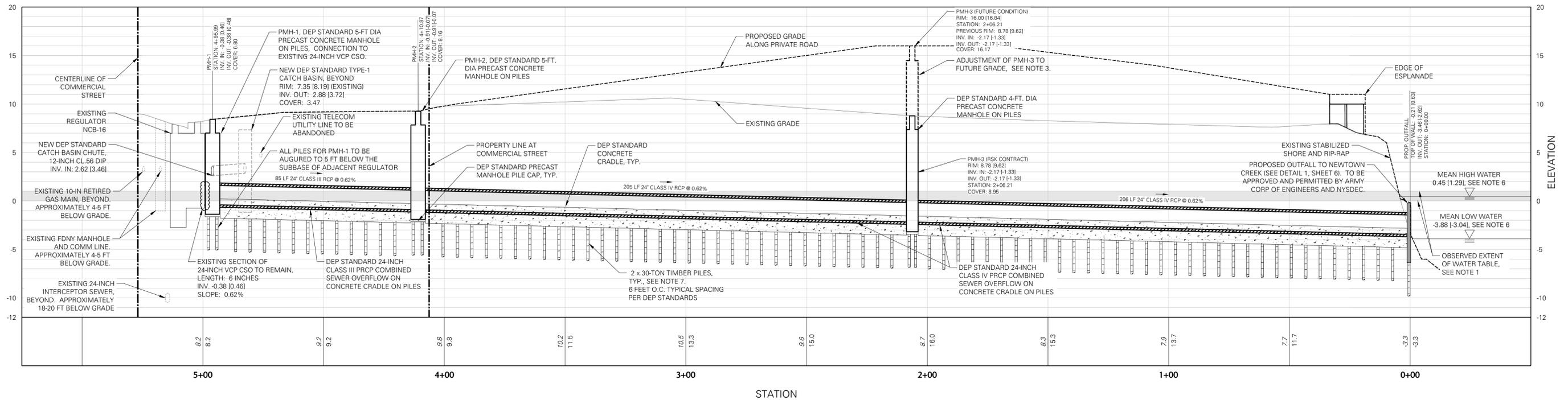
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PLAN VIEW  
SCALE 1" = 20'



PROFILE VIEW  
HORIZONTAL SCALE 1" = 20'  
VERTICAL SCALE 1" = 5'

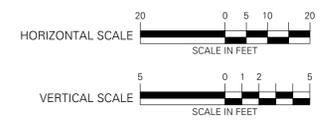
- NOTES:**
- LIMITS OF WATER TABLE AS SHOWN IN BORING LOGS PREPARED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, AND LANDSCAPE ARCHITECTURE, D.P.C., TITLED "COMMERCIAL AND FRANKLIN STREETS COMBINED SEWER GEOTECHNICAL STUDY," AND DATED 10 MAY 2013.
  - ELEVATIONS ARE IN REFERENCE TO BROOKLYN BOROUGH HIGHWAY DATUM UNLESS INDICATED WITH BRACKETS ( ) IN WHICH CASE THE ELEVATION IS IN REFERENCE TO BROOKLYN BOROUGH SEWER DATUM.
  - PROPOSED MANHOLE NUMBER 3 TO BE CONSTRUCTED TO EXISTING GRADE AS PART OF THIS CONTRACT. MANHOLE DESIGN WILL ALLOW FOR FUTURE DEVELOPMENT WHICH WILL REQUIRE THE MANHOLE TO BE ADJUSTED TO FUTURE GRADE BY INSTALLING DEP STANDARD PRECAST CONCRETE RISER SECTIONS AND ADJUSTING ITS FRAME AND GRATE. GRADE TO BE RAISED IN THE VICINITY OF THE MANHOLE MUST BE COMPACTED IN 2-FOOT MAX LIFTS AS THE RISER SECTIONS ARE INSTALLED.
  - TREE AND TREE PIT LOCATIONS ARE CONCEPTUAL AND SHOWN FOR DIMENSIONAL REFERENCE ONLY AND ARE NOT PART OF THIS APPLICATION.

- PER DEP RULES AND REGULATIONS, CLEARANCES BETWEEN PROPOSED TREES AND EXISTING AND PROPOSED SEWER/WATER MAINS SHALL BE 4 FEET OUTSIDE THE SHEETING AREA OF THE MAIN.
- ON-SITE STORMWATER DRAINAGE NETWORK IS CONCEPTUAL AND SHOWN FOR REFERENCE ONLY AND IS NOT PART OF THIS APPLICATION. ALL STORMWATER RUN-OFF TRIBUTARY TO THE PROPOSED PRIVATE DRIVE WILL BE COLLECTED ON-SITE AND CONVEYED TO THE EAST RIVER VIA NYDOB APPROVED DRAINAGE NETWORK. DRAINAGE OUTFALL AND STORMWATER QUALITY TREATMENT TO BE APPROVED BY NYSDEC. NO STORMWATER RUNOFF WILL DRAIN OFF-SITE NOR WILL IT BE DIRECTED TO THE RELOCATED COMBINED SEWER OVERFLOW.
- MEAN HIGH AND LOW WATER ESTIMATE OBTAINED FROM NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION STATION DATA AT QUEENSBOROUGH BRIDGE (STATION ID 8519667).
- IN THE EVENT THAT OBSTRUCTIONS ARE ENCOUNTERED IN THE FIELD (CRIBBING, PLATFORMS) OR IN THE SAND (BOULDERS), PRE-DRILLING MAY BE REQUIRED. IN THE EVENT THAT PILES CANNOT PENETRATE TO THE SPECIFIED

- DEPTH AN ALTERNATE PILE TYPE MAY NEED TO BE DETERMINED IN THE FIELD.
- ON-SITE UTILITY NETWORKS ARE CONCEPTUAL AND SHOWN FOR REFERENCE ONLY. THESE NETWORKS ARE SHOWN FOR EASEMENT DECLARATION COORDINATION, REFER TO ASSOCIATED EASEMENT DOCUMENTS FOR MORE INFORMATION.
- LANDSCAPE FEATURES AND WATERFRONT AMENITIES.** ITEMS REFERENCED TO THIS NOTE ARE LANDSCAPE FEATURES AND WATERFRONT AMENITIES AS DEFINED IN THE DECLARATION OF EASEMENT. THESE FEATURES ARE LOCATED WITHIN THE SHORE PUBLIC WALKWAY AND ITS SUPPLEMENTAL AREA, ARE REQUIRED PER CHAPTER 2 OF ARTICLE VI OF THE NEW YORK CITY RESOLUTION, AND HAVE BEEN APPROVED UNDER CPC #N140020ZAK AND CPC #N140024ZCK. ONLY APPROVED LANDSCAPE FEATURES WILL BE ALLOWED WITHIN THE EASEMENT AREA.
- FOR THE FUTURE BUILDING CONSTRUCTION ALONG COMMERCIAL STREET, ALL PILES WITHIN 5 FEET OF COMMERCIAL STREET TO BE AUGURED OR DRIVEN CONCURRENTLY WITH THE SEWER PILES. WORK TO BE PERFORMED BY OTHERS, NOT PART OF THIS APPLICATION.

**LEGEND**

- PROPOSED DEP MANHOLE
- PROPOSED DEP COMBINED SEWER OVERFLOW
- PROPOSED DEP TYPE-1 CATCH BASIN
- CONCEPTUAL ON-SITE STORM DRAIN
- CONCEPTUAL ON-SITE YARD DRAIN
- CONCEPTUAL ON-SITE GAS MAIN
- CONCEPTUAL ON-SITE WATER MAIN
- CONCEPTUAL UNDERGROUND WATER MAIN VAULT
- CONCEPTUAL ON-SITE ELECTRIC CONDUIT
- CONCEPTUAL ON-SITE ELECTRIC MANHOLE
- CONCEPTUAL ON-SITE VALVE AND VALVE BOX
- CONCEPTUAL HYDRANT
- CONCEPTUAL TREE AND TREE PIT
- CONCEPTUAL LARGE ORNAMENTAL SHRUBS
- CONCEPTUAL LANDSCAPE FURNISHINGS



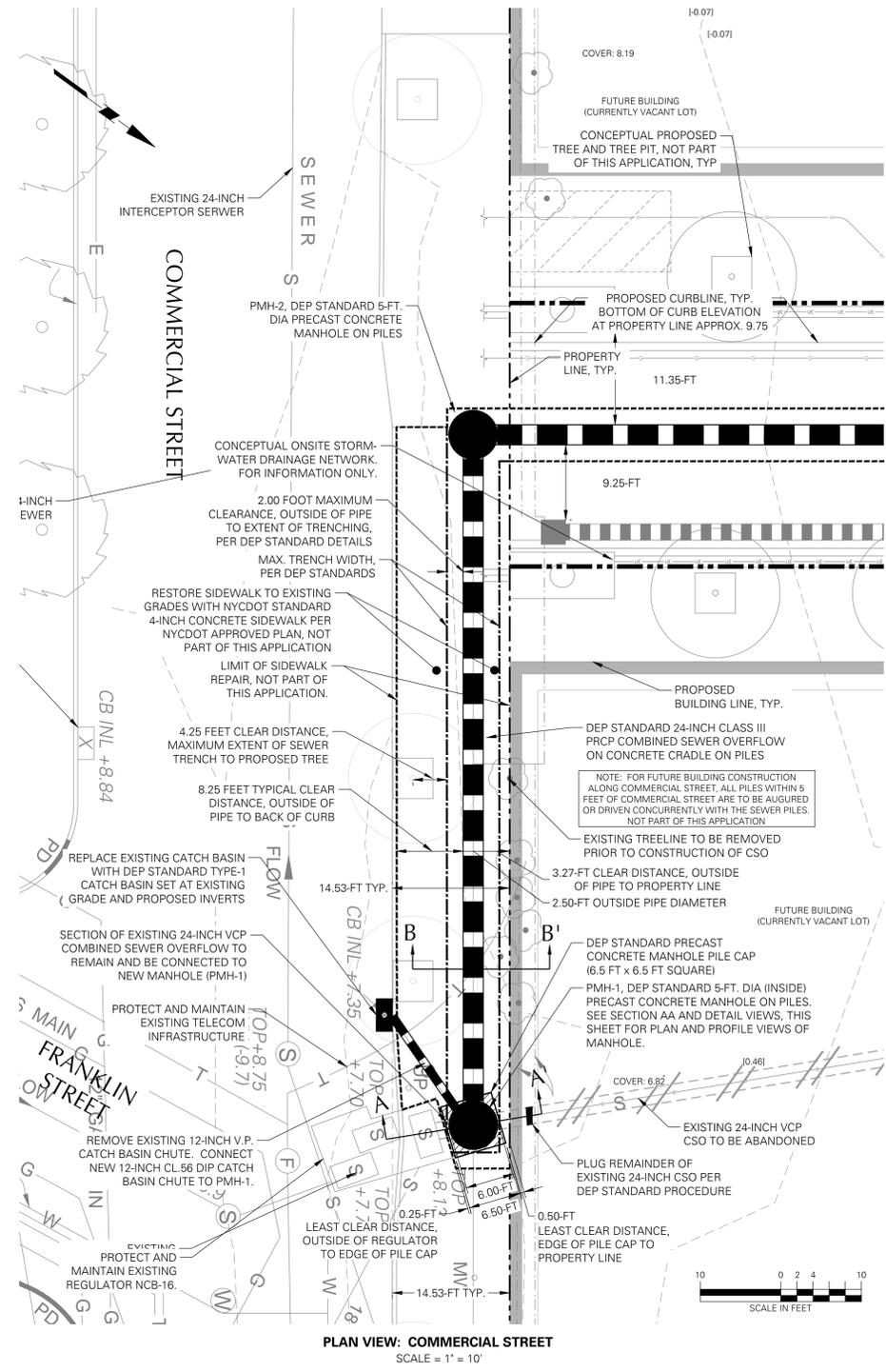
**PROPOSED SEWER PLAN AND PROFILE**

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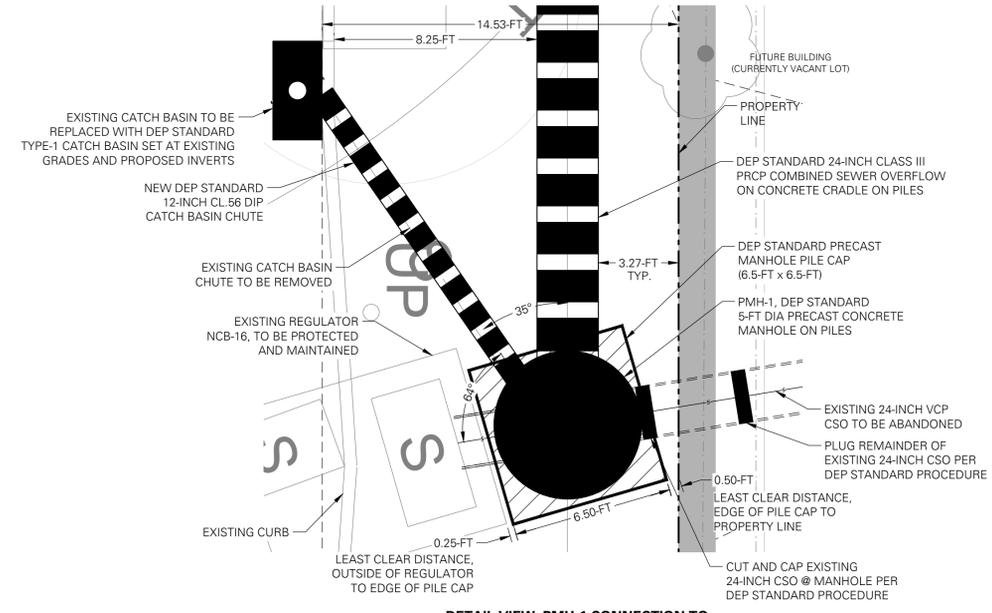
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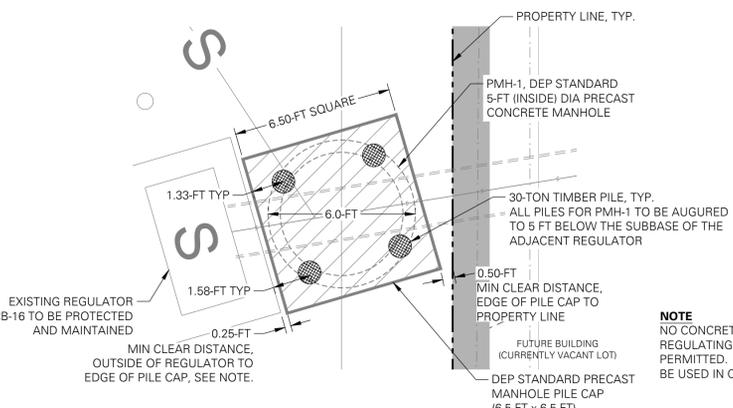
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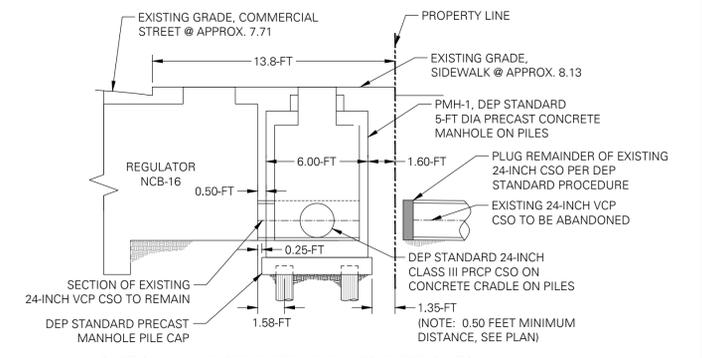
PLAN VIEW: COMMERCIAL STREET  
SCALE = 1" = 10'



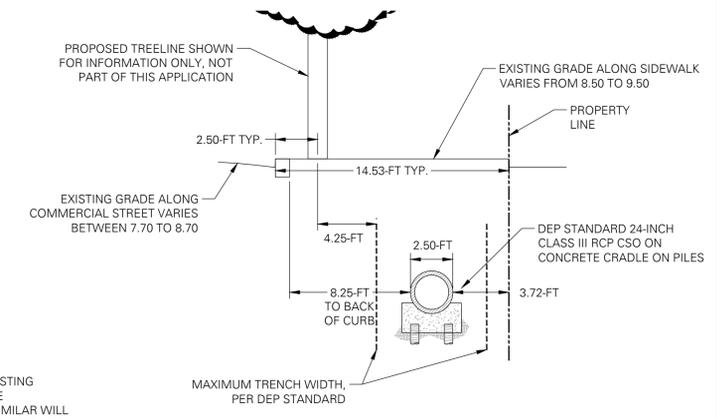
DETAIL VIEW: PMH-1 CONNECTION TO EXISTING 24-INCH VCP CSO  
SCALE = N.T.S.



DETAIL VIEW: PMH-1 PILE PLAN  
SCALE = N.T.S.



SECTION A-A': PROFILE VIEW, PMH-1 CONNECTION TO EXISTING 24-INCH VCP CSO  
SCALE = N.T.S.



SECTION B-B': PROPOSED 24-INCH CSO ALONG COMMERCIAL STREET  
SCALE = N.T.S.

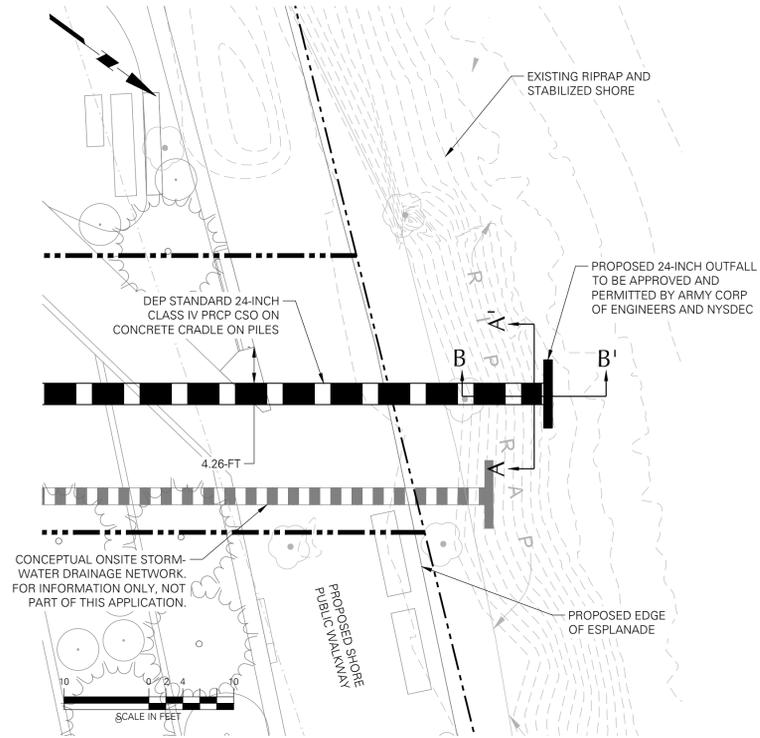
**NOTE:** NO CONCRETE BONDING TO EXISTING REGULATING CHAMBER WILL BE PERMITTED. STYROFOAM OR SIMILAR WILL BE USED IN CONSTRUCTION AND FORMING.

**NOTE:** REFER TO SHEET 7 FOR CSO SECTIONS ALONG PROPOSED PRIVATE DRIVE.

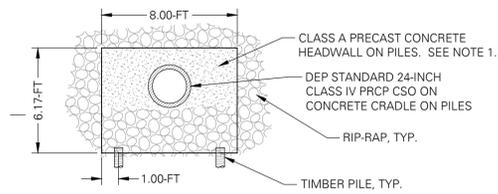
**1 PROPOSED COMBINED SEWER OVERFLOW, DETAIL PLANS AND SECTIONS**  
SCALE: AS NOTED

PROPOSED CSO, DETAIL PLANS AND SECTIONS

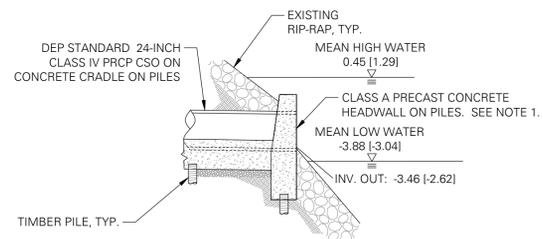
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**PLAN VIEW:**  
SCALE: 1' = 10'



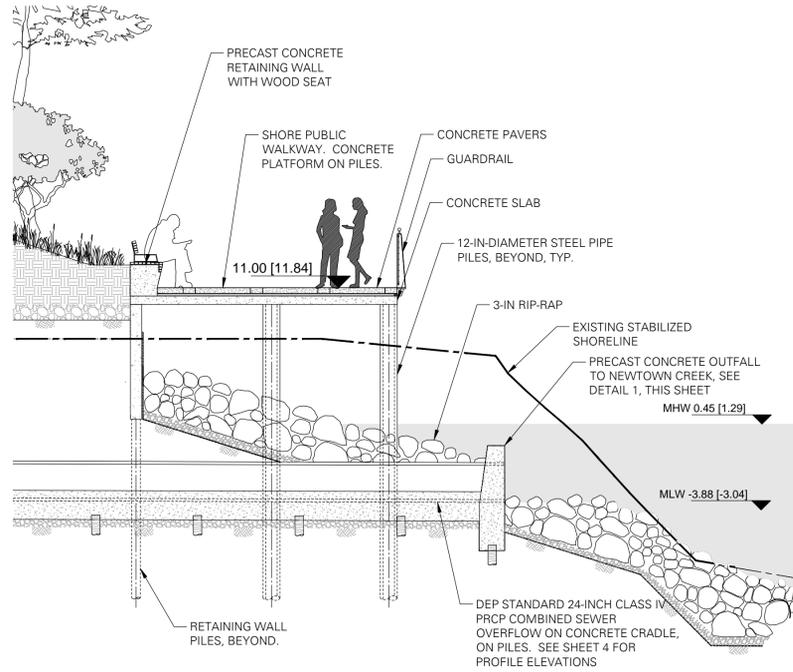
**SECTION A-A: PROPOSED 24-INCH OUTFALL TO NEWTOWN CREEK, ELEVATION**  
SCALE = N.T.S.



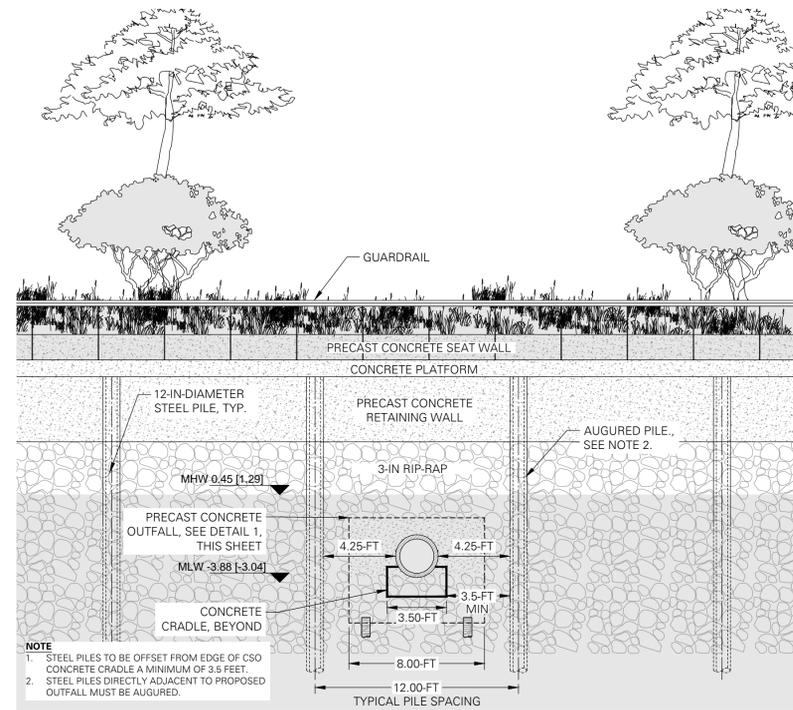
**SECTION B-B: PROPOSED 24-INCH OUTFALL TO NEWTOWN CREEK, PROFILE**  
SCALE = N.T.S.

**NOTE**  
1. CONTRACTOR TO PROVIDE SHOP DRAWING WITH STRUCTURAL DETAILS AND STRUCTURAL CALCULATIONS TO ENGINEER AND NYSDCE FOR APPROVAL PRIOR TO PRE-CONSTRUCTION MEETING. WORK SHALL NOT PROCEED WITHOUT NYSDCE APPROVAL.

**1 PROPOSED 24-INCH OUTFALL TO NEWTOWN CREEK**  
SCALE: AS NOTED



**24-INCH CSO OUTFALL, SIDE VIEW PROFILE**



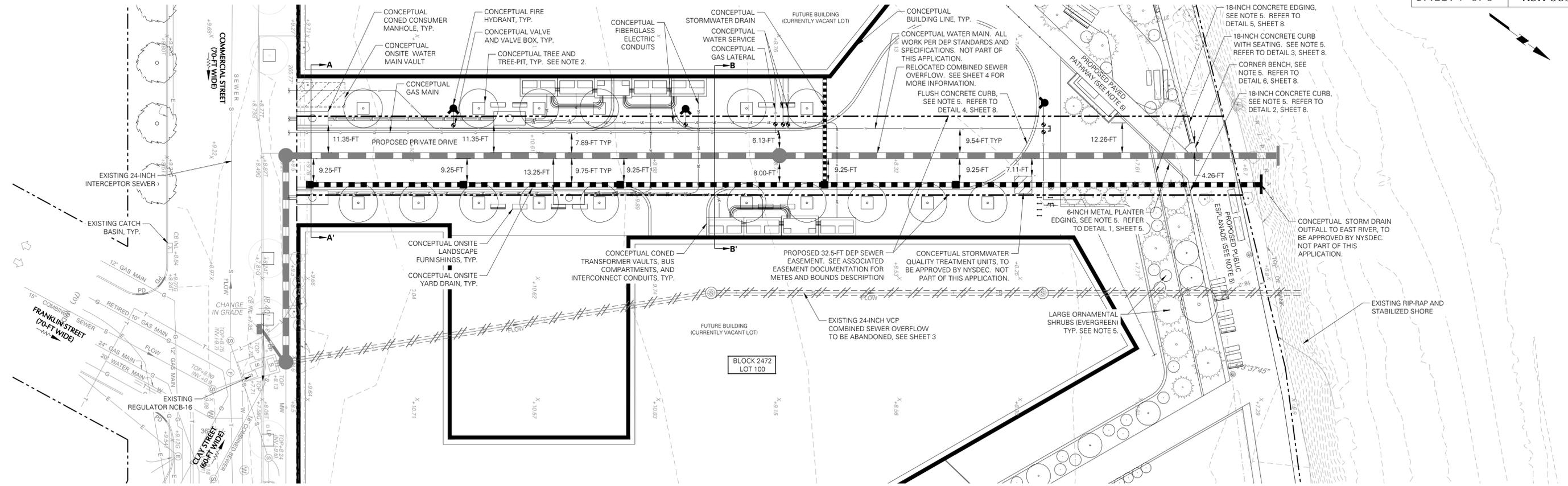
**NOTE**  
1. STEEL PILES TO BE OFFSET FROM EDGE OF CSO CONCRETE CRADLE A MINIMUM OF 3.5 FEET.  
2. STEEL PILES DIRECTLY ADJACENT TO PROPOSED OUTFALL MUST BE AUGURED.

**24-INCH CSO OUTFALL, FACE ON PROFILE**

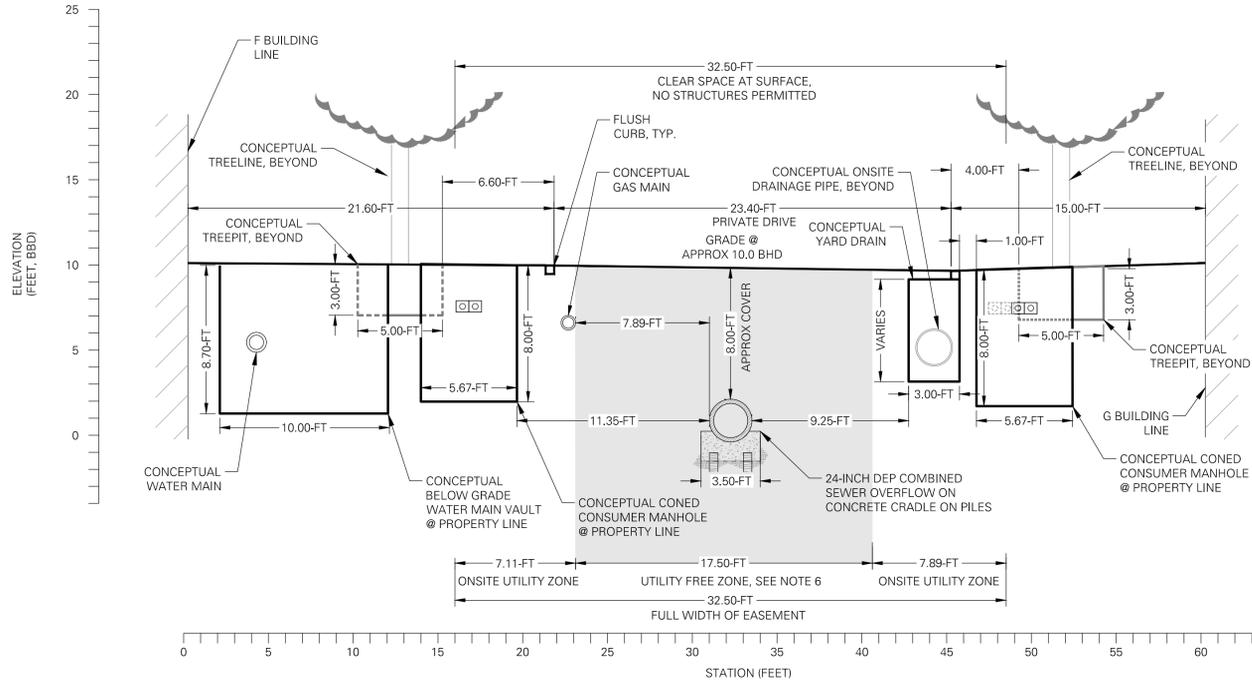
**2 SHORE PUBLIC WALKWAY SECTIONS @ 24-INCH CSO OUTFALL**  
SCALE = N.T.S.

**PROPOSED OUTFALL, DETAIL PLANS AND SECTIONS**

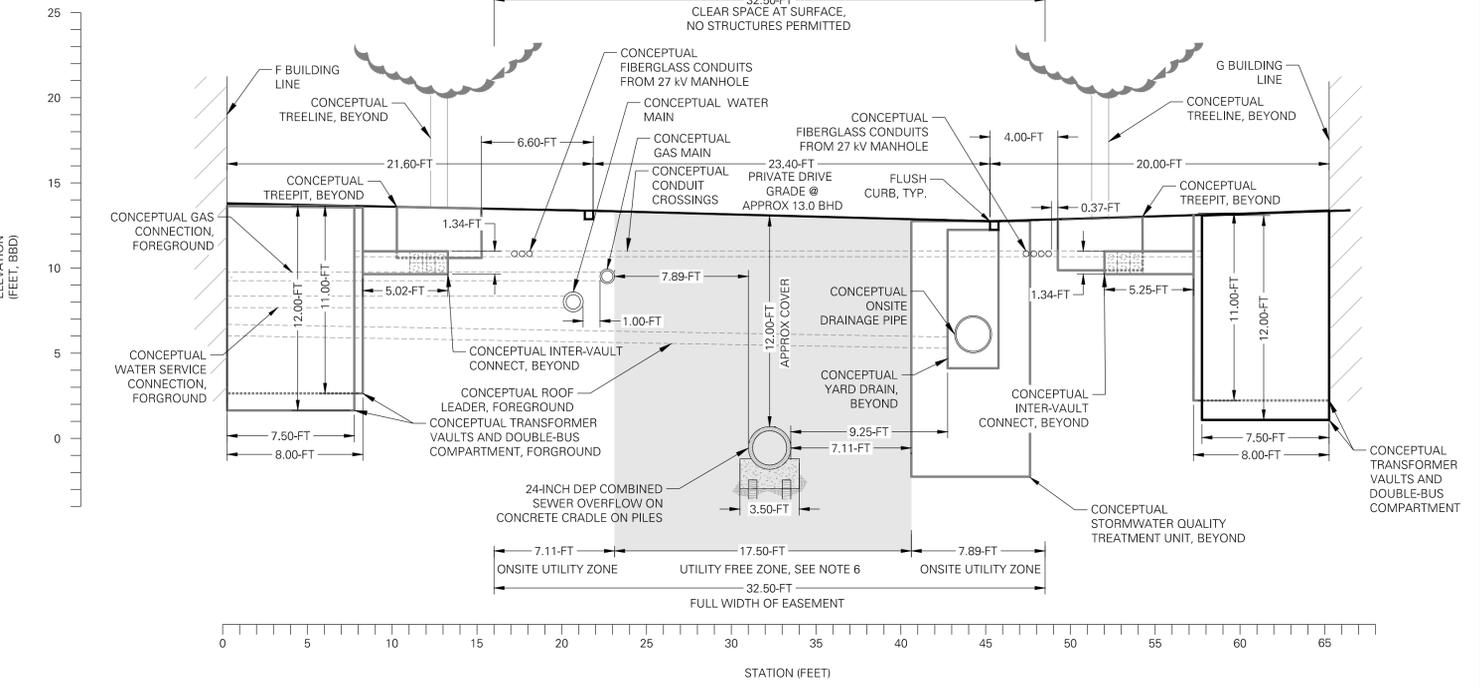
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T: 212.479.5400 F: 212.479.5444 www.langan.com  
NEW JERSEY NEW YORK VIRGINIA CALIFORNIA  
PENNSYLVANIA CONNECTICUT FLORIDA  
ABU DHABI ATHENS DOHA  
DUBAI ISTANBUL  
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan International LLC  
Collectively known as Langan



PLAN VIEW  
SCALE 1" = 20'



SECTION A-A'



SECTION B-B'



SECTION VIEW  
SCALE 1" = 5'

NOTES:

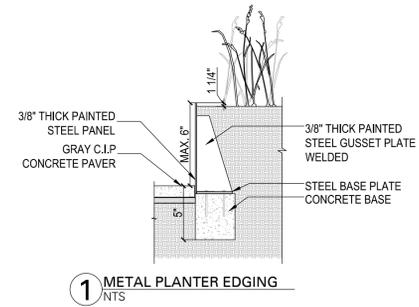
- ELEVATIONS ARE IN REFERENCE TO BROOKLYN BOROUGH HIGHWAY DATUM UNLESS INDICATED WITH BRACKETS [ ] IN WHICH CASE THE ELEVATION IS IN REFERENCE TO BROOKLYN BOROUGH SEWER DATUM.
- TREE AND TREE PIT LOCATIONS ARE CONCEPTUAL AND SHOWN FOR DIMENSIONAL REFERENCE ONLY AND ARE NOT PART OF THIS APPLICATION. PER DEP RULES AND REGULATIONS, CLEARANCES BETWEEN PROPOSED TREES AND EXISTING AND PROPOSED SEWER/WATER MAINS SHALL BE 4 FEET OUTSIDE THE SHEETING AREA OF THE MAIN. FINAL LOCATION OF TREE PITS ALONG THE PRIVATE DRIVE TO BE COORDINATED WITH FINAL LOCATION OF CONED HIGH VOLTAGE FEEDERS.
- ONSITE STORMWATER DRAINAGE NETWORK IS CONCEPTUAL AND SHOWN FOR REFERENCE ONLY AND IS NOT PART OF THIS APPLICATION. ALL STORMWATER RUN-OFF TRIBUTARY TO THE PROPOSED PRIVATE DRIVE WILL BE COLLECTED ONSITE AND CONVEYED TO THE EAST RIVER VIA NYCDOB APPROVED DRAINAGE NETWORK. DRAINAGE OUTFALL AND STORMWATER QUALITY TREATMENT TO BE APPROVED BY NYSDEC. NO STORMWATER RUNOFF WILL DRAIN OFFSITE NOR WILL IT BE DIRECTED TO THE RELOCATED COMBINED SEWER OVERFLOW.
- ONSITE UTILITY NETWORKS ARE CONCEPTUAL AND SHOWN FOR REFERENCE ONLY. THESE NETWORKS ARE SHOWN FOR EASEMENT DECLARATION COORDINATION AND ARE NOT PART OF THIS APPLICATION, REFER TO ASSOCIATED EASEMENT DOCUMENTS FOR MORE INFORMATION.
- LANDSCAPE FEATURES AND WATERFRONT AMENITIES.** ITEMS REFERENCED TO THIS NOTE ARE LANDSCAPE FEATURES AND WATERFRONT AMENITIES AS DEFINED IN THE DECLARATION OF EASEMENT. THESE FEATURES ARE LOCATED WITHIN THE SHORE PUBLIC WALKWAY AND ITS SUPPLEMENTAL AREA, ARE REQUIRED PER CHAPTER 2 OF ARTICLE VI OF THE NEW YORK CITY RESOLUTION, AND HAVE BEEN APPROVED UNDER CPC #N14002ZAK AND CPC #N14002ZCK. ONLY APPROVED LANDSCAPE FEATURES WILL BE ALLOWED WITHIN THE EASEMENT AREA.
- ONSITE UTILITIES WILL BE PERMITTED IN THE UTILITY ZONES AS SHOWN ON THE PROFILES. AT MINIMUM, A SUBSURFACE 17.5-FT WIDE UTILITY CLEAR SPACE IS PROVIDED FOR THE CSO. NO PARALLEL UTILITIES WILL BE PERMITTED IN THIS ZONE. CROSSING UTILITIES WILL BE PERMITTED.

LEGEND

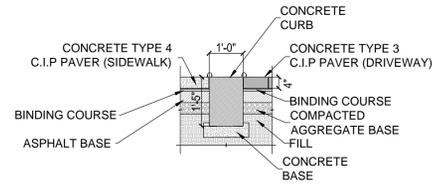
- PROPOSED DEP MANHOLE
- PROPOSED DEP COMBINED SEWER OVERFLOW
- CONCEPTUAL ONSITE STORM DRAIN
- CONCEPTUAL ONSITE YARD DRAIN
- CONCEPTUAL ONSITE GAS MAIN
- CONCEPTUAL ONSITE WATER MAIN
- CONCEPTUAL ONSITE UNDERGROUND WATER MAIN VAULT
- CONCEPTUAL ONSITE ELECTRIC CONDUIT
- CONCEPTUAL ONSITE ELECTRIC MANHOLE
- CONCEPTUAL ONSITE VALVE AND VALVE BOX
- CONCEPTUAL HYDRANT
- CONCEPTUAL TREE AND TREE PIT
- CONCEPTUAL LARGE ORNAMENTAL SHRUBS
- CONCEPTUAL LANDSCAPE FURNISHINGS

CONCEPTUAL ONSITE UTILITY AND LANDSCAPE PLAN

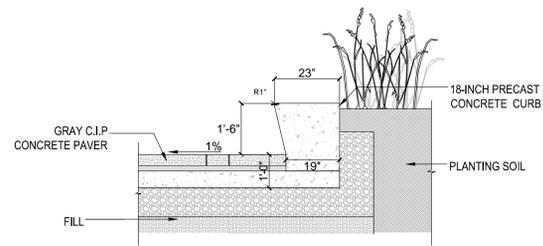
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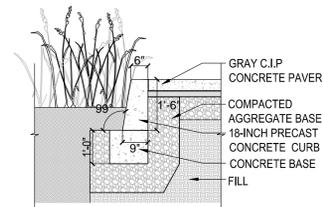
**1 METAL PLANTER EDGING**  
NTS



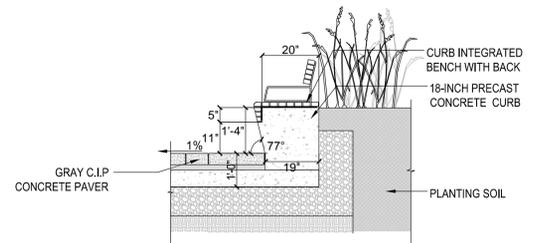
**4 PRECAST CONCRETE CURB, FLUSH**  
NTS



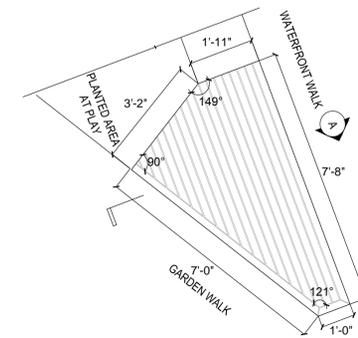
**2 18-INCH PRECAST CONCRETE CURB**  
NTS



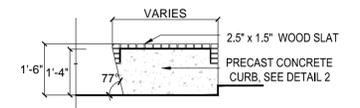
**5 18-INCH CONCRETE EDGING**  
NTS



**3 18-INCH PRECAST CONCRETE CURB W/ SEAT**  
NTS



PLAN VIEW



SECTION A

**6 CORNER BENCH DETAIL**  
NTS

NOTE: LANDSCAPE FEATURES AND WATERFRONT AMENITIES SHOWN ON THIS PLAN ARE DESCRIBED IN THE DECLARATION OF EASEMENT AND ARE REQUIRED PER CHAPTER 2 OF ARTICLE VI OF THE NEW YORK CITY RESOLUTION AND HAVE BEEN APPROVED UNDER CPC #N140020ZAK AND CPC #N140024ZCK. THESE DETAILS ARE FOR REFERENCE ONLY AND ARE NOT PART OF THIS APPLICATION.

LANDSCAPE FEATURES AND WATERFRONT AMENITIES

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**ATTACHMENT D**

**SOIL AND FILL MATERIAL AND GROUNDWATER MANAGEMENT PLAN**

## TABLE OF CONTENTS

1.0	Introduction .....	4
2.0	Soil/Fill Management .....	4
2.1	General .....	4
2.2	Soil and Fill Management Methods .....	6
2.3	Soil and Fill Material Screening Methods .....	7
2.4	Stockpile Methods .....	8
2.5	Characterization of Excavated Soil/Fill Material.....	8
2.6	Endpoint Sampling .....	10
2.7	Materials Excavation, Load-Out and Transport .....	11
2.8	Materials Disposal Off-Site.....	13
2.9	Demarcation.....	15
2.10	Import of Backfill from Off-Site Sources.....	16
2.11	Source Screening and Testing.....	17
3.0	Fluids Management.....	19
3.1	Discharges to Surface Waters of the East River / Newtown Creek .....	20
3.2	Discharges to the NYCDEP Municipal Sewer System.....	20
3.3	Discharges to Groundwater .....	20
3.4	Containerization and Off-Site Disposal .....	21
4.0	Community Air Monitoring Program .....	23
4.1	VOCs – Monitoring, Action Levels, Responses .....	23
4.2	Particulate Matter – Monitoring, Action Levels, Responses .....	24
5.0	Site Management .....	26
5.1	Pre-Construction Meeting .....	26
5.2	Mobilization.....	26

5.3	Utility Marker and Easement Layouts.....	26
5.4	Equipment and Material Staging .....	26
5.5	Stabilized Construction Entrance.....	27
5.6	Truck inspection Station.....	27
5.7	Odor and Dust Control .....	27
5.7.1	Odor Control .....	27
5.7.2	Dust Control.....	28
5.8	Spill Prevention .....	28
5.9	Stormwater Pollution Prevention.....	29
5.10	Contingency Plan .....	30
5.10.1	Petroleum or Solvent-Impacted Material.....	30
5.10.2	Hazardous Material .....	30
5.10.3	Underground Storage Tanks.....	31
6.0	Import of Clean over.....	33
7.0	Reporting.....	35
7.1	Daily Reports.....	35
7.2	Closure Report .....	35
7.3	Deviations .....	36

APPENDIX A – CSO Waste Characterization Memo

## **1.0 INTRODUCTION**

This plan describes the soil/fill material and groundwater management procedures that will be implemented during the construction of a new (replacement) public CSO in Parcel F of the Greenpoint Landing development site in Brooklyn, New York.

## **2.0 SOIL/FILL MANAGEMENT**

### **2.1 General**

There is an existing CSO that runs from Commercial Street northwest across Parcel G to a discharge location in the East River. This CSO is not functional at this time and will be decommissioned by capping the pipe at Commercial Street in accordance with DEP approvals. A replacement CSO will be constructed by excavating an approximately 500-foot long 10-foot wide trench to a depth of 10 feet below current surface grade (about el. -2 to el. -5 BBHD<sup>1</sup>) along the sidewalk of the public right-of-way (ROW) on Commercial Street (the first 100') and across Parcel F (approximately 400') of the Greenpoint Landing development site. The segment of the CSO in the sidewalk will be restored to Department of Transportation (DOT) specifications, which require a 4-inch thick concrete sidewalk. The segment of the CSO within Parcel F will be backfilled with excavated soil/fill from the CSO and/or imported fill material and then temporarily covered with quarry gravel or RCA from a Part 360 registered facility to protect the ground surface from erosion. Langan will meet DEP requirements and specifications for reusing excavated soil as backfill in the new CSO trench. A private, asphalt-paved roadway will be built over the CSO in the future. The concrete block and rock riprap comprising the existing bulkhead at the location of the new outfall will be removed to facilitate the construction of a new precast concrete outfall. This effort will be approved and permitted by the New York State Department of Conservation (NYSDEC).

We estimate about 1,600 cubic yards of subsurface material will be excavated during construction of the new CSO. Excavated soil/fill material from within Parcel F will be reused as backfill in the CSO trench provided it meets geotechnical requirements and

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<sup>1</sup> Borough of Brooklyn Highway Datum (BBHD), which is 2.56 feet above mean sea level datum at Sandy Hook New Jersey as defined by the United States Geologic Survey (USGS NGVD 1929).

DEP specifications for backfill material. Excavated soil from the sidewalk portion of the CSO will not be used as backfill in Parcel F, but may be used as backfill in the sidewalk portion of the CSO provided it also meets geotechnical requirements and DEP specifications for backfill material. The soil/fill material to be excavated in Parcel F was characterized and is non-hazardous with characteristics typical of historic fill. Excavated soil/fill material that cannot be reused as backfill in the CSO trench or excess excavated soil/fill material will be either transported off-site for disposal at a receiving facility with permit authorizing it to receive the excavated soil/fill material or placed in one or more covered roll-offs for up to 60 days. During this 60-day period, and commencing promptly after issuance of the NNO, the Applicant will work with the NYSDEC and the OER with regard to any on-site disposition of excavated material that is not used as backfill.

No over-excavation beyond the proposed trench is anticipated. Trench boxes may be used during excavation to minimize the volume of fill removed from the ground. In anticipation of the planned excavation, a waste characterization study, including both soil and groundwater characterization, was performed in September 2013. Section 2.4 further details this effort and Appendix A contains the *CSO-Waste Characterization Memo* prepared by Langan dated November 11, 2013. Groundwater was generally found to meet the Technical and Operation Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA and I Waters for analytes reported and fill planned for excavation was characterized as historic urban fill. The quality of the soil and fill material meets Track 4 Soil Cleanup Objectives (SCOs)<sup>2</sup> commonly accepted on E-Designation projects. No hazardous waste or evidence of a petroleum release were identified during the waste characterization study. While not anticipated, if unknown areas of grossly-contaminated soil (i.e., hotspots) are identified at or beyond the bottom of the trench, impacted soil/fill material associated with these areas will be removed to the extent practicable with the approval of the OER and under the jurisdiction of other regulatory agencies, as applicable. Any grossly-contaminated soil will be delineated horizontally and vertically by GPS or survey. Sources of groundwater impact, if encountered, will be addressed. If petroleum spill conditions are encountered, the NYSDEC will be notified.

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<sup>2</sup> Commonly used Track 4 SCOs include total SVOCs (250 mg/kg), arsenic (25 mg/kg), copper (1000 mg/kg), lead (1200 mg/kg), and mercury (2.8 mg/kg).

## **2.2 Soil and Fill Management Methods**

Excavated soil/fill material generated during CSO construction may be staged in temporary stockpiles (no more than 900 cubic yards in total for up to 60 days, on a rolling basis, unless otherwise approved by the DEC) or in covered roll-off containers for up to 60 days pending a decision on its reuse by the DEC. Potential locations for temporary stockpiles are illustrated on Figure 2 of the CSO-NNO application. Excavated soil/fill material that cannot be reused as backfill in the CSO trench or excess excavated soil/fill material will be either transported off-site for disposal at a receiving facility with permit authorizing it to receive the excavated soil/fill material or placed in one or more covered roll-offs for up to 60 days. During this 60-day period, and commencing promptly after issuance of the NNO, the Applicant will work with the NYSDEC and the OER with regard to any on-site disposition of excavated material that is not used as backfill in the CSO trench. Excavated soil/fill material from the new CSO trench will be either be temporarily stockpiled (only applicable to backfill materials) or stored in covered roll-off separately and segregated from any areas of grossly-contaminated soil (i.e., hotspots), if encountered. Surficial organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the site will not be commingled with the soil/fill material excavated from the CSO trench. Soil/fill excavated from the site for grading or other purposes will not be reused within a cover soil layer because the results of our waste characterization study indicate that it does not meet 6 NYCRR 375-6.8(a) Unrestricted Use SCOs.

The concrete block and rock riprap of the existing bulkhead will be removed and be disposed off-site as C&D debris and not reused on-site. The concrete block and rock riprap may be broken up on-site and will eventually be removed and transported off-site to a registered Part 360-16 C&D debris processing facility provided the concrete is not visibly commingled with non-hazardous contaminated soil or fill material or another solid waste and has not been in contact with a spill of petroleum, hazardous waste or industrial waste.

Temporary stockpiles generated during CSO construction will be limited to no more than a total of 900 cubic yards of excavated soil and will be removed within 60 days of the start of stockpiling, on a rolling basis, unless otherwise approved by the DEC.

Stockpiled soil will be placed on, at minimum, double layers of 8-mil (minimum) polyethylene sheeting (or equivalent), kept covered at all times with appropriately anchored plastic tarps or polyethylene sheeting. Stockpiles will be inspected daily and before and after every major storm event while on-site. The results of the inspections will be recorded in a logbook maintained at the site and made available for review by OER upon request.

### **2.3 Soil and Fill Material Screening Methods**

Visual, olfactory and photoionization detector (PID) soil screening and assessments will be performed by Langan environmental field staff under the supervision and direction of a Qualified Environmental Professional (QEP) or Professional Engineer (PE) during excavation, earthwork, and soil disturbance activities to evaluate if soil/fill material has been in contact with a spill of petroleum, hazardous waste or industrial waste prior to the issuance of the Notice of Satisfaction. The results of the soil screening surveys and assessments will be recorded in a field logbook and presented in the daily reports that will be submitted to OER.

Langan will meet DEP requirements and specifications for reusing excavated soil as backfill in the new CSO trench. Excavated soil/fill material generated during CSO construction will also be visually screened by a Langan geotechnical field engineer to determine its potential for reuse as backfill in the CSO trench. Backfill material shall meet the specifications for "Approved Excavated Suitable Fill" as described in the DEP's Standard Sewer Specifications (2009) Sections 2.24.2(C) and 4.06.2. According to the DEP specifications, approved excavated suitable fill shall be earth, free of bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign matter, shall not contain oversized material, and shall exhibit a fines content equal to or less than 20 percent (portion of material passing a No. 200 sieve). If excavated soil/fill material is found to contain any of the non-complaint, oversized materials referenced above, the excavated soil/fill material may be screened as a standard construction measure using small soil screener (Screen Pro 200XL manufactured by CWM, Inc., or equivalent) to remove oversized material. Screening out oversized material and objects will consist of an excavator or front-end loader placing excavated soil/fill material into the hopper of the soil screener, allowing the finer soil/fill material to fall through the screen, and then

placing the screened soil/fill material directly back into the CSO trench as backfill or in temporary stockpiles (no more than 900 cubic yards in total for up to 60 days, on a rolling basis, unless otherwise approved by the DEC) or in covered roll-off containers for up to 60 days pending a decision on its reuse by the DEC.

During soil/fill material screening operations, Langan environmental field staff will implement a Community Air Monitoring Plan (CAMP) in accordance with Section 4.0 and the site-specific Construction Health and Safety Plan (CHASP). Fugitive dust emissions from screening operations will be managed in accordance with Section 5.7.2.

## **2.4 Stockpile Methods**

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before 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 OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be completed by the contractor retained to perform the excavation (the Contractor) and will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off, in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales, silt fences, or equivalent control measures will surround soil stockpiles to further control runoff, as necessary except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible.

## **2.5 Characterization of Excavated Soil/Fill Material**

The waste characterization of the proposed CSO trench was performed during the period September 12-14, 2013; about 3,000 cubic yards of subsurface material was characterized. A memo providing an overview of the investigation, including sampling methodology and analytical results, was previously provided to the OER and is included in Appendix A.

Although not anticipated, if previously uncharacterized soil/fill material is excavated from the CSO trench, it will be characterized for reuse and/or off-site disposal purposes in a manner consistent with the requirements of this plan, the requirements of receiving facilities, and in compliance with applicable laws and regulations.

Previously uncharacterized and excavated soil/fill material will be sampled and analyzed for reuse and/or disposal parameters. ENCORE® kits (5-gram) will be used to collect soil samples for VOCs analysis. Characterization samples will be analyzed for one or more of the following parameters:

- Volatile Organic Compounds (VOCs) by USEPA Method 8260C
- Semi-volatile Organic Compounds (SVOCs) by USEPA Method 8270D
- Metals by USEPA Method 6010C/7471B
- Polychlorinated Biphenyls (PCBs) by USEPA Method 8082A
- Organochlorine pesticides by USEPA Method 8081B
- Herbicides by USEPA Method 8151A
- Hexavalent Chromium by USEPA Method 7196A
- Total Cyanide by USEPA Method 9010C/9012A
- Ignitability by USEPA Method 1030
- Corrosivity (pH) by USEPA Method 9045D
- Sulfide Reactivity by SW846 Chapter 7.3
- Cyanide Reactivity by SW846 Chapter 7.3
- Toxicity Characteristic Leaching Procedure (TCLP) VOCs, SVOCs, Pesticides, Herbicides and Metals by USEPA Method 1311
- Total petroleum hydrocarbons gasoline-range organics (TPH-GRO) (USEPA Method 8015C)
- Total petroleum hydrocarbons diesel-range organics (TPH-DRO) (USEPA Method 8015C)
- Paint Filter by USEPA Method 9095A

Additional analysis beyond this list may be performed, as per the requirements of specific waste disposal facilities. Characterization samples will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory in the states of New York, New Jersey, and Pennsylvania, and any other state where the soil/fill material may be disposed of. Characterization sampling methodology and laboratory analytical results will be reported in a closure report.

## **2.6 Endpoint Sampling**

If areas of grossly-contaminated soil (i.e., hotspots) are identified and removed during construction, endpoint samples will be collected and analyzed per the frequencies described in DER-10. The endpoint sampling plan(s) will be determined in coordination with the OER and/or NYSDEC. In general, endpoint sampling frequency may consist of the following:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
  - For surface and subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. Excavation bottom samples should be collected within 24 hours of excavation when sampling for VOCs, and should be taken from the 0- to 6-inch interval below the excavation bottom. Samples taken after 24 hours should be taken at 6 to 12 inches.

A NYSDOH-ELAP-certified laboratory will be used for the analysis of endpoint samples, as necessary. Endpoint samples will be analyzed for parameters selected in coordination with OER and/or NYSDEC and will be consistent with the nature of the

identified contamination. Analytical methods used for endpoint sample analysis may include, but not be limited to, the following:

- USEPA Method 8260C for VOCs;
- USEPA Method 8270D for SVOCs;
- USEPA Method 8081B for organochlorine pesticides;
- USEPA Method 8082A for PCBs;
- USEPA Method 8151A for herbicides;
- USEPA Method 6010/7471/7196 for metals;
- USEPA Method 9010C/9012A for total cyanide

ENCORE® kits (5-gram) will be used to collect soil samples for VOCs analysis.

The endpoint sample analytical data will be compared to 6 NYCRR Part 375 Restricted Use Restricted-Residential SCOs, site-specific Track 4 SCOs, and/or CP-51 Soil Cleanup Guidance SCOs in coordination with the OER. The closure report will present a description of sampling methodology and field observations and provide tabulated analytical data tables with comparison to the applicable SCOs, a sampling location map, a map of the analytical results, copies of the laboratory analytical data reports, and copies of the analytical laboratory's certification.

## **2.7 Materials Excavation, Load-Out and Transport**

Excavated soil/fill material that cannot be reused as backfill in the CSO trench or excess excavated soil/fill material may be transported off-site for disposal in a manner consistent with the requirements of the receiving facility and in compliance with applicable laws and regulations.

The Contractor will be responsible for material excavation, handling, stockpiling, any additional characterization, transport and disposal during construction. The Contractor will be responsible for marking out (prior to excavation) and maintaining (during excavation) the characterization grid. The Contractor is responsible for correcting any situation involving material inadvertently transported to an incorrect disposal facility or material released during transit.

The New York State licensed Professional Engineer (PE) or QEP overseeing the work shall perform the following duties:

- Supervise Langan staff overseeing the excavation and load-out of excavated soil/fill material;
- Advise the Contractor that construction activities will not interfere with, or otherwise impair or compromise the soil/fill material and groundwater management activities; and
- Review the Contractor's plans for characterization, transportation, and off-site disposal of waste material.

The Contractor shall perform the following duties:

- Retain a party responsible for the safe execution of invasive and other work performed under this work plan;
- Investigate utilities and easements on the site and address any identified risks for the scope of work;
- Verify loaded outbound trucks are inspected and cleaned, as necessary, before leaving the site; and
- Verify egress points for truck and equipment transport from the site will be kept clean of soil and fill material during excavation and earthwork.

The Contractor shall inspect vehicle egress points daily for evidence of soil being tracked off the site. Cleaning of the adjacent streets will be performed by the Contractor as needed to maintain a clean condition. Open and uncontrolled mechanical processing of excavated soil/fill material on-site will not be performed without implementing appropriate dust control measures. No visible emissions of fugitive dust will be allowed. The site will be monitored for fugitive dust emissions and the Contractor will be responsible for controlling fugitive dust emissions.

The Contractor will be responsible for ensuring that loaded vehicles leaving the site with excavated soil/fill material will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. Truck liners will be used if loads contain wet soil/fill material.

Queuing of trucks will be performed on-site, when possible to minimize off-site disturbance. The Contractor will be responsible for ensuring that trucks will not stop or idle on adjacent streets or in the neighborhood after leaving the site.

The Contractor will design outbound truck transport routes that take into account the following factors:

- Limiting transport through residential areas and past sensitive receptors;
- Using mapped truck routes;
- Minimizing off-site queuing of truck entering the site;
- Limiting total distance to major highways and thoroughfares;
- Promoting safety in access major highways and thoroughfares;
- Achieving overall safety during transport.

## **2.8 Materials Disposal Off-Site**

Excavated soil/fill material or other waste excavated and removed from the site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Disposal facility pre-approval letters will be forwarded to OER upon receipt and prior to the start of excavated materials load-out. A strict chain of custody or manifest system for exported soil/fill material will be employed. The Contractor shall provide the PE with the facility-signed manifest and scale ticket for each load of soil/fill material leaving the site within one week of disposal. Non-hazardous contaminated historic fill and soil transported off-site will be handled as a solid waste and will not be sent to a registered construction and demolition (C&D) processing facility pursuant to 6 NYCRR Part 360-16. Characteristic hazardous soil/fill material will be stored, transported, and disposed of off-site in compliance with applicable laws and regulations.

The following documentation will be established and reported by the PE/QEP for each disposal destination used during the construction project to document that the disposal of regulated material complies with applicable laws and regulations:

- A signed letter from owner or generator to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at a

site in New York. The letter will provide the project identity and the name and phone number of the owner or generator. The letter will include as an attachment a summary of all analytical data for the material being transported; and

- A letter from each disposal facility stating it is in receipt of the correspondence (bulleted above) and is approved to accept the regulated material.

The above requirements will not apply to recycling or disposal of construction and demolition debris<sup>3</sup>.

The concrete block and rock riprap of the existing bulkhead will be removed and be disposed off-site as C&D debris (no sampling required). The crushed concrete will be removed and transported off-site to a registered Part 360-16 C&D debris processing facility provided the concrete is not visibly commingled with non-hazardous contaminated soil or fill material or another solid waste and has not been in contact with a spill of petroleum, hazardous waste or industrial waste.

If excavated soil/fill material from the site is proposed for unregulated use (i.e., excavated soil/fill material does not exceed any of the 6 NYCRR 375-6.8(a) Unrestricted Use SCOs, and has not been in contact with a spill of petroleum, hazardous waste or industrial waste), including transport to registered C&D processing facility, a formal request will be prepared for approval by the OER with in compliance with 6 NYCRR Part 360-16. However, the results of our waste characterization study indicated that no soil and fill material meets the above criteria. This request will include the location and description, including volume, of the soil/fill material to be recycled, laboratory analytical data, verification the soil/fill material has not been in contact with a spill of petroleum,

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<sup>3</sup> According to 6 NYCRR Part 360-1.2(b)(38), construction and demolition (C&D) debris means uncontaminated solid waste resulting from the construction, remodeling, repair and demolition of utilities, structures, roads and uncontaminated solid waste resulting from land clearing. Such solid waste includes, but is not limited to bricks, concrete and other masonry materials, soil, rock, wood (including painted, treated and coated wood and wood products), land clearing debris, wall coverings, plaster, drywall, plumbing fixtures, non-asbestos insulation, roofing shingles and other roof coverings, asphaltic pavement, glass, plastics that are not sealed in a manner that conceals other waste, empty buckets ten gallons or less in size and having no more than one inch of residue remaining on the bottom, electrical wiring and components containing no hazardous liquids and pipes and metals that are incidental to any of the above.

hazardous waste or industrial waste, and verification that the soil/fill material complies with the receipt requirements for recycling under 6 NYCRR Part 360. Contractor shall be responsible for providing any additional information that is required as part of the OER review process. Excavated soil/fill material proposed for unregulated use will be appropriately handled on-site to prevent mixing with other excavated materials and construction materials.

The closure report prepared and submitted to the OER will include an itemized account of the destination of excavated soil/fill material removed from the site during the construction project. Documentation associated with disposal of excavated soil/fill material will include the following:

- Facility-signed manifests;
- Scale-tickets;
- Facility applications and pre-approval letters; and
- Copies of valid, current (at the time of disposal), operating permits for each receiving facility.

## **2.9 Demarcation**

After completion of any hotspot removal and other remedial activities (which do not include the standard construction practices for the CSO), and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods:

- Placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the closure report, as necessary;
- A land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures; and
- All materials beneath the approved cover shall be considered impacted and subject to site management after the remedy is complete.

Demarcation may be established by one or any combination of the three methods referenced above. As appropriate, a map showing the method of demarcation and associated documentation will be presented in the closure report, as necessary. This demarcation will constitute the top of the site management horizon.

## **2.10 Import of Backfill from Off-Site Sources**

This section presents the requirements for importing soil/fill material to be used in the new CSO trench. All imported soil/fill material will meet OER-approved backfill quality objectives for this site. The backfill quality objectives are described below.

A process will be established to evaluate sources of backfill and cover soil to be imported to the site, and will include an examination of source location, current and historical use(s), and other applicable documentation. Material from industrial sites, spill sites, environmental remediation sites, or other potentially contaminated sites will not be imported to the site.

Imported soil and fill material used as backfill material in the CSO trench shall be approved by DEP, meet geotechnical requirements and DEP specifications for backfill, and comply with the requirements of 6 NYCRR Part 360. In addition, imported soil and fill material shall not contain any C&D debris, other than recognizable concrete aggregate as described herein, or exhibit any observable indicators of contamination (i.e., petroleum-staining and odors). Imported backfill shall meet the lesser of the appropriate NYSDEC 6 NYCRR Part 375-6.8(a) Unrestricted Use SCOs and the NYSDEC 6 NYCRR Part 375-6.8 Groundwater Protection SCOs.

The following potential off-site sources may be used as backfill provided the material meets the backfill quality objectives specified herein:

- Gravel, rock or stone, consisting of virgin material from a permitted mine or quarry;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the NYSDEC under 6 NYCRR Part 360;
- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations; and

- Clean soil from roadway or other transportation projects in compliance with applicable laws and regulations.

RCA imported from compliant facilities and virgin gravel, rock, or stone will not require additional testing unless required by the NYSDEC under its terms for operation of the facility. Langan will review each source facility to determine it is compliant with its 6 NYCRR Part 360 registration or permitting requirements, as applicable, for the period of acquisition of RCA. RCA imported to the site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for and will not be used as cover material.

Materials received for import to the site will be reviewed by Langan, approved by the OER, and will be in compliance with provisions of this plan. The closure report will identify the source of the backfill material, provide evidence that an inspection was performed at the source, and present the laboratory analytical data, sampling methodology and a site plan illustrating where the backfill material was placed.

## **2.11 Source Screening and Testing**

Materials proposed for import to the site will be inspected at the source location prior to import. Inspection of imported soil/fill material will include visual, olfactory and PID screening for evidence of potential contamination as follows:

- Trucks with imported soil/fill material shall be in compliance with applicable laws and regulations and will enter the site at designated locations.
- Each truck load of imported soil/fill material will be inspected for evidence of contamination.
- Imported soil/fill material shall be free of solid waste including C&D debris, hazardous waste, organic matter (e.g., stumps, roots, etc.), municipal solid waste, and deleterious matter and shall not or exhibit any observable indicators of contamination (i.e., petroleum-staining and odors).

Discrete and composite samples of imported soil/fill material will be collected at a frequency described in Table 4 of CP-51 and each sample will be analyzed for 6 NYCRR Part 375 parameters. The laboratory analytical results will be submitted to OER for

review and approval before import. A formal request will be prepared by the Contractor for approval by the OER in compliance with 6 NYCRR Part 360. This request will identify the source of the backfill material, provide evidence that an inspection was performed at the source, and present laboratory analytical data, sampling methodology, and a site plan illustrating where the backfill material will be placed. The Contractor shall be responsible for providing any additional information that is required as part of the OER review process.

All sources of imported material will be identified in the closure report. RCA imported from compliant facilities and virgin gravel, rock, or stone will not require additional testing unless required by the NYSDEC under its terms for operation of the facility. Langan will review each source facility to determine it is compliant with its 6 NYCRR Part 360 registration or permitting requirements, as applicable, for the period of acquisition of RCA. RCA imported to the site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for and will not be used as cover material.

### **3.0 FLUIDS MANAGEMENT**

All liquids to be removed from the site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. The excavation and construction work for the new CSO will also require temporary construction dewatering. The groundwater surface in the vicinity of the proposed excavation area is about 6 to 8 feet below ground surface (about el. 2 to el. 0 BBHD). The groundwater surface is expected to be shallower towards the East River (el. 0 BBHD) and deeper towards Commercial Street (el. 1 BBHD). Based on the local hydrogeological conditions and proximity to the East River/Newtown Creek, a temporary construction dewatering effort is required to facilitate pile driving, construction of the pipe platform and outfall, concrete placement and curing, pipe laying and placement, and backfilling.

Dewatering fluids will be managed by the Contractor in accordance with applicable laws and regulations. The Contractor shall be responsible for handling, treating, and disposing of all contaminated groundwater removed from the site. The methods of dewatering shall be at the option of the Contractor, provided that dewatering is accomplished in a manner that shall preserve the strength of foundation strata; shall not cause instability of the excavation sides; shall not result in loss of ground from beyond the property lines; shall not cause damage to existing structures, streets, pavements, and utilities; and complies with all applicable regulations.

Dewatering fluids from temporary construction dewatering will be managed through one or more of the following methods:

- Discharge to the surface waters of the East River / Newtown Creek;
- Discharge to the NYCDEP municipal sewer system;
- Discharge to groundwater; and/or
- Containerization and off-site disposal at permitted or licenses treatment, storage or disposal facility.

A brief description of each option and regulatory requirements is provided in the sections below.

### **3.1 Discharges to Surface Waters of the East River / Newtown Creek**

Dewatering fluids discharged to the surface waters of the East River / Newtown Creek would be authorized upon receipt of a State Pollutant Discharge Elimination System (SPDES) permit or a SPDES Non-Jurisdictional Determination (NJD) from the NYSDEC. The dewatering fluids would be pretreated as necessary to meet the requirements of the SPDES permit. Discharges to the surface waters of the East River / Newtown Creek under a SPDES permit or a SPDES NJD may also require a Long Island Well Permit from the NYSDEC depending on the design of the dewatering system. Copies of all NYSDEC permits and supporting documentation would be included in the closure report.

### **3.2 Discharges to the NYCDEP Municipal Sewer System**

Dewatering fluids discharged to the municipal sewer system would be authorized upon receipt of a sewer discharge permit from the NYCDEP. The NYCDEP regulates discharges to the New York City municipal sewer system pursuant to Title 15 Rules of the City of New York Chapter 19. Receiving a sewer discharge permit from the NYCDEP would require completing a Wastewater Quality Control Application, submitting laboratory analytical data, and paying payment of fees upfront. The dewatering fluid would be pretreated as necessary to meet the NYCDEP limitations for effluent to sewer system. Discharges to the NYCDEP municipal sewer system may also require a Long Island Well Permit from the NYSDEC depending on the design of the dewatering system. Copies of all NYCDEP and NYSDEC permits and supporting documentation would be included in the closure report.

### **3.3 Discharges to Groundwater**

Discharges to groundwater would be authorized upon receipt of a SPDES permit or a SPDES NJD from the NYSDEC. The dewatering fluids would be pretreated as necessary to meet the requirements of the SPDES permit and the groundwater effluent limitations as set forth in Technical Operation and Guidance Series (TOGS) 1.1.1 Table 5 – New York State Groundwater Effluent Limitations (Class GA) and 6 NYCRR Part 703.6. Discharges to groundwater under a SPDES permit or a SPDES NJD may also require a Long Island Well Permit from the NYSDEC depending on the design of the dewatering

system. Copies of all NYDEC permits and supporting documentation would be included in the closure report.

### **3.4 Containerization and Off-Site Disposal**

The dewatering fluids would be containerized in appropriate vessels (e.g., frac tanks, vac trucks, or equivalent) and transported off-site for disposal at a permitted treatment, storage or disposal facility. Dewatering fluids would be characterized before transport off-site for disposal purposes in a manner consistent with the requirements of the receiving facility and in compliance with applicable laws and regulations. Waste characterization samples would be analyzed by a laboratory that is certified by the state in which the receiving facility is located and shall be collected at a frequency specified by the selected disposal facility. Dewatering fluids would be transported off-site in accordance the requirements of Section 2.7 and in compliance with applicable laws and regulations.

The following documentation will be established and reported by the PE or QEP for each disposal destination used during the construction project to document that the disposal of dewatering fluids complies with applicable laws and regulations:

- A signed letter from the owner or generator to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at a site in New York. The letter will provide the project identity and the name and phone number of the owner or generator. The letter will include as an attachment a summary of all analytical data for the material being transported; and
- A letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the regulated material.

Dewatering fluids transported off-site for disposal will be managed as regulated material and will be managed in accordance with applicable laws and regulations. A strict chain of custody or manifest system for exported dewatering fluids will be employed. The

Contractor shall provide the PE or QEP the facility-signed manifest for each load of leaving the site within one week of disposal.

The closure report will include an itemized account of the destination of dewatering fluids exported from the site during the construction project. Documentation associated with disposal of dewatered groundwater will include the following:

- Facility-signed manifests;
- Facility pre-approval letters; and
- Copies of valid, current, operating permits for each receiving facility.

#### **4.0 COMMUNITY AIR MONITORING PROGRAM**

Continuous, real-time air monitoring for VOCs and particulate matter at the perimeter of the work area will be performed by Langan during excavation, earthwork, screening of excavated soil/fill material, and soil disturbance activities. Soil disturbance activities include, but are not limited to, soil/fill material excavation, handling, stockpiling, and loading, trenching, sheeting and lagging. Action levels exceedances observed during the CAMP will be presented in the daily report.

##### **4.1 VOCs – Monitoring, Action Levels, Responses**

Concentrations of VOCs will be monitored at the upwind and downwind site perimeter on a continuous basis during soil disturbance activities. Upwind concentrations will be used to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated daily. The equipment will be equipped with an audible alarm to indicate exceedance of the action levels described below. The equipment will be programmed to record 15-minute average concentrations, which will be compared to the levels specified below:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the work area 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.

- If the organic vapor level is above 25 ppm at the site perimeter, activities will be shutdown.

The 15-minute average readings will be recorded and presented in the daily reports. Instantaneous readings, if any, will also be recorded by Langan field staff on routine inspection of CAMP stations and used for decision-making purposes.

#### **4.2 Particulate Matter – Monitoring, Action Levels, Responses**

Concentrations of particulate matter will be monitored continuously at the upwind and downwind site perimeters during soil disturbance activities. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers (PM10) in size. The equipment will be calibrated daily. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. The equipment will be programmed to record 15-minute average concentrations, which will be compared to the levels specified below:

- If the downwind PM10 particulate level is 100 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM10 particulate levels do not exceed  $150 \mu\text{g}/\text{m}^3$  above the upwind concentration and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 particulate levels are greater than  $150 \mu\text{g}/\text{m}^3$  above the upwind level, work will be stopped and work activities will be reevaluated. Work will resume provided dust suppression measures and other controls are successful in reducing the downwind PM10 particulate concentration to within  $150 \mu\text{g}/\text{m}^3$  of the upwind concentration and in preventing visible migration of dust off-site.

In addition, to continuous, real-time monitoring of particulate matter, fugitive dust migration will be visually assessed during all soil disturbance activities by Langan field

staff. The 15-minute average readings will be recorded and presented in the daily reports. Instantaneous readings, if any, will also be recorded by Langan field staff on routine inspection of CAMP stations and used for decision-making purposes.

## **5.0 SITE MANAGEMENT**

### **5.1 Pre-Construction Meeting**

The OER will be invited to attend the pre-construction meeting at the site with parties involved in the work before the start of construction activities. The Contractor shall organize and accommodate this meeting in the site trailer or elsewhere on-site.

### **5.2 Mobilization**

Mobilization will be conducted as necessary for each phase of work at the site. Mobilization includes field personnel orientation, equipment mobilization, and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the site, health and safety requirements, and field procedures.

### **5.3 Utility Marker and Easement Layouts**

The Contractor will be responsible for fully investigating the presence of utilities and easements on the site before the start of construction, excavation and earthwork by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution and explosion hazard during excavation and earthwork. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the mark-out ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with excavating, sheeting, and pile driving in the vicinity of overhead utilities will be prevented by maintaining a safe distance from overhead power lines.

### **5.4 Equipment and Material Staging**

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

## **5.5 Stabilized Construction Entrance**

The Contactor will be responsible for taking measures to ensure trucks departing the site will not track soil, fill or other construction debris off-site. Such measures may include the use of cleaned asphalt or concrete roads or use of stone or other aggregate-based egress paths between the truck inspection station and the egress point(s).

## **5.6 Truck inspection Station**

An outbound-truck inspection station will be set up by the Contractor on-site next to each truck egress point. Trucks will be required to stop at the truck inspection station and will be examined by the Contractor for evidence of contaminated soil on the undercarriage, body, and wheels before exiting the site. Brooms, shovels and potable water will be used by the Contractor to remove soil, fill, or construction debris from the tires or undercarriage of each truck leaving the site.

## **5.7 Odor and Dust Control**

### **5.7.1 Odor Control**

Necessary means will be strictly employed by the Contractor to prevent on- and off-site odor nuisances. At a minimum, procedures to control odor, where required, will include:

- Limiting the area of open excavations;
- Shrouding open excavations with tarps and other covers; and
- Use of foams to cover exposed odorous soils, including strong petroleum odors in the event that a petroleum spill is discovered.

If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include:

- Direct load-out of soils to trucks for off-site disposal; and
- Use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, 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 by the Contractor. OER will be notified of all odor complaint events.

### **5.7.2 Dust Control**

Dust management implemented by the Contractor during excavation, earthwork, screening of soil/fill material, and soil disturbance activities will include, as required:

- Use of a dedicated water spraying methods for roads, excavation areas, soil/fill material screening equipment, and stockpiles;
- Use of properly anchored tarps to cover stockpiles and roll-offs;
- Exercise extra care during dry and high-wind periods; and
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust resulting from excavation, earthwork, screening of soil/fill material, and soil disturbance activities. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected by the Contractor. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events.

### **5.8 Spill Prevention**

In order to prevent spills from occurring at the site, the following inspections will be performed during construction by the Contractor:

- Weekly Equipment Inspections – Used to account for fluids carried on and used to operate equipment and ensure that they are not leaking. Also account for overall function of equipment to protect against malfunction during operation or handling of excavated materials.
- On-site Materials Handling – Used to account for material quantity and proper methods of storage to help reduce the chance of a spill or release.

- Safety Equipment Inspections – Used to account for the quantity, location, and working condition of safety equipment on-site. Safety equipment and supplies will be kept accessible and in good working order.

Any inadequacies discovered as a result of these inspections will be corrected immediately by the Contractor. The following is a list of actions that should be taken by the Contractor in the event of a spill:

- Account for site personnel and make proper notifications.
- Evaluate the hazard(s), identify the source of the discharge, and stop the spill or leak.
- Exclude any source of ignition from the spilled material if flammable.
- Isolate and contain the spill in the smallest area possible.
- Keep personnel upwind of the spill area. Evaluate potential vapor and dust hazards, and implement appropriate suppression operations.
- At no time will personnel be allowed to come in contact with unidentified spilled materials.
- Notify the Owner.
- Notify the NYSDEC, as applicable.

## **5.9 Stormwater Pollution Prevention**

Applicable laws and regulations (e.g., NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity) related to stormwater pollution prevention will be addressed during the construction project by the Contractor, as applicable. If necessary, erosion and sediment control measures (e.g., silt fences and barriers, and hay bales) will be installed by the Contractor around the perimeter of the construction area and inspected once a week and after storm events to ensure that they are operating appropriately. Stormwater discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant runoff of soil and sediment. All necessary repairs to erosion and sediment control measures shall be made immediately by the Contractor. Accumulated sediments will be removed by the Contractor to keep the barrier and hay bales functional, as necessary. Undercutting or erosion of the silt fence anchor will be repaired immediately by the Contractor. The

manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

## **5.10 Contingency Plan**

This contingency plan shall address the discovery of unknown structures or contaminated media during construction of the new CSO. Identification of unknown contamination source areas will be promptly communicated to the OER's Project Manager and address in the daily reports. Petroleum spills will be reported to the NYSDEC Spill Hotline. If previously unidentified contaminant sources are found during construction of the new CSO, sampling will be performed on the contaminated source material and surrounding soil and reported to the OER. Sampling and analysis will be performed in accordance with the provisions set forth in Sections 2.5 and 2.6.

### **5.10.1 Petroleum or Solvent-Impacted Material**

During excavation and earthwork, soil and fill material will be monitored by Langan staff using a PID and visual and olfactory field screening techniques to identify soil or fill material containing petroleum, solvents or other indicators of contamination that may otherwise exclude material from being accepted at the selected disposal facility or reused on-site. If petroleum- or solvent-impacted material is identified, samples may be collected and analyzed for parameters consistent with the nature of the identified contamination. The analytical data will be compared to 6 NYCRR Part 375 Restricted Use Restricted-Residential SCOs and/or CP-51 Soil Cleanup Guidance SCOs. If the petroleum- or solvent-impacted material exhibit exceedances of the SCOs, the material will be excavated to the extent practical and transported off-site for disposal. Endpoint samples will be collected to document removal of the petroleum- or solvent-impacted material in accordance with Section 2.6.

### **5.10.2 Hazardous Material**

If characteristic hazardous material is identified by waste characterization sampling or other construction activities, the hazardous material will be delineated and removed. Hazardous material will not be reused on-site and will be transported off-site for disposal.

at a facility permitted to accept hazardous waste. Endpoint samples will be collected to document removal of the hazardous material in accordance with Section 2.6.

### **5.10.3 Underground Storage Tanks**

The presence of a UST in the new CSO trench is unlikely based on the review of previous environmental reports. However, as a contingency, if a UST is encountered during excavation and earthwork, the tank will be decommissioned in accordance with applicable NYSDEC UST closure requirements. A FDNY-licensed tank contractor will clean and remove the tank, any concrete encasements, piping and appurtenances in accordance with applicable laws and regulations. The tank will be exposed, excavated, cut open and cleaned on polyethylene sheeting, as necessary. Waste characterization samples of the tank contents (including oil, sludge, and wastewater) will be collected and analyzed, as necessary, in accordance with the permit requirements of the proposed disposal facility(ies) and in accordance with 6 NYCRR Part 372.2(a)(2). Tank contents will be disposed of off-site in accordance with applicable laws and regulations. The cleaned tank, piping and appurtenances will be transported off-site to a scrap metal facility for recycling.

Post-excavation soil samples will be collected as per the NYSDEC DER-10. Petroleum-contaminated soils will be removed in accordance with Section 2.4 through Section 2.7 and other applicable procedures described in this plan. The UST(s) will be registered and closed with the NYSDEC Petroleum Bulk Storage unit in accordance with regulatory requirements. UST closure documentation will be provided in the closure report. The closure report will include the following information, as necessary:

- A description of the completed scope of work;
- Data tables and figures;
- Photographs of spill response, dewatering, housekeeping and tank removal activities;
- Waste characterization analytical reports;
- Laboratory analytical reports;
- Copies of completed waste profiles, forms and/or applications;
- Copies of disposal facility approval letters;
- Waste transporter and disposal facility permits;

- Copies of waste disposal documentation (i.e. manifests, chains of custody, and/or receipts)
- A copy of the NYSDEC PBS application and facility information report;
- A copy of the notarized FDNY affidavit of tank removal and closure signed by a FDNY certificate/license holder; and
- Other applicable correspondence and documentation.

## **6.0 IMPORT OF CLEAN COVER**

No soil is anticipated to be imported to the site for use as clean cover. The segment of the CSO within Parcel F, after it is backfilled, will be temporarily covered with quarry gravel or RCA from a Part 360 registered facility to protect the ground surface from erosion. If construction plans change (not anticipated), all imported soil will be uncontaminated, clean soil that meets the lesser of the appropriate NYSDEC 6 NYCRR Part 375-6.8(a) Unrestricted Use SCOs and the NYSDEC 6 NYCRR Part 375-6.8 Groundwater Protection SCOs.

The imported uncontaminated, clean soil cover will be from an approved source/facility and will be evaluated by Langan to confirm:

- That a segregated stockpile is properly maintained at the source and will not be commingled with any other material prior to importing and grading the clean soil material at the site;
- That the material does not include any solid waste, including C&D debris, as it's prohibited;
- That screening for evidence of contamination by visual, olfactory and PID screening methods prior to testing at the source as well as upon importing to the site for grading is completed; and
- That a five-point composite sample will be collected from the segregated stockpile at the source at the appropriate frequency specified in Table 4 of CP-51 and analyzed for 6 NYCRR Part 375 parameters.

Upon receipt of the analytical results from the stockpile of soil proposed for import, a Clean Soil Sampling Report will be submitted to OER for review and approval prior to importing. The report will include the following:

- Summary of number of samples collected and analyzed, tabulated analytical data and comparison to the lesser of the appropriate NYSDEC 6 NYCRR Part 375-6.8(a) Unrestricted Use SCOs and the NYSDEC 6 NYCRR Part 375-6.8 Groundwater Protection SCOs;
- Analytical data sheets and chain of custody documentation;
- A tabulated summary of imported soil;

- Photographs of the segregated stockpile at the source with sample point locations identified;
- An affidavit from the source/facility on company letterhead stating that the segregated stockpile was properly maintained at the source and complies with the requirements listed above; and
- A copy of source/facility's valid operating permit.

A highly visible demarcation barrier (i.e. orange geo-synthetic material or equivalent) will be installed beneath the clean soil/fill surface cover if placed as part of the CSO project. Upon importing and grading the OER-approved clean soil cover on top of a highly visible demarcation barrier, the following documentation will be presented in the closure report:

- Copies of purchase invoices for the demarcation barrier;
- Manifests and scale tickets for the soil OER-approved clean soil cover imported to the site;
- A tabulated summary of imported soil;
- A site plan depicting all areas where the OER-approved clean soil cover was placed; and
- Photographs documenting the importing and grading of the OER-approved clean soil cover across the site with the underlying highly visible demarcation barrier.

## **7.0 REPORTING**

### **7.1 Daily Reports**

Daily reports, providing a summary of work activities for each day of active soil disturbance work, will be emailed to the OER project manager by the end of the following day. Those reports will include:

- OER project number
- Description of the work activities;
- Quantities of soil/fill material imported and exported from the site;
- Quantities of dewatering fluids exported from the site;
- Status of on-site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP data and exceedances (if any); and
- Photographs of site conditions and work activities.

The frequency of the reporting obligations may be revised in consultation with OER project manager. Email reports are not intended to be the primary mode of communication for notification to OER of emergencies (i.e., spills), requests for changes to this plan or other sensitive or time critical information. Emergency conditions and changes to this plan will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an appendix in the closure report.

### **7.2 Closure Report**

A closure report to document the new CSO construction activities will be prepared by Langan submitted to the OER for review. The closure report will include:

- Information required by this plan;
- Description of deviations from this management plan;
- An itemized record and account of the destination of excavated soil/fill material removed from the site during the construction project including facility-signed

- manifests, scale-tickets; facility pre-approval letters; and copies of valid, current, operating permits for each receiving facility;
- An itemized record and account of the destination of dewatering fluids exported from the site during the construction project including facility-signed manifests, facility pre-approval letters; and copies of valid, current, operating permits for each receiving facility;
  - Tabular summary of endpoint sampling results, waste characterization results, reuse analytical results, imported soil/fill material analytical results, and other analytical data generated as part of construction;
  - Photographic documentation of any remedial work performed during construction, as necessary;
  - Copies of all dewatering and discharge permits (e.g., NYSDEC, NYCDEP, etc.);
  - Copies of all OER-approved import soil/fill material requests;
  - Copies of all daily reports, including CAMP data;
  - Copies of spill and/or UST closure documentation, as necessary;
  - Copies of all other application correspondence and documentation.

### **7.3 Deviations**

All changes to this plan will be reported to the OER project manager and will be documented in the daily reports and closure report. The process to be followed if there are any deviations from this plan will include a request for approval for the change from the OER. The request will:

- Explain the reasons for deviating from the approved management plan;
- Explain the effect of the deviations on construction activity and other environmental requirements; and
- Demonstrate the revised management plan is protective of human health and the environment.

**APPENDIX A**

**CSO – WASTE CHARACTERIZATION MEMO**

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Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.  
21 Penn Plaza, 360 West 31<sup>st</sup> Street, 8<sup>th</sup> Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444

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**To:** Cavy Chu, P.E., NYCOER

**From:** Langan

**Info:**

**Date:** November 11, 2013

**Re:** CSO – Waste Characterization  
Greenpoint Landing  
Brooklyn, New York  
Langan Project No.: 170229002

---

The purpose of this memorandum is to provide an overview of the waste characterization investigation of the proposed CSO trench.

## **SAMPLING METHODOLOGY**

The waste characterization of the proposed CSO trench was performed concurrently with the waste characterization investigations of Building G1 and Building G2 during the period September 12-14, 2013.

The proposed CSO trench was divided into six approximately 2,400-square-foot waste characterization grids. Waste characterization grids were composed of cells extending from the surface to approximately 10 feet below grade surface (bgs) and comprising approximately 500 cubic yards (CY) of subsurface material. The cells for the proposed CSO outfall trench assume an excavation cut of 10 feet and a 1.5 layback slope from the 5-foot wide CSO pipe platform<sup>1</sup>. We estimate about 3,000 cubic yards of subsurface material will be excavated during construction.

Twelve soil borings were completed by Aquifer Drilling & Testing, Inc. (ADT) of Mineola, New York under the supervision of Langan field engineers on September 14, 2013. Two soil borings

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<sup>1</sup> As an alternative, industry standard steel trench boxes may be used to facilitate the construction of the proposed CSO. Assuming a 10-foot steel trench box is used along the full length of the proposed CSO, we estimate about 1,850 cubic yards of subsurface material will be excavated during construction.

# MEMO

(denoted “A” and “B”) were completed within each waste characterization grid. Soil boring locations are presented in the attached figure.

All soil borings were advanced by a Sonic® Compact Roto Sonic 17C Model drill rig to a depth of approximately 10 feet bgs. Soil samples were collected continuously into 5-foot core barrels and transferred to dedicated, disposable polyethylene bags. The extracted soil was screened for VOCs with a photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp, inspected for visual and olfactory evidence of contamination, and classified by Langan field engineers. Boring logs for completed borings are provided as Attachment B. Investigative-derived waste (IDW) (i.e., drill cuttings) was returned to each borehole. Excess IDW that could not be returned to the borehole because of space constraints or that appeared impacted was containerized in 55-gallon steel drums and stored on-site pending off-site disposal.

A sample set was collected for laboratory analysis from each grid cell. Each sample set comprised one grab sample and one composite sample. Composite samples were generated by homogenizing, at a minimum, five grab samples collected from the two soil cores extracted from each waste characterization grid. Discrete samples for VOC analysis were collected from the 6-inch interval between the two soil cores exhibiting the highest degree of contamination based on visual and olfactory indicators and PID readings. Discrete samples for VOC analysis were collected using 5-gram EnCore™ sampling devices.

Six sample sets were collected and submitted for laboratory analysis. Three trip blanks were collected and analyzed for quality assurance/quality control (QA/QC) purposes. Sample nomenclature for grab samples reflects the soil boring number and depth interval from which a sample was collected. Sample nomenclature for composite samples reflects the grid cell number from which a sample was collected. Summaries of all samples collected and submitted for laboratory analysis are presented in Tables 1 and 2.

## **LABORATORY ANALYTICAL PROGRAM**

All samples were containerized in laboratory-supplied glassware and submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory (Alpha Analytical, Inc. of Westborough, MA [ELAP ID #11148]) via courier service under standard chain-of-custody protocol. Grab soil samples were analyzed for

# MEMO

VOCs only by United States Environmental Protection Agency (USEPA) Method 8260C. Composite soil samples were analyzed for the following parameters:

- Semi-volatile organic compounds (SVOCs) (USEPA Method 8270D)
- Polychlorinated biphenyls (PCBs) (USEPA Method 8082A)
- Organochlorine pesticides (USEPA Method 8081B)
- Herbicides (USEPA Method 8151A)
- Target analyte list [TAL] metals (USEPA Method 6010C/7471B)
- Hexavalent chromium (USEPA Method 7196A)
- Cyanide (USEPA Method 9010C/9012A)
- Toxicity characteristic leaching procedure [TCLP] Resource Conservation and Recovery Act (RCRA) 8 metals (USEPA Method 1311)
- Ignitability (USEPA Method 1030)
- Corrosivity (USEPA Method 9045D)
- Cyanide Reactivity (SW846 Chapter 7.3)
- Sulfide Reactivity (SW846 Chapter 7.3)
- Total petroleum hydrocarbons gasoline-range organics (TPH-GRO) (USEPA Method 8015C)
- Total petroleum hydrocarbons diesel-range organics (TPH-DRO) (USEPA Method 8015C)

Soil samples were analyzed for the above parameters to meet the analytical requirements for soil reuse set forth by NYC OER and typical receiving facility analytical requirements. Trip blanks were analyzed for VOCs only.

The laboratory was instructed to report all analytes inclusive of the United States Environmental Protection Agency (USEPA) Target Compound Lists (TCL) and the Title 6 New York Codes, Rules and Regulations (6 NYCRR) Part 375 lists. In addition, the laboratory was instructed to report the analytical data as an Analytical Services Protocol (ASP) Category A data deliverable and as an Electronic Data Deliverable (EDD) consistent with the New York State Department of Environmental Conservation (NYSDEC) requirements.

## **ANALYTICAL RESULTS**

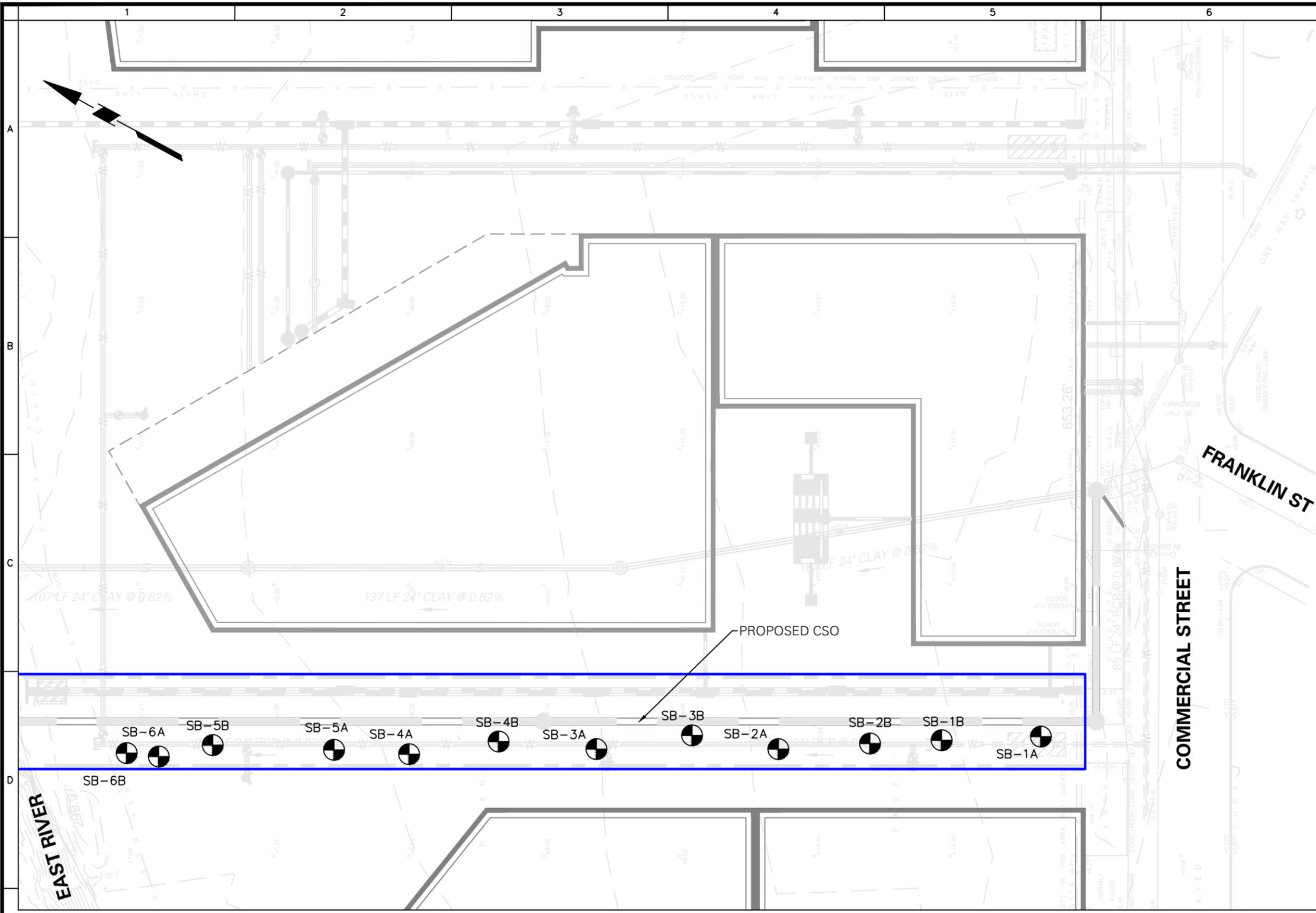
The analytical soil results were tabulated and compared to the following regulatory criteria:

# MEMO

- Title 6 of the New York Codes, Rules, Regulations (NYCRR) Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (SCOs);
- 6 NYCRR Part 375-6.8(b) Restricted Use Restricted-Residential SCOs;
- New Jersey Administrative Code (N.J.A.C.) 7:26D Remediation Standards, Appendix 1, Table 1A – Residential Direct Contact Soil Remediation Standards;
- N.J.A.C. 7:26D Remediation Standards, Appendix 1, Table 1B – Non-Residential Direct Contact Soil Remediation Standards; and
- Title 40 Code of Federal Regulations (CFR) 261 Subpart C and Table 1 of 40 CFR 261.24 Maximum Concentrations of Contaminants for the Toxicity Characteristic.

The analytical soil results and the QA/QC sample analytical results for the proposed CSO trench are presented in Tables 3 through 6.

## FIGURES



**LEGEND**

PROPOSED EXCAVATION FOOTPRINT OF CSO AND OUTFALL

SB-1A BORING LOCATION AND ID

- GENERAL NOTES**
1. BASE PLANS TAKEN FROM LANGAN DRAWINGS: UTILITY DRAWING "170229001-C-UI0101", DATED 08/16/2013 AND SITE SURVEY "170229001-V-EX0101", DATED 08/13/2013.
  2. ALL BORING LOCATIONS WERE LOCATED BY GPS.
  3. WASTE CHARACTERIZATION SAMPLING FOR THE PROPOSED CSO CONSISTED OF APPROX. 500-CY CELLS FROM 0 TO 10 FEET BELOW GRADE SURFACE. THE CELLS ASSUME AN EXCAVATION CUT OF 10 FEET AND A 1.5 LAYBACK SLOPE FROM THE 5-FOOT WIDE CSO PIPE PLATFORM.
  4. SAMPLE LABELING REFLECTS THE GRID AND CELL FROM WHERE THE SAMPLE WAS COLLECTED.
  5. NO GROUNDWATER SAMPLES WERE COLLECTED FROM WITHIN THE FOOTPRINT OF THE PROPOSED CSO OUTFALL.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

SCALE IN FEET

**LANGAN**

21 Penn Plaza, 360 West 31st Street, 8th Floor  
New York, NY 10001  
T: 212.479.5400 F: 212.479.5444 www.langan.com

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan International LLC  
Collectively known as Langan

Project

**GREENPOINT LANDING**

**BROOKLYN**

**KINGS NEW YORK**

Drawing Title

**WASTE CHARACTERIZATION SAMPLING LOCATION MAP**

**PROPOSED CSO**

Project No.	170229002	Drawing No.	<b>1</b>
Date	11/04/2013		
Scale	1" = 40'		
Drawn By	SD	Checked By	GCW
Submission Date			
		Sheet 1 of 1	

## TABLES

**Table 1**  
**Soil Sample Summary**  
**Waste Characterization Technical Memo**

**Proposed CSO**  
**Greenpoint Landing**  
**Brooklyn, New York**  
**Langan Project No. 170229002**

Sample Number	Sample Name	Sample Type	Boring Numbers	Depth (ft bgs)	Analysis
1	CSO_SB-01A_0-0.5	Grab	SB-1A	0 to 0.5	VOCs
2	CSO_COMP-01_0-10	Composite	SB-1A, SB-1B	0-10	SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Cyanide, Hexavalent Chromium, Trivalent Chromium, TCLP RCRA 8 Metals, Ignitability, Corrosivity, Reactivity (Cyanide and Sulfide), TPH (GRO & DRO)
3	CSO_SB-02B_5-5.5	Grab	SB-2B	5 to 5.5	VOCs
4	CSO_COMP-02_0-10	Composite	SB-2A, SB-2B	0-10	SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Cyanide, Hexavalent Chromium, Trivalent Chromium, TCLP RCRA 8 Metals, Ignitability, Corrosivity, Reactivity (Cyanide and Sulfide), TPH (GRO & DRO)
5	CSO_SB-03A_8.5-9	Grab	SB-3A	8.5 to 9	VOCs
6	CSO_COMP-03_0-10	Composite	SB-3A, SB-3B	0-10	SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Cyanide, Hexavalent Chromium, Trivalent Chromium, TCLP RCRA 8 Metals, Ignitability, Corrosivity, Reactivity (Cyanide and Sulfide), TPH (GRO & DRO)
7	CSO_SB-04B_6.5-7.0	Grab	SB-4B	6.5 to 7	VOCs
8	CSO_COMP-04_0-10	Composite	SB-4A, SB-4B	0-10	SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Cyanide, Hexavalent Chromium, Trivalent Chromium, TCLP RCRA 8 Metals, Ignitability, Corrosivity, Reactivity (Cyanide and Sulfide), TPH (GRO & DRO)
9	CSO_SB-05A_7.5-8.0	Grab	SB-5A	7.5 to 8	VOCs
10	CSO_COMP-05_0-10	Composite	SB-5A, SB-5B	0-10	SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Cyanide, Hexavalent Chromium, Trivalent Chromium, TCLP RCRA 8 Metals, Ignitability, Corrosivity, Reactivity (Cyanide and Sulfide), TPH (GRO & DRO)
11	CSO_SB-06A_3.5-4	Grab	SB-6A	3.5 to 4	VOCs
12	CSO_COMP-06_0-10	Composite	SB-6A, SB-6B	0-10	SVOCs, PCBs, Pesticides, Herbicides, TAL Metals, Cyanide, Hexavalent Chromium, Trivalent Chromium, TCLP RCRA 8 Metals, Ignitability, Corrosivity, Reactivity (Cyanide and Sulfide), TPH (GRO & DRO)

**Notes:**

1. All soil samples for VOC analysis were collected using EnCore sampling devices.
2. Composite samples were obtained from homogenizing at a minimum of five grab samples.
3. Grab samples were collected from the 6-inch interval exhibiting the highest degree of contamination based on visual, olfactory and PID readings.

**Table 2**  
**QA/QC Samples Summary**  
**Waste Characterization Technical Memo**

**Proposed CSO**  
**Greenpoint Landing**  
**Brooklyn, New York**  
**Langan Project No. 170229002**

Sample Number	QA/QC Type	Sample Name	Sample Type	Parent Sample ID	Sampling Location	Sampling Frequency	Depth (ft bgs)	Analysis
1	Trip Blank	TB01_091413	N/A	N/A	N/A	One per Sample Cooler	N/A	VOCs
2	Trip Blank	TB02_091413	N/A	N/A	N/A	One per Sample Cooler	N/A	VOCs
3	Trip Blank	TB03_091413	N/A	N/A	N/A	One per Sample Cooler	N/A	VOCs

**Table 3**  
**Grab Soil Sample Results Summary**  
**Waste Characterization Technical Memo**

**Proposed CSO**  
**Greenpoint Landing**  
**Brooklyn, New York**  
**Langan Project No. 170229002**

Sample Location Client Sample ID Lab Sample ID Sample Date Sample Depth (feet bgs)	NYSDEC PART 375 UNRESTRICTED SCO	NYSDEC PART 375 RESTRICTED RESIDENTIAL SCO	CSO_SB-01A CSO_SB-01A_0-0.5 L1318168-03 09/14/2013 0 to 0.5	CSO_SB-02B CSO_SB-02B_5-5.5 L1318166-01 09/14/2013 5 to 5.5	CSO_SB-03A CSO_SB-03A_8.5-9 L1318166-04 09/14/2013 8.5 to 9	CSO_SB-04B CSO_SB-04B_6.5-7.0 L1318166-07 09/14/2013 6.5 to 7	CSO_SB-05A CSO_SB-05A_7.5-8.0 L1318167-02 09/14/2013 7.5 to 8	CSO_SB-06A CSO_SB-06A_3.5-4 L1318167-03 09/14/2013 3.5 to 4												
<b>Volatile Organic Compounds (mg/kg)</b>			Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF			
Acetone	0.05	100	0.0034	J	1	0.0036	J	1	0.0085	J	1	0.013	U	1	0.0065	J	1	<i>0.64</i>	U	1
M-P-Xylene	~	~	0.002	U	1	0.0022	U	1	0.0024	U	1	0.0027	U	1	0.0018	U	1	0.024	J	1
Naphthalene	12	100	0.005	U	1	0.0017	J	1	0.0061	U	1	0.0067	U	1	0.0046	U	1	0.68		1
Tetrachloroethylene(PCE)	1.3	19	0.001	U	1	0.0011	U	1	0.0012	U	1	0.0013	U	1	0.00092	U	1	0.029	J	1
Toluene	0.7	100	0.0015	U	1	0.0016	U	1	0.0018	U	1	0.002	U	1	0.0014	U	1	0.027	J	1
Trichloroethylene (TCE)	0.47	21	0.001	U	1	0.0011	U	1	0.0012	U	1	0.00039	J	1	0.00092	U	1	<b>1.5</b>		1
Xylene (total)	0.26	100	ND			ND			ND			ND			0.024	J				

**Notes:**

1. Grab soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Use and Restricted Use Restricted-Residential Soil Cleanup Objectives (SCO).
2. Only compounds with detections are shown in the table.
3. NYSDEC Part 375 Unrestricted Use SCO exceedances are shaded and bolded.
4. There are no reported NYSDEC Part 375 Restricted Use Restricted-Residential SCO exceedances.
5. Reporting Limits (RL) above the NYSDEC Part 375 Unrestricted Use and Restricted Use Restricted-Residential SCO standards are italicized.
6. mg/kg = milligrams per kilogram
7. ~ = Criteria does not exist.
8. ND = Not Detected

**Qualifiers:**

- J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.  
U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL or the sample concentration for results impacted by blank contamination.

**Table 3  
Composite Soil Sample Results Summary  
Waste Characterization Technical Memo**

**Proposed CSO  
Greenpoint Landing  
Brooklyn, New York  
Langan Project No. 170229002**

Sample Location Client Sample ID Lab Sample ID Sample Date Sample Depth (feet bgs)	NYSDEC PART 375 UNRESTRICTED SCO	NYSDEC PART 375 RESTRICTED RESIDENTIAL SCO	CSO_COMP-01 CSO_COMP-01_0-10 L1318168-06 09/14/2013 0 to 10	CSO_COMP-02 CSO_COMP-02_0-10 L1318166-02 09/14/2013 0 to 10	CSO_COMP-03 CSO_COMP-03_0-10 L1318166-03 09/14/2013 0 to 10	CSO_COMP-04 CSO_COMP-04_0-10 L1318166-05 09/14/2013 0 to 10	CSO_COMP-05 CSO_COMP-05_0-10 L1318167-01 09/14/2013 0 to 10	CSO_COMP-06 CSO_COMP-06_0-10 L1318167-04 09/14/2013 0 to 10									
<b>SVOC (mg/kg)</b>			Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF
2-Methylnaphthalene	~	~	0.093	J	1	0.9	U	4	0.33	U	1	0.23	U	1	0.49	U	1
3-Methylphenol	0.33	100	0.26	U	1	1.1	U	4	0.32	U	1	0.28	J	1	0.28	U	1
Acenaphthene	20	100	0.35	U	1	0.16	J	4	1.1	U	1	0.072	J	1	0.82	U	1
Acenaphthylene	100	100	0.11	J	1	0.21	J	4	0.43	U	1	0.16	U	1	0.64	U	1
Anthracene	100	100	1.6	U	1	0.72	U	4	2.9	U	1	0.26	U	1	2	U	1
Atrazine	~	~	0.14	U	1	0.6	U	4	0.18	U	1	0.16	U	1	0.15	U	1
Benzaldehyde	~	~	0.24	U	1	0.99	U	4	0.29	U	1	0.26	U	1	0.25	U	1
Benzo(a)anthracene	1	1	<b>4.5</b>	U	1	<b>2</b>	U	4	<b>3.9</b>	U	1	0.51	U	1	<b>3.2</b>	U	1
Benzo(a)pyrene	1	1	<b>4.3</b>	U	1	<b>2.6</b>	U	4	<b>3.5</b>	U	1	0.56	U	1	<b>3.3</b>	U	1
Benzo(b)fluoranthene	1	1	<b>5.3</b>	U	1	<b>2.8</b>	U	4	<b>4.1</b>	U	1	0.65	U	1	<b>3.9</b>	U	1
Benzo(g,h,i)perylene	100	100	2.5	U	1	1.9	U	4	1.7	U	1	0.41	U	1	2.2	U	1
Benzo(k)fluoranthene	0.8	3.9	<b>1.6</b>	U	1	<b>1.1</b>	U	4	<b>1.7</b>	U	1	0.24	U	1	<b>1.5</b>	U	1
Biphenyl (Diphenyl)	~	~	0.41	U	1	1.7	U	4	0.12	J	1	0.45	U	1	0.17	J	1
Bis(2-Ethylhexyl) Phthalate	~	~	0.068	J	1	0.75	U	4	0.22	U	1	0.2	U	1	0.19	U	1
Carbazole	~	~	0.22	U	1	0.27	J	4	1.2	U	1	0.097	J	1	0.77	U	1
Chrysene	1	3.9	<b>4.2</b>	U	1	<b>2.2</b>	U	4	<b>3.5</b>	U	1	0.55	U	1	<b>3.1</b>	U	1
Dibenz(a,h)anthracene	0.33	0.33	<b>0.76</b>	U	1	<b>0.44</b>	J	4	<b>0.57</b>	U	1	0.11	J	1	<b>0.61</b>	U	1
Dibenzofuran	7	59	0.17	J	1	0.75	U	4	0.86	U	1	0.086	J	1	0.78	U	1
Di-n-butylphthalate	~	~	0.18	U	1	0.75	U	4	0.22	U	1	0.04	J	1	0.19	U	1
Fluoranthene	100	100	9.4	U	2	4	U	4	7.6	U	1	1.2	U	1	6.8	U	1
Fluorene	30	100	0.35	U	1	0.22	J	4	1.4	U	1	0.09	J	1	0.89	U	1
Indeno(1,2,3-c,d)pyrene	0.5	0.5	<b>2.7</b>	U	1	<b>1.8</b>	U	4	<b>2</b>	U	1	0.39	U	1	<b>2.3</b>	U	1
Naphthalene	12	100	0.14	J	1	0.32	J	4	0.52	U	1	0.1	J	1	1	U	1
Phenanthrene	100	100	4.3	U	1	2.5	U	4	7.6	U	1	0.99	U	1	6.1	U	1
Pyrene	100	100	9	U	2	3.5	U	4	6.6	U	1	1.1	U	1	5.7	U	1
Total SVOCs	~	~	51.661	J		26.74	J		51.85	J		7.455	J		46.332	J	
<b>PCB (mg/kg)</b>			Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF
Aroclor 1260	~	~	0.0359	U	1	0.0283	J	1	0.0435	U	1	0.0381	U	1	0.0373	U	1
Aroclor 1254	~	~	0.0359	U	1	0.0231	J	1	0.0435	U	1	0.0381	U	1	0.0373	U	1
Aroclor 1248	~	~	0.0359	U	1	0.0246	J	1	0.0435	U	1	0.0381	U	1	0.0373	U	1
Total PCBs	0.1	1	ND	J		0.076	J		ND	J		ND	J		ND	J	
<b>Pesticides (mg/kg)</b>			Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF
p,p'-DDT	0.0033	7.9	<b>0.0249</b>	J	10	<i>0.0328</i>	U	10	<i>0.0392</i>	U	10	<b>0.00388</b>	U	1	<i>0.0331</i>	U	10
<b>Herbicides (mg/kg)</b>			Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF
Total Herbicides	~	~	ND	U	1	ND	U	1	ND	U	1	ND	U	1	ND	U	1
<b>Metals (mg/kg)</b>			Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF
Aluminum	~	~	7100	U	2	8700	U	2	7000	U	2	9000	U	2	8900	U	2
Antimony	~	~	4.3	U	2	4.4	U	2	1.9	J	2	4.6	U	2	4.3	U	2
Arsenic	13	16	4.8	U	2	10	U	2	<b>20</b>	U	2	9.6	U	2	10	U	2
Barium	350	400	110	U	2	160	U	2	150	U	2	160	U	2	140	U	2
Beryllium	7.2	72	0.34	J	2	0.87	U	2	0.54	J	2	1.2	U	2	1.3	U	2
Cadmium	2.5	4.3	0.6	J	2	0.87	J	2	0.93	J	2	0.93	U	2	0.96	U	2
Calcium	~	~	4700	U	2	28000	U	2	26000	U	2	31000	U	2	28000	U	2
Chromium Trivalent	30	180	14	U	1	25	U	1	14	U	1	18	U	1	<b>32</b>	U	1
Chromium Hexavalent	1	110	0.23	J	1	0.91	U	1	1.1	U	1	0.95	U	1	0.91	U	1
Chromium, Total	~	~	14	U	2	25	U	2	14	U	2	18	U	2	32	U	2
Cobalt	~	~	6.8	U	2	12	U	2	7.4	U	2	11	U	2	16	U	2
Copper	50	270	42	U	2	<b>230</b>	U	2	<b>87</b>	U	2	<b>68</b>	U	2	<b>210</b>	U	2
Iron	~	~	15000	U	2	22000	U	2	23000	U	2	18000	U	2	18000	U	2
Lead	63	400	<b>160</b>	U	2	<b>360</b>	U	2	<b>920</b>	U	2	<b>420</b>	U	2	<b>610</b>	U	2
Magnesium	~	~	2800	U	2	6700	U	2	3400	U	2	6800	U	2	10000	U	2
Manganese	1600	2000	280	U	2	320	U	2	490	U	2	270	U	2	300	U	2
Mercury	0.18	2.8	<b>0.36</b>	U	1	<b>0.45</b>	U	1	<b>0.41</b>	U	1	<b>0.23</b>	U	1	<b>0.49</b>	U	1
Nickel	30	310	12	U	2	24	U	2	12	U	2	23	U	2	<b>34</b>	U	2
Potassium	~	~	1000	U	2	1100	U	2	1200	U	2	800	U	2	1200	U	2
Selenium	3.9	180	1.7	U	2	0.91	J	2	0.48	J	2	0.68	J	2	0.41	J	2
Sodium	~	~	78	J	2	320	U	2	440	U	2	240	U	2	690	U	2
Vanadium	~	~	19	U	2	25	U	2	20	U	2	20	U	2	22	U	2
Zinc	109	10000	<b>360</b>	U	2	<b>700</b>	U	2	<b>370</b>	U	2	<b>290</b>	U	2	<b>1100</b>	U	2
<b>Petroleum Hydrocarbons (mg/kg)</b>			Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF
Gasoline Range Organics	~	~	0.082	J	1	1.6	J	1	1.6	J	1	1.3	J	1	3	U	1
Total Petroleum Hydrocarbons	~	~	182	U	1	1850	U	5	317	U	1	74.5	U	1	251	U	1
<b>Other (mg/kg)</b>			Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF
Cyanide	27	27	1.1	U	1	1.1	U	1	1.3	U	1	1.2	U	1	1.1	U	1

**Notes:**

- Grab soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Unrestricted Use and Restricted Use Residential Soil Cleanup Objectives (SCO).
- Only compounds with detections are shown in the table.
- NYSDEC Part 375 Unrestricted Use SCO exceedances are shaded and bolded.
- NYSDEC Part 375 Restricted Use Residential Soil Cleanup Objectives (SCO) exceedances are bolded and in red.
- Reporting Limits (RL) above the NYSDEC Part 375 Unrestricted Use and Restricted Use Residential Soil Cleanup Objectives (SCO) standards are italicized.
- mg/kg = milligrams per kilogram
- ~ = Criteria does not exist.
- DF = Dilution Factor

**Qualifiers (Q):**

- J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- U = The analyte was analyzed for, but was not detected at a level greater than or equal to the level of RL or the sample concentration for results impacted by blank contamination.

**Table 5  
Composite Soil Sample Results Summary  
Waste Characterization Technical Memo**

**Proposed CSO  
Greenpoint Landing  
Brooklyn, New York  
Langan Project No. 170229002**

Sample Location Client Sample ID Lab Sample ID Sample Date Sample Depth (feet bgs)	USEPA RCRA TCLP	CSO_COMP-01 CSO_COMP-01_0-10 L1318168-06 09/14/2013 0 to 10	CSO_COMP-02 CSO_COMP-02_0-10 L1318166-02 09/14/2013 0 to 10	CSO_COMP-03 CSO_COMP-03_0-10 L1318166-03 09/14/2013 0 to 10	CSO_COMP-04 CSO_COMP-04_0-10 L1318166-05 09/14/2013 0 to 10	CSO_COMP-05 CSO_COMP-05_0-10 L1318167-01 09/14/2013 0 to 10	CSO_COMP-06 CSO_COMP-06_0-10 L1318167-04 09/14/2013 0 to 10												
<b>TCLP Metals (mg/l)</b>		Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF	Result	Q	DF			
Lead	5	0.13	J	1	0.18	J	1	3.6		1	1.7		1	0.62		1	1.5		1
Mercury	0.2	0.001	U	1	0.001	U	1	0.001	U	1	0.001	U	1	0.001	U	1	0.001	U	1
Silver	5	0.1	U	1	0.1	U	1	0.1	U	1	0.1	U	1	0.1	U	1	0.1	U	1
Arsenic	5	1	U	1	1	U	1	1	U	1	1	U	1	0.03	J	1	1	U	1
Barium	100	0.5		1	0.6		1	0.64		1	0.5		1	0.59		1	0.65		1
Cadmium	1	0.1	U	1	0.1	U	1	0.1	U	1	0.01	J	1	0.1	U	1	0.1	U	1
Chromium, Total	5	0.2	U	1	0.2	U	1	0.2	U	1	0.2	U	1	0.2	U	1	0.2	U	1
Selenium	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1	0.5	U	1
<b>RCRA Characteristics</b>		Result	Q	DL	Result	Q	DL	Result	Q	DL	Result	Q	DL	Result	Q	DL	Result	Q	DL
pH (pH units)	<2 or >12.5	9		1	10		1	8.4		1	7.9		1	8.2		1	8.1		1
Reactive Cyanide (mg/kg)	250	10	U	1	10	U	1	10	U	1	10	U	1	10	U	1	10	U	1
Ignitability	I/NI	NI			NI			NI			NI			NI			NI		
Sulfide Reactive (mg/kg)	500	10	U	1	10	U	1	10	U	1	10	U	1	10	U	1	10	U	1
<b>Miscellaneous</b>		Result	Q	DL	Result	Q	DL	Result	Q	DL	Result	Q	DL	Result	Q	DL	Result	Q	DL
Paint Filter (Negative/Positive)	~	NA			NA			NA			NA			NA			NA		

**Notes:**

- Composite soil sample analytical results are compared to 40 CFR 261 Subpart C and Table 1 of 40 CFR 261.24 - Maximum Concentration of Contaminants for the Toxicity Characteristic.
- Only compounds with detections are shown in the table.
- Composite soil exceedances are shaded and bolded.
- Reporting Limits (RL) above the Maximum Concentration of Contaminants for the Toxicity Characteristic standards are italicized.
- mg/l = milligrams per liter
- mg/kg = milligrams per kilogram
- ~ = Criteria does not exist.
- NA = Not Analyzed
- I/NI = Ignitable/ Not Ignitable

**Qualifiers:**

- J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- U = The analyte was analyzed for, but was not detected at a level greater than or equal to the level of RL or the sample concentration for results impacted by blank contamination.

**Table 6**  
**QA/QC Sample Detections Summary**  
**Waste Characterization Technical Memo**

**Proposed CSO**  
**Greenpoint Landing**  
**Brooklyn, New York**  
**Langan Project No. 170229002**

<b>Client Sample ID</b>	<b>TB01_091413</b>	<b>TB02_091413</b>	<b>TB03_091413</b>
<b>Sampling Date</b>	<b>9/14/2013</b>	<b>9/14/2013</b>	<b>9/14/2013</b>
<b>Lab Sample ID</b>	<b>L1318166-06</b>	<b>L1318167-05</b>	<b>L1318168-07</b>
<b>Sample Type</b>	<b>Trip Blank</b>	<b>Trip Blank</b>	<b>Trip Blank</b>
<b>VOC (µg/l)</b>			
Acetone	5 U	3.8 J	2.6 J
<b>SVOC (µg/l)</b>			
Bis(2-Ethylhexyl)phthalate	NA	NA	NA
<b>Total Metals (µg/l)</b>			
Aluminum, Total	NA	NA	NA
Barium, Total	NA	NA	NA
Calcium, Total	NA	NA	NA
Chromium, Total	NA	NA	NA
Copper, Total	NA	NA	NA
Manganese, Total	NA	NA	NA
Nickel, Total	NA	NA	NA
Sodium, Total	NA	NA	NA
<b>PCB (µg/l)</b>			
Total PCBs	NA	NA	NA
<b>Pesticides (µg/l)</b>			
Pesticides	NA	NA	NA
<b>Herbicides (µg/l)</b>			
Herbicides	NA	NA	NA
<b>General Chemistry (µg/l)</b>			
Cyanide, Total	NA	NA	NA

**Notes and Qualifiers:**

1. Only compounds with detections are shown in the table.
2. VOC = Volatile Organic Compounds
3. SVOC = Semi-Volatile Organic Compounds
4. PCB = Polychlorinated Biphenyls
5. µg/l = micrograms per liter
6. NA = Not Analyzed
7. ND= Not Detected
8. U = The analyte was analyzed for, but was not detected at a level greater than or equal to the level of RL or the sample concentration for results impacted by blank contamination.
9. J = Detected above the Method Detection Limit but below the Reporting Limit; therefore, result is an estimated concentration.

**LABORATORY ANALYTICAL DATA REPORTS**



## ANALYTICAL REPORT

Lab Number:	L1318166
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Mimi Raygorodetsky
Phone:	(212) 479-5400
Project Name:	GREENPOINT LANDING
Project Number:	170229002
Report Date:	09/24/13

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Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>
L1318166-01	CSO_SB-02B_5-5.5	BROOKLYN, NY	09/14/13 09:40
L1318166-02	CSO_COMP-02_0-10	BROOKLYN, NY	09/14/13 10:00
L1318166-03	CSO_COMP-03_0-10	BROOKLYN, NY	09/14/13 11:00
L1318166-04	CSO_SB-03A_8.5-9	BROOKLYN, NY	09/14/13 10:50
L1318166-05	CSO_COMP-04_0-10	BROOKLYN, NY	09/14/13 11:55
L1318166-06	TB01_091413	BROOKLYN, NY	09/14/13 00:00
L1318166-07	CSO_SB-04B_6.5-7.0	BROOKLYN, NY	09/14/13 11:45

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

---

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

### Case Narrative (continued)

#### Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

#### Semivolatile Organics

L1318166-02 has elevated detection limits due to the dilution required by the matrix interferences encountered during the concentration of the sample and the analytical dilution required by the sample matrix.

#### Organochlorine Pesticides

L1318166-02 and -03 have elevated detection limits due to the dilutions required by the sample matrices.

#### Total Metals

L1318166-02, -03 and -05 have elevated detection limits for all elements, with the exception of mercury, due to the dilutions required by matrix interferences encountered during analysis.

The WG637410-1 Method Blank, associated with L1318166-02, -03 and -05, has a concentration above the reporting limit for calcium. Since the associated sample concentrations are greater than 10x the blank concentration for this analyte, no qualification of the results was performed.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Michelle M. Morris

Title: Technical Director/Representative

Date: 09/24/13

# ORGANICS

# VOLATILES

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-01  
**Client ID:** CSO\_SB-02B\_5-5.5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/23/13 15:51  
**Analyst:** BN  
**Percent Solids:** 88%

**Date Collected:** 09/14/13 09:40  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	11	2.2	1
1,1-Dichloroethane	ND		ug/kg	1.6	0.19	1
Chloroform	ND		ug/kg	1.6	0.40	1
Carbon tetrachloride	ND		ug/kg	1.1	0.23	1
1,2-Dichloropropane	ND		ug/kg	3.8	0.25	1
Dibromochloromethane	ND		ug/kg	1.1	0.33	1
1,1,2-Trichloroethane	ND		ug/kg	1.6	0.33	1
Tetrachloroethene	ND		ug/kg	1.1	0.15	1
Chlorobenzene	ND		ug/kg	1.1	0.38	1
Trichlorofluoromethane	ND		ug/kg	5.4	0.13	1
1,2-Dichloroethane	ND		ug/kg	1.1	0.16	1
1,1,1-Trichloroethane	ND		ug/kg	1.1	0.12	1
Bromodichloromethane	ND		ug/kg	1.1	0.25	1
trans-1,3-Dichloropropene	ND		ug/kg	1.1	0.13	1
cis-1,3-Dichloropropene	ND		ug/kg	1.1	0.14	1
1,1-Dichloropropene	ND		ug/kg	5.4	0.50	1
Bromoform	ND		ug/kg	4.4	0.45	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.1	0.18	1
Benzene	ND		ug/kg	1.1	0.13	1
Toluene	ND		ug/kg	1.6	0.12	1
Ethylbenzene	ND		ug/kg	1.1	0.16	1
Chloromethane	ND		ug/kg	5.4	0.85	1
Bromomethane	ND		ug/kg	2.2	0.37	1
Vinyl chloride	ND		ug/kg	2.2	0.15	1
Chloroethane	ND		ug/kg	2.2	0.34	1
1,1-Dichloroethene	ND		ug/kg	1.1	0.22	1
trans-1,2-Dichloroethene	ND		ug/kg	1.6	0.23	1
Trichloroethene	ND		ug/kg	1.1	0.16	1
1,2-Dichlorobenzene	ND		ug/kg	5.4	0.20	1
1,3-Dichlorobenzene	ND		ug/kg	5.4	0.20	1
1,4-Dichlorobenzene	ND		ug/kg	5.4	0.26	1

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-01  
 Client ID: CSO\_SB-02B\_5-5.5  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 09:40  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Methyl tert butyl ether	ND		ug/kg	2.2	0.11	1
p/m-Xylene	ND		ug/kg	2.2	0.35	1
o-Xylene	ND		ug/kg	2.2	0.29	1
cis-1,2-Dichloroethene	ND		ug/kg	1.1	0.16	1
Dibromomethane	ND		ug/kg	11	0.18	1
Styrene	ND		ug/kg	2.2	0.34	1
Dichlorodifluoromethane	ND		ug/kg	11	0.24	1
Acetone	3.6	J	ug/kg	11	3.4	1
Carbon disulfide	ND		ug/kg	11	2.2	1
2-Butanone	ND		ug/kg	11	0.39	1
Vinyl acetate	ND		ug/kg	11	0.52	1
4-Methyl-2-pentanone	ND		ug/kg	11	0.26	1
1,2,3-Trichloropropane	ND		ug/kg	11	0.24	1
2-Hexanone	ND		ug/kg	11	0.20	1
Bromochloromethane	ND		ug/kg	5.4	0.21	1
2,2-Dichloropropane	ND		ug/kg	5.4	0.24	1
1,2-Dibromoethane	ND		ug/kg	4.4	0.19	1
1,3-Dichloropropane	ND		ug/kg	5.4	0.19	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.1	0.35	1
Bromobenzene	ND		ug/kg	5.4	0.23	1
n-Butylbenzene	ND		ug/kg	1.1	0.21	1
sec-Butylbenzene	ND		ug/kg	1.1	0.22	1
tert-Butylbenzene	ND		ug/kg	5.4	0.61	1
o-Chlorotoluene	ND		ug/kg	5.4	0.17	1
p-Chlorotoluene	ND		ug/kg	5.4	0.17	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.4	0.86	1
Hexachlorobutadiene	ND		ug/kg	5.4	0.46	1
Isopropylbenzene	ND		ug/kg	1.1	0.18	1
p-Isopropyltoluene	ND		ug/kg	1.1	0.21	1
Naphthalene	1.7	J	ug/kg	5.4	0.84	1
Acrylonitrile	ND		ug/kg	11	0.26	1
n-Propylbenzene	ND		ug/kg	1.1	0.14	1
1,2,3-Trichlorobenzene	ND		ug/kg	5.4	0.18	1
1,2,4-Trichlorobenzene	ND		ug/kg	5.4	0.86	1
1,3,5-Trimethylbenzene	ND		ug/kg	5.4	0.16	1
1,2,4-Trimethylbenzene	ND		ug/kg	5.4	0.62	1
Methyl Acetate	ND		ug/kg	22	0.83	1
Cyclohexane	ND		ug/kg	22	1.2	1
1,4-Dioxane	ND		ug/kg	110	19.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-01

Date Collected: 09/14/13 09:40

Client ID: CSO\_SB-02B\_5-5.5

Date Received: 09/14/13

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Freon-113	ND		ug/kg	22	0.30	1
p-Diethylbenzene	ND		ug/kg	4.4	0.17	1
p-Ethyltoluene	ND		ug/kg	4.4	0.13	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.4	0.14	1
Ethyl ether	ND		ug/kg	5.4	0.29	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.4	0.49	1
Methyl cyclohexane	ND		ug/kg	4.4	1.4	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	100		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-04  
**Client ID:** CSO\_SB-03A\_8.5-9  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/22/13 22:32  
**Analyst:** PP  
**Percent Solids:** 89%

**Date Collected:** 09/14/13 10:50  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	12	2.4	1
1,1-Dichloroethane	ND		ug/kg	1.8	0.22	1
Chloroform	ND		ug/kg	1.8	0.45	1
Carbon tetrachloride	ND		ug/kg	1.2	0.26	1
1,2-Dichloropropane	ND		ug/kg	4.3	0.28	1
Dibromochloromethane	ND		ug/kg	1.2	0.38	1
1,1,2-Trichloroethane	ND		ug/kg	1.8	0.37	1
Tetrachloroethene	ND		ug/kg	1.2	0.17	1
Chlorobenzene	ND		ug/kg	1.2	0.43	1
Trichlorofluoromethane	ND		ug/kg	6.1	0.15	1
1,2-Dichloroethane	ND		ug/kg	1.2	0.18	1
1,1,1-Trichloroethane	ND		ug/kg	1.2	0.14	1
Bromodichloromethane	ND		ug/kg	1.2	0.28	1
trans-1,3-Dichloropropene	ND		ug/kg	1.2	0.15	1
cis-1,3-Dichloropropene	ND		ug/kg	1.2	0.16	1
1,1-Dichloropropene	ND		ug/kg	6.1	0.56	1
Bromoform	ND		ug/kg	4.9	0.51	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.2	0.21	1
Benzene	ND		ug/kg	1.2	0.14	1
Toluene	ND		ug/kg	1.8	0.14	1
Ethylbenzene	ND		ug/kg	1.2	0.18	1
Chloromethane	ND		ug/kg	6.1	0.96	1
Bromomethane	ND		ug/kg	2.4	0.42	1
Vinyl chloride	ND		ug/kg	2.4	0.17	1
Chloroethane	ND		ug/kg	2.4	0.39	1
1,1-Dichloroethene	ND		ug/kg	1.2	0.25	1
trans-1,2-Dichloroethene	ND		ug/kg	1.8	0.26	1
Trichloroethene	ND		ug/kg	1.2	0.19	1
1,2-Dichlorobenzene	ND		ug/kg	6.1	0.22	1
1,3-Dichlorobenzene	ND		ug/kg	6.1	0.22	1
1,4-Dichlorobenzene	ND		ug/kg	6.1	0.30	1

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-04  
 Client ID: CSO\_SB-03A\_8.5-9  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 10:50  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Methyl tert butyl ether	ND		ug/kg	2.4	0.13	1
p/m-Xylene	ND		ug/kg	2.4	0.40	1
o-Xylene	ND		ug/kg	2.4	0.33	1
cis-1,2-Dichloroethene	ND		ug/kg	1.2	0.18	1
Dibromomethane	ND		ug/kg	12	0.20	1
Styrene	ND		ug/kg	2.4	0.38	1
Dichlorodifluoromethane	ND		ug/kg	12	0.27	1
Acetone	8.5	J	ug/kg	12	3.8	1
Carbon disulfide	ND		ug/kg	12	2.4	1
2-Butanone	ND		ug/kg	12	0.44	1
Vinyl acetate	ND		ug/kg	12	0.59	1
4-Methyl-2-pentanone	ND		ug/kg	12	0.30	1
1,2,3-Trichloropropane	ND		ug/kg	12	0.28	1
2-Hexanone	ND		ug/kg	12	0.23	1
Bromochloromethane	ND		ug/kg	6.1	0.24	1
2,2-Dichloropropane	ND		ug/kg	6.1	0.28	1
1,2-Dibromoethane	ND		ug/kg	4.9	0.22	1
1,3-Dichloropropane	ND		ug/kg	6.1	0.21	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.2	0.39	1
Bromobenzene	ND		ug/kg	6.1	0.26	1
n-Butylbenzene	ND		ug/kg	1.2	0.24	1
sec-Butylbenzene	ND		ug/kg	1.2	0.25	1
tert-Butylbenzene	ND		ug/kg	6.1	0.69	1
o-Chlorotoluene	ND		ug/kg	6.1	0.20	1
p-Chlorotoluene	ND		ug/kg	6.1	0.19	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	6.1	0.97	1
Hexachlorobutadiene	ND		ug/kg	6.1	0.52	1
Isopropylbenzene	ND		ug/kg	1.2	0.20	1
p-Isopropyltoluene	ND		ug/kg	1.2	0.23	1
Naphthalene	ND		ug/kg	6.1	0.94	1
Acrylonitrile	ND		ug/kg	12	0.29	1
n-Propylbenzene	ND		ug/kg	1.2	0.15	1
1,2,3-Trichlorobenzene	ND		ug/kg	6.1	0.21	1
1,2,4-Trichlorobenzene	ND		ug/kg	6.1	0.97	1
1,3,5-Trimethylbenzene	ND		ug/kg	6.1	0.18	1
1,2,4-Trimethylbenzene	ND		ug/kg	6.1	0.70	1
Methyl Acetate	ND		ug/kg	24	0.94	1
Cyclohexane	ND		ug/kg	24	1.3	1
1,4-Dioxane	ND		ug/kg	120	21.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-04

Date Collected: 09/14/13 10:50

Client ID: CSO\_SB-03A\_8.5-9

Date Received: 09/14/13

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Freon-113	ND		ug/kg	24	0.34	1
p-Diethylbenzene	ND		ug/kg	4.9	0.20	1
p-Ethyltoluene	ND		ug/kg	4.9	0.14	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.9	0.16	1
Ethyl ether	ND		ug/kg	6.1	0.33	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	6.1	0.55	1
Methyl cyclohexane	ND		ug/kg	4.9	1.6	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	102		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-06  
**Client ID:** TB01\_091413  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Water  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/20/13 18:29  
**Analyst:** PD

**Date Collected:** 09/14/13 00:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.13	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.33	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.14	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Trichloroethene	ND		ug/l	0.50	0.17	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-06  
 Client ID: TB01\_091413  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 00:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	ND		ug/l	5.0	1.0	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.0	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
Methyl Acetate	ND		ug/l	2.0	0.23	1
Cyclohexane	ND		ug/l	10	0.24	1
1,4-Dioxane	ND		ug/l	250	41.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-06  
 Client ID: TB01\_091413  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 00:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatiles Organics by GC/MS - Westborough Lab</b>						
Freon-113	ND		ug/l	2.5	0.70	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1
Methyl cyclohexane	ND		ug/l	10	0.29	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	105		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-07  
**Client ID:** CSO\_SB-04B\_6.5-7.0  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/22/13 23:00  
**Analyst:** PP  
**Percent Solids:** 84%

**Date Collected:** 09/14/13 11:45  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	13	2.7	1
1,1-Dichloroethane	ND		ug/kg	2.0	0.24	1
Chloroform	ND		ug/kg	2.0	0.50	1
Carbon tetrachloride	ND		ug/kg	1.3	0.28	1
1,2-Dichloropropane	ND		ug/kg	4.7	0.31	1
Dibromochloromethane	ND		ug/kg	1.3	0.41	1
1,1,2-Trichloroethane	ND		ug/kg	2.0	0.41	1
Tetrachloroethene	ND		ug/kg	1.3	0.19	1
Chlorobenzene	ND		ug/kg	1.3	0.47	1
Trichlorofluoromethane	ND		ug/kg	6.7	0.16	1
1,2-Dichloroethane	ND		ug/kg	1.3	0.20	1
1,1,1-Trichloroethane	ND		ug/kg	1.3	0.15	1
Bromodichloromethane	ND		ug/kg	1.3	0.31	1
trans-1,3-Dichloropropene	ND		ug/kg	1.3	0.16	1
cis-1,3-Dichloropropene	ND		ug/kg	1.3	0.17	1
1,1-Dichloropropene	ND		ug/kg	6.7	0.61	1
Bromoform	ND		ug/kg	5.4	0.56	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.3	0.23	1
Benzene	ND		ug/kg	1.3	0.16	1
Toluene	ND		ug/kg	2.0	0.15	1
Ethylbenzene	ND		ug/kg	1.3	0.20	1
Chloromethane	ND		ug/kg	6.7	1.0	1
Bromomethane	ND		ug/kg	2.7	0.46	1
Vinyl chloride	ND		ug/kg	2.7	0.19	1
Chloroethane	ND		ug/kg	2.7	0.42	1
1,1-Dichloroethene	ND		ug/kg	1.3	0.28	1
trans-1,2-Dichloroethene	ND		ug/kg	2.0	0.28	1
Trichloroethene	0.39	J	ug/kg	1.3	0.20	1
1,2-Dichlorobenzene	ND		ug/kg	6.7	0.25	1
1,3-Dichlorobenzene	ND		ug/kg	6.7	0.25	1
1,4-Dichlorobenzene	ND		ug/kg	6.7	0.32	1

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-07  
 Client ID: CSO\_SB-04B\_6.5-7.0  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 11:45  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Methyl tert butyl ether	ND		ug/kg	2.7	0.14	1
p/m-Xylene	ND		ug/kg	2.7	0.43	1
o-Xylene	ND		ug/kg	2.7	0.36	1
cis-1,2-Dichloroethene	ND		ug/kg	1.3	0.20	1
Dibromomethane	ND		ug/kg	13	0.22	1
Styrene	ND		ug/kg	2.7	0.42	1
Dichlorodifluoromethane	ND		ug/kg	13	0.29	1
Acetone	ND		ug/kg	13	4.2	1
Carbon disulfide	ND		ug/kg	13	2.7	1
2-Butanone	ND		ug/kg	13	0.48	1
Vinyl acetate	ND		ug/kg	13	0.64	1
4-Methyl-2-pentanone	ND		ug/kg	13	0.33	1
1,2,3-Trichloropropane	ND		ug/kg	13	0.30	1
2-Hexanone	ND		ug/kg	13	0.25	1
Bromochloromethane	ND		ug/kg	6.7	0.26	1
2,2-Dichloropropane	ND		ug/kg	6.7	0.30	1
1,2-Dibromoethane	ND		ug/kg	5.4	0.24	1
1,3-Dichloropropane	ND		ug/kg	6.7	0.23	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.3	0.43	1
Bromobenzene	ND		ug/kg	6.7	0.28	1
n-Butylbenzene	ND		ug/kg	1.3	0.27	1
sec-Butylbenzene	ND		ug/kg	1.3	0.28	1
tert-Butylbenzene	ND		ug/kg	6.7	0.76	1
o-Chlorotoluene	ND		ug/kg	6.7	0.22	1
p-Chlorotoluene	ND		ug/kg	6.7	0.21	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	6.7	1.1	1
Hexachlorobutadiene	ND		ug/kg	6.7	0.57	1
Isopropylbenzene	ND		ug/kg	1.3	0.22	1
p-Isopropyltoluene	ND		ug/kg	1.3	0.26	1
Naphthalene	ND		ug/kg	6.7	1.0	1
Acrylonitrile	ND		ug/kg	13	0.32	1
n-Propylbenzene	ND		ug/kg	1.3	0.17	1
1,2,3-Trichlorobenzene	ND		ug/kg	6.7	0.23	1
1,2,4-Trichlorobenzene	ND		ug/kg	6.7	1.1	1
1,3,5-Trimethylbenzene	ND		ug/kg	6.7	0.19	1
1,2,4-Trimethylbenzene	ND		ug/kg	6.7	0.77	1
Methyl Acetate	ND		ug/kg	27	1.0	1
Cyclohexane	ND		ug/kg	27	1.4	1
1,4-Dioxane	ND		ug/kg	130	23.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-07  
 Client ID: CSO\_SB-04B\_6.5-7.0  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 11:45  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Freon-113	ND		ug/kg	27	0.37	1
p-Diethylbenzene	ND		ug/kg	5.4	0.22	1
p-Ethyltoluene	ND		ug/kg	5.4	0.16	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	5.4	0.18	1
Ethyl ether	ND		ug/kg	6.7	0.36	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	6.7	0.60	1
Methyl cyclohexane	ND		ug/kg	5.4	1.7	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	101		70-130

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 09/20/13 12:55  
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 06 Batch: WG638014-3					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.13
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.33
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.14
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.17
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260C  
 Analytical Date: 09/20/13 12:55  
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 06 Batch: WG638014-3					
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.0
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.0
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/20/13 12:55  
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 06 Batch: WG638014-3					
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
Methyl Acetate	ND		ug/l	2.0	0.23
Cyclohexane	ND		ug/l	10	0.24
1,4-Dioxane	ND		ug/l	250	41.
Freon-113	ND		ug/l	2.5	0.70
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70
Methyl cyclohexane	ND		ug/l	10	0.29

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	100		70-130

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/22/13 17:50  
Analyst: PP

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 04,07 Batch: WG638254-3					
Methylene chloride	ND		ug/kg	10	2.0
1,1-Dichloroethane	ND		ug/kg	1.5	0.18
Chloroform	ND		ug/kg	1.5	0.37
Carbon tetrachloride	ND		ug/kg	1.0	0.21
1,2-Dichloropropane	ND		ug/kg	3.5	0.23
Dibromochloromethane	ND		ug/kg	1.0	0.31
1,1,2-Trichloroethane	ND		ug/kg	1.5	0.30
Tetrachloroethene	ND		ug/kg	1.0	0.14
Chlorobenzene	ND		ug/kg	1.0	0.35
Trichlorofluoromethane	ND		ug/kg	5.0	0.12
1,2-Dichloroethane	ND		ug/kg	1.0	0.15
1,1,1-Trichloroethane	ND		ug/kg	1.0	0.11
Bromodichloromethane	ND		ug/kg	1.0	0.23
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.12
cis-1,3-Dichloropropene	ND		ug/kg	1.0	0.13
1,1-Dichloropropene	ND		ug/kg	5.0	0.46
Bromoform	ND		ug/kg	4.0	0.41
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.0	0.17
Benzene	ND		ug/kg	1.0	0.12
Toluene	ND		ug/kg	1.5	0.11
Ethylbenzene	ND		ug/kg	1.0	0.15
Chloromethane	ND		ug/kg	5.0	0.78
Bromomethane	ND		ug/kg	2.0	0.34
Vinyl chloride	ND		ug/kg	2.0	0.14
Chloroethane	ND		ug/kg	2.0	0.32
1,1-Dichloroethene	ND		ug/kg	1.0	0.20
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.21
Trichloroethene	ND		ug/kg	1.0	0.15
1,2-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,3-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,4-Dichlorobenzene	ND		ug/kg	5.0	0.24

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/22/13 17:50  
Analyst: PP

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 04,07 Batch: WG638254-3					
Methyl tert butyl ether	ND		ug/kg	2.0	0.10
p/m-Xylene	ND		ug/kg	2.0	0.32
o-Xylene	ND		ug/kg	2.0	0.27
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.15
Dibromomethane	ND		ug/kg	10	0.16
Styrene	ND		ug/kg	2.0	0.31
Dichlorodifluoromethane	ND		ug/kg	10	0.22
Acetone	ND		ug/kg	10	3.1
Carbon disulfide	ND		ug/kg	10	2.0
2-Butanone	ND		ug/kg	10	0.36
Vinyl acetate	ND		ug/kg	10	0.48
4-Methyl-2-pentanone	ND		ug/kg	10	0.24
1,2,3-Trichloropropane	ND		ug/kg	10	0.22
2-Hexanone	ND		ug/kg	10	0.19
Bromochloromethane	ND		ug/kg	5.0	0.20
2,2-Dichloropropane	ND		ug/kg	5.0	0.22
1,2-Dibromoethane	ND		ug/kg	4.0	0.18
1,3-Dichloropropane	ND		ug/kg	5.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.0	0.32
Bromobenzene	ND		ug/kg	5.0	0.21
n-Butylbenzene	ND		ug/kg	1.0	0.20
sec-Butylbenzene	ND		ug/kg	1.0	0.20
tert-Butylbenzene	ND		ug/kg	5.0	0.56
o-Chlorotoluene	ND		ug/kg	5.0	0.16
p-Chlorotoluene	ND		ug/kg	5.0	0.15
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	0.79
Hexachlorobutadiene	ND		ug/kg	5.0	0.42
Isopropylbenzene	ND		ug/kg	1.0	0.17
p-Isopropyltoluene	ND		ug/kg	1.0	0.19
Naphthalene	ND		ug/kg	5.0	0.77
Acrylonitrile	ND		ug/kg	10	0.24

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/22/13 17:50  
Analyst: PP

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 04,07 Batch: WG638254-3					
n-Propylbenzene	ND		ug/kg	1.0	0.12
1,2,3-Trichlorobenzene	ND		ug/kg	5.0	0.17
1,2,4-Trichlorobenzene	ND		ug/kg	5.0	0.79
1,3,5-Trimethylbenzene	ND		ug/kg	5.0	0.14
1,2,4-Trimethylbenzene	ND		ug/kg	5.0	0.57
Methyl Acetate	ND		ug/kg	20	0.76
Cyclohexane	ND		ug/kg	20	1.1
1,4-Dioxane	ND		ug/kg	100	17.
Freon-113	ND		ug/kg	20	0.27
p-Diethylbenzene	ND		ug/kg	4.0	0.16
p-Ethyltoluene	ND		ug/kg	4.0	0.12
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.0	0.13
Ethyl ether	ND		ug/kg	5.0	0.26
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	0.45
Methyl cyclohexane	ND		ug/kg	4.0	1.3

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	98		70-130

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/23/13 09:30  
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 01 Batch: WG638262-3					
Methylene chloride	ND		ug/kg	10	2.0
1,1-Dichloroethane	ND		ug/kg	1.5	0.18
Chloroform	ND		ug/kg	1.5	0.37
Carbon tetrachloride	ND		ug/kg	1.0	0.21
1,2-Dichloropropane	ND		ug/kg	3.5	0.23
Dibromochloromethane	ND		ug/kg	1.0	0.31
1,1,2-Trichloroethane	ND		ug/kg	1.5	0.30
Tetrachloroethene	ND		ug/kg	1.0	0.14
Chlorobenzene	ND		ug/kg	1.0	0.35
Trichlorofluoromethane	ND		ug/kg	5.0	0.12
1,2-Dichloroethane	ND		ug/kg	1.0	0.15
1,1,1-Trichloroethane	ND		ug/kg	1.0	0.11
Bromodichloromethane	ND		ug/kg	1.0	0.23
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.12
cis-1,3-Dichloropropene	ND		ug/kg	1.0	0.13
1,1-Dichloropropene	ND		ug/kg	5.0	0.46
Bromoform	ND		ug/kg	4.0	0.41
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.0	0.17
Benzene	ND		ug/kg	1.0	0.12
Toluene	ND		ug/kg	1.5	0.11
Ethylbenzene	ND		ug/kg	1.0	0.15
Chloromethane	ND		ug/kg	5.0	0.78
Bromomethane	ND		ug/kg	2.0	0.34
Vinyl chloride	ND		ug/kg	2.0	0.14
Chloroethane	ND		ug/kg	2.0	0.32
1,1-Dichloroethene	ND		ug/kg	1.0	0.20
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.21
Trichloroethene	ND		ug/kg	1.0	0.15
1,2-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,3-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,4-Dichlorobenzene	ND		ug/kg	5.0	0.24

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/23/13 09:30  
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 01 Batch: WG638262-3					
Methyl tert butyl ether	ND		ug/kg	2.0	0.10
p/m-Xylene	ND		ug/kg	2.0	0.32
o-Xylene	ND		ug/kg	2.0	0.27
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.15
Dibromomethane	ND		ug/kg	10	0.16
Styrene	ND		ug/kg	2.0	0.31
Dichlorodifluoromethane	ND		ug/kg	10	0.22
Acetone	ND		ug/kg	10	3.1
Carbon disulfide	ND		ug/kg	10	2.0
2-Butanone	ND		ug/kg	10	0.36
Vinyl acetate	ND		ug/kg	10	0.48
4-Methyl-2-pentanone	ND		ug/kg	10	0.24
1,2,3-Trichloropropane	ND		ug/kg	10	0.22
2-Hexanone	ND		ug/kg	10	0.19
Bromochloromethane	ND		ug/kg	5.0	0.20
2,2-Dichloropropane	ND		ug/kg	5.0	0.22
1,2-Dibromoethane	ND		ug/kg	4.0	0.18
1,3-Dichloropropane	ND		ug/kg	5.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.0	0.32
Bromobenzene	ND		ug/kg	5.0	0.21
n-Butylbenzene	ND		ug/kg	1.0	0.20
sec-Butylbenzene	ND		ug/kg	1.0	0.20
tert-Butylbenzene	ND		ug/kg	5.0	0.56
o-Chlorotoluene	ND		ug/kg	5.0	0.16
p-Chlorotoluene	ND		ug/kg	5.0	0.15
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	0.79
Hexachlorobutadiene	ND		ug/kg	5.0	0.42
Isopropylbenzene	ND		ug/kg	1.0	0.17
p-Isopropyltoluene	ND		ug/kg	1.0	0.19
Naphthalene	ND		ug/kg	5.0	0.77
Acrylonitrile	ND		ug/kg	10	0.24

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/23/13 09:30  
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 01 Batch: WG638262-3					
n-Propylbenzene	ND		ug/kg	1.0	0.12
1,2,3-Trichlorobenzene	ND		ug/kg	5.0	0.17
1,2,4-Trichlorobenzene	ND		ug/kg	5.0	0.79
1,3,5-Trimethylbenzene	ND		ug/kg	5.0	0.14
1,2,4-Trimethylbenzene	ND		ug/kg	5.0	0.57
Methyl Acetate	ND		ug/kg	20	0.76
Cyclohexane	ND		ug/kg	20	1.1
1,4-Dioxane	ND		ug/kg	100	17.
Freon-113	ND		ug/kg	20	0.27
p-Diethylbenzene	ND		ug/kg	4.0	0.16
p-Ethyltoluene	ND		ug/kg	4.0	0.12
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.0	0.13
Ethyl ether	ND		ug/kg	5.0	0.26
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	0.45
Methyl cyclohexane	ND		ug/kg	4.0	1.3

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	99		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 06 Batch: WG638014-1 WG638014-2								
Methylene chloride	108		108		70-130	0		20
1,1-Dichloroethane	115		117		70-130	2		20
Chloroform	114		117		70-130	3		20
2-Chloroethylvinyl ether	78		80		70-130	3		20
Carbon tetrachloride	118		125		63-132	6		20
1,2-Dichloropropane	114		115		70-130	1		20
Dibromochloromethane	111		114		63-130	3		20
1,1,2-Trichloroethane	110		112		70-130	2		20
Tetrachloroethene	112		116		70-130	4		20
Chlorobenzene	110		112		75-130	2		20
Trichlorofluoromethane	106		111		62-150	5		20
1,2-Dichloroethane	106		108		70-130	2		20
1,1,1-Trichloroethane	115		118		67-130	3		20
Bromodichloromethane	108		111		67-130	3		20
trans-1,3-Dichloropropene	111		113		70-130	2		20
cis-1,3-Dichloropropene	112		115		70-130	3		20
1,1-Dichloropropene	117		121		70-130	3		20
Bromoform	109		117		54-136	7		20
1,1,2,2-Tetrachloroethane	110		113		67-130	3		20
Benzene	117		121		70-130	3		20
Toluene	112		115		70-130	3		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 06 Batch: WG638014-1 WG638014-2								
Ethylbenzene	110		112		70-130	2		20
Chloromethane	89		87		64-130	2		20
Bromomethane	48		50		39-139	4		20
Vinyl chloride	98		102		55-140	4		20
Chloroethane	92		94		55-138	2		20
1,1-Dichloroethene	116		123		61-145	6		20
trans-1,2-Dichloroethene	119		122		70-130	2		20
Trichloroethene	115		118		70-130	3		20
1,2-Dichlorobenzene	109		110		70-130	1		20
1,3-Dichlorobenzene	111		113		70-130	2		20
1,4-Dichlorobenzene	107		109		70-130	2		20
Methyl tert butyl ether	119		120		63-130	1		20
p/m-Xylene	110		111		70-130	1		20
o-Xylene	108		110		70-130	2		20
cis-1,2-Dichloroethene	116		118		70-130	2		20
Dibromomethane	111		115		70-130	4		20
1,2,3-Trichloropropane	116		115		64-130	1		20
Acrylonitrile	122		125		70-130	2		20
Isopropyl Ether	114		116		70-130	2		20
Styrene	109		110		70-130	1		20
Dichlorodifluoromethane	86		86		36-147	0		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 06 Batch: WG638014-1 WG638014-2								
Acetone	143		133		58-148	7		20
Carbon disulfide	116		123		51-130	6		20
2-Butanone	127		124		63-138	2		20
Vinyl acetate	113		116		70-130	3		20
4-Methyl-2-pentanone	108		110		59-130	2		20
2-Hexanone	103		104		57-130	1		20
Bromochloromethane	121		124		70-130	2		20
2,2-Dichloropropane	116		124		63-133	7		20
1,2-Dibromoethane	108		110		70-130	2		20
1,3-Dichloropropane	110		112		70-130	2		20
1,1,1,2-Tetrachloroethane	112		114		64-130	2		20
Bromobenzene	104		110		70-130	6		20
n-Butylbenzene	105		107		53-136	2		20
sec-Butylbenzene	108		112		70-130	4		20
tert-Butylbenzene	106		110		70-130	4		20
o-Chlorotoluene	111		114		70-130	3		20
p-Chlorotoluene	106		110		70-130	4		20
1,2-Dibromo-3-chloropropane	102		100		41-144	2		20
Hexachlorobutadiene	107		108		63-130	1		20
Isopropylbenzene	105		110		70-130	5		20
p-Isopropyltoluene	109		113		70-130	4		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 06 Batch: WG638014-1 WG638014-2								
Naphthalene	106		105		70-130	1		20
n-Propylbenzene	104		110		69-130	6		20
1,2,3-Trichlorobenzene	104		102		70-130	2		20
1,2,4-Trichlorobenzene	106		104		70-130	2		20
1,3,5-Trimethylbenzene	108		111		64-130	3		20
1,2,4-Trimethylbenzene	104		108		70-130	4		20
Methyl Acetate	118		119		70-130	1		20
Ethyl Acetate	114		117		70-130	3		20
Cyclohexane	122		128		70-130	5		20
Ethyl-Tert-Butyl-Ether	115		115		70-130	0		20
Tertiary-Amyl Methyl Ether	113		114		66-130	1		20
1,4-Dioxane	160		152		56-162	5		20
Freon-113	124		129		70-130	4		20
p-Diethylbenzene	104		107		70-130	3		20
p-Ethyltoluene	106		110		70-130	4		20
1,2,4,5-Tetramethylbenzene	111		111		70-130	0		20
Ethyl ether	118		120		59-134	2		20
trans-1,4-Dichloro-2-butene	82		84		70-130	2		20
Methyl cyclohexane	117		122		70-130	4		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 06 Batch: WG638014-1 WG638014-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	91		91		70-130
Toluene-d8	96		95		70-130
4-Bromofluorobenzene	92		94		70-130
Dibromofluoromethane	100		100		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS	Qual	LCSD	Qual	%Recovery	RPD	Qual	RPD
	%Recovery		%Recovery		Limits			Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04,07 Batch: WG638254-1 WG638254-2								
Methylene chloride	78		76		70-130	3		30
1,1-Dichloroethane	84		84		70-130	0		30
Chloroform	84		85		70-130	1		30
Carbon tetrachloride	89		88		70-130	1		30
1,2-Dichloropropane	84		85		70-130	1		30
Dibromochloromethane	94		95		70-130	1		30
1,1,2-Trichloroethane	93		94		70-130	1		30
Tetrachloroethene	98		98		70-130	0		30
Chlorobenzene	93		95		70-130	2		30
Trichlorofluoromethane	96		84		70-139	13		30
1,2-Dichloroethane	82		82		70-130	0		30
1,1,1-Trichloroethane	86		86		70-130	0		30
Bromodichloromethane	84		85		70-130	1		30
trans-1,3-Dichloropropene	92		93		70-130	1		30
cis-1,3-Dichloropropene	85		85		70-130	0		30
1,1-Dichloropropene	86		85		70-130	1		30
Bromoform	100		99		70-130	1		30
1,1,2,2-Tetrachloroethane	94		93		70-130	1		30
Benzene	87		86		70-130	1		30
Toluene	101		95		70-130	6		30
Ethylbenzene	93		94		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04,07 Batch: WG638254-1 WG638254-2								
Chloromethane	85		82		52-130	4		30
Bromomethane	101		102		57-147	1		30
Vinyl chloride	94		95		67-130	1		30
Chloroethane	97		100		50-151	3		30
1,1-Dichloroethene	90		89		65-135	1		30
trans-1,2-Dichloroethene	88		88		70-130	0		30
Trichloroethene	86		86		70-130	0		30
1,2-Dichlorobenzene	97		98		70-130	1		30
1,3-Dichlorobenzene	97		99		70-130	2		30
1,4-Dichlorobenzene	98		98		70-130	0		30
Methyl tert butyl ether	85		85		66-130	0		30
p/m-Xylene	95		96		70-130	1		30
o-Xylene	93		96		70-130	3		30
cis-1,2-Dichloroethene	86		87		70-130	1		30
Dibromomethane	86		85		70-130	1		30
Styrene	95		97		70-130	2		30
Dichlorodifluoromethane	83		81		30-146	2		30
Acetone	93		65		54-140	35	Q	30
Carbon disulfide	87		84		59-130	4		30
2-Butanone	100		79		70-130	23		30
Vinyl acetate	80		79		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04,07 Batch: WG638254-1 WG638254-2								
4-Methyl-2-pentanone	89		83		70-130	7		30
1,2,3-Trichloropropane	96		94		68-130	2		30
2-Hexanone	98		82		70-130	18		30
Bromochloromethane	88		88		70-130	0		30
2,2-Dichloropropane	89		87		70-130	2		30
1,2-Dibromoethane	94		94		70-130	0		30
1,3-Dichloropropane	91		93		69-130	2		30
1,1,1,2-Tetrachloroethane	93		95		70-130	2		30
Bromobenzene	95		96		70-130	1		30
n-Butylbenzene	98		97		70-130	1		30
sec-Butylbenzene	96		96		70-130	0		30
tert-Butylbenzene	96		97		70-130	1		30
o-Chlorotoluene	97		89		70-130	9		30
p-Chlorotoluene	95		96		70-130	1		30
1,2-Dibromo-3-chloropropane	96		97		68-130	1		30
Hexachlorobutadiene	99		100		67-130	1		30
Isopropylbenzene	94		95		70-130	1		30
p-Isopropyltoluene	98		98		70-130	0		30
Naphthalene	97		99		70-130	2		30
Acrylonitrile	88		84		70-130	5		30
Isopropyl Ether	81		82		66-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04,07 Batch: WG638254-1 WG638254-2								
tert-Butyl Alcohol	98		92		70-130	6		30
n-Propylbenzene	94		95		70-130	1		30
1,2,3-Trichlorobenzene	99		100		70-130	1		30
1,2,4-Trichlorobenzene	99		101		70-130	2		30
1,3,5-Trimethylbenzene	96		97		70-130	1		30
1,2,4-Trimethylbenzene	96		98		70-130	2		30
Methyl Acetate	89		84		51-146	6		30
Ethyl Acetate	91		83		70-130	9		30
Acrolein	97		86		70-130	12		30
Cyclohexane	86		83		59-142	4		30
1,4-Dioxane	100		96		65-136	4		30
Freon-113	89		88		50-139	1		30
p-Diethylbenzene	99		99		70-130	0		30
p-Ethyltoluene	95		96		70-130	1		30
1,2,4,5-Tetramethylbenzene	96		100		70-130	4		30
Tetrahydrofuran	85		82		66-130	4		30
Ethyl ether	85		78		67-130	9		30
trans-1,4-Dichloro-2-butene	94		92		70-130	2		30
Methyl cyclohexane	88		86		70-130	2		30
Ethyl-Tert-Butyl-Ether	83		84		70-130	1		30
Tertiary-Amyl Methyl Ether	86		87		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>%Recovery</i> Limits	<i>RPD</i>	<i>Qual</i>	<i>RPD</i> Limits
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Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 04,07 Batch: WG638254-1 WG638254-2

<i>Surrogate</i>	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>Acceptance</i> Criteria
1,2-Dichloroethane-d4	97		93		70-130
Toluene-d8	103		104		70-130
4-Bromofluorobenzene	95		95		70-130
Dibromofluoromethane	99		98		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01 Batch: WG638262-1 WG638262-2								
Methylene chloride	77		79		70-130	3		30
1,1-Dichloroethane	83		82		70-130	1		30
Chloroform	84		82		70-130	2		30
Carbon tetrachloride	89		86		70-130	3		30
1,2-Dichloropropane	84		84		70-130	0		30
Dibromochloromethane	91		92		70-130	1		30
1,1,2-Trichloroethane	91		90		70-130	1		30
Tetrachloroethene	95		93		70-130	2		30
Chlorobenzene	92		91		70-130	1		30
Trichlorofluoromethane	92		89		70-139	3		30
1,2-Dichloroethane	82		82		70-130	0		30
1,1,1-Trichloroethane	85		83		70-130	2		30
Bromodichloromethane	83		83		70-130	0		30
trans-1,3-Dichloropropene	88		89		70-130	1		30
cis-1,3-Dichloropropene	82		82		70-130	0		30
1,1-Dichloropropene	85		83		70-130	2		30
Bromoform	91		93		70-130	2		30
1,1,2,2-Tetrachloroethane	89		90		70-130	1		30
Benzene	85		84		70-130	1		30
Toluene	93		91		70-130	2		30
Ethylbenzene	92		91		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01 Batch: WG638262-1 WG638262-2								
Chloromethane	76		77		52-130	1		30
Bromomethane	98		95		57-147	3		30
Vinyl chloride	79		84		67-130	6		30
Chloroethane	94		95		50-151	1		30
1,1-Dichloroethene	80		82		65-135	2		30
trans-1,2-Dichloroethene	84		83		70-130	1		30
Trichloroethene	85		83		70-130	2		30
1,2-Dichlorobenzene	93		94		70-130	1		30
1,3-Dichlorobenzene	94		95		70-130	1		30
1,4-Dichlorobenzene	94		95		70-130	1		30
Methyl tert butyl ether	78		80		66-130	3		30
p/m-Xylene	94		94		70-130	0		30
o-Xylene	94		92		70-130	2		30
cis-1,2-Dichloroethene	84		83		70-130	1		30
Dibromomethane	83		84		70-130	1		30
Styrene	94		93		70-130	1		30
Dichlorodifluoromethane	51		52		30-146	2		30
Acetone	77		75		54-140	3		30
Carbon disulfide	77		76		59-130	1		30
2-Butanone	93		93		70-130	0		30
Vinyl acetate	78		79		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01 Batch: WG638262-1 WG638262-2								
4-Methyl-2-pentanone	77		80		70-130	4		30
1,2,3-Trichloropropane	90		91		68-130	1		30
2-Hexanone	88		87		70-130	1		30
Bromochloromethane	86		85		70-130	1		30
2,2-Dichloropropane	86		83		70-130	4		30
1,2-Dibromoethane	90		90		70-130	0		30
1,3-Dichloropropane	89		90		69-130	1		30
1,1,1,2-Tetrachloroethane	92		91		70-130	1		30
Bromobenzene	91		91		70-130	0		30
n-Butylbenzene	96		95		70-130	1		30
sec-Butylbenzene	95		94		70-130	1		30
tert-Butylbenzene	93		93		70-130	0		30
o-Chlorotoluene	94		94		70-130	0		30
p-Chlorotoluene	91		91		70-130	0		30
1,2-Dibromo-3-chloropropane	88		89		68-130	1		30
Hexachlorobutadiene	96		92		67-130	4		30
Isopropylbenzene	91		90		70-130	1		30
p-Isopropyltoluene	95		95		70-130	0		30
Naphthalene	85		90		70-130	6		30
Acrylonitrile	82		83		70-130	1		30
Isopropyl Ether	79		80		66-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01 Batch: WG638262-1 WG638262-2								
tert-Butyl Alcohol	82		86		70-130	5		30
n-Propylbenzene	92		91		70-130	1		30
1,2,3-Trichlorobenzene	91		92		70-130	1		30
1,2,4-Trichlorobenzene	92		94		70-130	2		30
1,3,5-Trimethylbenzene	94		93		70-130	1		30
1,2,4-Trimethylbenzene	95		94		70-130	1		30
Methyl Acetate	78		80		51-146	3		30
Ethyl Acetate	79		80		70-130	1		30
Acrolein	85		85		70-130	0		30
Cyclohexane	83		81		59-142	2		30
1,4-Dioxane	91		95		65-136	4		30
Freon-113	85		83		50-139	2		30
p-Diethylbenzene	94		94		70-130	0		30
p-Ethyltoluene	93		92		70-130	1		30
1,2,4,5-Tetramethylbenzene	93		93		70-130	0		30
Tetrahydrofuran	92		79		66-130	15		30
Ethyl ether	70		86		67-130	21		30
trans-1,4-Dichloro-2-butene	87		90		70-130	3		30
Methyl cyclohexane	86		84		70-130	2		30
Ethyl-Tert-Butyl-Ether	80		80		70-130	0		30
Tertiary-Amyl Methyl Ether	82		82		70-130	0		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>%Recovery</i> Limits	<i>RPD</i>	<i>Qual</i>	<i>RPD</i> Limits
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Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 01 Batch: WG638262-1 WG638262-2

<i>Surrogate</i>	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>Acceptance</i> <i>Criteria</i>
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	104		103		70-130
4-Bromofluorobenzene	92		93		70-130
Dibromofluoromethane	100		99		70-130

# SEMIVOLATILES

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-02 D  
 Client ID: CSO\_COMP-02\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8270D  
 Analytical Date: 09/20/13 21:36  
 Analyst: PS  
 Percent Solids: 88%

Date Collected: 09/14/13 10:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	160	J	ug/kg	600	150	4
1,2,4-Trichlorobenzene	ND		ug/kg	750	250	4
Hexachlorobenzene	ND		ug/kg	450	140	4
Bis(2-chloroethyl)ether	ND		ug/kg	680	210	4
2-Chloronaphthalene	ND		ug/kg	750	240	4
1,2-Dichlorobenzene	ND		ug/kg	750	250	4
1,3-Dichlorobenzene	ND		ug/kg	750	240	4
1,4-Dichlorobenzene	ND		ug/kg	750	230	4
3,3'-Dichlorobenzidine	ND		ug/kg	750	200	4
2,4-Dinitrotoluene	ND		ug/kg	750	160	4
2,6-Dinitrotoluene	ND		ug/kg	750	190	4
Fluoranthene	4000		ug/kg	450	140	4
4-Chlorophenyl phenyl ether	ND		ug/kg	750	230	4
4-Bromophenyl phenyl ether	ND		ug/kg	750	170	4
Bis(2-chloroisopropyl)ether	ND		ug/kg	900	260	4
Bis(2-chloroethoxy)methane	ND		ug/kg	810	230	4
Hexachlorobutadiene	ND		ug/kg	750	210	4
Hexachlorocyclopentadiene	ND		ug/kg	2200	480	4
Hexachloroethane	ND		ug/kg	600	140	4
Isophorone	ND		ug/kg	680	200	4
Naphthalene	320	J	ug/kg	750	250	4
Nitrobenzene	ND		ug/kg	680	180	4
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	600	160	4
n-Nitrosodi-n-propylamine	ND		ug/kg	750	220	4
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	750	200	4
Butyl benzyl phthalate	ND		ug/kg	750	150	4
Di-n-butylphthalate	ND		ug/kg	750	140	4
Di-n-octylphthalate	ND		ug/kg	750	180	4
Diethyl phthalate	ND		ug/kg	750	160	4
Dimethyl phthalate	ND		ug/kg	750	190	4
Benzo(a)anthracene	2000		ug/kg	450	150	4

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-02 D  
 Client ID: CSO\_COMP-02\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 10:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)pyrene	2600		ug/kg	600	180	4
Benzo(b)fluoranthene	2800		ug/kg	450	150	4
Benzo(k)fluoranthene	1100		ug/kg	450	140	4
Chrysene	2200		ug/kg	450	150	4
Acenaphthylene	210	J	ug/kg	600	140	4
Anthracene	720		ug/kg	450	120	4
Benzo(ghi)perylene	1900		ug/kg	600	160	4
Fluorene	220	J	ug/kg	750	220	4
Phenanthrene	2500		ug/kg	450	150	4
Dibenzo(a,h)anthracene	440	J	ug/kg	450	140	4
Indeno(1,2,3-cd)Pyrene	1800		ug/kg	600	170	4
Pyrene	3500		ug/kg	450	150	4
Biphenyl	ND		ug/kg	1700	250	4
4-Chloroaniline	ND		ug/kg	750	200	4
2-Nitroaniline	ND		ug/kg	750	210	4
3-Nitroaniline	ND		ug/kg	750	210	4
4-Nitroaniline	ND		ug/kg	750	200	4
Dibenzofuran	ND		ug/kg	750	250	4
2-Methylnaphthalene	ND		ug/kg	900	240	4
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	750	230	4
Acetophenone	ND		ug/kg	750	230	4
2,4,6-Trichlorophenol	ND		ug/kg	450	140	4
P-Chloro-M-Cresol	ND		ug/kg	750	220	4
2-Chlorophenol	ND		ug/kg	750	230	4
2,4-Dichlorophenol	ND		ug/kg	680	240	4
2,4-Dimethylphenol	ND		ug/kg	750	220	4
2-Nitrophenol	ND		ug/kg	1600	230	4
4-Nitrophenol	ND		ug/kg	1000	240	4
2,4-Dinitrophenol	ND		ug/kg	3600	1000	4
4,6-Dinitro-o-cresol	ND		ug/kg	2000	280	4
Pentachlorophenol	ND		ug/kg	600	160	4
Phenol	ND		ug/kg	750	220	4
2-Methylphenol	ND		ug/kg	750	240	4
3-Methylphenol/4-Methylphenol	ND		ug/kg	1100	250	4
2,4,5-Trichlorophenol	ND		ug/kg	750	240	4
Benzoic Acid	ND		ug/kg	2400	760	4
Benzyl Alcohol	ND		ug/kg	750	230	4
Carbazole	270	J	ug/kg	750	160	4
Benzaldehyde	ND		ug/kg	990	300	4

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-02 D

Date Collected: 09/14/13 10:00

Client ID: CSO\_COMP-02\_0-10

Date Received: 09/14/13

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Caprolactam	ND		ug/kg	750	210	4
Atrazine	ND		ug/kg	600	170	4
2,3,4,6-Tetrachlorophenol	ND		ug/kg	750	130	4

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	59		25-120
Phenol-d6	72		10-120
Nitrobenzene-d5	104		23-120
2-Fluorobiphenyl	90		30-120
2,4,6-Tribromophenol	55		0-136
4-Terphenyl-d14	81		18-120

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-03  
**Client ID:** CSO\_COMP-03\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 09/20/13 22:03  
**Analyst:** PS  
**Percent Solids:** 74%

**Date Collected:** 09/14/13 11:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	1100		ug/kg	180	45.	1
1,2,4-Trichlorobenzene	ND		ug/kg	220	72.	1
Hexachlorobenzene	ND		ug/kg	130	41.	1
Bis(2-chloroethyl)ether	ND		ug/kg	200	61.	1
2-Chloronaphthalene	ND		ug/kg	220	71.	1
1,2-Dichlorobenzene	ND		ug/kg	220	72.	1
1,3-Dichlorobenzene	ND		ug/kg	220	69.	1
1,4-Dichlorobenzene	ND		ug/kg	220	66.	1
3,3'-Dichlorobenzidine	ND		ug/kg	220	58.	1
2,4-Dinitrotoluene	ND		ug/kg	220	47.	1
2,6-Dinitrotoluene	ND		ug/kg	220	56.	1
Fluoranthene	7600		ug/kg	130	40.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	220	66.	1
4-Bromophenyl phenyl ether	ND		ug/kg	220	50.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	260	77.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	240	66.	1
Hexachlorobutadiene	ND		ug/kg	220	62.	1
Hexachlorocyclopentadiene	ND		ug/kg	630	140	1
Hexachloroethane	ND		ug/kg	180	40.	1
Isophorone	ND		ug/kg	200	58.	1
Naphthalene	520		ug/kg	220	73.	1
Nitrobenzene	ND		ug/kg	200	52.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	180	46.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	220	65.	1
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	220	57.	1
Butyl benzyl phthalate	ND		ug/kg	220	43.	1
Di-n-butylphthalate	ND		ug/kg	220	42.	1
Di-n-octylphthalate	ND		ug/kg	220	54.	1
Diethyl phthalate	ND		ug/kg	220	46.	1
Dimethyl phthalate	ND		ug/kg	220	56.	1
Benzo(a)anthracene	3900		ug/kg	130	43.	1

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-03  
 Client ID: CSO\_COMP-03\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 11:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)pyrene	3500		ug/kg	180	54.	1
Benzo(b)fluoranthene	4100		ug/kg	130	44.	1
Benzo(k)fluoranthene	1700		ug/kg	130	42.	1
Chrysene	3500		ug/kg	130	43.	1
Acenaphthylene	430		ug/kg	180	41.	1
Anthracene	2900		ug/kg	130	36.	1
Benzo(ghi)perylene	1700		ug/kg	180	46.	1
Fluorene	1400		ug/kg	220	63.	1
Phenanthrene	7600		ug/kg	130	43.	1
Dibenzo(a,h)anthracene	570		ug/kg	130	42.	1
Indeno(1,2,3-cd)Pyrene	2000		ug/kg	180	48.	1
Pyrene	6600		ug/kg	130	42.	1
Biphenyl	120	J	ug/kg	500	72.	1
4-Chloroaniline	ND		ug/kg	220	58.	1
2-Nitroaniline	ND		ug/kg	220	62.	1
3-Nitroaniline	ND		ug/kg	220	60.	1
4-Nitroaniline	ND		ug/kg	220	59.	1
Dibenzofuran	860		ug/kg	220	73.	1
2-Methylnaphthalene	330		ug/kg	260	70.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	220	68.	1
Acetophenone	ND		ug/kg	220	68.	1
2,4,6-Trichlorophenol	ND		ug/kg	130	41.	1
P-Chloro-M-Cresol	ND		ug/kg	220	63.	1
2-Chlorophenol	ND		ug/kg	220	66.	1
2,4-Dichlorophenol	ND		ug/kg	200	71.	1
2,4-Dimethylphenol	ND		ug/kg	220	65.	1
2-Nitrophenol	ND		ug/kg	470	68.	1
4-Nitrophenol	ND		ug/kg	310	71.	1
2,4-Dinitrophenol	ND		ug/kg	1000	300	1
4,6-Dinitro-o-cresol	ND		ug/kg	570	80.	1
Pentachlorophenol	ND		ug/kg	180	47.	1
Phenol	ND		ug/kg	220	65.	1
2-Methylphenol	ND		ug/kg	220	70.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	320	72.	1
2,4,5-Trichlorophenol	ND		ug/kg	220	71.	1
Benzoic Acid	ND		ug/kg	710	220	1
Benzyl Alcohol	ND		ug/kg	220	67.	1
Carbazole	1200		ug/kg	220	47.	1
Benzaldehyde	ND		ug/kg	290	88.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-03  
 Client ID: CSO\_COMP-03\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 11:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Caprolactam	ND		ug/kg	220	60.	1
Atrazine	ND		ug/kg	180	50.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	220	37.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	80		25-120
Phenol-d6	79		10-120
Nitrobenzene-d5	80		23-120
2-Fluorobiphenyl	88		30-120
2,4,6-Tribromophenol	102		0-136
4-Terphenyl-d14	92		18-120

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-05  
 Client ID: CSO\_COMP-04\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8270D  
 Analytical Date: 09/20/13 22:31  
 Analyst: PS  
 Percent Solids: 84%

Date Collected: 09/14/13 11:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	72	J	ug/kg	160	40.	1
1,2,4-Trichlorobenzene	ND		ug/kg	200	64.	1
Hexachlorobenzene	ND		ug/kg	120	36.	1
Bis(2-chloroethyl)ether	ND		ug/kg	180	55.	1
2-Chloronaphthalene	ND		ug/kg	200	64.	1
1,2-Dichlorobenzene	ND		ug/kg	200	64.	1
1,3-Dichlorobenzene	ND		ug/kg	200	62.	1
1,4-Dichlorobenzene	ND		ug/kg	200	59.	1
3,3'-Dichlorobenzidine	ND		ug/kg	200	52.	1
2,4-Dinitrotoluene	ND		ug/kg	200	42.	1
2,6-Dinitrotoluene	ND		ug/kg	200	50.	1
Fluoranthene	1200		ug/kg	120	36.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	200	60.	1
4-Bromophenyl phenyl ether	ND		ug/kg	200	45.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	230	69.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	210	59.	1
Hexachlorobutadiene	ND		ug/kg	200	55.	1
Hexachlorocyclopentadiene	ND		ug/kg	560	120	1
Hexachloroethane	ND		ug/kg	160	36.	1
Isophorone	ND		ug/kg	180	52.	1
Naphthalene	100	J	ug/kg	200	65.	1
Nitrobenzene	ND		ug/kg	180	46.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	160	41.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	200	58.	1
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	200	51.	1
Butyl benzyl phthalate	ND		ug/kg	200	38.	1
Di-n-butylphthalate	40	J	ug/kg	200	38.	1
Di-n-octylphthalate	ND		ug/kg	200	48.	1
Diethyl phthalate	ND		ug/kg	200	41.	1
Dimethyl phthalate	ND		ug/kg	200	50.	1
Benzo(a)anthracene	510		ug/kg	120	38.	1

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-05  
 Client ID: CSO\_COMP-04\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 11:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)pyrene	560		ug/kg	160	48.	1
Benzo(b)fluoranthene	650		ug/kg	120	40.	1
Benzo(k)fluoranthene	240		ug/kg	120	37.	1
Chrysene	550		ug/kg	120	38.	1
Acenaphthylene	ND		ug/kg	160	36.	1
Anthracene	260		ug/kg	120	32.	1
Benzo(ghi)perylene	410		ug/kg	160	41.	1
Fluorene	90	J	ug/kg	200	56.	1
Phenanthrene	990		ug/kg	120	38.	1
Dibenzo(a,h)anthracene	110	J	ug/kg	120	38.	1
Indeno(1,2,3-cd)Pyrene	390		ug/kg	160	43.	1
Pyrene	1100		ug/kg	120	38.	1
Biphenyl	ND		ug/kg	450	64.	1
4-Chloroaniline	ND		ug/kg	200	52.	1
2-Nitroaniline	ND		ug/kg	200	55.	1
3-Nitroaniline	ND		ug/kg	200	54.	1
4-Nitroaniline	ND		ug/kg	200	53.	1
Dibenzofuran	86	J	ug/kg	200	65.	1
2-Methylnaphthalene	ND		ug/kg	230	62.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	200	61.	1
Acetophenone	ND		ug/kg	200	61.	1
2,4,6-Trichlorophenol	ND		ug/kg	120	37.	1
P-Chloro-M-Cresol	ND		ug/kg	200	57.	1
2-Chlorophenol	ND		ug/kg	200	59.	1
2,4-Dichlorophenol	ND		ug/kg	180	63.	1
2,4-Dimethylphenol	ND		ug/kg	200	58.	1
2-Nitrophenol	ND		ug/kg	420	61.	1
4-Nitrophenol	ND		ug/kg	270	63.	1
2,4-Dinitrophenol	ND		ug/kg	940	270	1
4,6-Dinitro-o-cresol	ND		ug/kg	510	72.	1
Pentachlorophenol	ND		ug/kg	160	42.	1
Phenol	ND		ug/kg	200	58.	1
2-Methylphenol	ND		ug/kg	200	63.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	280	64.	1
2,4,5-Trichlorophenol	ND		ug/kg	200	63.	1
Benzoic Acid	ND		ug/kg	630	200	1
Benzyl Alcohol	ND		ug/kg	200	60.	1
Carbazole	97	J	ug/kg	200	42.	1
Benzaldehyde	ND		ug/kg	260	79.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-05  
 Client ID: CSO\_COMP-04\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 11:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Caprolactam	ND		ug/kg	200	54.	1
Atrazine	ND		ug/kg	160	44.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	200	33.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	81		25-120
Phenol-d6	77		10-120
Nitrobenzene-d5	79		23-120
2-Fluorobiphenyl	88		30-120
2,4,6-Tribromophenol	107		0-136
4-Terphenyl-d14	99		18-120

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270D  
**Analytical Date:** 09/18/13 11:04  
**Analyst:** PS

**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02-03,05 Batch: WG636555-1					
Acenaphthene	ND		ug/kg	130	33.
1,2,4-Trichlorobenzene	ND		ug/kg	160	53.
Hexachlorobenzene	ND		ug/kg	97	30.
Bis(2-chloroethyl)ether	ND		ug/kg	140	45.
2-Chloronaphthalene	ND		ug/kg	160	53.
1,2-Dichlorobenzene	ND		ug/kg	160	53.
1,3-Dichlorobenzene	ND		ug/kg	160	51.
1,4-Dichlorobenzene	ND		ug/kg	160	49.
3,3'-Dichlorobenzidine	ND		ug/kg	160	43.
2,4-Dinitrotoluene	ND		ug/kg	160	35.
2,6-Dinitrotoluene	ND		ug/kg	160	41.
Fluoranthene	ND		ug/kg	97	30.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	49.
4-Bromophenyl phenyl ether	ND		ug/kg	160	37.
Bis(2-chloroisopropyl)ether	ND		ug/kg	190	57.
Bis(2-chloroethoxy)methane	ND		ug/kg	170	49.
Hexachlorobutadiene	ND		ug/kg	160	46.
Hexachlorocyclopentadiene	ND		ug/kg	460	100
Hexachloroethane	ND		ug/kg	130	29.
Isophorone	ND		ug/kg	140	43.
Naphthalene	ND		ug/kg	160	54.
Nitrobenzene	ND		ug/kg	140	38.
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	130	34.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	48.
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	160	42.
Butyl benzyl phthalate	ND		ug/kg	160	32.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	40.
Diethyl phthalate	ND		ug/kg	160	34.
Dimethyl phthalate	ND		ug/kg	160	41.
Benzo(a)anthracene	ND		ug/kg	97	32.

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8270D  
 Analytical Date: 09/18/13 11:04  
 Analyst: PS

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02-03,05 Batch: WG636555-1					
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	97	33.
Benzo(k)fluoranthene	ND		ug/kg	97	31.
Chrysene	ND		ug/kg	97	32.
Acenaphthylene	ND		ug/kg	130	30.
Anthracene	ND		ug/kg	97	27.
Benzo(ghi)perylene	ND		ug/kg	130	34.
Fluorene	ND		ug/kg	160	46.
Phenanthrene	ND		ug/kg	97	32.
Dibenzo(a,h)anthracene	ND		ug/kg	97	31.
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	130	36.
Pyrene	ND		ug/kg	97	31.
Biphenyl	ND		ug/kg	370	53.
4-Chloroaniline	ND		ug/kg	160	43.
2-Nitroaniline	ND		ug/kg	160	46.
3-Nitroaniline	ND		ug/kg	160	45.
4-Nitroaniline	ND		ug/kg	160	44.
Dibenzofuran	ND		ug/kg	160	54.
2-Methylnaphthalene	ND		ug/kg	190	52.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	50.
Acetophenone	ND		ug/kg	160	50.
2,4,6-Trichlorophenol	ND		ug/kg	97	30.
P-Chloro-M-Cresol	ND		ug/kg	160	47.
2-Chlorophenol	ND		ug/kg	160	49.
2,4-Dichlorophenol	ND		ug/kg	140	52.
2,4-Dimethylphenol	ND		ug/kg	160	48.
2-Nitrophenol	ND		ug/kg	350	50.
4-Nitrophenol	ND		ug/kg	230	52.
2,4-Dinitrophenol	ND		ug/kg	780	220
4,6-Dinitro-o-cresol	ND		ug/kg	420	59.
Pentachlorophenol	ND		ug/kg	130	35.

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270D  
**Analytical Date:** 09/18/13 11:04  
**Analyst:** PS

**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 02-03,05 Batch: WG636555-1					
Phenol	ND		ug/kg	160	48.
2-Methylphenol	ND		ug/kg	160	52.
3-Methylphenol/4-Methylphenol	ND		ug/kg	230	53.
2,4,5-Trichlorophenol	ND		ug/kg	160	52.
Benzoic Acid	ND		ug/kg	520	160
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	35.
Benzaldehyde	ND		ug/kg	210	65.
Caprolactam	ND		ug/kg	160	45.
Atrazine	ND		ug/kg	130	37.
2,3,4,6-Tetrachlorophenol	ND		ug/kg	160	28.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	82		25-120
Phenol-d6	79		10-120
Nitrobenzene-d5	81		23-120
2-Fluorobiphenyl	74		30-120
2,4,6-Tribromophenol	83		0-136
4-Terphenyl-d14	81		18-120

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636555-2 WG636555-3								
Acenaphthene	87		92		31-137	6		50
1,2,4-Trichlorobenzene	72		76		38-107	5		50
Hexachlorobenzene	98		98		40-140	0		50
Bis(2-chloroethyl)ether	70		75		40-140	7		50
2-Chloronaphthalene	79		86		40-140	8		50
1,2-Dichlorobenzene	71		77		40-140	8		50
1,3-Dichlorobenzene	69		76		40-140	10		50
1,4-Dichlorobenzene	69		76		28-104	10		50
3,3'-Dichlorobenzidine	63		58		40-140	8		50
2,4-Dinitrotoluene	109	Q	110	Q	28-89	1		50
2,6-Dinitrotoluene	102		106		40-140	4		50
Fluoranthene	110		110		40-140	0		50
4-Chlorophenyl phenyl ether	92		96		40-140	4		50
4-Bromophenyl phenyl ether	99		103		40-140	4		50
Bis(2-chloroisopropyl)ether	73		78		40-140	7		50
Bis(2-chloroethoxy)methane	74		79		40-117	7		50
Hexachlorobutadiene	71		77		40-140	8		50
Hexachlorocyclopentadiene	79		82		40-140	4		50
Hexachloroethane	71		78		40-140	9		50
Isophorone	80		85		40-140	6		50
Naphthalene	74		79		40-140	7		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636555-2 WG636555-3								
Nitrobenzene	78		85		40-140	9		50
NitrosoDiPhenylAmine(NDPA)/DPA	106		108			2		50
n-Nitrosodi-n-propylamine	83		89		32-121	7		50
Bis(2-Ethylhexyl)phthalate	103		105		40-140	2		50
Butyl benzyl phthalate	126		120		40-140	5		50
Di-n-butylphthalate	119		118		40-140	1		50
Di-n-octylphthalate	111		112		40-140	1		50
Diethyl phthalate	109		109		40-140	0		50
Dimethyl phthalate	99		102		40-140	3		50
Benzo(a)anthracene	106		107		40-140	1		50
Benzo(a)pyrene	104		108		40-140	4		50
Benzo(b)fluoranthene	103		101		40-140	2		50
Benzo(k)fluoranthene	96		103		40-140	7		50
Chrysene	98		101		40-140	3		50
Acenaphthylene	89		96		40-140	8		50
Anthracene	110		111		40-140	1		50
Benzo(ghi)perylene	98		103		40-140	5		50
Fluorene	96		100		40-140	4		50
Phenanthrene	100		104		40-140	4		50
Dibenzo(a,h)anthracene	101		104		40-140	3		50
Indeno(1,2,3-cd)Pyrene	106		108		40-140	2		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636555-2 WG636555-3								
Pyrene	108		106		35-142	2		50
Biphenyl	77		83			8		50
4-Chloroaniline	60		55		40-140	9		50
2-Nitroaniline	102		108		47-134	6		50
3-Nitroaniline	71		64		26-129	10		50
4-Nitroaniline	108		106		41-125	2		50
Dibenzofuran	91		95		40-140	4		50
2-Methylnaphthalene	74		80		40-140	8		50
1,2,4,5-Tetrachlorobenzene	77		81		40-117	5		50
Acetophenone	77		84		14-144	9		50
2,4,6-Trichlorophenol	96		103		30-130	7		50
P-Chloro-M-Cresol	103		110	Q	26-103	7		50
2-Chlorophenol	78		85		25-102	9		50
2,4-Dichlorophenol	84		92		30-130	9		50
2,4-Dimethylphenol	84		90		30-130	7		50
2-Nitrophenol	80		88		30-130	10		50
4-Nitrophenol	114		112		11-114	2		50
2,4-Dinitrophenol	102		96		4-130	6		50
4,6-Dinitro-o-cresol	121		116		10-130	4		50
Pentachlorophenol	103		100		17-109	3		50
Phenol	78		83		26-90	6		50

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636555-2 WG636555-3								
2-Methylphenol	84		90		30-130.	7		50
3-Methylphenol/4-Methylphenol	83		91		30-130	9		50
2,4,5-Trichlorophenol	96		103		30-130	7		50
Benzoic Acid	25		25			0		50
Benzyl Alcohol	83		87		40-140	5		50
Carbazole	108		108		54-128	0		50
Benzaldehyde	70		74			6		50
Caprolactam	114		116			2		50
Atrazine	120		126			5		50
2,3,4,6-Tetrachlorophenol	102		103			1		50

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
2-Fluorophenol	75		79		25-120
Phenol-d6	75		78		10-120
Nitrobenzene-d5	77		80		23-120
2-Fluorobiphenyl	72		77		30-120
2,4,6-Tribromophenol	105		104		0-136
4-Terphenyl-d14	88		85		18-120



# PETROLEUM HYDROCARBONS

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-02  
 Client ID: CSO\_COMP-02\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8015C(M)  
 Analytical Date: 09/19/13 02:37  
 Analyst: JV  
 Percent Solids: 88%

Date Collected: 09/14/13 10:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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## Gasoline Range Organics - Westborough Lab

Gasoline Range Organics	1600	J	ug/kg	2800	54.	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	96		70-130
4-Bromofluorobenzene	92		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-02 D  
**Client ID:** CSO\_COMP-02\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8015C(M)  
**Analytical Date:** 09/18/13 18:19  
**Analyst:** AR  
**Percent Solids:** 88%

**Date Collected:** 09/14/13 10:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbon Quantitation - Westborough Lab						
TPH	1850000		ug/kg	182000	17800	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	83		40-140

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-03  
**Client ID:** CSO\_COMP-03\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8015C(M)  
**Analytical Date:** 09/18/13 02:48  
**Analyst:** AR  
**Percent Solids:** 74%

**Date Collected:** 09/14/13 11:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbon Quantitation - Westborough Lab						
TPH	317000		ug/kg	43400	4250	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	89		40-140

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-03  
**Client ID:** CSO\_COMP-03\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8015C(M)  
**Analytical Date:** 09/19/13 03:18  
**Analyst:** JV  
**Percent Solids:** 74%

**Date Collected:** 09/14/13 11:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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## Gasoline Range Organics - Westborough Lab

Gasoline Range Organics	1600	J	ug/kg	3400	65.	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	93		70-130
4-Bromofluorobenzene	93		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-05  
**Client ID:** CSO\_COMP-04\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8015C(M)  
**Analytical Date:** 09/18/13 04:21  
**Analyst:** AR  
**Percent Solids:** 84%

**Date Collected:** 09/14/13 11:55  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Petroleum Hydrocarbon Quantitation - Westborough Lab						
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TPH	74500		ug/kg	37600	3680	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	106		40-140

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-05  
 Client ID: CSO\_COMP-04\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8015C(M)  
 Analytical Date: 09/19/13 03:58  
 Analyst: JV  
 Percent Solids: 84%

Date Collected: 09/14/13 11:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Gasoline Range Organics - Westborough Lab</b>						
Gasoline Range Organics	1300	J	ug/kg	3000	57.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	102		70-130
4-Bromofluorobenzene	95		70-130



Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8015C(M)  
 Analytical Date: 09/17/13 14:10  
 Analyst: AR

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 12:15

Parameter	Result	Qualifier	Units	RL	MDL
Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 02-03,05 Batch: WG636406-1					
TPH	ND		ug/kg	32900	3220

Surrogate	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	85		40-140

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8015C(M)  
 Analytical Date: 09/18/13 21:53  
 Analyst: JV

Parameter	Result	Qualifier	Units	RL	MDL
Gasoline Range Organics - Westborough Lab for sample(s): 02-03,05 Batch: WG637130-3					
Gasoline Range Organics	ND		ug/kg	2500	48.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	74		70-130
4-Bromofluorobenzene	72		70-130

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

<b>Parameter</b>	<b>LCS %Recovery</b>	<b>Qual</b>	<b>LCSD %Recovery</b>	<b>Qual</b>	<b>%Recovery Limits</b>	<b>RPD</b>	<b>Qual</b>	<b>RPD Limits</b>
Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636406-2								
TPH	113		-		40-140	-		40

<b>Surrogate</b>	<b>LCS %Recovery</b>	<b>Qual</b>	<b>LCSD %Recovery</b>	<b>Qual</b>	<b>Acceptance Criteria</b>
o-Terphenyl	101				40-140

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Gasoline Range Organics - Westborough Lab Associated sample(s): 02-03,05 Batch: WG637130-1 WG637130-2								
Gasoline Range Organics	111		112		80-120	1		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,1,1-Trifluorotoluene	109		108		70-130
4-Bromofluorobenzene	112		112		70-130

### Matrix Spike Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Gasoline Range Organics - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG637130-5 QC Sample: L1318164-03 Client ID: MS Sample												
Gasoline Range Organics	200J	23000	26000	112		-	-		80-120	-		20

<i>Surrogate</i>	<i>MS % Recovery</i>	<i>Qualifier</i>	<i>MSD % Recovery</i>	<i>Qualifier</i>	<i>Acceptance Criteria</i>
1,1,1-Trifluorotoluene	107				70-130
4-Bromofluorobenzene	108				70-130



**Lab Duplicate Analysis**  
**Batch Quality Control**

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318166

**Report Date:** 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG636406-3 QC Sample: L1318009-02 Client ID: DUP Sample						
TPH	653000	959000	ug/kg	38		40

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	74		90		40-140

**Lab Duplicate Analysis**  
Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318166

**Report Date:** 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Gasoline Range Organics - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG637130-4 QC Sample: L1318164-03 Client ID: DUP Sample					
Gasoline Range Organics	200J	570J	ug/kg	NC	20

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	70		72		70-130
4-Bromofluorobenzene	79		77		70-130



# PCBS

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-02  
 Client ID: CSO\_COMP-02\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8082A  
 Analytical Date: 09/21/13 04:22  
 Analyst: KB  
 Percent Solids: 88%

Date Collected: 09/14/13 10:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 10:25  
 Cleanup Method1: EPA 3665A  
 Cleanup Date1: 09/17/13  
 Cleanup Method2: EPA 3660B  
 Cleanup Date2: 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	37.2	7.36	1	A
Aroclor 1221	ND		ug/kg	37.2	11.2	1	A
Aroclor 1232	ND		ug/kg	37.2	7.91	1	A
Aroclor 1242	ND		ug/kg	37.2	7.07	1	A
Aroclor 1248	24.6	J	ug/kg	37.2	4.51	1	B
Aroclor 1254	23.1	J	ug/kg	37.2	5.87	1	B
Aroclor 1260	28.3	J	ug/kg	37.2	6.46	1	B
Aroclor 1262	ND		ug/kg	37.2	2.75	1	A
Aroclor 1268	ND		ug/kg	37.2	5.40	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	64		30-150	A
Decachlorobiphenyl	76		30-150	A
2,4,5,6-Tetrachloro-m-xylene	65		30-150	B
Decachlorobiphenyl	85		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-03  
**Client ID:** CSO\_COMP-03\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 09/21/13 04:35  
**Analyst:** KB  
**Percent Solids:** 74%

**Date Collected:** 09/14/13 11:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 10:25  
**Cleanup Method1:** EPA 3665A  
**Cleanup Date1:** 09/17/13  
**Cleanup Method2:** EPA 3660B  
**Cleanup Date2:** 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	43.5	8.59	1	A
Aroclor 1221	ND		ug/kg	43.5	13.1	1	A
Aroclor 1232	ND		ug/kg	43.5	9.24	1	A
Aroclor 1242	ND		ug/kg	43.5	8.25	1	A
Aroclor 1248	ND		ug/kg	43.5	5.26	1	A
Aroclor 1254	ND		ug/kg	43.5	6.85	1	A
Aroclor 1260	ND		ug/kg	43.5	7.55	1	A
Aroclor 1262	ND		ug/kg	43.5	3.22	1	A
Aroclor 1268	ND		ug/kg	43.5	6.31	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	58		30-150	A
Decachlorobiphenyl	73		30-150	A
2,4,5,6-Tetrachloro-m-xylene	54		30-150	B
Decachlorobiphenyl	79		30-150	B

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-05  
 Client ID: CSO\_COMP-04\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8082A  
 Analytical Date: 09/21/13 04:48  
 Analyst: KB  
 Percent Solids: 84%

Date Collected: 09/14/13 11:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 10:25  
 Cleanup Method1: EPA 3665A  
 Cleanup Date1: 09/17/13  
 Cleanup Method2: EPA 3660B  
 Cleanup Date2: 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	38.1	7.52	1	A
Aroclor 1221	ND		ug/kg	38.1	11.5	1	A
Aroclor 1232	ND		ug/kg	38.1	8.09	1	A
Aroclor 1242	ND		ug/kg	38.1	7.23	1	A
Aroclor 1248	ND		ug/kg	38.1	4.61	1	A
Aroclor 1254	ND		ug/kg	38.1	6.00	1	A
Aroclor 1260	ND		ug/kg	38.1	6.61	1	A
Aroclor 1262	ND		ug/kg	38.1	2.82	1	A
Aroclor 1268	ND		ug/kg	38.1	5.52	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	54		30-150	A
Decachlorobiphenyl	55		30-150	A
2,4,5,6-Tetrachloro-m-xylene	51		30-150	B
Decachlorobiphenyl	62		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8082A  
 Analytical Date: 09/21/13 02:36  
 Analyst: KB

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 10:25  
 Cleanup Method1: EPA 3665A  
 Cleanup Date1: 09/17/13  
 Cleanup Method2: EPA 3660B  
 Cleanup Date2: 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 02-03,05 Batch: WG636368-1						
Aroclor 1016	ND		ug/kg	32.4	6.40	A
Aroclor 1221	ND		ug/kg	32.4	9.77	A
Aroclor 1232	ND		ug/kg	32.4	6.88	A
Aroclor 1242	ND		ug/kg	32.4	6.15	A
Aroclor 1248	ND		ug/kg	32.4	3.92	A
Aroclor 1254	ND		ug/kg	32.4	5.11	A
Aroclor 1260	ND		ug/kg	32.4	5.62	A
Aroclor 1262	ND		ug/kg	32.4	2.40	A
Aroclor 1268	ND		ug/kg	32.4	4.70	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	74		30-150	A
Decachlorobiphenyl	88		30-150	A
2,4,5,6-Tetrachloro-m-xylene	71		30-150	B
Decachlorobiphenyl	100		30-150	B

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636368-2 WG636368-3									
Aroclor 1016	78		84		40-140	7		50	A
Aroclor 1260	81		88		40-140	8		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		88		30-150	A
Decachlorobiphenyl	87		97		30-150	A
2,4,5,6-Tetrachloro-m-xylene	71		81		30-150	B
Decachlorobiphenyl	100		111		30-150	B

# PESTICIDES

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-02  
 Client ID: CSO\_COMP-02\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 19:23  
 Analyst: SH  
 Percent Solids: 88%

Date Collected: 09/14/13 10:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21  
 Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	187	22.7	1	A
2,4,5-T	ND		ug/kg	187	11.6	1	A
2,4,5-TP (Silvex)	ND		ug/kg	187	10.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	62		30-150	A
DCAA	57		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-02 D  
 Client ID: CSO\_COMP-02\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 09/20/13 11:38  
 Analyst: SH  
 Percent Solids: 88%

Date Collected: 09/14/13 10:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/19/13 14:36  
 Cleanup Method1: EPA 3620B  
 Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	17.5	3.43	10	A
Lindane	ND		ug/kg	7.30	3.26	10	A
Alpha-BHC	ND		ug/kg	7.30	2.07	10	A
Beta-BHC	ND		ug/kg	17.5	6.64	10	A
Heptachlor	ND		ug/kg	8.76	3.93	10	A
Aldrin	ND		ug/kg	17.5	6.17	10	A
Heptachlor epoxide	ND		ug/kg	32.8	9.86	10	A
Endrin	ND		ug/kg	7.30	2.99	10	A
Endrin ketone	ND		ug/kg	17.5	4.51	10	A
Dieldrin	ND		ug/kg	11.0	5.48	10	A
4,4'-DDE	ND		ug/kg	17.5	4.05	10	A
4,4'-DDD	ND		ug/kg	17.5	6.25	10	A
4,4'-DDT	ND		ug/kg	32.8	14.1	10	A
Endosulfan I	ND		ug/kg	17.5	4.14	10	A
Endosulfan II	ND		ug/kg	17.5	5.86	10	A
Endosulfan sulfate	ND		ug/kg	7.30	3.34	10	A
Methoxychlor	ND		ug/kg	32.8	10.2	10	A
Toxaphene	ND		ug/kg	328	92.0	10	A
cis-Chlordane	ND		ug/kg	21.9	6.10	10	A
trans-Chlordane	ND		ug/kg	21.9	5.78	10	A
Chlordane	ND		ug/kg	142	58.0	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	103		30-150	A
Decachlorobiphenyl	97		30-150	A
2,4,5,6-Tetrachloro-m-xylene	82		30-150	B
Decachlorobiphenyl	69		30-150	B

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-03  
 Client ID: CSO\_COMP-03\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 19:43  
 Analyst: SH  
 Percent Solids: 74%

Date Collected: 09/14/13 11:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21  
 Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	221	26.9	1	A
2,4,5-T	ND		ug/kg	221	13.8	1	A
2,4,5-TP (Silvex)	ND		ug/kg	221	12.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	85		30-150	A
DCAA	108		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318166-03 D  
 Client ID: CSO\_COMP-03\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 09/20/13 11:51  
 Analyst: SH  
 Percent Solids: 74%

Date Collected: 09/14/13 11:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/19/13 14:36  
 Cleanup Method1: EPA 3620B  
 Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	20.9	4.09	10	A
Lindane	ND		ug/kg	8.71	3.89	10	A
Alpha-BHC	ND		ug/kg	8.71	2.47	10	A
Beta-BHC	ND		ug/kg	20.9	7.92	10	A
Heptachlor	ND		ug/kg	10.4	4.68	10	A
Aldrin	ND		ug/kg	20.9	7.36	10	A
Heptachlor epoxide	ND		ug/kg	39.2	11.8	10	A
Endrin	ND		ug/kg	8.71	3.57	10	A
Endrin ketone	ND		ug/kg	20.9	5.38	10	A
Dieldrin	ND		ug/kg	13.1	6.53	10	A
4,4'-DDE	ND		ug/kg	20.9	4.83	10	A
4,4'-DDD	ND		ug/kg	20.9	7.45	10	A
4,4'-DDT	ND		ug/kg	39.2	16.8	10	A
Endosulfan I	ND		ug/kg	20.9	4.94	10	A
Endosulfan II	ND		ug/kg	20.9	6.98	10	A
Endosulfan sulfate	ND		ug/kg	8.71	3.98	10	A
Methoxychlor	ND		ug/kg	39.2	12.2	10	A
Toxaphene	ND		ug/kg	392	110.	10	A
cis-Chlordane	ND		ug/kg	26.1	7.28	10	A
trans-Chlordane	ND		ug/kg	26.1	6.90	10	A
Chlordane	ND		ug/kg	170	69.2	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	145		30-150	A
Decachlorobiphenyl	97		30-150	A
2,4,5,6-Tetrachloro-m-xylene	411	Q	30-150	B
Decachlorobiphenyl	61		30-150	B

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-05  
 Client ID: CSO\_COMP-04\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 09/20/13 12:04  
 Analyst: SH  
 Percent Solids: 84%

Date Collected: 09/14/13 11:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/19/13 14:36  
 Cleanup Method1: EPA 3620B  
 Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	1.85	0.362	1	A
Lindane	ND		ug/kg	0.770	0.344	1	A
Alpha-BHC	ND		ug/kg	0.770	0.219	1	A
Beta-BHC	ND		ug/kg	1.85	0.701	1	A
Heptachlor	ND		ug/kg	0.924	0.414	1	A
Aldrin	ND		ug/kg	1.85	0.651	1	A
Heptachlor epoxide	ND		ug/kg	3.47	1.04	1	A
Endrin	ND		ug/kg	0.770	0.316	1	A
Endrin ketone	ND		ug/kg	1.85	0.476	1	A
Dieldrin	ND		ug/kg	1.16	0.578	1	A
4,4'-DDE	ND		ug/kg	1.85	0.428	1	A
4,4'-DDD	ND		ug/kg	1.85	0.660	1	A
4,4'-DDT	3.88		ug/kg	3.47	1.49	1	A
Endosulfan I	ND		ug/kg	1.85	0.437	1	A
Endosulfan II	ND		ug/kg	1.85	0.618	1	A
Endosulfan sulfate	ND		ug/kg	0.770	0.352	1	A
Methoxychlor	ND		ug/kg	3.47	1.08	1	A
Toxaphene	ND		ug/kg	34.7	9.71	1	A
cis-Chlordane	ND		ug/kg	2.31	0.644	1	A
trans-Chlordane	ND		ug/kg	2.31	0.610	1	A
Chlordane	ND		ug/kg	15.0	6.12	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	71		30-150	A
Decachlorobiphenyl	75		30-150	A
2,4,5,6-Tetrachloro-m-xylene	53		30-150	B
Decachlorobiphenyl	73		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318166**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318166-05  
**Client ID:** CSO\_COMP-04\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8151A  
**Analytical Date:** 09/17/13 20:03  
**Analyst:** SH  
**Percent Solids:** 84%

**Date Collected:** 09/14/13 11:55  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 8151A  
**Extraction Date:** 09/16/13 09:21  
**Methylation Date:** 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	198	24.0	1	A
2,4,5-T	ND		ug/kg	198	12.3	1	A
2,4,5-TP (Silvex)	ND		ug/kg	198	10.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	98		30-150	A
DCAA	75		30-150	B

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 15:05  
 Analyst: SH

Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21

Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Column
Chlorinated Herbicides by GC - Westborough Lab for sample(s): 02-03,05 Batch: WG636326-1						
2,4-D	ND		ug/kg	162	19.7	A
2,4,5-T	ND		ug/kg	162	10.1	A
2,4,5-TP (Silvex)	ND		ug/kg	162	8.95	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DCAA	90		30-150	A
DCAA	71		30-150	B

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8081B  
Analytical Date: 09/20/13 12:17  
Analyst: SH

Extraction Method: EPA 3546  
Extraction Date: 09/19/13 14:36  
Cleanup Method1: EPA 3620B  
Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 02-03,05 Batch: WG637490-1						
Delta-BHC	ND		ug/kg	1.57	0.308	A
Lindane	ND		ug/kg	0.654	0.292	A
Alpha-BHC	ND		ug/kg	0.654	0.186	A
Beta-BHC	ND		ug/kg	1.57	0.596	A
Heptachlor	ND		ug/kg	0.785	0.352	A
Aldrin	ND		ug/kg	1.57	0.553	A
Heptachlor epoxide	ND		ug/kg	2.94	0.884	A
Endrin	ND		ug/kg	0.654	0.268	A
Endrin ketone	ND		ug/kg	1.57	0.404	A
Dieldrin	ND		ug/kg	0.982	0.491	A
4,4'-DDE	ND		ug/kg	1.57	0.363	A
4,4'-DDD	ND		ug/kg	1.57	0.560	A
4,4'-DDT	ND		ug/kg	2.94	1.26	A
Endosulfan I	ND		ug/kg	1.57	0.371	A
Endosulfan II	ND		ug/kg	1.57	0.525	A
Endosulfan sulfate	ND		ug/kg	0.654	0.299	A
Methoxychlor	ND		ug/kg	2.94	0.916	A
Toxaphene	ND		ug/kg	29.4	8.25	A
cis-Chlordane	ND		ug/kg	1.96	0.547	A
trans-Chlordane	ND		ug/kg	1.96	0.518	A
Chlordane	ND		ug/kg	12.8	5.20	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	88		30-150	A
Decachlorobiphenyl	85		30-150	A
2,4,5,6-Tetrachloro-m-xylene	62		30-150	B
Decachlorobiphenyl	87		30-150	B

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Chlorinated Herbicides by GC - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636326-2 WG636326-3									
2,4-D	99		113		30-150	13		30	A
2,4,5-T	93		96		30-150	3		30	A
2,4,5-TP (Silvex)	89		89		30-150	0		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DCAA	91		96		30-150	A
DCAA	77		73		30-150	B

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 02-03,05 Batch: WG637490-2 WG637490-3									
Delta-BHC	95		98		30-150	3		30	A
Lindane	83		88		30-150	6		30	A
Alpha-BHC	83		84		30-150	1		30	A
Beta-BHC	80		86		30-150	7		30	A
Heptachlor	89		95		30-150	7		30	A
Aldrin	88		94		30-150	7		30	A
Heptachlor epoxide	82		93		30-150	13		30	A
Endrin	99		100		30-150	1		30	A
Endrin ketone	95		93		30-150	2		30	A
Dieldrin	92		96		30-150	4		30	A
4,4'-DDE	86		89		30-150	3		30	A
4,4'-DDD	94		94		30-150	0		30	A
4,4'-DDT	93		87		30-150	7		30	A
Endosulfan I	92		97		30-150	5		30	A
Endosulfan II	100		77		30-150	26		30	A
Endosulfan sulfate	104		102		30-150	2		30	A
Methoxychlor	82		84		30-150	2		30	A
cis-Chlordane	85		84		30-150	1		30	A
trans-Chlordane	88		90		30-150	2		30	A

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 02-03,05 Batch: WG637490-2 WG637490-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		84		30-150	A
Decachlorobiphenyl	93		89		30-150	A
2,4,5,6-Tetrachloro-m-xylene	62		65		30-150	B
Decachlorobiphenyl	102		104		30-150	B

## METALS

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-02  
 Client ID: CSO\_COMP-02\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 88%

Date Collected: 09/14/13 10:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 TCLP/SPLP Ext. Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab</b>											
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 10:40	09/19/13 16:36	EPA 3015	1,6010C	TT
Barium, TCLP	0.60		mg/l	0.50	0.03	1	09/19/13 10:40	09/19/13 16:36	EPA 3015	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 10:40	09/19/13 16:36	EPA 3015	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 10:40	09/19/13 16:36	EPA 3015	1,6010C	TT
Lead, TCLP	0.18	J	mg/l	0.50	0.02	1	09/19/13 10:40	09/19/13 16:36	EPA 3015	1,6010C	TT
Mercury, TCLP	ND		mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 12:55	EPA 7470A	1,7470A	JH
Selenium, TCLP	ND		mg/l	0.50	0.03	1	09/19/13 10:40	09/19/13 16:36	EPA 3015	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 10:40	09/19/13 16:36	EPA 3015	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-02  
 Client ID: CSO\_COMP-02\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 88%

Date Collected: 09/14/13 10:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	8700		mg/kg	8.9	1.8	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.4	0.71	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Arsenic, Total	10		mg/kg	0.89	0.18	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Barium, Total	160		mg/kg	0.89	0.27	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Beryllium, Total	0.87		mg/kg	0.44	0.09	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Cadmium, Total	0.87	J	mg/kg	0.89	0.06	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Calcium, Total	28000		mg/kg	8.9	2.7	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Chromium, Total	25		mg/kg	0.89	0.18	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Cobalt, Total	12		mg/kg	1.8	0.44	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Copper, Total	230		mg/kg	0.89	0.18	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Iron, Total	22000		mg/kg	4.4	1.8	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Lead, Total	360		mg/kg	4.4	0.18	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Magnesium, Total	6700		mg/kg	8.9	0.89	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Manganese, Total	320		mg/kg	0.89	0.18	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Mercury, Total	0.45		mg/kg	0.08	0.02	1	09/21/13 12:30	09/23/13 10:26	EPA 7471B	1,7471B	MC
Nickel, Total	24		mg/kg	2.2	0.36	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Potassium, Total	1100		mg/kg	220	36.	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Selenium, Total	0.91	J	mg/kg	1.8	0.27	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.89	0.18	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Sodium, Total	320		mg/kg	180	27.	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.8	0.36	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Vanadium, Total	25		mg/kg	0.89	0.09	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT
Zinc, Total	700		mg/kg	4.4	0.62	2	09/19/13 11:28	09/19/13 20:04	EPA 3050B	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-03  
 Client ID: CSO\_COMP-03\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 74%

Date Collected: 09/14/13 11:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 TCLP/SPLP Ext. Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab</b>											
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 10:40	09/19/13 18:05	EPA 3015	1,6010C	TT
Barium, TCLP	0.64		mg/l	0.50	0.03	1	09/19/13 10:40	09/19/13 18:05	EPA 3015	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 10:40	09/19/13 18:05	EPA 3015	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 10:40	09/19/13 18:05	EPA 3015	1,6010C	TT
Lead, TCLP	3.6		mg/l	0.50	0.02	1	09/19/13 10:40	09/19/13 18:05	EPA 3015	1,6010C	TT
Mercury, TCLP	ND		mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 12:57	EPA 7470A	1,7470A	JH
Selenium, TCLP	ND		mg/l	0.50	0.03	1	09/19/13 10:40	09/19/13 18:05	EPA 3015	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 10:40	09/19/13 18:05	EPA 3015	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-03  
 Client ID: CSO\_COMP-03\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 74%

Date Collected: 09/14/13 11:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	7000		mg/kg	10	2.0	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Antimony, Total	1.9	J	mg/kg	5.1	0.82	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Arsenic, Total	20		mg/kg	1.0	0.20	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Barium, Total	150		mg/kg	1.0	0.31	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Beryllium, Total	0.54		mg/kg	0.51	0.10	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Cadmium, Total	0.93	J	mg/kg	1.0	0.07	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Calcium, Total	26000		mg/kg	10	3.1	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Chromium, Total	14		mg/kg	1.0	0.20	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Cobalt, Total	7.4		mg/kg	2.0	0.51	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Copper, Total	87		mg/kg	1.0	0.20	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Iron, Total	23000		mg/kg	5.1	2.0	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Lead, Total	920		mg/kg	5.1	0.20	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Magnesium, Total	3400		mg/kg	10	1.0	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Manganese, Total	490		mg/kg	1.0	0.20	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Mercury, Total	0.41		mg/kg	0.11	0.02	1	09/21/13 12:30	09/23/13 10:28	EPA 7471B	1,7471B	MC
Nickel, Total	12		mg/kg	2.6	0.41	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Potassium, Total	1200		mg/kg	260	41.	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Selenium, Total	0.48	J	mg/kg	2.0	0.31	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	1.0	0.20	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Sodium, Total	440		mg/kg	200	31.	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	2.0	0.41	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Vanadium, Total	20		mg/kg	1.0	0.10	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT
Zinc, Total	370		mg/kg	5.1	0.72	2	09/19/13 11:28	09/19/13 20:08	EPA 3050B	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-05  
 Client ID: CSO\_COMP-04\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 84%

Date Collected: 09/14/13 11:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 TCLP/SPLP Ext. Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab</b>											
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 10:40	09/19/13 18:09	EPA 3015	1,6010C	TT
Barium, TCLP	0.50		mg/l	0.50	0.03	1	09/19/13 10:40	09/19/13 18:09	EPA 3015	1,6010C	TT
Cadmium, TCLP	0.01	J	mg/l	0.10	0.01	1	09/19/13 10:40	09/19/13 18:09	EPA 3015	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 10:40	09/19/13 18:09	EPA 3015	1,6010C	TT
Lead, TCLP	1.7		mg/l	0.50	0.02	1	09/19/13 10:40	09/19/13 18:09	EPA 3015	1,6010C	TT
Mercury, TCLP	ND		mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 12:58	EPA 7470A	1,7470A	JH
Selenium, TCLP	ND		mg/l	0.50	0.03	1	09/19/13 10:40	09/19/13 18:09	EPA 3015	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 10:40	09/19/13 18:09	EPA 3015	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318166-05  
 Client ID: CSO\_COMP-04\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 84%

Date Collected: 09/14/13 11:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	9000		mg/kg	9.3	1.8	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.6	0.74	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Arsenic, Total	9.6		mg/kg	0.93	0.18	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Barium, Total	160		mg/kg	0.93	0.28	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Beryllium, Total	1.2		mg/kg	0.46	0.09	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Cadmium, Total	0.93		mg/kg	0.93	0.07	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Calcium, Total	31000		mg/kg	9.3	2.8	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Chromium, Total	18		mg/kg	0.93	0.18	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Cobalt, Total	11		mg/kg	1.8	0.46	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Copper, Total	68		mg/kg	0.93	0.18	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Iron, Total	18000		mg/kg	4.6	1.8	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Lead, Total	420		mg/kg	4.6	0.18	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Magnesium, Total	6800		mg/kg	9.3	0.93	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Manganese, Total	270		mg/kg	0.93	0.18	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Mercury, Total	0.23		mg/kg	0.09	0.02	1	09/21/13 12:30	09/23/13 10:29	EPA 7471B	1,7471B	MC
Nickel, Total	23		mg/kg	2.3	0.37	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Potassium, Total	800		mg/kg	230	37.	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Selenium, Total	0.68	J	mg/kg	1.8	0.28	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.93	0.18	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Sodium, Total	240		mg/kg	180	28.	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.8	0.37	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Vanadium, Total	20		mg/kg	0.93	0.09	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT
Zinc, Total	290		mg/kg	4.6	0.65	2	09/19/13 11:28	09/19/13 20:12	EPA 3050B	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

## Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
TCLP Metals by EPA 1311 - Westborough Lab for sample(s): 02-03,05 Batch: WG637383-1										
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 10:40	09/19/13 11:22	1,6010C	TT
Barium, TCLP	0.04	J	mg/l	0.50	0.03	1	09/19/13 10:40	09/19/13 11:22	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 10:40	09/19/13 11:22	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 10:40	09/19/13 11:22	1,6010C	TT
Lead, TCLP	ND		mg/l	0.50	0.02	1	09/19/13 10:40	09/19/13 11:22	1,6010C	TT
Selenium, TCLP	ND		mg/l	0.50	0.03	1	09/19/13 10:40	09/19/13 11:22	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 10:40	09/19/13 11:22	1,6010C	TT

### Prep Information

Digestion Method: EPA 3015  
TCLP/SPLP Extraction Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Westborough Lab for sample(s): 02-03,05 Batch: WG637410-1										
Aluminum, Total	2.0	J	mg/kg	4.0	0.80	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Antimony, Total	ND		mg/kg	2.0	0.32	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Arsenic, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Barium, Total	ND		mg/kg	0.40	0.12	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Beryllium, Total	ND		mg/kg	0.20	0.04	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Cadmium, Total	ND		mg/kg	0.40	0.03	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Calcium, Total	4.2		mg/kg	4.0	1.2	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Chromium, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Cobalt, Total	ND		mg/kg	0.80	0.20	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Copper, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Iron, Total	ND		mg/kg	2.0	0.80	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Lead, Total	ND		mg/kg	2.0	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Magnesium, Total	ND		mg/kg	4.0	0.40	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Manganese, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Nickel, Total	ND		mg/kg	1.0	0.16	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Potassium, Total	ND		mg/kg	100	16.	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Selenium, Total	ND		mg/kg	0.80	0.12	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Silver, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Sodium, Total	ND		mg/kg	80	12.	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

### Method Blank Analysis Batch Quality Control

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Thallium, Total	ND	mg/kg	0.80	0.16	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Vanadium, Total	ND	mg/kg	0.40	0.04	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Zinc, Total	ND	mg/kg	2.0	0.28	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT

#### Prep Information

Digestion Method: EPA 3050B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Westborough Lab for sample(s): 02-03,05 Batch: WG637778-1									
Mercury, Total	ND	mg/kg	0.08	0.02	1	09/21/13 12:30	09/23/13 09:53	1,7471B	MC

#### Prep Information

Digestion Method: EPA 7471B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
TCLP Metals by EPA 1311 - Westborough Lab for sample(s): 02-03,05 Batch: WG638031-1									
Mercury, TCLP	ND	mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 12:32	1,7470A	JH

#### Prep Information

Digestion Method: EPA 7470A  
TCLP/SPLP Extraction Date: 09/18/13 16:44

## Lab Control Sample Analysis

Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318166

**Report Date:** 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 02-03,05 Batch: WG637383-2								
Arsenic, TCLP	108		-		75-125	-		20
Barium, TCLP	105		-		75-125	-		20
Cadmium, TCLP	106		-		75-125	-		20
Chromium, TCLP	105		-		75-125	-		20
Lead, TCLP	104		-		75-125	-		20
Selenium, TCLP	117		-		75-125	-		20
Silver, TCLP	108		-		75-125	-		20

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318166

**Report Date:** 09/24/13

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 02-03,05 Batch: WG637410-2 SRM Lot Number: 0518-10-02					
Aluminum, Total	85	-	29-171	-	
Antimony, Total	122	-	4-196	-	
Arsenic, Total	104	-	81-119	-	
Barium, Total	100	-	83-118	-	
Beryllium, Total	98	-	83-117	-	
Cadmium, Total	94	-	82-117	-	
Calcium, Total	90	-	83-117	-	
Chromium, Total	92	-	80-119	-	
Cobalt, Total	99	-	83-117	-	
Copper, Total	101	-	83-117	-	
Iron, Total	94	-	51-150	-	
Lead, Total	96	-	80-120	-	
Magnesium, Total	78	-	74-126	-	
Manganese, Total	97	-	83-117	-	
Nickel, Total	94	-	82-117	-	
Potassium, Total	99	-	74-126	-	
Selenium, Total	109	-	80-120	-	
Silver, Total	105	-	66-134	-	
Sodium, Total	106	-	74-127	-	
Thallium, Total	96	-	79-120	-	
Vanadium, Total	89	-	79-121	-	

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318166

**Report Date:** 09/24/13

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 02-03,05 Batch: WG637410-2 SRM Lot Number: 0518-10-02					
Zinc, Total	94	-	82-119	-	
Total Metals - Westborough Lab Associated sample(s): 02-03,05 Batch: WG637778-2 SRM Lot Number: 0518-10-02					
Mercury, Total	105	-	67-133	-	
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 02-03,05 Batch: WG638031-2					
Mercury, TCLP	111	-	80-120	-	

**Matrix Spike Analysis**  
Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD	RPD Qual	RPD Limits
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 02-03,05    QC Batch ID: WG637383-4    QC Sample: L1318339-01    Client ID: MS Sample												
Arsenic, TCLP	ND	1.2	1.3	108	-	-	-	-	75-125	-	-	20
Barium, TCLP	0.34J	20	21	105	-	-	-	-	75-125	-	-	20
Cadmium, TCLP	ND	0.51	0.54	106	-	-	-	-	75-125	-	-	20
Chromium, TCLP	0.10J	2	2.2	110	-	-	-	-	75-125	-	-	20
Lead, TCLP	0.14J	5.1	5.4	106	-	-	-	-	75-125	-	-	20
Selenium, TCLP	ND	1.2	1.4	117	-	-	-	-	75-125	-	-	20
Silver, TCLP	ND	0.5	0.54	108	-	-	-	-	75-125	-	-	20

## Matrix Spike Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 02-03,05    QC Batch ID: WG637410-4    QC Sample: L1318142-43    Client ID: MS Sample									
Aluminum, Total	1500	194	2700	618	Q	-	75-125	-	35
Antimony, Total	4.4J	48.5	52	107		-	75-125	-	35
Arsenic, Total	12.	11.6	23	86		-	75-125	-	35
Barium, Total	360	194	670	154	Q	-	75-125	-	35
Beryllium, Total	0.22J	4.85	5.1	105		-	75-125	-	35
Cadmium, Total	4.5	4.95	7.1	50	Q	-	75-125	-	35
Calcium, Total	620	971	4700	419	Q	-	75-125	-	35
Chromium, Total	14.	19.4	27	62	Q	-	75-125	-	35
Cobalt, Total	3.4	48.5	49	94		-	75-125	-	35
Copper, Total	130	24.3	120	0	Q	-	75-125	-	35
Iron, Total	5800	97.1	5200	0	Q	-	75-125	-	35
Lead, Total	420	49.5	280	0	Q	-	75-125	-	35
Magnesium, Total	290	971	1200	93		-	75-125	-	35
Manganese, Total	56.	48.5	110	107		-	75-125	-	35
Nickel, Total	15.	48.5	56	84		-	75-125	-	35
Potassium, Total	220J	971	1300	134	Q	-	75-125	-	35
Selenium, Total	6.1	11.6	16	84		-	75-125	-	35
Silver, Total	0.26J	29.1	28	96		-	75-125	-	35
Sodium, Total	120J	971	1200	124		-	75-125	-	35
Thallium, Total	ND	11.6	10	86		-	75-125	-	35
Vanadium, Total	8.1	48.5	54	94		-	75-125	-	35

### Matrix Spike Analysis Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG637410-4 QC Sample: L1318142-43 Client ID: MS Sample									
Zinc, Total	1800	48.5	960	0	Q	-	75-125	-	35
Total Metals - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG637778-4 QC Sample: L1318158-03 Client ID: MS Sample									
Mercury, Total	0.72	0.192	0.77	26	Q	-	70-130	-	35
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG638031-4 QC Sample: L1318158-03 Client ID: MS Sample									
Mercury, TCLP	ND	0.025	0.0263	105	-	-	70-130	-	20

## Lab Duplicate Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318166

Report Date: 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG637383-3 QC Sample: L1318339-01 Client ID: DUP Sample						
Lead, TCLP	0.14J	0.15J	mg/l	NC		20

## Lab Duplicate Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318166

Report Date: 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG637410-3 QC Sample: L1318142-43 Client ID: DUP Sample					
Aluminum, Total	1500	1400	mg/kg	7	35
Antimony, Total	4.4J	4.0J	mg/kg	NC	35
Arsenic, Total	12.	15	mg/kg	14	35
Barium, Total	360	380	mg/kg	3	35
Beryllium, Total	0.22J	0.25J	mg/kg	NC	35
Cadmium, Total	4.5	3.0	mg/kg	42	35
Calcium, Total	620	570	mg/kg	10	35
Chromium, Total	14.	14	mg/kg	7	35
Cobalt, Total	3.4	3.2	mg/kg	6	35
Copper, Total	130	140	mg/kg	0	35
Iron, Total	5800	5200	mg/kg	13	35
Lead, Total	420	370	mg/kg	15	35
Magnesium, Total	290	320	mg/kg	6	35
Manganese, Total	56.	57	mg/kg	2	35
Nickel, Total	15.	14	mg/kg	7	35
Potassium, Total	220J	210J	mg/kg	NC	35
Selenium, Total	6.1	5.1	mg/kg	19	35
Silver, Total	0.26J	0.29J	mg/kg	NC	35
Sodium, Total	120J	150J	mg/kg	NC	35

## Lab Duplicate Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318166

Report Date: 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
<b>Total Metals - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG637410-3 QC Sample: L1318142-43 Client ID: DUP Sample</b>					
Thallium, Total	ND	ND	mg/kg	NC	35
Vanadium, Total	8.1	9.8	mg/kg	17	35
Zinc, Total	1800	1300	mg/kg	32	35
<b>Total Metals - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG637778-3 QC Sample: L1318158-03 Client ID: DUP Sample</b>					
Mercury, Total	0.72	0.69	mg/kg	4	35
<b>TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG638031-3 QC Sample: L1318158-03 Client ID: DUP Sample</b>					
Mercury, TCLP	ND	ND	mg/l	NC	20

# **INORGANICS & MISCELLANEOUS**

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

### SAMPLE RESULTS

**Lab ID:** L1318166-02  
**Client ID:** CSO\_COMP-02\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 10:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

Parameter	Result	Date Analyzed	Analytical Method	Analyst
Ignitability of Solids - Westborough Lab				
Ignitability	NI	09/19/13 08:33	1,1030	DM



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

### SAMPLE RESULTS

**Lab ID:** L1318166-03  
**Client ID:** CSO\_COMP-03\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 11:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

Parameter	Result	Date Analyzed	Analytical Method	Analyst
Ignitability of Solids - Westborough Lab				
Ignitability	NI	09/19/13 08:33	1,1030	DM



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

### SAMPLE RESULTS

**Lab ID:** L1318166-05  
**Client ID:** CSO\_COMP-04\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 11:55  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

Parameter	Result	Date Analyzed	Analytical Method	Analyst
Ignitability of Solids - Westborough Lab				
Ignitability	NI	09/19/13 08:33	1,1030	DM



Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-01  
 Client ID: CSO\_SB-02B\_5-5.5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil

Date Collected: 09/14/13 09:40  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.4		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

**Lab ID:** L1318166-02  
**Client ID:** CSO\_COMP-02\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 10:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Chromium, Trivalent	25		mg/kg	0.91	0.91	1	-	09/23/13 11:29	107,-	JO
Solids, Total	88.2		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT
Cyanide, Total	ND		mg/kg	1.1	0.26	1	09/17/13 11:20	09/18/13 14:51	1,9010C/9012A	JO
pH (H)	10		SU	-	NA	1	-	09/14/13 21:00	1,9045D	EL
Chromium, Hexavalent	ND		mg/kg	0.91	0.20	1	09/16/13 22:00	09/18/13 00:30	1,7196A	JT
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:07	1,7.3	TL
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:00	1,7.3	TL



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

**Lab ID:** L1318166-03  
**Client ID:** CSO\_COMP-03\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 11:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Chromium, Trivalent	14		mg/kg	1.1	1.1	1	-	09/23/13 11:29	107,-	JO
Solids, Total	74.0		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT
Cyanide, Total	ND		mg/kg	1.3	0.31	1	09/18/13 10:00	09/18/13 15:20	1,9010C/9012A	JO
pH (H)	8.4		SU	-	NA	1	-	09/14/13 21:00	1,9045D	EL
Chromium, Hexavalent	ND		mg/kg	1.1	0.24	1	09/16/13 22:00	09/18/13 00:31	1,7196A	JT
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:07	1,7.3	TL
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:00	1,7.3	TL



Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-04  
 Client ID: CSO\_SB-03A\_8.5-9  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil

Date Collected: 09/14/13 10:50  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.5		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

**Lab ID:** L1318166-05  
**Client ID:** CSO\_COMP-04\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 11:55  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Chromium, Trivalent	18		mg/kg	0.95	0.95	1	-	09/23/13 11:29	107,-	JO
Solids, Total	83.9		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT
Cyanide, Total	ND		mg/kg	1.2	0.27	1	09/18/13 10:00	09/18/13 15:21	1,9010C/9012A	JO
pH (H)	7.9		SU	-	NA	1	-	09/14/13 21:00	1,9045D	EL
Chromium, Hexavalent	ND		mg/kg	0.95	0.21	1	09/16/13 22:00	09/18/13 00:31	1,7196A	JT
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:08	1,7.3	TL
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:00	1,7.3	TL



Project Name: GREENPOINT LANDING

Lab Number: L1318166

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318166-07  
 Client ID: CSO\_SB-04B\_6.5-7.0  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil

Date Collected: 09/14/13 11:45  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.4		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 02-03,05 Batch: WG636553-1									
Chromium, Hexavalent	ND	mg/kg	0.80	0.18	1	09/16/13 22:00	09/18/13 00:21	1,7196A	JT
General Chemistry - Westborough Lab for sample(s): 02 Batch: WG636702-1									
Cyanide, Total	ND	mg/kg	0.94	0.22	1	09/17/13 11:20	09/18/13 14:38	1,9010C/9012A	JO
General Chemistry - Westborough Lab for sample(s): 02-03,05 Batch: WG636888-1									
Cyanide, Reactive	ND	mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:06	1,7.3	TL
General Chemistry - Westborough Lab for sample(s): 02-03,05 Batch: WG636890-1									
Sulfide, Reactive	ND	mg/kg	10	10.	1	09/17/13 21:00	09/17/13 23:59	1,7.3	TL
General Chemistry - Westborough Lab for sample(s): 03,05 Batch: WG637047-1									
Cyanide, Total	ND	mg/kg	0.91	0.21	1	09/18/13 10:00	09/18/13 14:57	1,9010C/9012A	JO

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318166

Report Date: 09/24/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
General Chemistry - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636188-1								
pH	100		-		99-101	-		
General Chemistry - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636553-2								
Chromium, Hexavalent	103		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 02 Batch: WG636702-2 WG636702-3								
Cyanide, Total	104		105		80-120	1		35
General Chemistry - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636888-2								
Cyanide, Reactive	43		-		30-125	-		40
General Chemistry - Westborough Lab Associated sample(s): 02-03,05 Batch: WG636890-2								
Sulfide, Reactive	89		-		60-125	-		40
General Chemistry - Westborough Lab Associated sample(s): 03,05 Batch: WG637047-2 WG637047-3								
Cyanide, Total	103		104		80-120	1		35

### Matrix Spike Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Lab Number:** L1318166

**Project Number:** 170229002

**Report Date:** 09/24/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD	RPD Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 02-03,05 QC Batch ID: WG636553-5 QC Sample: L1318159-04 Client ID: MS Sample												
Chromium, Hexavalent	ND	1310	1200	92		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG636702-4 WG636702-5 QC Sample: L1318164-03 Client ID: MS Sample												
Cyanide, Total	ND	11	11	97		11	99		65-135	0		35
General Chemistry - Westborough Lab Associated sample(s): 03,05 QC Batch ID: WG637047-4 WG637047-5 QC Sample: L1318168-04 Client ID: MS Sample												
Cyanide, Total	ND	10	10	98		9.9	95		65-135	1		35

## Lab Duplicate Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318166

Report Date: 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 02-03,05 02_0-10	QC Batch ID: WG636188-2	QC Batch ID: WG636188-2	QC Sample: L1318166-02	Client ID: CSO_COMP-		
pH (H)	10.	10.0	SU	1		5
General Chemistry - Westborough Lab Associated sample(s): 02-03,05	QC Batch ID: WG636553-4	QC Batch ID: WG636553-4	QC Sample: L1318159-04	Client ID: DUP Sample		
Chromium, Hexavalent	ND	ND	mg/kg	NC		20
General Chemistry - Westborough Lab Associated sample(s): 02-03,05	QC Batch ID: WG636888-3	QC Batch ID: WG636888-3	QC Sample: L1318234-01	Client ID: DUP Sample		
Cyanide, Reactive	ND	ND	mg/kg	NC		40
General Chemistry - Westborough Lab Associated sample(s): 02-03,05	QC Batch ID: WG636890-3	QC Batch ID: WG636890-3	QC Sample: L1318234-01	Client ID: DUP Sample		
Sulfide, Reactive	ND	ND	mg/kg	NC		40
General Chemistry - Westborough Lab Associated sample(s): 01-05,07	QC Batch ID: WG636931-1	QC Batch ID: WG636931-1	QC Sample: L1318141-01	Client ID: DUP Sample		
Solids, Total	89.9	91.1	%	1		20

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

### Sample Receipt and Container Information

Were project specific reporting limits specified? YES

**Reagent H2O Preserved Vials Frozen on:** 09/14/2013 19:09

#### Cooler Information Custody Seal

##### Cooler

A Absent

#### Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318166-01A	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-01B	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-01C	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-01D	Plastic 2oz unpreserved for TS	A	N/A	3.5	Y	Absent	TS(7)
L1318166-01X	Vial MeOH preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)
L1318166-01Y	Vial Water preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)
L1318166-01Z	Vial Water preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)
L1318166-02A	Vial Large Septa unpreserved	A	N/A	3.5	Y	Absent	TPH-GRO(14)
L1318166-02B	Amber 500ml unpreserved	A	N/A	3.5	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)

\*Values in parentheses indicate holding time in days

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318166-02C	Amber 500ml unpreserved	A	N/A	3.5	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318166-02X	Plastic 250ml HNO3 preserved spl	A	<2	3.5	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)
L1318166-03A	Vial Large Septa unpreserved	A	N/A	3.5	Y	Absent	TPH-GRO(14)
L1318166-03B	Amber 500ml unpreserved	A	N/A	3.5	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318166-03C	Amber 500ml unpreserved	A	N/A	3.5	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318166-03X	Plastic 250ml HNO3 preserved spl	A	<2	3.5	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)
L1318166-04A	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-04B	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-04C	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-04D	Plastic 2oz unpreserved for TS	A	N/A	3.5	Y	Absent	TS(7)
L1318166-04X	Vial MeOH preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)
L1318166-04Y	Vial Water preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)
L1318166-04Z	Vial Water preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)
L1318166-05A	Vial Large Septa unpreserved	A	N/A	3.5	Y	Absent	TPH-GRO(14)
L1318166-05B	Amber 500ml unpreserved	A	N/A	3.5	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318166-05C	Amber 500ml unpreserved	A	N/A	3.5	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318166-05X	Plastic 250ml HNO3 preserved spl	A	<2	3.5	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)
L1318166-06A	Vial HCl preserved	A	N/A	3.5	Y	Absent	NYTCL-8260(14)
L1318166-06B	Vial HCl preserved	A	N/A	3.5	Y	Absent	NYTCL-8260(14)
L1318166-07A	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-07B	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-07C	5 gram Encore Sampler	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(2)
L1318166-07D	Plastic 2oz unpreserved for TS	A	N/A	3.5	Y	Absent	TS(7)
L1318166-07X	Vial MeOH preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)
L1318166-07Y	Vial Water preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)
L1318166-07Z	Vial Water preserved split	A	N/A	3.5	Y	Absent	NYTCL-8260HLW(14)

**Container Comments**

L1318166-02C

L1318166-03B

L1318166-03C

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.

Report Format: DU Report with "J" Qualifiers



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

**Data Qualifiers**

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with "J" Qualifiers



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318166  
**Report Date:** 09/24/13

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.
- 107 Alpha Analytical - In-house calculation method.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



**C** **A** **P** **S**  
Last revised August 29, 2013 - Westboro Facility

The following list includes only those analytes/methods for which certification/approval is currently held.  
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

**C** **P** **Certificate/Lab ID: PH-0574. NELAP Accredited Solid Waste/Soil.**

*Drinking Water (Inorganic Parameters:* Color, pH, Turbidity, Conductivity, Alkalinity, Chloride, Free Residual Chlorine, Fluoride, Calcium Hardness, Sulfate, Nitrate, Nitrite, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Silver, Sodium, Thallium, Zinc, Total Dissolved Solids, Total Organic Carbon, Total Cyanide, Perchlorate. *Organic Parameters:* Volatile Organics 524.2, Total Trihalomethanes 524.2, 1,2-Dibromo-3-chloropropane (DBCP) 504.1, Ethylene Dibromide (EDB) 504.1, 1,4-Dioxane (Mod 8270). *Microbiology Parameters:* Total Coliform-MF mEndo (SM9222B), Total Coliform – Colilert (SM9223, Enumeration and P/A), E. Coli. – Colilert (SM9223, Enumeration and P/A), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform-EC Medium (SM 9221E).

*Wastewater/Non-Potable Water (Inorganic Parameters:* Color, pH, Conductivity, Acidity, Alkalinity, Chloride, Total Residual Chlorine, Fluoride, Total Hardness, Silica, Sulfate, Sulfide, Ammonia, Kjeldahl Nitrogen, Nitrate, Nitrite, O-Phosphate, Total Phosphorus, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Dissolved Solids, Total Suspended Solids (non-filterable), BOD, CBOD, COD, TOC, Total Cyanide, Phenolics, Foaming Agents (MBAS), Bromide, Oil and Grease. *Organic Parameters:* PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables (Phenols), Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, Polynuclear Aromatic Hydrocarbons, Haloethers, Chlorinated Hydrocarbons, Volatile Organics, TPH (HEM/SGT), CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH. *Microbiology Parameters:* Total Coliform – MF mEndo (SM9222B), Total Coliform – MTF (SM9221B), E. Coli – Colilert (SM9223 Enumeration), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform – A-1 Broth (SM9221E), Enterococcus - Enterolert.

*Solid Waste/Soil (Inorganic Parameters:* pH, Sulfide, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Tin, Vanadium, Zinc, Total Cyanide, Ignitability, Phenolics, Corrosivity, TCLP Leach (1311), SPLP Leach (1312 metals only), Reactivity. *Organic Parameters:* PCBs, PCBs in Oil, Organochlorine Pesticides, Technical Chlordane, Toxaphene, CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH, Dicamba, 2,4-D, 2,4,5-T, 2,4,5-TP(Silvex), Dalapon, Volatile Organics (SW 8260), Acid Extractables (Phenols) (SW 8270), Benzidines (SW 8270), Phthalates (SW 8270), Nitrosamines (SW 8270), Nitroaromatics & Cyclic Ketones (SW 8270), PAHs (SW 8270), Haloethers (SW 8270), Chlorinated Hydrocarbons (SW 8270). )

**S** **Certificate/Lab ID: 003155. NELAP Accredited.**

*Drinking Water (Inorganic Parameters:* SM2120B, 2320B, 2510B, 2540C, SM4500CN-CE, 4500F-C, 4500H-B, 4500NO3-F, 5310C, EPA 200.7, 200.8, 245.1, 300.0. *Organic Parameters:* EPA 504.1, 524.2.)

*Wastewater/Non-Potable Water (Inorganic Parameters:* SM2120B, 2310B, 2320B, 2340B, 2510B, 2540B, 2540C, 2540D, SM4500CL-E, 4500CN-E, 4500F-C, 4500H-B, 4500NH3-H, 4500NO2-B, 4500NO3-F, 4500P-E, 4500S-D, 4500SO3-B, 5210B, 5220D, 5310C, 5540C, EPA 120.1, 1664A, 200.7, 200.8, 245.1, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1. *Organic Parameters:* EPA 608, 624, 625.)

*Hazardous and Solid Waste (Inorganic Parameters:* EPA 1010A, 1030, 1311, 1312, 6010C, 6020A, 7196A, 7470A, 7471B, 9012B, 9014, 9038, 9040C, 9045D, 9050A, 9065, 9251. *Organic Parameters:* 8011 (NPW only), 8015C, 8081B, 8082A, 8151A, 8260C, 8270D, 8315A, 8330.)

**M** **S** **Certificate/Lab ID: 2009024.**

*Drinking Water (Inorganic Parameters:* SM9215B, 9222D, 9223B, EPA 180.1, 353.2, SM2120B, 2130B, 2320B, 2510C, 2540C, 4500CI-D, 4500CN-C, 4500CN-E, 4500F-C, 4500H+B, 4500NO3-F, 5310C, EPA 200.7, EPA 200.8, 245.1, EPA 300.0. *Organic Parameters:* 504.1, 524.2.)

*Wastewater/Non-Potable Water (Inorganic Parameters:* EPA 120.1, 1664A, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1, 8315A, 9010C, SM2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 426C, 4500CI-E, 4500CN-C, 4500CN-E, 4500F-B, 4500F-C, 4500H+B, 4500Norg-C, 4500NH3-B, 4500NH3-H, 4500NO2-B, 4500NO3-F, 4500P-B, 4500P-E, 4500S2-D, 4500SO3-B, 5540C, 5210B, 5220D, 5310C, 9010B, 9030B, 9040C, 7470A, 7196A, 2340B, EPA 200.7, 6010C, 200.8, 6020A, 245.1, 1311, 1312, 3005A, Enterolert, 9223B, 9222D. *Organic Parameters:* 608, 624, 625, 8011, 8081B, 8082A, 8330, 8151A, 8260C, 8270D, 3510C, 3630C, 5030B, ME-DRO, ME-GRO, MA-EPH, MA-VPH.)

*Solid Waste/Soil (Inorganic Parameters:* 9010B, 9012A, 9014, 9040B, 9045C, 6010C, 6020A, 7471B, 7196A, 9050A, 1010, 1030, 9065, 1311, 1312, 3005A, 3050B, 9038, 9251. Organic Parameters: ME-DRO, ME-GRO, MA-EPH, MA-VPH, 8260C, 8270D, 8330, 8151A, 8081B, 8082A, 3540C, 3546, 3580A, 3620C, 3630C, 5030B, 5035.)

**M** Certificate/Lab ID: M-MA086.

*Drinking Water (Inorganic Parameters:* (EPA 200.8 for: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl) (EPA 200.7 for: Ba,Be,Ca,Cd,Cr,Cu,Na,Ni) 245.1, (300.0 for: Nitrate-N, Fluoride, Sulfate); (EPA 353.2 for: Nitrate-N, Nitrite-N); (SM4500NO3-F for: Nitrate-N and Nitrite-N); 4500F-C, 4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, 2320B, SM2540C, SM4500H-B. Organic Parameters: (EPA 524.2 for: Trihalomethanes, Volatile Organics); (504.1 for: 1,2-Dibromoethane, 1,2-Dibromo-3-Chloropropane), EPA 332. Microbiology Parameters: SM9215B; ENZ. SUB. SM9223; ColilertQT SM9223B; MF-SM9222D.)

*Non-Potable Water (Inorganic Parameters:* (EPA 200.8 for: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn); (EPA 200.7 for: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn); 245.1, SM4500H,B, EPA 120.1, SM2510B, 2540C, 2340B, 2320B, 4500CL-E, 4500F-BC, 426C, SM4500NH3-BH, (EPA 350.1 for: Ammonia-N), LACHAT 10-107-06-1-B for Ammonia-N, SM4500NO3-F, 353.2 for Nitrate-N, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, 4500P-B,E, 5220D, EPA 410.4, SM 5210B, 5310C, 4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.

Organic Parameters: (EPA 624 for Volatile Halocarbons, Volatile Aromatics),(608 for: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT,Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs-Water), (EPA 625 for SVOC Acid Extractables and SVOC Base/Neutral Extractables), 600/4-81-045-PCB-Oil. Microbiology Parameters: (ColilertQT SM9223B; Enterolert-QT: SM9222D-MF.)

**N** Certificate/Lab ID: 200307. **NELAP Accredited.**

*Drinking Water (Inorganic Parameters:* SM 9222B, 9223B, 9215B, EPA 200.7, 200.8, 300.0, SM4500CN-E, 4500H+B, 4500NO3-F, 2320B, 2510B, 2540C, 4500F-C, 5310C, 2120B, EPA 332.0. Organic Parameters: 504.1, 524.2.)

*Non-Potable Water (Inorganic Parameters:* SM9222D, 9221B, 9222B, 9221E-EC, EPA 3005A, 200.7, 200.8, 245.1, SW-846 6010C, 6020A, 7196A, 7470A, SM3500-CR-D, EPA 120.1, 300.0, 350.1, 350.2, 351.1, 353.2, 410.4, 420.1, 426C, 1664A, SW-846 9010B, 9010C, 9030, 9040B, 9040C, SM2120B, 2310B, 2320B, 2340B, 2540B, 2540D, 4500H+B, 4500CL-E, 4500CN-E, 4500NH3-H, 4500NO3-F, 4500NO2-B, 4500P-E, 4500-S2-D, 4500SO3-B, 5210B, 5220D, 2510B, 2540C, 4500F-C, 5310C, 5540C, LACHAT 10-204-00-1-A, LACHAT 10-107-06-2-D, 3060A. Organic Parameters: SW-846 3510C, 3630C, 5030B, 8260C, 8270D, 8330, EPA 624, 625, 608, SW-846 8082A, 8081B, 8015C, 8151A, 8330, 8270D-SIM.)

*Solid & Chemical Materials (Inorganic Parameters:* SW-846 6010C, 6020A, 7196A, 7471B, 1010, 1010A, 1030, 9010C, 9012B, 9014, 9030B, 9040C, 9045C, 9045D, 9050, 9065, 9251, 1311, 1312, 3005A, 3050B, 3060A. Organic Parameters: SW-846 3540C, 3546, 3050B, 3580A, 3620D, 3630C, 5030B, 5035, 8260C, 8270D, 8270D-SIM, 8330, 8151A, 8015B, 8015C, 8082A, 8081B.)

**N** Certificate/Lab ID: 2064. **NELAP Accredited.**

*Drinking Water (Organic Parameters:* EPA Di-isopropyl ether (DIPE), Ethyl-t-butyl ether (ETBE), Tert-amyl methyl ether (TAME)).

*Non-Potable Water (Organic Parameters:* EPA 1,3,5-Trichlorobenzene. EPA CMTPH.)

*Solid & Chemical Materials (Organic Parameters:* EPA 1,3,5-Trichlorobenzene.)

**N** Certificate/Lab ID: MA935. **NELAP Accredited.**

*Drinking Water (Inorganic Parameters:* SM9222B, 9221E, 9223B, 9215B, 4500CN-CE, 4500NO3-F, 4500F-C, EPA 300.0, 200.7, 200.8, 245.1, 2540C, SM2120B, 2320B, 2510B, 5310C, SM4500H-B. Organic Parameters: EPA 332, 504.1, 524.2.)

*Non-Potable Water (Inorganic Parameters:* SM5210B, EPA 410.4, SM5220D, 4500CI-E, EPA 300.0, SM2120B, 2340B, SM4500F-BC, EPA 200.7, 200.8, 351.1, LACHAT 10-107-06-2-D, EPA 353.2, SM4500NO3-F, 4500NO2-B, EPA 1664A, SM5310B, C or D, 4500-PE, EPA 420.1, SM510ABC, SM4500P-B5+E, 2540B, 2540C, 2540D, EPA 120.1, SM2510B, SM15 426C, 9222D, 9221B, 9221C, 9221E, 9222B, 9215B, 2310B, 2320B, 4500NH3-H, 4500-S D, EPA 350.1, 350.2, SW-846 1312, 7470A, 5540C, SM4500H-B, 4500SO3-B, SM3500Cr-D, 4500CN-CE, EPA 245.1, SW-846 9040B, 9040C, 3005A, 3015, EPA 6010B, 6010C, 6020, 6020A, 7196A, 3060A, SW-846 9010C, 9030B. Organic Parameters: SW-846 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3510C, EPA 608, 624, 625, SW-846 3630C, 5030B, 8011, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 1,4-Dioxane by NJ Modified 8270, 8015B, NJ EPH.)



9030B, 9040C. Organic Parameters: EPA 3510C, 3630C, 5030B, 8260B, 608, 624, 625, 8011, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, )

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010A, 1030, 3060A, 3050B, 1311, 1312, 6010B, 6010C, 6020, , 7196A, 7471A, 7471B, 6020A, 9010C, 9012B, 9030B, 9014, 9038, 9040C, 9045D, 9251, 9050A, 9065. Organic Parameters: EPA 5030B, 5035, 3540C, 3546, 3550B, 3580A, 3620C, 3630C, 6020A, 8260B, 8260C, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330.)

LA Certificate/Lab ID: L2217.

Drinking Water (Inorganic Parameters: SM 4500H-B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: EPA 200.7, 200.8, 6010C, 6020A, 245.1, 7470A, 9040B, 9010B, 180.1, 300.0, 332.0, 6860, 351.1, 353.2, 9060, 1664A, SM 4500CN-E, 4500H-B, 4500Norg-C, 4500NO3-F, 5310C, 2130B, 2320B, 2340B, 2540C, 5540C, 3005A, 3015, 9056, 7196A, 3500-Cr-D. Organic Parameters: EPA 8015C, 8151A, 8260C, 8270D, 8270D-SIM, 8330A, 8082A, 8081B, 3510C, 5030B, MassDEP EPH, MassDEP VPH.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 200.7, 6010C, 6020A, 7471A, 6860, 1311, 1312, 3050B, 7196A, 9040B, 9045C, 9010C, 9012B, 9251, SM3500-CR-D, 4500CN-CE, 2540G, Organic Parameters: EPA 8015C, 8151A, 8260C, 8270D, 8270D-SIM, 8330A/B-prep, 8082A, 8081B, 3540C, 3546, 3580A, 5035A, MassDEP EPH, MassDEP VPH.)

NELAP TNI S A d

EPA Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether. EPA 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene. EPA N Iodomethane (methyl iodide), Methyl methacrylate. EPA S Tert-amyl methyl ether (TAME), Diisopropyl ether (DIPE), Azobenzene. EPA A PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT. EPA C Methyl naphthalene, Dimethyl naphthalene, Total Methylnaphthalenes, Total Dimethylnaphthalenes, 1,4-Diphenylhydrazine. EPA 4-Chloroaniline, 4-Methylphenol. Total Phosphorus in a soil matrix, TKN in a soil matrix, NO2 in a soil matrix, NO3 in a soil matrix. EPA Total Petroleum Hydrocarbons, Oil & Grease.



# CHAIN OF CUSTODY

PAGE 1 OF 1

WESTBORO, MA  
TEL: 508-898-9220  
FAX: 508-898-9193

MANSFIELD, MA  
TEL: 508-822-9300  
FAX: 508-822-3288

### Client Information

Client: Langan, D.P.C.  
Address: 360 W 31st St. 8th floor  
New York, NY 10001  
Phone: 212-479-5400  
Fax: 212-479-5444  
Email: GWYKA@LANGAN.COM

### Project Information

Project Name: Greenpoint Landing  
Project Location: Brooklyn, NY  
Project #: 170229002  
Project Manager: Mimi Raygorodetsky  
ALPHA Quote #: 2013963

### Report Information - Data Deliverables

FAX  EMAIL  
 CD/EX  Add'l Deliverables

### Billing Information

Same as Client info PO #:

These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:  
1) Report TCL and Part 375 Parameters 2) Provide Category A data deliverables 3) Provide NYSDEC EDP

### Turn-Around Time

Standard  RUSH (only confirmed if pre-approved)

Date Due: 9/23/13 Time:

### Regulatory Requirements/Report Limits

State/Fed Program: NYSDEC Criteria: 6 NYCRR, 375 Unrestricted use SCDs

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials	ANALYSIS					Sample Specific Comments	TOTAL # BOTTLES	
		Date	Time			VOC	SVOC	PCB	PH	TPH			OPD
	<del>CSO-SB-02C-(5-5.5)</del>	<u>9/14/13</u>	<u>9:14</u>	<u>SOI</u>									
<u>18/66-1</u>	<u>CSO-SB-02B-(5-5.5)</u>	<u>9/14/13</u>	<u>9:40</u>	<u>SOI</u>	X	X	X	X	X	X		<u>CSO_SB-02B_5-5.5</u>	<u>4</u>
<u>2</u>	<u>CSO-COMP-02-0-10</u>		<u>10:00</u>			X	X	X	X	X			<u>3</u>
<u>3</u>	<u>CSO-COMP-03-0-10</u>		<u>11:00</u>			X	X	X	X	X			<u>3</u>
<u>4</u>	<u>CSO-SB-03A-(8.5-9)</u>		<u>10:50</u>		X	X	X	X	X	X		<u>CSO_SB-03A_8.5-9</u>	<u>4</u>
<u>5</u>	<u>CSO-COMP-04-0-10</u>		<u>11:55</u>			X	X	X	X	X			<u>3</u>
	<del>CSO-SB-04A-(5.5-6)</del>												
<u>6</u>	<u>TRIP BLANK-091413</u>		<u>13:20</u>	<u>AO</u>						X		<u>TB01_091413</u>	<u>2</u>
<u>7</u>	<u>CSO-SB-04B-(5.5-6)</u>		<u>11:45</u>	<u>SOI</u>	X	X	X	X	X	X		<u>CSO_SB-04B_6.5-7</u>	<u>4</u>

*Handwritten notes:*  
ANALYSIS  
VOC  
TPH  
OPD  
SVOC  
PCB  
PH  
TPH  
OPD  
TPH  
OPD

### SAMPLE HANDLING

Filtration  
 Done  
 Not needed  
 Lab to do Preservation  
 Lab to do  
(Please specify below)

Container Type	
Preservative	

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Relinquished By:	Date/Time	Received By:	Date/Time
<u>Notasha Bell</u>	<u>1330 9/14/13</u>	<u>Abdul Matuly</u>	<u>9/14/13 1330</u>
<u>Abdul Matuly</u>	<u>9/14/13 1335</u>	<u>Tom Waack</u>	<u>9/14/13 1735</u>





## ANALYTICAL REPORT

Lab Number:	L1318167
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Mimi Raygorodetsky
Phone:	(212) 479-5400
Project Name:	GREENPOINT LANDING
Project Number:	170229002
Report Date:	09/24/13

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

---

Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>
L1318167-01	CSO_COMP-05_0-10	BROOKLYN, NY	09/14/13 13:05
L1318167-02	CSO_SB-05A_7.5-8.0	BROOKLYN, NY	09/14/13 13:00
L1318167-03	CSO_SB-06A_3.5-4	BROOKLYN, NY	09/14/13 13:15
L1318167-04	CSO_COMP-06_0-10	BROOKLYN, NY	09/14/13 13:15
L1318167-05	TB02_091413	BROOKLYN, NY	09/14/13 00:00

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

---

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

### Case Narrative (continued)

#### Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

#### Organochlorine Pesticides

L1318167-01 and -04 have elevated detection limits due to the dilutions required by the sample matrices.

#### Total Metals

L1318167-01 and -04 have elevated detection limits for all elements, with the exception of mercury, due to the dilutions required by matrix interferences encountered during analysis.

The WG637410-1 Method Blank, associated with L1318167-01 and -04, has a concentration above the reporting limit for calcium. Since the associated sample concentrations are greater than 10x the blank concentration for this analyte, no qualification of the results was performed.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Cynthia McQueen

Title: Technical Director/Representative

Date: 09/24/13

# ORGANICS

# VOLATILES

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-02  
 Client ID: CSO\_SB-05A\_7.5-8.0  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8260C  
 Analytical Date: 09/24/13 10:17  
 Analyst: BN  
 Percent Solids: 89%

Date Collected: 09/14/13 13:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	9.2	1.8	1
1,1-Dichloroethane	ND		ug/kg	1.4	0.16	1
Chloroform	ND		ug/kg	1.4	0.34	1
Carbon tetrachloride	ND		ug/kg	0.92	0.19	1
1,2-Dichloropropane	ND		ug/kg	3.2	0.21	1
Dibromochloromethane	ND		ug/kg	0.92	0.28	1
1,1,2-Trichloroethane	ND		ug/kg	1.4	0.28	1
Tetrachloroethene	ND		ug/kg	0.92	0.13	1
Chlorobenzene	ND		ug/kg	0.92	0.32	1
Trichlorofluoromethane	ND		ug/kg	4.6	0.11	1
1,2-Dichloroethane	ND		ug/kg	0.92	0.14	1
1,1,1-Trichloroethane	ND		ug/kg	0.92	0.10	1
Bromodichloromethane	ND		ug/kg	0.92	0.21	1
trans-1,3-Dichloropropene	ND		ug/kg	0.92	0.11	1
cis-1,3-Dichloropropene	ND		ug/kg	0.92	0.12	1
1,1-Dichloropropene	ND		ug/kg	4.6	0.42	1
Bromoform	ND		ug/kg	3.7	0.38	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.92	0.16	1
Benzene	ND		ug/kg	0.92	0.11	1
Toluene	ND		ug/kg	1.4	0.10	1
Ethylbenzene	ND		ug/kg	0.92	0.14	1
Chloromethane	ND		ug/kg	4.6	0.72	1
Bromomethane	ND		ug/kg	1.8	0.31	1
Vinyl chloride	ND		ug/kg	1.8	0.13	1
Chloroethane	ND		ug/kg	1.8	0.29	1
1,1-Dichloroethene	ND		ug/kg	0.92	0.19	1
trans-1,2-Dichloroethene	ND		ug/kg	1.4	0.20	1
Trichloroethene	ND		ug/kg	0.92	0.14	1
1,2-Dichlorobenzene	ND		ug/kg	4.6	0.17	1
1,3-Dichlorobenzene	ND		ug/kg	4.6	0.17	1
1,4-Dichlorobenzene	ND		ug/kg	4.6	0.22	1

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318167-02  
 Client ID: CSO\_SB-05A\_7.5-8.0  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 13:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Methyl tert butyl ether	ND		ug/kg	1.8	0.10	1
p/m-Xylene	ND		ug/kg	1.8	0.30	1
o-Xylene	ND		ug/kg	1.8	0.25	1
cis-1,2-Dichloroethene	ND		ug/kg	0.92	0.14	1
Dibromomethane	ND		ug/kg	9.2	0.15	1
Styrene	ND		ug/kg	1.8	0.28	1
Dichlorodifluoromethane	ND		ug/kg	9.2	0.20	1
Acetone	6.5	J	ug/kg	9.2	2.9	1
Carbon disulfide	ND		ug/kg	9.2	1.8	1
2-Butanone	ND		ug/kg	9.2	0.33	1
Vinyl acetate	ND		ug/kg	9.2	0.44	1
4-Methyl-2-pentanone	ND		ug/kg	9.2	0.22	1
1,2,3-Trichloropropane	ND		ug/kg	9.2	0.21	1
2-Hexanone	ND		ug/kg	9.2	0.17	1
Bromochloromethane	ND		ug/kg	4.6	0.18	1
2,2-Dichloropropane	ND		ug/kg	4.6	0.21	1
1,2-Dibromoethane	ND		ug/kg	3.7	0.16	1
1,3-Dichloropropane	ND		ug/kg	4.6	0.16	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.92	0.29	1
Bromobenzene	ND		ug/kg	4.6	0.19	1
n-Butylbenzene	ND		ug/kg	0.92	0.18	1
sec-Butylbenzene	ND		ug/kg	0.92	0.19	1
tert-Butylbenzene	ND		ug/kg	4.6	0.52	1
o-Chlorotoluene	ND		ug/kg	4.6	0.15	1
p-Chlorotoluene	ND		ug/kg	4.6	0.14	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	4.6	0.73	1
Hexachlorobutadiene	ND		ug/kg	4.6	0.39	1
Isopropylbenzene	ND		ug/kg	0.92	0.15	1
p-Isopropyltoluene	ND		ug/kg	0.92	0.18	1
Naphthalene	ND		ug/kg	4.6	0.71	1
Acrylonitrile	ND		ug/kg	9.2	0.22	1
n-Propylbenzene	ND		ug/kg	0.92	0.12	1
1,2,3-Trichlorobenzene	ND		ug/kg	4.6	0.16	1
1,2,4-Trichlorobenzene	ND		ug/kg	4.6	0.73	1
1,3,5-Trimethylbenzene	ND		ug/kg	4.6	0.13	1
1,2,4-Trimethylbenzene	ND		ug/kg	4.6	0.53	1
Methyl Acetate	ND		ug/kg	18	0.70	1
Cyclohexane	ND		ug/kg	18	0.99	1
1,4-Dioxane	ND		ug/kg	92	16.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318167-02  
 Client ID: CSO\_SB-05A\_7.5-8.0  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 13:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Freon-113	ND		ug/kg	18	0.25	1
p-Diethylbenzene	ND		ug/kg	3.7	0.15	1
p-Ethyltoluene	ND		ug/kg	3.7	0.11	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	3.7	0.12	1
Ethyl ether	ND		ug/kg	4.6	0.24	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	4.6	0.41	1
Methyl cyclohexane	ND		ug/kg	3.7	1.2	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	100		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318167-03  
**Client ID:** CSO\_SB-06A\_3.5-4  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/23/13 13:01  
**Analyst:** BN  
**Percent Solids:** 87%

**Date Collected:** 09/14/13 13:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	640	130	1
1,1-Dichloroethane	ND		ug/kg	96	11.	1
Chloroform	ND		ug/kg	96	24.	1
Carbon tetrachloride	ND		ug/kg	64	13.	1
1,2-Dichloropropane	ND		ug/kg	220	15.	1
Dibromochloromethane	ND		ug/kg	64	20.	1
1,1,2-Trichloroethane	ND		ug/kg	96	19.	1
Tetrachloroethene	29	J	ug/kg	64	9.0	1
Chlorobenzene	ND		ug/kg	64	22.	1
Trichlorofluoromethane	ND		ug/kg	320	7.8	1
1,2-Dichloroethane	ND		ug/kg	64	9.3	1
1,1,1-Trichloroethane	ND		ug/kg	64	7.1	1
Bromodichloromethane	ND		ug/kg	64	15.	1
trans-1,3-Dichloropropene	ND		ug/kg	64	7.7	1
cis-1,3-Dichloropropene	ND		ug/kg	64	8.1	1
1,1-Dichloropropene	ND		ug/kg	320	29.	1
Bromoform	ND		ug/kg	260	26.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	64	11.	1
Benzene	ND		ug/kg	64	7.5	1
Toluene	27	J	ug/kg	96	7.2	1
Ethylbenzene	ND		ug/kg	64	9.4	1
Chloromethane	ND		ug/kg	320	50.	1
Bromomethane	ND		ug/kg	130	22.	1
Vinyl chloride	ND		ug/kg	130	9.0	1
Chloroethane	ND		ug/kg	130	20.	1
1,1-Dichloroethene	ND		ug/kg	64	13.	1
trans-1,2-Dichloroethene	ND		ug/kg	96	14.	1
Trichloroethene	1500		ug/kg	64	9.7	1
1,2-Dichlorobenzene	ND		ug/kg	320	12.	1
1,3-Dichlorobenzene	ND		ug/kg	320	12.	1
1,4-Dichlorobenzene	ND		ug/kg	320	15.	1

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318167-03  
 Client ID: CSO\_SB-06A\_3.5-4  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Methyl tert butyl ether	ND		ug/kg	130	6.7	1
p/m-Xylene	24	J	ug/kg	130	21.	1
o-Xylene	ND		ug/kg	130	17.	1
cis-1,2-Dichloroethene	ND		ug/kg	64	9.6	1
Dibromomethane	ND		ug/kg	640	10.	1
Styrene	ND		ug/kg	130	20.	1
Dichlorodifluoromethane	ND		ug/kg	640	14.	1
Acetone	ND		ug/kg	640	200	1
Carbon disulfide	ND		ug/kg	640	130	1
2-Butanone	ND		ug/kg	640	23.	1
Vinyl acetate	ND		ug/kg	640	31.	1
4-Methyl-2-pentanone	ND		ug/kg	640	16.	1
1,2,3-Trichloropropane	ND		ug/kg	640	14.	1
2-Hexanone	ND		ug/kg	640	12.	1
Bromochloromethane	ND		ug/kg	320	12.	1
2,2-Dichloropropane	ND		ug/kg	320	14.	1
1,2-Dibromoethane	ND		ug/kg	260	11.	1
1,3-Dichloropropane	ND		ug/kg	320	11.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	64	20.	1
Bromobenzene	ND		ug/kg	320	13.	1
n-Butylbenzene	ND		ug/kg	64	13.	1
sec-Butylbenzene	ND		ug/kg	64	13.	1
tert-Butylbenzene	ND		ug/kg	320	36.	1
o-Chlorotoluene	ND		ug/kg	320	10.	1
p-Chlorotoluene	ND		ug/kg	320	9.8	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	320	50.	1
Hexachlorobutadiene	ND		ug/kg	320	27.	1
Isopropylbenzene	ND		ug/kg	64	11.	1
p-Isopropyltoluene	ND		ug/kg	64	12.	1
Naphthalene	680		ug/kg	320	49.	1
Acrylonitrile	ND		ug/kg	640	15.	1
n-Propylbenzene	ND		ug/kg	64	8.0	1
1,2,3-Trichlorobenzene	ND		ug/kg	320	11.	1
1,2,4-Trichlorobenzene	ND		ug/kg	320	50.	1
1,3,5-Trimethylbenzene	ND		ug/kg	320	9.2	1
1,2,4-Trimethylbenzene	ND		ug/kg	320	37.	1
Methyl Acetate	ND		ug/kg	1300	49.	1
Cyclohexane	ND		ug/kg	1300	69.	1
1,4-Dioxane	ND		ug/kg	6400	1100	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318167-03  
 Client ID: CSO\_SB-06A\_3.5-4  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Freon-113	ND		ug/kg	1300	17.	1
p-Diethylbenzene	ND		ug/kg	260	10.	1
p-Ethyltoluene	ND		ug/kg	260	7.5	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	260	8.3	1
Ethyl ether	ND		ug/kg	320	17.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	320	29.	1
Methyl cyclohexane	ND		ug/kg	260	81.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	96		70-130

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-05  
 Client ID: TB02\_091413  
 Sample Location: BROOKLYN, NY  
 Matrix: Water  
 Analytical Method: 1,8260C  
 Analytical Date: 09/20/13 18:57  
 Analyst: PD

Date Collected: 09/14/13 00:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.13	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.33	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.14	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Trichloroethene	ND		ug/l	0.50	0.17	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318167-05  
 Client ID: TB02\_091413  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 00:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	3.8	J	ug/l	5.0	1.0	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.0	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
Methyl Acetate	ND		ug/l	2.0	0.23	1
Cyclohexane	ND		ug/l	10	0.24	1
1,4-Dioxane	ND		ug/l	250	41.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318167-05  
 Client ID: TB02\_091413  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 00:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatiles Organics by GC/MS - Westborough Lab</b>						
Freon-113	ND		ug/l	2.5	0.70	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1
Methyl cyclohexane	ND		ug/l	10	0.29	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	126		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	90		70-130
Dibromofluoromethane	118		70-130

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/20/13 12:55  
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05 Batch: WG638014-3					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.13
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.33
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.14
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.17
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260C  
 Analytical Date: 09/20/13 12:55  
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05 Batch: WG638014-3					
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.0
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.0
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 09/20/13 12:55  
 Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05 Batch: WG638014-3					
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
Methyl Acetate	ND		ug/l	2.0	0.23
Cyclohexane	ND		ug/l	10	0.24
1,4-Dioxane	ND		ug/l	250	41.
Freon-113	ND		ug/l	2.5	0.70
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70
Methyl cyclohexane	ND		ug/l	10	0.29

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	100		70-130

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 09/23/13 09:30  
 Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 03 Batch: WG638377-3					
Methylene chloride	ND		ug/kg	500	100
1,1-Dichloroethane	ND		ug/kg	75	8.9
Chloroform	ND		ug/kg	75	18.
Carbon tetrachloride	ND		ug/kg	50	10.
1,2-Dichloropropane	ND		ug/kg	180	11.
Dibromochloromethane	ND		ug/kg	50	15.
1,1,2-Trichloroethane	ND		ug/kg	75	15.
Tetrachloroethene	ND		ug/kg	50	7.0
Chlorobenzene	ND		ug/kg	50	17.
Trichlorofluoromethane	ND		ug/kg	250	6.1
1,2-Dichloroethane	ND		ug/kg	50	7.3
1,1,1-Trichloroethane	ND		ug/kg	50	5.5
Bromodichloromethane	ND		ug/kg	50	11.
trans-1,3-Dichloropropene	ND		ug/kg	50	6.0
cis-1,3-Dichloropropene	ND		ug/kg	50	6.4
1,1-Dichloropropene	ND		ug/kg	250	23.
Bromoform	ND		ug/kg	200	21.
1,1,2,2-Tetrachloroethane	ND		ug/kg	50	8.5
Benzene	ND		ug/kg	50	5.9
Toluene	ND		ug/kg	75	5.6
Ethylbenzene	ND		ug/kg	50	7.4
Chloromethane	ND		ug/kg	250	39.
Bromomethane	ND		ug/kg	100	17.
Vinyl chloride	ND		ug/kg	100	7.1
Chloroethane	ND		ug/kg	100	16.
1,1-Dichloroethene	ND		ug/kg	50	10.
trans-1,2-Dichloroethene	ND		ug/kg	75	10.
Trichloroethene	ND		ug/kg	50	7.6
1,2-Dichlorobenzene	ND		ug/kg	250	9.2
1,3-Dichlorobenzene	ND		ug/kg	250	9.2
1,4-Dichlorobenzene	ND		ug/kg	250	12.

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/23/13 09:30  
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 03 Batch: WG638377-3					
Methyl tert butyl ether	ND		ug/kg	100	5.2
p/m-Xylene	ND		ug/kg	100	16.
o-Xylene	ND		ug/kg	100	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	7.5
Dibromomethane	ND		ug/kg	500	8.2
Styrene	ND		ug/kg	100	15.
Dichlorodifluoromethane	ND		ug/kg	500	11.
Acetone	ND		ug/kg	500	160
Carbon disulfide	ND		ug/kg	500	100
2-Butanone	ND		ug/kg	500	18.
Vinyl acetate	ND		ug/kg	500	24.
4-Methyl-2-pentanone	ND		ug/kg	500	12.
1,2,3-Trichloropropane	ND		ug/kg	500	11.
2-Hexanone	ND		ug/kg	500	9.4
Bromochloromethane	ND		ug/kg	250	9.8
2,2-Dichloropropane	ND		ug/kg	250	11.
1,2-Dibromoethane	ND		ug/kg	200	8.9
1,3-Dichloropropane	ND		ug/kg	250	8.6
1,1,1,2-Tetrachloroethane	ND		ug/kg	50	16.
Bromobenzene	ND		ug/kg	250	10.
n-Butylbenzene	ND		ug/kg	50	9.9
sec-Butylbenzene	ND		ug/kg	50	10.
tert-Butylbenzene	ND		ug/kg	250	28.
o-Chlorotoluene	ND		ug/kg	250	8.0
p-Chlorotoluene	ND		ug/kg	250	7.7
1,2-Dibromo-3-chloropropane	ND		ug/kg	250	39.
Hexachlorobutadiene	ND		ug/kg	250	21.
Isopropylbenzene	ND		ug/kg	50	8.4
p-Isopropyltoluene	ND		ug/kg	50	9.6
Naphthalene	ND		ug/kg	250	38.
Acrylonitrile	ND		ug/kg	500	12.

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 09/23/13 09:30  
 Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 03 Batch: WG638377-3					
n-Propylbenzene	ND		ug/kg	50	6.3
1,2,3-Trichlorobenzene	ND		ug/kg	250	8.4
1,2,4-Trichlorobenzene	ND		ug/kg	250	39.
1,3,5-Trimethylbenzene	ND		ug/kg	250	7.2
1,2,4-Trimethylbenzene	ND		ug/kg	250	29.
Methyl Acetate	ND		ug/kg	1000	38.
Cyclohexane	ND		ug/kg	1000	54.
1,4-Dioxane	ND		ug/kg	5000	870
Freon-113	ND		ug/kg	1000	14.
p-Diethylbenzene	ND		ug/kg	200	8.0
p-Ethyltoluene	ND		ug/kg	200	5.8
1,2,4,5-Tetramethylbenzene	ND		ug/kg	200	6.5
Ethyl ether	ND		ug/kg	250	13.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	22.
Methyl cyclohexane	ND		ug/kg	200	63.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	99		70-130

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260C  
 Analytical Date: 09/24/13 08:53  
 Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 02 Batch: WG638612-3					
Methylene chloride	ND		ug/kg	10	2.0
1,1-Dichloroethane	ND		ug/kg	1.5	0.18
Chloroform	ND		ug/kg	1.5	0.37
Carbon tetrachloride	ND		ug/kg	1.0	0.21
1,2-Dichloropropane	ND		ug/kg	3.5	0.23
Dibromochloromethane	ND		ug/kg	1.0	0.31
1,1,2-Trichloroethane	ND		ug/kg	1.5	0.30
Tetrachloroethene	ND		ug/kg	1.0	0.14
Chlorobenzene	ND		ug/kg	1.0	0.35
Trichlorofluoromethane	ND		ug/kg	5.0	0.12
1,2-Dichloroethane	ND		ug/kg	1.0	0.15
1,1,1-Trichloroethane	ND		ug/kg	1.0	0.11
Bromodichloromethane	ND		ug/kg	1.0	0.23
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.12
cis-1,3-Dichloropropene	ND		ug/kg	1.0	0.13
1,1-Dichloropropene	ND		ug/kg	5.0	0.46
Bromoform	ND		ug/kg	4.0	0.41
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.0	0.17
Benzene	ND		ug/kg	1.0	0.12
Toluene	ND		ug/kg	1.5	0.11
Ethylbenzene	ND		ug/kg	1.0	0.15
Chloromethane	ND		ug/kg	5.0	0.78
Bromomethane	ND		ug/kg	2.0	0.34
Vinyl chloride	ND		ug/kg	2.0	0.14
Chloroethane	ND		ug/kg	2.0	0.32
1,1-Dichloroethene	ND		ug/kg	1.0	0.20
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.21
Trichloroethene	ND		ug/kg	1.0	0.15
1,2-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,3-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,4-Dichlorobenzene	ND		ug/kg	5.0	0.24

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/24/13 08:53  
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 02 Batch: WG638612-3					
Methyl tert butyl ether	ND		ug/kg	2.0	0.10
p/m-Xylene	ND		ug/kg	2.0	0.32
o-Xylene	ND		ug/kg	2.0	0.27
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.15
Dibromomethane	ND		ug/kg	10	0.16
Styrene	ND		ug/kg	2.0	0.31
Dichlorodifluoromethane	ND		ug/kg	10	0.22
Acetone	ND		ug/kg	10	3.1
Carbon disulfide	ND		ug/kg	10	2.0
2-Butanone	ND		ug/kg	10	0.36
Vinyl acetate	ND		ug/kg	10	0.48
4-Methyl-2-pentanone	ND		ug/kg	10	0.24
1,2,3-Trichloropropane	ND		ug/kg	10	0.22
2-Hexanone	ND		ug/kg	10	0.19
Bromochloromethane	ND		ug/kg	5.0	0.20
2,2-Dichloropropane	ND		ug/kg	5.0	0.22
1,2-Dibromoethane	ND		ug/kg	4.0	0.18
1,3-Dichloropropane	ND		ug/kg	5.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.0	0.32
Bromobenzene	ND		ug/kg	5.0	0.21
n-Butylbenzene	ND		ug/kg	1.0	0.20
sec-Butylbenzene	ND		ug/kg	1.0	0.20
tert-Butylbenzene	ND		ug/kg	5.0	0.56
o-Chlorotoluene	ND		ug/kg	5.0	0.16
p-Chlorotoluene	ND		ug/kg	5.0	0.15
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	0.79
Hexachlorobutadiene	ND		ug/kg	5.0	0.42
Isopropylbenzene	ND		ug/kg	1.0	0.17
p-Isopropyltoluene	ND		ug/kg	1.0	0.19
Naphthalene	ND		ug/kg	5.0	0.77
Acrylonitrile	ND		ug/kg	10	0.24

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/24/13 08:53  
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 02 Batch: WG638612-3					
n-Propylbenzene	ND		ug/kg	1.0	0.12
1,2,3-Trichlorobenzene	ND		ug/kg	5.0	0.17
1,2,4-Trichlorobenzene	ND		ug/kg	5.0	0.79
1,3,5-Trimethylbenzene	ND		ug/kg	5.0	0.14
1,2,4-Trimethylbenzene	ND		ug/kg	5.0	0.57
Methyl Acetate	ND		ug/kg	20	0.76
Cyclohexane	ND		ug/kg	20	1.1
1,4-Dioxane	ND		ug/kg	100	17.
Freon-113	ND		ug/kg	20	0.27
p-Diethylbenzene	ND		ug/kg	4.0	0.16
p-Ethyltoluene	ND		ug/kg	4.0	0.12
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.0	0.13
Ethyl ether	ND		ug/kg	5.0	0.26
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	0.45
Methyl cyclohexane	ND		ug/kg	4.0	1.3

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	99		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG638014-1 WG638014-2								
Methylene chloride	108		108		70-130	0		20
1,1-Dichloroethane	115		117		70-130	2		20
Chloroform	114		117		70-130	3		20
2-Chloroethylvinyl ether	78		80		70-130	3		20
Carbon tetrachloride	118		125		63-132	6		20
1,2-Dichloropropane	114		115		70-130	1		20
Dibromochloromethane	111		114		63-130	3		20
1,1,2-Trichloroethane	110		112		70-130	2		20
Tetrachloroethene	112		116		70-130	4		20
Chlorobenzene	110		112		75-130	2		20
Trichlorofluoromethane	106		111		62-150	5		20
1,2-Dichloroethane	106		108		70-130	2		20
1,1,1-Trichloroethane	115		118		67-130	3		20
Bromodichloromethane	108		111		67-130	3		20
trans-1,3-Dichloropropene	111		113		70-130	2		20
cis-1,3-Dichloropropene	112		115		70-130	3		20
1,1-Dichloropropene	117		121		70-130	3		20
Bromoform	109		117		54-136	7		20
1,1,2,2-Tetrachloroethane	110		113		67-130	3		20
Benzene	117		121		70-130	3		20
Toluene	112		115		70-130	3		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG638014-1 WG638014-2								
Ethylbenzene	110		112		70-130	2		20
Chloromethane	89		87		64-130	2		20
Bromomethane	48		50		39-139	4		20
Vinyl chloride	98		102		55-140	4		20
Chloroethane	92		94		55-138	2		20
1,1-Dichloroethene	116		123		61-145	6		20
trans-1,2-Dichloroethene	119		122		70-130	2		20
Trichloroethene	115		118		70-130	3		20
1,2-Dichlorobenzene	109		110		70-130	1		20
1,3-Dichlorobenzene	111		113		70-130	2		20
1,4-Dichlorobenzene	107		109		70-130	2		20
Methyl tert butyl ether	119		120		63-130	1		20
p/m-Xylene	110		111		70-130	1		20
o-Xylene	108		110		70-130	2		20
cis-1,2-Dichloroethene	116		118		70-130	2		20
Dibromomethane	111		115		70-130	4		20
1,2,3-Trichloropropane	116		115		64-130	1		20
Acrylonitrile	122		125		70-130	2		20
Isopropyl Ether	114		116		70-130	2		20
Styrene	109		110		70-130	1		20
Dichlorodifluoromethane	86		86		36-147	0		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG638014-1 WG638014-2								
Acetone	143		133		58-148	7		20
Carbon disulfide	116		123		51-130	6		20
2-Butanone	127		124		63-138	2		20
Vinyl acetate	113		116		70-130	3		20
4-Methyl-2-pentanone	108		110		59-130	2		20
2-Hexanone	103		104		57-130	1		20
Bromochloromethane	121		124		70-130	2		20
2,2-Dichloropropane	116		124		63-133	7		20
1,2-Dibromoethane	108		110		70-130	2		20
1,3-Dichloropropane	110		112		70-130	2		20
1,1,1,2-Tetrachloroethane	112		114		64-130	2		20
Bromobenzene	104		110		70-130	6		20
n-Butylbenzene	105		107		53-136	2		20
sec-Butylbenzene	108		112		70-130	4		20
tert-Butylbenzene	106		110		70-130	4		20
o-Chlorotoluene	111		114		70-130	3		20
p-Chlorotoluene	106		110		70-130	4		20
1,2-Dibromo-3-chloropropane	102		100		41-144	2		20
Hexachlorobutadiene	107		108		63-130	1		20
Isopropylbenzene	105		110		70-130	5		20
p-Isopropyltoluene	109		113		70-130	4		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318167

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG638014-1 WG638014-2								
Naphthalene	106		105		70-130	1		20
n-Propylbenzene	104		110		69-130	6		20
1,2,3-Trichlorobenzene	104		102		70-130	2		20
1,2,4-Trichlorobenzene	106		104		70-130	2		20
1,3,5-Trimethylbenzene	108		111		64-130	3		20
1,2,4-Trimethylbenzene	104		108		70-130	4		20
Methyl Acetate	118		119		70-130	1		20
Ethyl Acetate	114		117		70-130	3		20
Cyclohexane	122		128		70-130	5		20
Ethyl-Tert-Butyl-Ether	115		115		70-130	0		20
Tertiary-Amyl Methyl Ether	113		114		66-130	1		20
1,4-Dioxane	160		152		56-162	5		20
Freon-113	124		129		70-130	4		20
p-Diethylbenzene	104		107		70-130	3		20
p-Ethyltoluene	106		110		70-130	4		20
1,2,4,5-Tetramethylbenzene	111		111		70-130	0		20
Ethyl ether	118		120		59-134	2		20
trans-1,4-Dichloro-2-butene	82		84		70-130	2		20
Methyl cyclohexane	117		122		70-130	4		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05 Batch: WG638014-1 WG638014-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	91		91		70-130
Toluene-d8	96		95		70-130
4-Bromofluorobenzene	92		94		70-130
Dibromofluoromethane	100		100		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03 Batch: WG638377-1 WG638377-2								
Methylene chloride	77		79		70-130	3		30
1,1-Dichloroethane	83		82		70-130	1		30
Chloroform	84		82		70-130	2		30
Carbon tetrachloride	89		86		70-130	3		30
1,2-Dichloropropane	84		84		70-130	0		30
Dibromochloromethane	91		92		70-130	1		30
1,1,2-Trichloroethane	91		90		70-130	1		30
Tetrachloroethene	95		93		70-130	2		30
Chlorobenzene	92		91		70-130	1		30
Trichlorofluoromethane	92		89		70-139	3		30
1,2-Dichloroethane	82		82		70-130	0		30
1,1,1-Trichloroethane	85		83		70-130	2		30
Bromodichloromethane	83		83		70-130	0		30
trans-1,3-Dichloropropene	88		89		70-130	1		30
cis-1,3-Dichloropropene	82		82		70-130	0		30
1,1-Dichloropropene	85		83		70-130	2		30
Bromoform	91		93		70-130	2		30
1,1,2,2-Tetrachloroethane	89		90		70-130	1		30
Benzene	85		84		70-130	1		30
Toluene	93		91		70-130	2		30
Ethylbenzene	92		91		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03 Batch: WG638377-1 WG638377-2								
Chloromethane	76		77		52-130	1		30
Bromomethane	98		95		57-147	3		30
Vinyl chloride	79		84		67-130	6		30
Chloroethane	94		95		50-151	1		30
1,1-Dichloroethene	80		82		65-135	2		30
trans-1,2-Dichloroethene	84		83		70-130	1		30
Trichloroethene	85		83		70-130	2		30
1,2-Dichlorobenzene	93		94		70-130	1		30
1,3-Dichlorobenzene	94		95		70-130	1		30
1,4-Dichlorobenzene	94		95		70-130	1		30
Methyl tert butyl ether	78		80		66-130	3		30
p/m-Xylene	94		94		70-130	0		30
o-Xylene	94		92		70-130	2		30
cis-1,2-Dichloroethene	84		83		70-130	1		30
Dibromomethane	83		84		70-130	1		30
Styrene	94		93		70-130	1		30
Dichlorodifluoromethane	51		52		30-146	2		30
Acetone	77		75		54-140	3		30
Carbon disulfide	77		76		59-130	1		30
2-Butanone	93		93		70-130	0		30
Vinyl acetate	78		79		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03 Batch: WG638377-1 WG638377-2								
4-Methyl-2-pentanone	77		80		70-130	4		30
1,2,3-Trichloropropane	90		91		68-130	1		30
2-Hexanone	88		87		70-130	1		30
Bromochloromethane	86		85		70-130	1		30
2,2-Dichloropropane	86		83		70-130	4		30
1,2-Dibromoethane	90		90		70-130	0		30
1,3-Dichloropropane	89		90		69-130	1		30
1,1,1,2-Tetrachloroethane	92		91		70-130	1		30
Bromobenzene	91		91		70-130	0		30
n-Butylbenzene	96		95		70-130	1		30
sec-Butylbenzene	95		94		70-130	1		30
tert-Butylbenzene	93		93		70-130	0		30
o-Chlorotoluene	94		94		70-130	0		30
p-Chlorotoluene	91		91		70-130	0		30
1,2-Dibromo-3-chloropropane	88		89		68-130	1		30
Hexachlorobutadiene	96		92		67-130	4		30
Isopropylbenzene	91		90		70-130	1		30
p-Isopropyltoluene	95		95		70-130	0		30
Naphthalene	85		90		70-130	6		30
Acrylonitrile	82		83		70-130	1		30
Isopropyl Ether	79		80		66-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03 Batch: WG638377-1 WG638377-2								
tert-Butyl Alcohol	82		86		70-130	5		30
n-Propylbenzene	92		91		70-130	1		30
1,2,3-Trichlorobenzene	91		92		70-130	1		30
1,2,4-Trichlorobenzene	92		94		70-130	2		30
1,3,5-Trimethylbenzene	94		93		70-130	1		30
1,2,4-Trimethylbenzene	95		94		70-130	1		30
Methyl Acetate	78		80		51-146	3		30
Ethyl Acetate	79		80		70-130	1		30
Acrolein	85		85		70-130	0		30
Cyclohexane	83		81		59-142	2		30
1,4-Dioxane	91		95		65-136	4		30
1,1,2-Trichloro-1,2,2-Trifluoroethane	85		83		50-139	2		30
1,4-Diethylbenzene	94		94		70-130	0		30
4-Ethyltoluene	93		92		70-130	1		30
1,2,4,5-Tetramethylbenzene	93		93		70-130	0		30
Tetrahydrofuran	92		79		66-130	15		30
Ethyl ether	70		86		67-130	21		30
trans-1,4-Dichloro-2-butene	87		90		70-130	3		30
Methyl cyclohexane	86		84		70-130	2		30
Ethyl-Tert-Butyl-Ether	80		80		70-130	0		30
Tertiary-Amyl Methyl Ether	82		82		70-130	0		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>%Recovery</i> Limits	<i>RPD</i>	<i>Qual</i>	<i>RPD</i> Limits
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Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 03 Batch: WG638377-1 WG638377-2

<i>Surrogate</i>	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>Acceptance</i> <i>Criteria</i>
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	104		103		70-130
4-Bromofluorobenzene	92		93		70-130
Dibromofluoromethane	100		99		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02 Batch: WG638612-1 WG638612-2								
Methylene chloride	86		91		70-130	6		30
1,1-Dichloroethane	91		97		70-130	6		30
Chloroform	92		97		70-130	5		30
Carbon tetrachloride	98		101		70-130	3		30
1,2-Dichloropropane	92		96		70-130	4		30
Dibromochloromethane	101		105		70-130	4		30
1,1,2-Trichloroethane	100		104		70-130	4		30
Tetrachloroethene	104		107		70-130	3		30
Chlorobenzene	101		104		70-130	3		30
Trichlorofluoromethane	105		111		70-139	6		30
1,2-Dichloroethane	92		94		70-130	2		30
1,1,1-Trichloroethane	94		98		70-130	4		30
Bromodichloromethane	92		95		70-130	3		30
trans-1,3-Dichloropropene	100		103		70-130	3		30
cis-1,3-Dichloropropene	92		95		70-130	3		30
1,1-Dichloropropene	94		98		70-130	4		30
Bromoform	103		105		70-130	2		30
1,1,2,2-Tetrachloroethane	99		102		70-130	3		30
Benzene	94		98		70-130	4		30
Toluene	101		104		70-130	3		30
Ethylbenzene	100		103		70-130	3		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02 Batch: WG638612-1 WG638612-2								
Chloromethane	88		101		52-130	14		30
Bromomethane	106		113		57-147	6		30
Vinyl chloride	100		107		67-130	7		30
Chloroethane	109		109		50-151	0		30
1,1-Dichloroethene	97		102		65-135	5		30
trans-1,2-Dichloroethene	94		100		70-130	6		30
Trichloroethene	94		98		70-130	4		30
1,2-Dichlorobenzene	102		106		70-130	4		30
1,3-Dichlorobenzene	103		107		70-130	4		30
1,4-Dichlorobenzene	102		106		70-130	4		30
Methyl tert butyl ether	90		94		66-130	4		30
p/m-Xylene	102		105		70-130	3		30
o-Xylene	102		105		70-130	3		30
cis-1,2-Dichloroethene	93		97		70-130	4		30
Dibromomethane	94		97		70-130	3		30
Styrene	103		107		70-130	4		30
Dichlorodifluoromethane	92		99		30-146	7		30
Acetone	90		80		54-140	12		30
Carbon disulfide	90		94		59-130	4		30
2-Butanone	112		102		70-130	9		30
Vinyl acetate	84		88		70-130	5		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02 Batch: WG638612-1 WG638612-2								
4-Methyl-2-pentanone	88		89		70-130	1		30
1,2,3-Trichloropropane	101		102		68-130	1		30
2-Hexanone	106		96		70-130	10		30
Bromochloromethane	96		100		70-130	4		30
2,2-Dichloropropane	96		99		70-130	3		30
1,2-Dibromoethane	101		104		70-130	3		30
1,3-Dichloropropane	99		102		69-130	3		30
1,1,1,2-Tetrachloroethane	102		106		70-130	4		30
Bromobenzene	100		104		70-130	4		30
n-Butylbenzene	102		105		70-130	3		30
sec-Butylbenzene	102		106		70-130	4		30
tert-Butylbenzene	102		105		70-130	3		30
o-Chlorotoluene	102		106		70-130	4		30
p-Chlorotoluene	100		104		70-130	4		30
1,2-Dibromo-3-chloropropane	97		100		68-130	3		30
Hexachlorobutadiene	101		104		67-130	3		30
Isopropylbenzene	100		103		70-130	3		30
p-Isopropyltoluene	103		106		70-130	3		30
Naphthalene	94		100		70-130	6		30
Acrylonitrile	89		92		70-130	3		30
Isopropyl Ether	88		93		66-130	6		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02 Batch: WG638612-1 WG638612-2								
tert-Butyl Alcohol	92		93		70-130	1		30
n-Propylbenzene	99		103		70-130	4		30
1,2,3-Trichlorobenzene	98		103		70-130	5		30
1,2,4-Trichlorobenzene	100		104		70-130	4		30
1,3,5-Trimethylbenzene	102		105		70-130	3		30
1,2,4-Trimethylbenzene	102		106		70-130	4		30
Methyl Acetate	90		92		51-146	2		30
Ethyl Acetate	89		90		70-130	1		30
Acrolein	91		93		70-130	2		30
Cyclohexane	92		95		59-142	3		30
1,4-Dioxane	84		88		65-136	5		30
1,1,2-Trichloro-1,2,2-Trifluoroethane	97		102		50-139	5		30
1,4-Diethylbenzene	103		107		70-130	4		30
4-Ethyltoluene	101		105		70-130	4		30
1,2,4,5-Tetramethylbenzene	101		105		70-130	4		30
Tetrahydrofuran	88		87		66-130	1		30
Ethyl ether	86		91		67-130	6		30
trans-1,4-Dichloro-2-butene	98		99		70-130	1		30
Methyl cyclohexane	95		97		70-130	2		30
Ethyl-Tert-Butyl-Ether	90		95		70-130	5		30
Tertiary-Amyl Methyl Ether	94		97		70-130	3		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02 Batch: WG638612-1 WG638612-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	96		95		70-130
Toluene-d8	104		103		70-130
4-Bromofluorobenzene	95		95		70-130
Dibromofluoromethane	98		99		70-130

# SEMIVOLATILES

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8270D  
 Analytical Date: 09/20/13 22:59  
 Analyst: PS  
 Percent Solids: 88%

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	820		ug/kg	150	38.	1
1,2,4-Trichlorobenzene	ND		ug/kg	190	61.	1
Hexachlorobenzene	ND		ug/kg	110	35.	1
Bis(2-chloroethyl)ether	ND		ug/kg	170	52.	1
2-Chloronaphthalene	ND		ug/kg	190	61.	1
1,2-Dichlorobenzene	ND		ug/kg	190	61.	1
1,3-Dichlorobenzene	ND		ug/kg	190	59.	1
1,4-Dichlorobenzene	ND		ug/kg	190	57.	1
3,3'-Dichlorobenzidine	ND		ug/kg	190	50.	1
2,4-Dinitrotoluene	ND		ug/kg	190	40.	1
2,6-Dinitrotoluene	ND		ug/kg	190	48.	1
Fluoranthene	6800		ug/kg	110	34.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	190	57.	1
4-Bromophenyl phenyl ether	ND		ug/kg	190	43.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	66.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	57.	1
Hexachlorobutadiene	ND		ug/kg	190	53.	1
Hexachlorocyclopentadiene	ND		ug/kg	540	120	1
Hexachloroethane	ND		ug/kg	150	34.	1
Isophorone	ND		ug/kg	170	50.	1
Naphthalene	1000		ug/kg	190	62.	1
Nitrobenzene	ND		ug/kg	170	44.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	150	39.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	190	56.	1
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	190	49.	1
Butyl benzyl phthalate	ND		ug/kg	190	36.	1
Di-n-butylphthalate	ND		ug/kg	190	36.	1
Di-n-octylphthalate	ND		ug/kg	190	46.	1
Diethyl phthalate	ND		ug/kg	190	40.	1
Dimethyl phthalate	ND		ug/kg	190	48.	1
Benzo(a)anthracene	3200		ug/kg	110	37.	1

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)pyrene	3300		ug/kg	150	46.	1
Benzo(b)fluoranthene	3900		ug/kg	110	38.	1
Benzo(k)fluoranthene	1500		ug/kg	110	36.	1
Chrysene	3100		ug/kg	110	37.	1
Acenaphthylene	640		ug/kg	150	35.	1
Anthracene	2000		ug/kg	110	31.	1
Benzo(ghi)perylene	2200		ug/kg	150	39.	1
Fluorene	890		ug/kg	190	54.	1
Phenanthrene	6100		ug/kg	110	37.	1
Dibenzo(a,h)anthracene	610		ug/kg	110	36.	1
Indeno(1,2,3-cd)Pyrene	2300		ug/kg	150	42.	1
Pyrene	5700		ug/kg	110	36.	1
Biphenyl	170	J	ug/kg	430	62.	1
4-Chloroaniline	ND		ug/kg	190	49.	1
2-Nitroaniline	ND		ug/kg	190	53.	1
3-Nitroaniline	ND		ug/kg	190	52.	1
4-Nitroaniline	ND		ug/kg	190	50.	1
Dibenzofuran	780		ug/kg	190	62.	1
2-Methylnaphthalene	490		ug/kg	220	60.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	190	58.	1
Acetophenone	ND		ug/kg	190	58.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	35.	1
P-Chloro-M-Cresol	ND		ug/kg	190	54.	1
2-Chlorophenol	ND		ug/kg	190	56.	1
2,4-Dichlorophenol	ND		ug/kg	170	61.	1
2,4-Dimethylphenol	ND		ug/kg	190	56.	1
2-Nitrophenol	ND		ug/kg	400	58.	1
4-Nitrophenol	ND		ug/kg	260	61.	1
2,4-Dinitrophenol	ND		ug/kg	900	260	1
4,6-Dinitro-o-cresol	ND		ug/kg	490	68.	1
Pentachlorophenol	ND		ug/kg	150	40.	1
Phenol	ND		ug/kg	190	55.	1
2-Methylphenol	ND		ug/kg	190	60.	1
3-Methylphenol/4-Methylphenol	62	J	ug/kg	270	61.	1
2,4,5-Trichlorophenol	ND		ug/kg	190	61.	1
Benzoic Acid	ND		ug/kg	610	190	1
Benzyl Alcohol	ND		ug/kg	190	58.	1
Carbazole	770		ug/kg	190	40.	1
Benzaldehyde	ND		ug/kg	250	76.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Caprolactam	ND		ug/kg	190	52.	1
Atrazine	ND		ug/kg	150	42.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	190	32.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	76		25-120
Phenol-d6	78		10-120
Nitrobenzene-d5	79		23-120
2-Fluorobiphenyl	90		30-120
2,4,6-Tribromophenol	91		0-136
4-Terphenyl-d14	89		18-120

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318167-04  
**Client ID:** CSO\_COMP-06\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 09/20/13 23:27  
**Analyst:** PS  
**Percent Solids:** 85%

**Date Collected:** 09/14/13 13:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	58	J	ug/kg	160	40.	1
1,2,4-Trichlorobenzene	ND		ug/kg	190	64.	1
Hexachlorobenzene	ND		ug/kg	120	36.	1
Bis(2-chloroethyl)ether	ND		ug/kg	170	54.	1
2-Chloronaphthalene	ND		ug/kg	190	63.	1
1,2-Dichlorobenzene	ND		ug/kg	190	64.	1
1,3-Dichlorobenzene	ND		ug/kg	190	61.	1
1,4-Dichlorobenzene	ND		ug/kg	190	59.	1
3,3'-Dichlorobenzidine	ND		ug/kg	190	52.	1
2,4-Dinitrotoluene	ND		ug/kg	190	42.	1
2,6-Dinitrotoluene	ND		ug/kg	190	50.	1
Fluoranthene	1200		ug/kg	120	36.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	190	59.	1
4-Bromophenyl phenyl ether	ND		ug/kg	190	45.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	230	68.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	210	59.	1
Hexachlorobutadiene	ND		ug/kg	190	55.	1
Hexachlorocyclopentadiene	ND		ug/kg	560	120	1
Hexachloroethane	ND		ug/kg	160	35.	1
Isophorone	ND		ug/kg	170	52.	1
Naphthalene	160	J	ug/kg	190	64.	1
Nitrobenzene	ND		ug/kg	170	46.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	160	41.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	190	58.	1
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	190	51.	1
Butyl benzyl phthalate	ND		ug/kg	190	38.	1
Di-n-butylphthalate	54	J	ug/kg	190	37.	1
Di-n-octylphthalate	ND		ug/kg	190	48.	1
Diethyl phthalate	ND		ug/kg	190	41.	1
Dimethyl phthalate	ND		ug/kg	190	49.	1
Benzo(a)anthracene	740		ug/kg	120	38.	1

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318167-04  
 Client ID: CSO\_COMP-06\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)pyrene	980		ug/kg	160	47.	1
Benzo(b)fluoranthene	1400		ug/kg	120	39.	1
Benzo(k)fluoranthene	470		ug/kg	120	37.	1
Chrysene	930		ug/kg	120	38.	1
Acenaphthylene	110	J	ug/kg	160	36.	1
Anthracene	220		ug/kg	120	32.	1
Benzo(ghi)perylene	830		ug/kg	160	40.	1
Fluorene	94	J	ug/kg	190	56.	1
Phenanthrene	890		ug/kg	120	38.	1
Dibenzo(a,h)anthracene	230		ug/kg	120	38.	1
Indeno(1,2,3-cd)Pyrene	820		ug/kg	160	43.	1
Pyrene	1200		ug/kg	120	38.	1
Biphenyl	ND		ug/kg	440	64.	1
4-Chloroaniline	ND		ug/kg	190	51.	1
2-Nitroaniline	ND		ug/kg	190	55.	1
3-Nitroaniline	ND		ug/kg	190	54.	1
4-Nitroaniline	ND		ug/kg	190	52.	1
Dibenzofuran	ND		ug/kg	190	65.	1
2-Methylnaphthalene	110	J	ug/kg	230	62.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	190	60.	1
Acetophenone	ND		ug/kg	190	60.	1
2,4,6-Trichlorophenol	ND		ug/kg	120	36.	1
P-Chloro-M-Cresol	ND		ug/kg	190	56.	1
2-Chlorophenol	ND		ug/kg	190	58.	1
2,4-Dichlorophenol	ND		ug/kg	170	63.	1
2,4-Dimethylphenol	ND		ug/kg	190	58.	1
2-Nitrophenol	ND		ug/kg	420	60.	1
4-Nitrophenol	ND		ug/kg	270	63.	1
2,4-Dinitrophenol	ND		ug/kg	930	260	1
4,6-Dinitro-o-cresol	ND		ug/kg	500	71.	1
Pentachlorophenol	ND		ug/kg	160	42.	1
Phenol	ND		ug/kg	190	57.	1
2-Methylphenol	ND		ug/kg	190	62.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	280	64.	1
2,4,5-Trichlorophenol	ND		ug/kg	190	63.	1
Benzoic Acid	ND		ug/kg	630	200	1
Benzyl Alcohol	ND		ug/kg	190	60.	1
Carbazole	82	J	ug/kg	190	42.	1
Benzaldehyde	ND		ug/kg	260	78.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318167-04  
 Client ID: CSO\_COMP-06\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Caprolactam	ND		ug/kg	190	54.	1
Atrazine	ND		ug/kg	160	44.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	190	33.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	74		25-120
Phenol-d6	74		10-120
Nitrobenzene-d5	74		23-120
2-Fluorobiphenyl	81		30-120
2,4,6-Tribromophenol	96		0-136
4-Terphenyl-d14	84		18-120

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270D  
**Analytical Date:** 09/18/13 11:04  
**Analyst:** PS

**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01,04 Batch: WG636555-1					
Acenaphthene	ND		ug/kg	130	33.
1,2,4-Trichlorobenzene	ND		ug/kg	160	53.
Hexachlorobenzene	ND		ug/kg	97	30.
Bis(2-chloroethyl)ether	ND		ug/kg	140	45.
2-Chloronaphthalene	ND		ug/kg	160	53.
1,2-Dichlorobenzene	ND		ug/kg	160	53.
1,3-Dichlorobenzene	ND		ug/kg	160	51.
1,4-Dichlorobenzene	ND		ug/kg	160	49.
3,3'-Dichlorobenzidine	ND		ug/kg	160	43.
2,4-Dinitrotoluene	ND		ug/kg	160	35.
2,6-Dinitrotoluene	ND		ug/kg	160	41.
Fluoranthene	ND		ug/kg	97	30.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	49.
4-Bromophenyl phenyl ether	ND		ug/kg	160	37.
Bis(2-chloroisopropyl)ether	ND		ug/kg	190	57.
Bis(2-chloroethoxy)methane	ND		ug/kg	170	49.
Hexachlorobutadiene	ND		ug/kg	160	46.
Hexachlorocyclopentadiene	ND		ug/kg	460	100
Hexachloroethane	ND		ug/kg	130	29.
Isophorone	ND		ug/kg	140	43.
Naphthalene	ND		ug/kg	160	54.
Nitrobenzene	ND		ug/kg	140	38.
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	130	34.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	48.
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	160	42.
Butyl benzyl phthalate	ND		ug/kg	160	32.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	40.
Diethyl phthalate	ND		ug/kg	160	34.
Dimethyl phthalate	ND		ug/kg	160	41.
Benzo(a)anthracene	ND		ug/kg	97	32.

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8270D  
 Analytical Date: 09/18/13 11:04  
 Analyst: PS

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01,04 Batch: WG636555-1					
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	97	33.
Benzo(k)fluoranthene	ND		ug/kg	97	31.
Chrysene	ND		ug/kg	97	32.
Acenaphthylene	ND		ug/kg	130	30.
Anthracene	ND		ug/kg	97	27.
Benzo(ghi)perylene	ND		ug/kg	130	34.
Fluorene	ND		ug/kg	160	46.
Phenanthrene	ND		ug/kg	97	32.
Dibenzo(a,h)anthracene	ND		ug/kg	97	31.
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	130	36.
Pyrene	ND		ug/kg	97	31.
Biphenyl	ND		ug/kg	370	53.
4-Chloroaniline	ND		ug/kg	160	43.
2-Nitroaniline	ND		ug/kg	160	46.
3-Nitroaniline	ND		ug/kg	160	45.
4-Nitroaniline	ND		ug/kg	160	44.
Dibenzofuran	ND		ug/kg	160	54.
2-Methylnaphthalene	ND		ug/kg	190	52.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	50.
Acetophenone	ND		ug/kg	160	50.
2,4,6-Trichlorophenol	ND		ug/kg	97	30.
P-Chloro-M-Cresol	ND		ug/kg	160	47.
2-Chlorophenol	ND		ug/kg	160	49.
2,4-Dichlorophenol	ND		ug/kg	140	52.
2,4-Dimethylphenol	ND		ug/kg	160	48.
2-Nitrophenol	ND		ug/kg	350	50.
4-Nitrophenol	ND		ug/kg	230	52.
2,4-Dinitrophenol	ND		ug/kg	780	220
4,6-Dinitro-o-cresol	ND		ug/kg	420	59.
Pentachlorophenol	ND		ug/kg	130	35.

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8270D  
**Analytical Date:** 09/18/13 11:04  
**Analyst:** PS

**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01,04 Batch: WG636555-1					
Phenol	ND		ug/kg	160	48.
2-Methylphenol	ND		ug/kg	160	52.
3-Methylphenol/4-Methylphenol	ND		ug/kg	230	53.
2,4,5-Trichlorophenol	ND		ug/kg	160	52.
Benzoic Acid	ND		ug/kg	520	160
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	35.
Benzaldehyde	ND		ug/kg	210	65.
Caprolactam	ND		ug/kg	160	45.
Atrazine	ND		ug/kg	130	37.
2,3,4,6-Tetrachlorophenol	ND		ug/kg	160	28.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	82		25-120
Phenol-d6	79		10-120
Nitrobenzene-d5	81		23-120
2-Fluorobiphenyl	74		30-120
2,4,6-Tribromophenol	83		0-136
4-Terphenyl-d14	81		18-120

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01,04 Batch: WG636555-2 WG636555-3								
Acenaphthene	87		92		31-137	6		50
1,2,4-Trichlorobenzene	72		76		38-107	5		50
Hexachlorobenzene	98		98		40-140	0		50
Bis(2-chloroethyl)ether	70		75		40-140	7		50
2-Chloronaphthalene	79		86		40-140	8		50
1,2-Dichlorobenzene	71		77		40-140	8		50
1,3-Dichlorobenzene	69		76		40-140	10		50
1,4-Dichlorobenzene	69		76		28-104	10		50
3,3'-Dichlorobenzidine	63		58		40-140	8		50
2,4-Dinitrotoluene	109	Q	110	Q	28-89	1		50
2,6-Dinitrotoluene	102		106		40-140	4		50
Fluoranthene	110		110		40-140	0		50
4-Chlorophenyl phenyl ether	92		96		40-140	4		50
4-Bromophenyl phenyl ether	99		103		40-140	4		50
Bis(2-chloroisopropyl)ether	73		78		40-140	7		50
Bis(2-chloroethoxy)methane	74		79		40-117	7		50
Hexachlorobutadiene	71		77		40-140	8		50
Hexachlorocyclopentadiene	79		82		40-140	4		50
Hexachloroethane	71		78		40-140	9		50
Isophorone	80		85		40-140	6		50
Naphthalene	74		79		40-140	7		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01,04 Batch: WG636555-2 WG636555-3								
Nitrobenzene	78		85		40-140	9		50
NitrosoDiPhenylAmine(NDPA)/DPA	106		108			2		50
n-Nitrosodi-n-propylamine	83		89		32-121	7		50
Bis(2-Ethylhexyl)phthalate	103		105		40-140	2		50
Butyl benzyl phthalate	126		120		40-140	5		50
Di-n-butylphthalate	119		118		40-140	1		50
Di-n-octylphthalate	111		112		40-140	1		50
Diethyl phthalate	109		109		40-140	0		50
Dimethyl phthalate	99		102		40-140	3		50
Benzo(a)anthracene	106		107		40-140	1		50
Benzo(a)pyrene	104		108		40-140	4		50
Benzo(b)fluoranthene	103		101		40-140	2		50
Benzo(k)fluoranthene	96		103		40-140	7		50
Chrysene	98		101		40-140	3		50
Acenaphthylene	89		96		40-140	8		50
Anthracene	110		111		40-140	1		50
Benzo(ghi)perylene	98		103		40-140	5		50
Fluorene	96		100		40-140	4		50
Phenanthrene	100		104		40-140	4		50
Dibenzo(a,h)anthracene	101		104		40-140	3		50
Indeno(1,2,3-cd)Pyrene	106		108		40-140	2		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01,04 Batch: WG636555-2 WG636555-3								
Pyrene	108		106		35-142	2		50
Biphenyl	77		83			8		50
4-Chloroaniline	60		55		40-140	9		50
2-Nitroaniline	102		108		47-134	6		50
3-Nitroaniline	71		64		26-129	10		50
4-Nitroaniline	108		106		41-125	2		50
Dibenzofuran	91		95		40-140	4		50
2-Methylnaphthalene	74		80		40-140	8		50
1,2,4,5-Tetrachlorobenzene	77		81		40-117	5		50
Acetophenone	77		84		14-144	9		50
2,4,6-Trichlorophenol	96		103		30-130	7		50
P-Chloro-M-Cresol	103		110	Q	26-103	7		50
2-Chlorophenol	78		85		25-102	9		50
2,4-Dichlorophenol	84		92		30-130	9		50
2,4-Dimethylphenol	84		90		30-130	7		50
2-Nitrophenol	80		88		30-130	10		50
4-Nitrophenol	114		112		11-114	2		50
2,4-Dinitrophenol	102		96		4-130	6		50
4,6-Dinitro-o-cresol	121		116		10-130	4		50
Pentachlorophenol	103		100		17-109	3		50
Phenol	78		83		26-90	6		50

## Lab Control Sample Analysis

Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01,04 Batch: WG636555-2 WG636555-3								
2-Methylphenol	84		90		30-130.	7		50
3-Methylphenol/4-Methylphenol	83		91		30-130	9		50
2,4,5-Trichlorophenol	96		103		30-130	7		50
Benzoic Acid	25		25			0		50
Benzyl Alcohol	83		87		40-140	5		50
Carbazole	108		108		54-128	0		50
Benzaldehyde	70		74			6		50
Caprolactam	114		116			2		50
Atrazine	120		126			5		50
2,3,4,6-Tetrachlorophenol	102		103			1		50

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
2-Fluorophenol	75		79		25-120
Phenol-d6	75		78		10-120
Nitrobenzene-d5	77		80		23-120
2-Fluorobiphenyl	72		77		30-120
2,4,6-Tribromophenol	105		104		0-136
4-Terphenyl-d14	88		85		18-120

# PETROLEUM HYDROCARBONS

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8015C(M)  
 Analytical Date: 09/19/13 04:07  
 Analyst: AR  
 Percent Solids: 88%

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Petroleum Hydrocarbon Quantitation - Westborough Lab						
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TPH	251000		ug/kg	37500	3680	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	89		40-140

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8015C(M)  
 Analytical Date: 09/20/13 14:31  
 Analyst: GT  
 Percent Solids: 88%

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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## Gasoline Range Organics - Westborough Lab

Gasoline Range Organics	3000		ug/kg	2800	55.	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	91		70-130
4-Bromofluorobenzene	89		70-130

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-04  
 Client ID: CSO\_COMP-06\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8015C(M)  
 Analytical Date: 09/20/13 15:12  
 Analyst: GT  
 Percent Solids: 85%

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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## Gasoline Range Organics - Westborough Lab

Gasoline Range Organics	760	J	ug/kg	2900	56.	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	94		70-130
4-Bromofluorobenzene	91		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318167-04 D  
**Client ID:** CSO\_COMP-06\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8015C(M)  
**Analytical Date:** 09/18/13 16:15  
**Analyst:** AR  
**Percent Solids:** 85%

**Date Collected:** 09/14/13 13:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbon Quantitation - Westborough Lab						
TPH	234000		ug/kg	75500	7400	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	80		40-140

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8015C(M)  
 Analytical Date: 09/17/13 14:10  
 Analyst: AR

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 12:15

Parameter	Result	Qualifier	Units	RL	MDL
Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 01,04 Batch: WG636406-1					
TPH	ND		ug/kg	32900	3220

Surrogate	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	85		40-140

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8015C(M)  
 Analytical Date: 09/20/13 10:26  
 Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Gasoline Range Organics - Westborough Lab for sample(s): 01,04 Batch: WG637313-3					
Gasoline Range Organics	ND		ug/kg	2500	48.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	81		70-130
4-Bromofluorobenzene	86		70-130

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

<b>Parameter</b>	<b>LCS %Recovery</b>	<b>Qual</b>	<b>LCSD %Recovery</b>	<b>Qual</b>	<b>%Recovery Limits</b>	<b>RPD</b>	<b>Qual</b>	<b>RPD Limits</b>
Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01,04 Batch: WG636406-2								
TPH	113		-		40-140	-		40

<b>Surrogate</b>	<b>LCS %Recovery</b>	<b>Qual</b>	<b>LCSD %Recovery</b>	<b>Qual</b>	<b>Acceptance Criteria</b>
o-Terphenyl	101				40-140

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Gasoline Range Organics - Westborough Lab Associated sample(s): 01,04 Batch: WG637313-1 WG637313-2								
Gasoline Range Organics	94		104		80-120	10		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,1,1-Trifluorotoluene	92		101		70-130
4-Bromofluorobenzene	92		101		70-130

## Matrix Spike Analysis

Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Gasoline Range Organics - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637313-5 QC Sample: L1318253-02 Client ID: MS Sample												
Gasoline Range Organics	8600	23100	30000	91		-	-		80-120	-		20

<i>Surrogate</i>	<i>MS % Recovery</i>	<i>Qualifier</i>	<i>MSD % Recovery</i>	<i>Qualifier</i>	<i>Acceptance Criteria</i>
1,1,1-Trifluorotoluene	81				70-130
4-Bromofluorobenzene	83				70-130

**Lab Duplicate Analysis**  
**Batch Quality Control**

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318167

**Report Date:** 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG636406-3 QC Sample: L1318009-02 Client ID: DUP Sample						
TPH	653000	959000	ug/kg	38		40

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	74		90		40-140

**Lab Duplicate Analysis**  
Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Gasoline Range Organics - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637313-4 QC Sample: L1318253-02 Client ID: DUP Sample					
Gasoline Range Organics	8600	13000	ug/kg	39	Q 20

Surrogate	%Recovery Qualifier	%Recovery Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	70	80	70-130
4-Bromofluorobenzene	79	83	70-130



# PCBS

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8082A  
 Analytical Date: 09/21/13 05:01  
 Analyst: KB  
 Percent Solids: 88%

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 10:25  
 Cleanup Method1: EPA 3665A  
 Cleanup Date1: 09/17/13  
 Cleanup Method2: EPA 3660B  
 Cleanup Date2: 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	37.3	7.36	1	A
Aroclor 1221	ND		ug/kg	37.3	11.2	1	A
Aroclor 1232	ND		ug/kg	37.3	7.92	1	A
Aroclor 1242	ND		ug/kg	37.3	7.07	1	A
Aroclor 1248	ND		ug/kg	37.3	4.51	1	A
Aroclor 1254	ND		ug/kg	37.3	5.88	1	A
Aroclor 1260	ND		ug/kg	37.3	6.47	1	A
Aroclor 1262	ND		ug/kg	37.3	2.76	1	A
Aroclor 1268	ND		ug/kg	37.3	5.41	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	54		30-150	A
Decachlorobiphenyl	60		30-150	A
2,4,5,6-Tetrachloro-m-xylene	50		30-150	B
Decachlorobiphenyl	66		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318167-04  
**Client ID:** CSO\_COMP-06\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 09/21/13 05:14  
**Analyst:** KB  
**Percent Solids:** 85%

**Date Collected:** 09/14/13 13:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 10:25  
**Cleanup Method1:** EPA 3665A  
**Cleanup Date1:** 09/17/13  
**Cleanup Method2:** EPA 3660B  
**Cleanup Date2:** 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	38.4	7.58	1	A
Aroclor 1221	ND		ug/kg	38.4	11.6	1	A
Aroclor 1232	ND		ug/kg	38.4	8.15	1	A
Aroclor 1242	ND		ug/kg	38.4	7.28	1	A
Aroclor 1248	ND		ug/kg	38.4	4.64	1	A
Aroclor 1254	ND		ug/kg	38.4	6.05	1	A
Aroclor 1260	ND		ug/kg	38.4	6.66	1	A
Aroclor 1262	ND		ug/kg	38.4	2.84	1	A
Aroclor 1268	ND		ug/kg	38.4	5.56	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	47		30-150	A
Decachlorobiphenyl	52		30-150	A
2,4,5,6-Tetrachloro-m-xylene	44		30-150	B
Decachlorobiphenyl	57		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8082A  
 Analytical Date: 09/21/13 02:36  
 Analyst: KB

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 10:25  
 Cleanup Method1: EPA 3665A  
 Cleanup Date1: 09/17/13  
 Cleanup Method2: EPA 3660B  
 Cleanup Date2: 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01,04 Batch: WG636368-1						
Aroclor 1016	ND		ug/kg	32.4	6.40	A
Aroclor 1221	ND		ug/kg	32.4	9.77	A
Aroclor 1232	ND		ug/kg	32.4	6.88	A
Aroclor 1242	ND		ug/kg	32.4	6.15	A
Aroclor 1248	ND		ug/kg	32.4	3.92	A
Aroclor 1254	ND		ug/kg	32.4	5.11	A
Aroclor 1260	ND		ug/kg	32.4	5.62	A
Aroclor 1262	ND		ug/kg	32.4	2.40	A
Aroclor 1268	ND		ug/kg	32.4	4.70	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	74		30-150	A
Decachlorobiphenyl	88		30-150	A
2,4,5,6-Tetrachloro-m-xylene	71		30-150	B
Decachlorobiphenyl	100		30-150	B

## Lab Control Sample Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01,04 Batch: WG636368-2 WG636368-3									
Aroclor 1016	78		84		40-140	7		50	A
Aroclor 1260	81		88		40-140	8		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		88		30-150	A
Decachlorobiphenyl	87		97		30-150	A
2,4,5,6-Tetrachloro-m-xylene	71		81		30-150	B
Decachlorobiphenyl	100		111		30-150	B

# PESTICIDES

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 20:23  
 Analyst: SH  
 Percent Solids: 88%

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21  
 Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	195	23.7	1	A
2,4,5-T	ND		ug/kg	195	12.2	1	A
2,4,5-TP (Silvex)	ND		ug/kg	195	10.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	94		30-150	A
DCAA	74		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318167-01 D  
**Client ID:** CSO\_COMP-05\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8081B  
**Analytical Date:** 09/20/13 18:00  
**Analyst:** SH  
**Percent Solids:** 88%

**Date Collected:** 09/14/13 13:05  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/17/13 20:56  
**Cleanup Method1:** EPA 3620B  
**Cleanup Date1:** 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	17.6	3.45	10	A
Lindane	ND		ug/kg	7.35	3.28	10	A
Alpha-BHC	ND		ug/kg	7.35	2.09	10	A
Beta-BHC	ND		ug/kg	17.6	6.69	10	A
Heptachlor	ND		ug/kg	8.82	3.95	10	A
Aldrin	ND		ug/kg	17.6	6.21	10	A
Heptachlor epoxide	ND		ug/kg	33.1	9.92	10	A
Endrin	ND		ug/kg	7.35	3.01	10	A
Endrin ketone	ND		ug/kg	17.6	4.54	10	A
Dieldrin	ND		ug/kg	11.0	5.51	10	A
4,4'-DDE	ND		ug/kg	17.6	4.08	10	A
4,4'-DDD	ND		ug/kg	17.6	6.29	10	A
4,4'-DDT	ND		ug/kg	33.1	14.2	10	A
Endosulfan I	ND		ug/kg	17.6	4.17	10	A
Endosulfan II	ND		ug/kg	17.6	5.89	10	A
Endosulfan sulfate	ND		ug/kg	7.35	3.36	10	A
Methoxychlor	ND		ug/kg	33.1	10.3	10	A
Toxaphene	ND		ug/kg	331	92.6	10	A
cis-Chlordane	ND		ug/kg	22.0	6.14	10	A
trans-Chlordane	ND		ug/kg	22.0	5.82	10	A
Chlordane	ND		ug/kg	143	58.4	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	335	Q	30-150	A
Decachlorobiphenyl	265	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	58		30-150	B
Decachlorobiphenyl	195	Q	30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

**Lab ID:** L1318167-04  
**Client ID:** CSO\_COMP-06\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8151A  
**Analytical Date:** 09/17/13 20:42  
**Analyst:** SH  
**Percent Solids:** 85%

**Date Collected:** 09/14/13 13:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 8151A  
**Extraction Date:** 09/16/13 09:21  
**Methylation Date:** 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	192	23.3	1	A
2,4,5-T	ND		ug/kg	192	12.0	1	A
2,4,5-TP (Silvex)	ND		ug/kg	192	10.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	95		30-150	A
DCAA	65		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318167**Project Number:** 170229002**Report Date:** 09/24/13**SAMPLE RESULTS**

Lab ID: L1318167-04 D  
 Client ID: CSO\_COMP-06\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 09/20/13 18:12  
 Analyst: SH  
 Percent Solids: 85%

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/17/13 20:56  
 Cleanup Method1: EPA 3620B  
 Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	17.9	3.50	10	A
Lindane	ND		ug/kg	7.44	3.33	10	A
Alpha-BHC	ND		ug/kg	7.44	2.11	10	A
Beta-BHC	ND		ug/kg	17.9	6.77	10	A
Heptachlor	ND		ug/kg	8.93	4.00	10	A
Aldrin	ND		ug/kg	17.9	6.29	10	A
Heptachlor epoxide	ND		ug/kg	33.5	10.0	10	A
Endrin	ND		ug/kg	7.44	3.05	10	A
Endrin ketone	ND		ug/kg	17.9	4.60	10	A
Dieldrin	ND		ug/kg	11.2	5.58	10	A
4,4'-DDE	ND		ug/kg	17.9	4.13	10	A
4,4'-DDD	ND		ug/kg	17.9	6.37	10	A
4,4'-DDT	22.3	J	ug/kg	33.5	14.4	10	B
Endosulfan I	ND		ug/kg	17.9	4.22	10	A
Endosulfan II	ND		ug/kg	17.9	5.97	10	A
Endosulfan sulfate	ND		ug/kg	7.44	3.40	10	A
Methoxychlor	ND		ug/kg	33.5	10.4	10	A
Toxaphene	ND		ug/kg	335	93.8	10	A
cis-Chlordane	ND		ug/kg	22.3	6.22	10	A
trans-Chlordane	ND		ug/kg	22.3	5.90	10	A
Chlordane	ND		ug/kg	145	59.2	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	125		30-150	A
Decachlorobiphenyl	161	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	85		30-150	B
Decachlorobiphenyl	381	Q	30-150	B

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 15:05  
 Analyst: SH

Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21

Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Column
Chlorinated Herbicides by GC - Westborough Lab for sample(s): 01,04 Batch: WG636326-1						
2,4-D	ND		ug/kg	162	19.7	A
2,4,5-T	ND		ug/kg	162	10.1	A
2,4,5-TP (Silvex)	ND		ug/kg	162	8.95	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DCAA	90		30-150	A
DCAA	71		30-150	B

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8081B  
Analytical Date: 09/20/13 20:33  
Analyst: SH

Extraction Method: EPA 3546  
Extraction Date: 09/17/13 20:56  
Cleanup Method1: EPA 3620B  
Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 01,04 Batch: WG636910-1						
Delta-BHC	ND		ug/kg	1.52	0.298	A
Lindane	ND		ug/kg	0.634	0.283	A
Alpha-BHC	ND		ug/kg	0.634	0.180	A
Beta-BHC	ND		ug/kg	1.52	0.577	A
Heptachlor	ND		ug/kg	0.760	0.341	A
Aldrin	ND		ug/kg	1.52	0.535	A
Heptachlor epoxide	ND		ug/kg	2.85	0.856	A
Endrin	ND		ug/kg	0.634	0.260	A
Endrin ketone	ND		ug/kg	1.52	0.392	A
Dieldrin	ND		ug/kg	0.950	0.475	A
4,4'-DDE	ND		ug/kg	1.52	0.352	A
4,4'-DDD	ND		ug/kg	1.52	0.542	A
4,4'-DDT	ND		ug/kg	2.85	1.22	A
Endosulfan I	ND		ug/kg	1.52	0.359	A
Endosulfan II	ND		ug/kg	1.52	0.508	A
Endosulfan sulfate	ND		ug/kg	0.634	0.290	A
Methoxychlor	ND		ug/kg	2.85	0.887	A
Toxaphene	ND		ug/kg	28.5	7.98	A
cis-Chlordane	ND		ug/kg	1.90	0.530	A
trans-Chlordane	ND		ug/kg	1.90	0.502	A
Chlordane	ND		ug/kg	12.4	5.04	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	93		30-150	A
Decachlorobiphenyl	93		30-150	A
2,4,5,6-Tetrachloro-m-xylene	65		30-150	B
Decachlorobiphenyl	106		30-150	B

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Chlorinated Herbicides by GC - Westborough Lab Associated sample(s): 01,04 Batch: WG636326-2 WG636326-3									
2,4-D	99		113		30-150	13		30	A
2,4,5-T	93		96		30-150	3		30	A
2,4,5-TP (Silvex)	89		89		30-150	0		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DCAA	91		96		30-150	A
DCAA	77		73		30-150	B

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01,04 Batch: WG636910-2 WG636910-3									
Delta-BHC	82		88		30-150	7		30	A
Lindane	64		79		30-150	21		30	A
Alpha-BHC	70		75		30-150	7		30	A
Beta-BHC	70		74		30-150	6		30	A
Heptachlor	86		87		30-150	1		30	A
Aldrin	80		84		30-150	5		30	A
Heptachlor epoxide	77		82		30-150	6		30	A
Endrin	87		93		30-150	7		30	A
Endrin ketone	74		81		30-150	9		30	A
Dieldrin	81		86		30-150	6		30	A
4,4'-DDE	78		81		30-150	4		30	A
4,4'-DDD	80		86		30-150	7		30	A
4,4'-DDT	84		90		30-150	7		30	A
Endosulfan I	79		84		30-150	6		30	A
Endosulfan II	84		89		30-150	6		30	A
Endosulfan sulfate	81		88		30-150	8		30	A
Methoxychlor	69		75		30-150	8		30	A
cis-Chlordane	76		81		30-150	6		30	A
trans-Chlordane	77		81		30-150	5		30	A

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 01,04 Batch: WG636910-2 WG636910-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	86		87		30-150	A
Decachlorobiphenyl	78		84		30-150	A
2,4,5,6-Tetrachloro-m-xylene	58		58		30-150	B
Decachlorobiphenyl	115		86		30-150	B

## METALS

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 88%

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 TCLP/SPLP Ext. Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab</b>											
Arsenic, TCLP	0.03	J	mg/l	1.0	0.02	1	09/19/13 13:05	09/20/13 11:59	EPA 3015	1,6010C	TT
Barium, TCLP	0.59		mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 11:59	EPA 3015	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 13:05	09/20/13 11:59	EPA 3015	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 13:05	09/20/13 11:59	EPA 3015	1,6010C	TT
Lead, TCLP	0.62		mg/l	0.50	0.02	1	09/19/13 13:05	09/20/13 11:59	EPA 3015	1,6010C	TT
Mercury, TCLP	ND		mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 13:00	EPA 7470A	1,7470A	JH
Selenium, TCLP	ND		mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 11:59	EPA 3015	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 13:05	09/20/13 11:59	EPA 3015	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-01  
 Client ID: CSO\_COMP-05\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 88%

Date Collected: 09/14/13 13:05  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	8900		mg/kg	8.7	1.7	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.3	0.70	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Arsenic, Total	10		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Barium, Total	140		mg/kg	0.87	0.26	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Beryllium, Total	1.3		mg/kg	0.43	0.09	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Cadmium, Total	0.96		mg/kg	0.87	0.06	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Calcium, Total	28000		mg/kg	8.7	2.6	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Chromium, Total	28		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Cobalt, Total	16		mg/kg	1.7	0.43	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Copper, Total	210		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Iron, Total	18000		mg/kg	4.3	1.7	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Lead, Total	610		mg/kg	4.3	0.17	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Magnesium, Total	10000		mg/kg	8.7	0.87	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Manganese, Total	300		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Mercury, Total	0.49		mg/kg	0.09	0.02	1	09/21/13 12:30	09/23/13 10:31	EPA 7471B	1,7471B	MC
Nickel, Total	34		mg/kg	2.2	0.35	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Potassium, Total	1200		mg/kg	220	35.	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Selenium, Total	0.41	J	mg/kg	1.7	0.26	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Sodium, Total	690		mg/kg	170	26.	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.7	0.35	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Vanadium, Total	22		mg/kg	0.87	0.09	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT
Zinc, Total	1100		mg/kg	4.3	0.61	2	09/19/13 11:28	09/19/13 20:16	EPA 3050B	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-04  
 Client ID: CSO\_COMP-06\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 85%

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 TCLP/SPLP Ext. Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab</b>											
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 13:05	09/20/13 13:49	EPA 3015	1,6010C	TT
Barium, TCLP	0.65		mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 13:49	EPA 3015	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 13:05	09/20/13 13:49	EPA 3015	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 13:05	09/20/13 13:49	EPA 3015	1,6010C	TT
Lead, TCLP	1.5		mg/l	0.50	0.02	1	09/19/13 13:05	09/20/13 13:49	EPA 3015	1,6010C	TT
Mercury, TCLP	ND		mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 13:02	EPA 7470A	1,7470A	JH
Selenium, TCLP	ND		mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 13:49	EPA 3015	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 13:05	09/20/13 13:49	EPA 3015	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

Lab ID: L1318167-04  
 Client ID: CSO\_COMP-06\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 85%

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	11000		mg/kg	8.8	1.8	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.4	0.70	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Arsenic, Total	7.8		mg/kg	0.88	0.18	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Barium, Total	160		mg/kg	0.88	0.26	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Beryllium, Total	1.5		mg/kg	0.44	0.09	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Cadmium, Total	1.1		mg/kg	0.88	0.06	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Calcium, Total	23000		mg/kg	8.8	2.6	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Chromium, Total	32		mg/kg	0.88	0.18	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Cobalt, Total	17		mg/kg	1.8	0.44	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Copper, Total	190		mg/kg	0.88	0.18	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Iron, Total	27000		mg/kg	4.4	1.8	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Lead, Total	310		mg/kg	4.4	0.18	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Magnesium, Total	8200		mg/kg	8.8	0.88	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Manganese, Total	280		mg/kg	0.88	0.18	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Mercury, Total	0.50		mg/kg	0.08	0.02	1	09/21/13 12:30	09/23/13 10:37	EPA 7471B	1,7471B	MC
Nickel, Total	34		mg/kg	2.2	0.35	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Potassium, Total	1000		mg/kg	220	35.	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Selenium, Total	0.40	J	mg/kg	1.8	0.26	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.88	0.18	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Sodium, Total	410		mg/kg	180	26.	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.8	0.35	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Vanadium, Total	25		mg/kg	0.88	0.09	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT
Zinc, Total	780		mg/kg	4.4	0.62	2	09/19/13 11:28	09/19/13 20:20	EPA 3050B	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

## Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>Total Metals - Westborough Lab for sample(s): 01,04 Batch: WG637410-1</b>										
Aluminum, Total	2.0	J	mg/kg	4.0	0.80	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Antimony, Total	ND		mg/kg	2.0	0.32	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Arsenic, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Barium, Total	ND		mg/kg	0.40	0.12	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Beryllium, Total	ND		mg/kg	0.20	0.04	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Cadmium, Total	ND		mg/kg	0.40	0.03	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Calcium, Total	4.2		mg/kg	4.0	1.2	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Chromium, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Cobalt, Total	ND		mg/kg	0.80	0.20	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Copper, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Iron, Total	ND		mg/kg	2.0	0.80	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Lead, Total	ND		mg/kg	2.0	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Magnesium, Total	ND		mg/kg	4.0	0.40	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Manganese, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Nickel, Total	ND		mg/kg	1.0	0.16	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Potassium, Total	ND		mg/kg	100	16.	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Selenium, Total	ND		mg/kg	0.80	0.12	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Silver, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Sodium, Total	ND		mg/kg	80	12.	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Thallium, Total	ND		mg/kg	0.80	0.16	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Vanadium, Total	ND		mg/kg	0.40	0.04	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Zinc, Total	ND		mg/kg	2.0	0.28	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT

### Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab for sample(s): 01,04 Batch: WG637446-1</b>										
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Barium, TCLP	0.04	J	mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

### Method Blank Analysis Batch Quality Control

Lead, TCLP	ND	mg/l	0.50	0.02	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Selenium, TCLP	ND	mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Silver, TCLP	ND	mg/l	0.10	0.02	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT

#### Prep Information

Digestion Method: EPA 3015  
TCLP/SPLP Extraction Date: 09/18/13 16:44

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Westborough Lab for sample(s): 01,04 Batch: WG637778-1									
Mercury, Total	ND	mg/kg	0.08	0.02	1	09/21/13 12:30	09/23/13 09:53	1,7471B	MC

#### Prep Information

Digestion Method: EPA 7471B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
TCLP Metals by EPA 1311 - Westborough Lab for sample(s): 01,04 Batch: WG638031-1									
Mercury, TCLP	ND	mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 12:32	1,7470A	JH

#### Prep Information

Digestion Method: EPA 7470A  
TCLP/SPLP Extraction Date: 09/18/13 16:44

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318167

**Report Date:** 09/24/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Total Metals - Westborough Lab Associated sample(s): 01,04 Batch: WG637410-2 SRM Lot Number: 0518-10-02								
Aluminum, Total	85		-		29-171	-		
Antimony, Total	122		-		4-196	-		
Arsenic, Total	104		-		81-119	-		
Barium, Total	100		-		83-118	-		
Beryllium, Total	98		-		83-117	-		
Cadmium, Total	94		-		82-117	-		
Calcium, Total	90		-		83-117	-		
Chromium, Total	92		-		80-119	-		
Cobalt, Total	99		-		83-117	-		
Copper, Total	101		-		83-117	-		
Iron, Total	94		-		51-150	-		
Lead, Total	96		-		80-120	-		
Magnesium, Total	78		-		74-126	-		
Manganese, Total	97		-		83-117	-		
Nickel, Total	94		-		82-117	-		
Potassium, Total	99		-		74-126	-		
Selenium, Total	109		-		80-120	-		
Silver, Total	105		-		66-134	-		
Sodium, Total	106		-		74-127	-		
Thallium, Total	96		-		79-120	-		
Vanadium, Total	89		-		79-121	-		



## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318167

**Report Date:** 09/24/13

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01,04 Batch: WG637410-2 SRM Lot Number: 0518-10-02					
Zinc, Total	94	-	82-119	-	
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01,04 Batch: WG637446-2					
Arsenic, TCLP	108	-	75-125	-	20
Barium, TCLP	100	-	75-125	-	20
Cadmium, TCLP	106	-	75-125	-	20
Chromium, TCLP	105	-	75-125	-	20
Lead, TCLP	100	-	75-125	-	20
Selenium, TCLP	108	-	75-125	-	20
Silver, TCLP	104	-	75-125	-	20
Total Metals - Westborough Lab Associated sample(s): 01,04 Batch: WG637778-2 SRM Lot Number: 0518-10-02					
Mercury, Total	105	-	67-133	-	
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01,04 Batch: WG638031-2					
Mercury, TCLP	111	-	80-120	-	

## Matrix Spike Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Qual	MSD Found	MSD %Recovery	MSD Qual	Recovery Limits	RPD	RPD Qual	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637410-4 QC Sample: L1318142-43 Client ID: MS Sample												
Aluminum, Total	1500	194	2700	618	Q	-	-		75-125	-		35
Antimony, Total	4.4J	48.5	52	107		-	-		75-125	-		35
Arsenic, Total	12.	11.6	23	86		-	-		75-125	-		35
Barium, Total	360	194	670	154	Q	-	-		75-125	-		35
Beryllium, Total	0.22J	4.85	5.1	105		-	-		75-125	-		35
Cadmium, Total	4.5	4.95	7.1	50	Q	-	-		75-125	-		35
Calcium, Total	620	971	4700	419	Q	-	-		75-125	-		35
Chromium, Total	14.	19.4	27	62	Q	-	-		75-125	-		35
Cobalt, Total	3.4	48.5	49	94		-	-		75-125	-		35
Copper, Total	130	24.3	120	0	Q	-	-		75-125	-		35
Iron, Total	5800	97.1	5200	0	Q	-	-		75-125	-		35
Lead, Total	420	49.5	280	0	Q	-	-		75-125	-		35
Magnesium, Total	290	971	1200	93		-	-		75-125	-		35
Manganese, Total	56.	48.5	110	107		-	-		75-125	-		35
Nickel, Total	15.	48.5	56	84		-	-		75-125	-		35
Potassium, Total	220J	971	1300	134	Q	-	-		75-125	-		35
Selenium, Total	6.1	11.6	16	84		-	-		75-125	-		35
Silver, Total	0.26J	29.1	28	96		-	-		75-125	-		35
Sodium, Total	120J	971	1200	124		-	-		75-125	-		35
Thallium, Total	ND	11.6	10	86		-	-		75-125	-		35
Vanadium, Total	8.1	48.5	54	94		-	-		75-125	-		35

### Matrix Spike Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637410-4 QC Sample: L1318142-43 Client ID: MS Sample									
Zinc, Total	1800	48.5	960	0	Q	-	75-125	-	35
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637446-4 QC Sample: L1318167-01 Client ID: CSO_COMP-05_0-10									
Arsenic, TCLP	0.03J	1.2	1.3	108	-	-	75-125	-	20
Barium, TCLP	0.59	20	21	102	-	-	75-125	-	20
Cadmium, TCLP	ND	0.51	0.54	106	-	-	75-125	-	20
Chromium, TCLP	ND	2	2.1	105	-	-	75-125	-	20
Lead, TCLP	0.62	5.1	5.7	100	-	-	75-125	-	20
Selenium, TCLP	ND	1.2	1.4	117	-	-	75-125	-	20
Silver, TCLP	ND	0.5	0.52	104	-	-	75-125	-	20
Total Metals - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637778-4 QC Sample: L1318158-03 Client ID: MS Sample									
Mercury, Total	0.72	0.192	0.77	26	Q	-	70-130	-	35
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG638031-4 QC Sample: L1318158-03 Client ID: MS Sample									
Mercury, TCLP	ND	0.025	0.0263	105	-	-	70-130	-	20



## Lab Duplicate Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318167

Report Date: 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637410-3 QC Sample: L1318142-43 Client ID: DUP Sample						
Aluminum, Total	1500	1400	mg/kg	7		35
Antimony, Total	4.4J	4.0J	mg/kg	NC		35
Arsenic, Total	12.	15	mg/kg	14		35
Barium, Total	360	380	mg/kg	3		35
Beryllium, Total	0.22J	0.25J	mg/kg	NC		35
Cadmium, Total	4.5	3.0	mg/kg	42	Q	35
Calcium, Total	620	570	mg/kg	10		35
Chromium, Total	14.	14	mg/kg	7		35
Cobalt, Total	3.4	3.2	mg/kg	6		35
Copper, Total	130	140	mg/kg	0		35
Iron, Total	5800	5200	mg/kg	13		35
Lead, Total	420	370	mg/kg	15		35
Magnesium, Total	290	320	mg/kg	6		35
Manganese, Total	56.	57	mg/kg	2		35
Nickel, Total	15.	14	mg/kg	7		35
Potassium, Total	220J	210J	mg/kg	NC		35
Selenium, Total	6.1	5.1	mg/kg	19		35
Silver, Total	0.26J	0.29J	mg/kg	NC		35
Sodium, Total	120J	150J	mg/kg	NC		35

**Lab Duplicate Analysis**  
**Batch Quality Control**

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
<b>Total Metals - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637410-3 QC Sample: L1318142-43 Client ID: DUP Sample</b>					
Thallium, Total	ND	ND	mg/kg	NC	35
Vanadium, Total	8.1	9.8	mg/kg	17	35
Zinc, Total	1800	1300	mg/kg	32	35
<b>TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637446-3 QC Sample: L1318167-01 Client ID: CSO_COMP-05_0-10</b>					
Arsenic, TCLP	0.03J	0.05J	mg/l	NC	20
Barium, TCLP	0.59	0.57	mg/l	3	20
Cadmium, TCLP	ND	ND	mg/l	NC	20
Chromium, TCLP	ND	ND	mg/l	NC	20
Lead, TCLP	0.62	0.60	mg/l	3	20
Selenium, TCLP	ND	ND	mg/l	NC	20
Silver, TCLP	ND	ND	mg/l	NC	20
<b>Total Metals - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637778-3 QC Sample: L1318158-03 Client ID: DUP Sample</b>					
Mercury, Total	0.72	0.69	mg/kg	4	35
<b>TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG638031-3 QC Sample: L1318158-03 Client ID: DUP Sample</b>					
Mercury, TCLP	ND	ND	mg/l	NC	20



# **INORGANICS & MISCELLANEOUS**

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

### SAMPLE RESULTS

**Lab ID:** L1318167-01  
**Client ID:** CSO\_COMP-05\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 13:05  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

Parameter	Result	Date Analyzed	Analytical Method	Analyst
Ignitability of Solids - Westborough Lab				
Ignitability	NI	09/19/13 08:33	1,1030	DM



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

### SAMPLE RESULTS

**Lab ID:** L1318167-04  
**Client ID:** CSO\_COMP-06\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 13:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

Parameter	Result	Date Analyzed	Analytical Method	Analyst
Ignitability of Solids - Westborough Lab				
Ignitability	NI	09/19/13 08:33	1,1030	DM



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

**Lab ID:** L1318167-01  
**Client ID:** CSO\_COMP-05\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 13:05  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Chromium, Trivalent	28		mg/kg	0.91	0.91	1	-	09/23/13 11:29	107,-	JO
Solids, Total	87.5		%	0.100	NA	1	-	09/16/13 22:04	30,2540G	RT
Cyanide, Total	ND		mg/kg	1.1	0.26	1	09/18/13 10:00	09/18/13 15:22	1,9010C/9012A	JO
pH (H)	8.2		SU	-	NA	1	-	09/14/13 21:00	1,9045D	EL
Chromium, Hexavalent	ND		mg/kg	0.91	0.20	1	09/16/13 17:50	09/17/13 22:39	1,7196A	TA
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:08	1,7.3	TL
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:00	1,7.3	TL



Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318167-02  
 Client ID: CSO\_SB-05A\_7.5-8.0  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil

Date Collected: 09/14/13 13:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.7		%	0.100	NA	1	-	09/16/13 22:04	30,2540G	RT



Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

## SAMPLE RESULTS

Lab ID: L1318167-03  
 Client ID: CSO\_SB-06A\_3.5-4  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil

Date Collected: 09/14/13 13:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	86.9		%	0.100	NA	1	-	09/16/13 22:04	30,2540G	RT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**SAMPLE RESULTS**

**Lab ID:** L1318167-04  
**Client ID:** CSO\_COMP-06\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 13:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Chromium, Trivalent	32		mg/kg	0.94	0.94	1	-	09/23/13 11:29	107,-	JO
Solids, Total	85.3		%	0.100	NA	1	-	09/16/13 22:04	30,2540G	RT
Cyanide, Total	ND		mg/kg	1.1	0.27	1	09/18/13 10:00	09/18/13 15:23	1,9010C/9012A	JO
pH (H)	8.1		SU	-	NA	1	-	09/14/13 21:00	1,9045D	EL
Chromium, Hexavalent	ND		mg/kg	0.94	0.21	1	09/16/13 17:50	09/17/13 22:39	1,7196A	TA
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:08	1,7.3	TL
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:00	1,7.3	TL



Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01,04 Batch: WG636545-1										
Chromium, Hexavalent	ND		mg/kg	0.80	0.18	1	09/16/13 17:50	09/17/13 22:28	1,7196A	TA
General Chemistry - Westborough Lab for sample(s): 01,04 Batch: WG636888-1										
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/18/13 00:06	1,7.3	TL
General Chemistry - Westborough Lab for sample(s): 01,04 Batch: WG636890-1										
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/17/13 21:00	09/17/13 23:59	1,7.3	TL
General Chemistry - Westborough Lab for sample(s): 01,04 Batch: WG637047-1										
Cyanide, Total	ND		mg/kg	0.91	0.21	1	09/18/13 10:00	09/18/13 14:57	1,9010C/9012A	JO

## Lab Control Sample Analysis

Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
General Chemistry - Westborough Lab Associated sample(s): 01,04 Batch: WG636188-1								
pH	100		-		99-101	-		
General Chemistry - Westborough Lab Associated sample(s): 01,04 Batch: WG636545-2								
Chromium, Hexavalent	89		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01,04 Batch: WG636888-2								
Cyanide, Reactive	43		-		30-125	-		40
General Chemistry - Westborough Lab Associated sample(s): 01,04 Batch: WG636890-2								
Sulfide, Reactive	89		-		60-125	-		40
General Chemistry - Westborough Lab Associated sample(s): 01,04 Batch: WG637047-2 WG637047-3								
Cyanide, Total	103		104		80-120	1		35

### Matrix Spike Analysis Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318167

Project Number: 170229002

Report Date: 09/24/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG636545-5 WG636545-8 QC Sample: L1318168-04 Client ID: MS Sample												
Chromium, Hexavalent	ND	1370	820	60	Q	860	64	Q	75-125	5		20
General Chemistry - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG637047-4 WG637047-5 QC Sample: L1318168-04 Client ID: MS Sample												
Cyanide, Total	ND	10	10	98		9.9	95		65-135	1		35

## Lab Duplicate Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318167

Report Date: 09/24/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG636188-2 QC Sample: L1318166-02 Client ID: DUP Sample						
pH	10.	10.0	SU	1		5
General Chemistry - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG636545-4 QC Sample: L1318168-04 Client ID: DUP Sample						
Chromium, Hexavalent	ND	ND	mg/kg	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG636567-1 QC Sample: L1318162-01 Client ID: DUP Sample						
Solids, Total	90.2	91.1	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG636888-3 QC Sample: L1318234-01 Client ID: DUP Sample						
Cyanide, Reactive	ND	ND	mg/kg	NC		40
General Chemistry - Westborough Lab Associated sample(s): 01,04 QC Batch ID: WG636890-3 QC Sample: L1318234-01 Client ID: DUP Sample						
Sulfide, Reactive	ND	ND	mg/kg	NC		40

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

### Sample Receipt and Container Information

Were project specific reporting limits specified? YES

**Reagent H2O Preserved Vials Frozen on:** 09/14/2013 19:09

#### Cooler Information Custody Seal

##### Cooler

A Absent

#### Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318167-01A	Vial Large Septa unpreserved	A	N/A	3.2	Y	Absent	TPH-GRO(14)
L1318167-01B	Amber 500ml unpreserved	A	N/A	3.2	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318167-01C	Amber 500ml unpreserved	A	N/A	3.2	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318167-01X	Plastic 250ml HNO3 preserved spl	A	<2	3.2	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)
L1318167-02A	5 gram Encore Sampler	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(2)

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318167-02B	5 gram Encore Sampler	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(2)
L1318167-02C	5 gram Encore Sampler	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(2)
L1318167-02D	Plastic 2oz unpreserved for TS	A	N/A	3.2	Y	Absent	TS(7)
L1318167-02X	Vial MeOH preserved split	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(14)
L1318167-02Y	Vial Water preserved split	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(14)
L1318167-02Z	Vial Water preserved split	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(14)
L1318167-03A	5 gram Encore Sampler	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(2)
L1318167-03B	5 gram Encore Sampler	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(2)
L1318167-03C	5 gram Encore Sampler	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(2)
L1318167-03D	Plastic 2oz unpreserved for TS	A	N/A	3.2	Y	Absent	TS(7)
L1318167-03X	Vial MeOH preserved split	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(14)
L1318167-03Y	Vial Water preserved split	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(14)
L1318167-03Z	Vial Water preserved split	A	N/A	3.2	Y	Absent	NYTCL-8260HLW(14)
L1318167-04A	Vial Large Septa unpreserved	A	N/A	3.2	Y	Absent	TPH-GRO(14)
L1318167-04B	Amber 500ml unpreserved	A	N/A	3.2	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318167-04C	Amber 500ml unpreserved	A	N/A	3.2	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING**Project Number:** 170229002**Lab Number:** L1318167**Report Date:** 09/24/13**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318167-04X	Plastic 250ml HNO3 preserved spl	A	<2	3.2	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)
L1318167-05A	Vial HCl preserved	A	N/A	3.2	Y	Absent	NYTCL-8260(14)
L1318167-05B	Vial HCl preserved	A	N/A	3.2	Y	Absent	NYTCL-8260(14)

\*Values in parentheses indicate holding time in days

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.

Report Format: DU Report with "J" Qualifiers



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

**Data Qualifiers**

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with "J" Qualifiers



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318167  
**Report Date:** 09/24/13

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.
- 107 Alpha Analytical - In-house calculation method.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



**C** **A** **P** **S**  
 Last revised August 29, 2013 - Westboro Facility

The following list includes only those analytes/methods for which certification/approval is currently held.  
 For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

**C** **P** **Certificate/Lab ID: PH-0574. NELAP Accredited Solid Waste/Soil.**

*Drinking Water (Inorganic Parameters:* Color, pH, Turbidity, Conductivity, Alkalinity, Chloride, Free Residual Chlorine, Fluoride, Calcium Hardness, Sulfate, Nitrate, Nitrite, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Selenium, Silver, Sodium, Thallium, Zinc, Total Dissolved Solids, Total Organic Carbon, Total Cyanide, Perchlorate. *Organic Parameters:* Volatile Organics 524.2, Total Trihalomethanes 524.2, 1,2-Dibromo-3-chloropropane (DBCP) 504.1, Ethylene Dibromide (EDB) 504.1, 1,4-Dioxane (Mod 8270). *Microbiology Parameters:* Total Coliform-MF mEndo (SM9222B), Total Coliform – Colilert (SM9223, Enumeration and P/A), E. Coli. – Colilert (SM9223, Enumeration and P/A), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform-EC Medium (SM 9221E).

*Wastewater/Non-Potable Water (Inorganic Parameters:* Color, pH, Conductivity, Acidity, Alkalinity, Chloride, Total Residual Chlorine, Fluoride, Total Hardness, Silica, Sulfate, Sulfide, Ammonia, Kjeldahl Nitrogen, Nitrate, Nitrite, O-Phosphate, Total Phosphorus, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Dissolved Solids, Total Suspended Solids (non-filterable), BOD, CBOD, COD, TOC, Total Cyanide, Phenolics, Foaming Agents (MBAS), Bromide, Oil and Grease. *Organic Parameters:* PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables (Phenols), Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, Polynuclear Aromatic Hydrocarbons, Haloethers, Chlorinated Hydrocarbons, Volatile Organics, TPH (HEM/SGT), CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH. *Microbiology Parameters:* Total Coliform – MF mEndo (SM9222B), Total Coliform – MTF (SM9221B), E. Coli – Colilert (SM9223 Enumeration), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform – A-1 Broth (SM9221E), Enterococcus - Enterolert.

*Solid Waste/Soil (Inorganic Parameters:* pH, Sulfide, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Tin, Vanadium, Zinc, Total Cyanide, Ignitability, Phenolics, Corrosivity, TCLP Leach (1311), SPLP Leach (1312 metals only), Reactivity. *Organic Parameters:* PCBs, PCBs in Oil, Organochlorine Pesticides, Technical Chlordane, Toxaphene, CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH, Dicamba, 2,4-D, 2,4,5-T, 2,4,5-TP(Silvex), Dalapon, Volatile Organics (SW 8260), Acid Extractables (Phenols) (SW 8270), Benzidines (SW 8270), Phthalates (SW 8270), Nitrosamines (SW 8270), Nitroaromatics & Cyclic Ketones (SW 8270), PAHs (SW 8270), Haloethers (SW 8270), Chlorinated Hydrocarbons (SW 8270). )

**S** **Certificate/Lab ID: 003155. NELAP Accredited.**

*Drinking Water (Inorganic Parameters:* SM2120B, 2320B, 2510B, 2540C, SM4500CN-CE, 4500F-C, 4500H-B, 4500NO3-F, 5310C, EPA 200.7, 200.8, 245.1, 300.0. *Organic Parameters:* EPA 504.1, 524.2.)

*Wastewater/Non-Potable Water (Inorganic Parameters:* SM2120B, 2310B, 2320B, 2340B, 2510B, 2540B, 2540C, 2540D, SM4500CL-E, 4500CN-E, 4500F-C, 4500H-B, 4500NH3-H, 4500NO2-B, 4500NO3-F, 4500P-E, 4500S-D, 4500SO3-B, 5210B, 5220D, 5310C, 5540C, EPA 120.1, 1664A, 200.7, 200.8, 245.1, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1. *Organic Parameters:* EPA 608, 624, 625.)

*Hazardous and Solid Waste (Inorganic Parameters:* EPA 1010A, 1030, 1311, 1312, 6010C, 6020A, 7196A, 7470A, 7471B, 9012B, 9014, 9038, 9040C, 9045D, 9050A, 9065, 9251. *Organic Parameters:* 8011 (NPW only), 8015C, 8081B, 8082A, 8151A, 8260C, 8270D, 8315A, 8330.)

**M** **S** **Certificate/Lab ID: 2009024.**

*Drinking Water (Inorganic Parameters:* SM9215B, 9222D, 9223B, EPA 180.1, 353.2, SM2120B, 2130B, 2320B, 2510C, 2540C, 4500CI-D, 4500CN-C, 4500CN-E, 4500F-C, 4500H+B, 4500NO3-F, 5310C, EPA 200.7, EPA 200.8, 245.1, EPA 300.0. *Organic Parameters:* 504.1, 524.2.)

*Wastewater/Non-Potable Water (Inorganic Parameters:* EPA 120.1, 1664A, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1, 8315A, 9010C, SM2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 426C, 4500CI-E, 4500CN-C, 4500CN-E, 4500F-B, 4500F-C, 4500H+B, 4500Norg-C, 4500NH3-B, 4500NH3-H, 4500NO2-B, 4500NO3-F, 4500P-B, 4500P-E, 4500S2-D, 4500SO3-B, 5540C, 5210B, 5220D, 5310C, 9010B, 9030B, 9040C, 7470A, 7196A, 2340B, EPA 200.7, 6010C, 200.8, 6020A, 245.1, 1311, 1312, 3005A, Enterolert, 9223B, 9222D. *Organic Parameters:* 608, 624, 625, 8011, 8081B, 8082A, 8330, 8151A, 8260C, 8270D, 3510C, 3630C, 5030B, ME-DRO, ME-GRO, MA-EPH, MA-VPH.)

*Solid Waste/Soil (Inorganic Parameters:* 9010B, 9012A, 9014, 9040B, 9045C, 6010C, 6020A, 7471B, 7196A, 9050A, 1010, 1030, 9065, 1311, 1312, 3005A, 3050B, 9038, 9251. Organic Parameters: ME-DRO, ME-GRO, MA-EPH, MA-VPH, 8260C, 8270D, 8330, 8151A, 8081B, 8082A, 3540C, 3546, 3580A, 3620C, 3630C, 5030B, 5035.)

**M** Certificate/Lab ID: M-MA086.

*Drinking Water (Inorganic Parameters:* (EPA 200.8 for: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl) (EPA 200.7 for: Ba,Be,Ca,Cd,Cr,Cu,Na,Ni) 245.1, (300.0 for: Nitrate-N, Fluoride, Sulfate); (EPA 353.2 for: Nitrate-N, Nitrite-N); (SM4500NO3-F for: Nitrate-N and Nitrite-N); 4500F-C, 4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, 2320B, SM2540C, SM4500H-B. Organic Parameters: (EPA 524.2 for: Trihalomethanes, Volatile Organics); (504.1 for: 1,2-Dibromoethane, 1,2-Dibromo-3-Chloropropane), EPA 332. Microbiology Parameters: SM9215B; ENZ. SUB. SM9223; ColilertQT SM9223B; MF-SM9222D.)

*Non-Potable Water (Inorganic Parameters:* (EPA 200.8 for: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn); (EPA 200.7 for: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn); 245.1, SM4500H,B, EPA 120.1, SM2510B, 2540C, 2340B, 2320B, 4500CL-E, 4500F-BC, 426C, SM4500NH3-BH, (EPA 350.1 for: Ammonia-N), LACHAT 10-107-06-1-B for Ammonia-N, SM4500NO3-F, 353.2 for Nitrate-N, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, 4500P-B,E, 5220D, EPA 410.4, SM 5210B, 5310C, 4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.

Organic Parameters: (EPA 624 for Volatile Halocarbons, Volatile Aromatics),(608 for: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT,Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs-Water), (EPA 625 for SVOC Acid Extractables and SVOC Base/Neutral Extractables), 600/4-81-045-PCB-Oil. Microbiology Parameters: (ColilertQT SM9223B; Enterolert-QT: SM9222D-MF.)

**N** Certificate/Lab ID: 200307. **NELAP Accredited.**

*Drinking Water (Inorganic Parameters:* SM 9222B, 9223B, 9215B, EPA 200.7, 200.8, 300.0, SM4500CN-E, 4500H+B, 4500NO3-F, 2320B, 2510B, 2540C, 4500F-C, 5310C, 2120B, EPA 332.0. Organic Parameters: 504.1, 524.2.)

*Non-Potable Water (Inorganic Parameters:* SM9222D, 9221B, 9222B, 9221E-EC, EPA 3005A, 200.7, 200.8, 245.1, SW-846 6010C, 6020A, 7196A, 7470A, SM3500-CR-D, EPA 120.1, 300.0, 350.1, 350.2, 351.1, 353.2, 410.4, 420.1, 426C, 1664A, SW-846 9010B, 9010C, 9030, 9040B, 9040C, SM2120B, 2310B, 2320B, 2340B, 2540B, 2540D, 4500H+B, 4500CL-E, 4500CN-E, 4500NH3-H, 4500NO3-F, 4500NO2-B, 4500P-E, 4500-S2-D, 4500SO3-B, 5210B, 5220D, 2510B, 2540C, 4500F-C, 5310C, 5540C, LACHAT 10-204-00-1-A, LACHAT 10-107-06-2-D, 3060A. Organic Parameters: SW-846 3510C, 3630C, 5030B, 8260C, 8270D, 8330, EPA 624, 625, 608, SW-846 8082A, 8081B, 8015C, 8151A, 8330, 8270D-SIM.)

*Solid & Chemical Materials (Inorganic Parameters:* SW-846 6010C, 6020A, 7196A, 7471B, 1010, 1010A, 1030, 9010C, 9012B, 9014, 9030B, 9040C, 9045C, 9045D, 9050, 9065, 9251, 1311, 1312, 3005A, 3050B, 3060A. Organic Parameters: SW-846 3540C, 3546, 3050B, 3580A, 3620D, 3630C, 5030B, 5035, 8260C, 8270D, 8270D-SIM, 8330, 8151A, 8015B, 8015C, 8082A, 8081B.)

**N** Certificate/Lab ID: 2064. **NELAP Accredited.**

*Drinking Water (Organic Parameters:* EPA Di-isopropyl ether (DIPE), Ethyl-t-butyl ether (ETBE), Tert-amyl methyl ether (TAME)).

*Non-Potable Water (Organic Parameters:* EPA 1,3,5-Trichlorobenzene. EPA CMTPH.)

*Solid & Chemical Materials (Organic Parameters:* EPA 1,3,5-Trichlorobenzene.)

**N** Certificate/Lab ID: MA935. **NELAP Accredited.**

*Drinking Water (Inorganic Parameters:* SM9222B, 9221E, 9223B, 9215B, 4500CN-CE, 4500NO3-F, 4500F-C, EPA 300.0, 200.7, 200.8, 245.1, 2540C, SM2120B, 2320B, 2510B, 5310C, SM4500H-B. Organic Parameters: EPA 332, 504.1, 524.2.)

*Non-Potable Water (Inorganic Parameters:* SM5210B, EPA 410.4, SM5220D, 4500CI-E, EPA 300.0, SM2120B, 2340B, SM4500F-BC, EPA 200.7, 200.8, 351.1, LACHAT 10-107-06-2-D, EPA 353.2, SM4500NO3-F, 4500NO2-B, EPA 1664A, SM5310B, C or D, 4500-PE, EPA 420.1, SM510ABC, SM4500P-B5+E, 2540B, 2540C, 2540D, EPA 120.1, SM2510B, SM15 426C, 9222D, 9221B, 9221C, 9221E, 9222B, 9215B, 2310B, 2320B, 4500NH3-H, 4500-S D, EPA 350.1, 350.2, SW-846 1312, 7470A, 5540C, SM4500H-B, 4500SO3-B, SM3500Cr-D, 4500CN-CE, EPA 245.1, SW-846 9040B, 9040C, 3005A, 3015, EPA 6010B, 6010C, 6020, 6020A, 7196A, 3060A, SW-846 9010C, 9030B. Organic Parameters: SW-846 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3510C, EPA 608, 624, 625, SW-846 3630C, 5030B, 8011, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 1,4-Dioxane by NJ Modified 8270, 8015B, NJ EPH.)

9050A, 9065, 9251. Organic Parameters: SW-846 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3540C, 3546, 3580A, 3620C, 3630C, 5030B, 5035L, 5035H, NJ EPH.)

**Norfolk County Certificate/Lab ID: 11148. NELAP Accredited.**

*Drinking Water* (Inorganic Parameters: SM9223B, 9222B, 9215B, EPA 200.8, 200.7, 245.1, SM5310C, EPA 332.0, SM2320B, EPA 300.0, SM2120B, 4500CN-E, 4500F-C, 4500NO3-F, 2540C, SM 2510B. Organic Parameters: EPA 524.2, 504.1.)

*Non-Potable Water* (Inorganic Parameters: SM9221E, 9222D, 9221B, 9222B, 9215B, 5210B, 5310C, EPA 410.4, SM5220D, 2310B, 2320B, EPA 200.7, 300.0, SM4500CL-E, 4500F-C, SM15 426C, EPA 350.1, SM4500NH3-BH, EPA 351.1, LACHAT 10-107-06-2, EPA 353.2, SM4500-NO3-F, 4500-NO2-B, 4500P-E, 2340B, 2540C, 2540B, 2540D, EPA 200.8, EPA 6010C, 6020A, EPA 7196A, SM3500Cr-D, EPA 245.1, 7470A, SM2120B, 4500CN-CE, EPA 1664A, EPA 420.1, SM14 510C, EPA 120.1, SM2510B, SM4500S-D, SM5540C, EPA 8315A, 3005A, 3015, 9010C, 9030B. Organic Parameters: EPA 624, 8260C, 8270D, 8270D-SIM, 625, 608, 8081B, 8151A, 8330, 8082A, EPA 3510C, 5030B, 8015C, 8011.)

*Solid & Hazardous Waste* (Inorganic Parameters: EPA 1010A, 1030, EPA 6010C, 6020A, 7196A, 7471B, 8315A, 9012B, 9014, 9065, 9050A, 9038, 9251, EPA 1311, 1312, 3005A, 3050B, 9010C, 9030B, 9040C, 9045D. Organic Parameters: EPA 8260C, 8270D, 8270D-SIM, 8015C, 8081B, 8151A, 8330, 8082A, 3540C, 3546, 3580A, 5035A-H, 5035A-L.)

**Norfolk County Environmental Department Certificate/Lab ID : 666. (Inorganic Parameters:** SM2310B, 2320B, 4500Cl-E, 4500Cn-E, 9012B, 9014, Lachat 10-204-00-1-X, 1010A, 1030, 4500NO3-F, 353.2, 4500P-E, 4500SO4-E, 300.0, 4500S-D, 5310B, 5310C, 6010C, 6020A, 200.7, 200.8, 3500Cr-B, 7196A, 245.1, 7470A, 7471B, 1311,1312. Organic Parameters: 608, 8081B, 8082A, 624, 8260B, 625, 8270D, 8151A, 8015C, 504.1, MA-EPH, MA-VPH.)

*Drinking Water Program Certificate/Lab ID: 25700. (Inorganic Parameters:* Chloride EPA 300.0. Organic Parameters: 524.2)

**Pennsylvania Environmental Protection Agency Certificate/Lab ID : 68-03671. NELAP Accredited.**

*Drinking Water* (Inorganic Parameters: 200.7, 200.8, 300.0, 332.0, 2120B, 2320B, 2510B, 2540C, 4500-CN-CE, 4500F-C, 4500H+-B, 4500NO3-F, 5310C. Organic Parameters: EPA 524.2, 504.1)

*Non-Potable Water* (Inorganic Parameters: EPA 120.1, 1312, 3005A,3015, 3060A, 200.7, 200.8, 410.4, 1664A, SM2540D, 5210B, 5220D, 4500-P,BE, 245.1, 300.0, 350.1, 350.2, 351.1, 353.2, 420.1, 6010C, 6020A, 7196A, 7470A, 9030B, 2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 3500Cr-D, 426C, 4500CN-CE, 4500Cl-E, 4500F-B, 4500F-C, 4500H+-B, 4500NH3-H, 4500NO2-B, 4500NO3-F, 4500S-D, 4500SO3-B, 5310BCD, 5540C, 9010C, 9040C. Organic Parameters: EPA 3510C, 3630C, 5030B, 625, 624, 608, 8081B, 8082A, 8151A, 8260C, 8270D, 8270D-SIM, 8330, 8015C, NJ-EPH.)

*Solid & Hazardous Waste* (Inorganic Parameters: EPA 350.1, 1010, 1030, 1311, 1312, 3005A, 3050B, 3060A, 6010C, 6020A, 7196A, 7471B, 9010C, 9012B, 9014, 9040B, 9045D, 9050A, 9065, SM 4500NH3-BH, 9030B, 9038, 9251. Organic Parameters: 3540C, 3546, 3580A, 3620C, 3630C, 5035, 8015C, 8081B, 8082A, 8151A, 8260C, 8270D, 8270D-SIM, 8330, NJ-EPH.)

**Rhode Island Certificate/Lab ID: LAO00065. NELAP Accredited via NJ-DEP.**

Refer to MA-DEP Certificate for Potable and Non-Potable Water.

Refer to NJ-DEP Certificate for Potable and Non-Potable Water.

**Tennessee Certificate/Lab ID: T104704476. NELAP Accredited.**

*Non-Potable Water* (Inorganic Parameters: EPA 120.1, 1664, 200.7, 200.8, 245.1, 245.2, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1, 6010, 6020, 7196, 7470, 9040, SM 2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 426C, 4500CL-E, 4500CN-E, 4500F-C, 4500H+B, 4500NH3-H, 4500NO2B, 4500P-E, 4500 S<sup>2-</sup> D, 510C, 5210B, 5220D, 5310C, 5540C. Organic Parameters: EPA 608, 624, 625, 8081, 8082, 8151, 8260, 8270, 8330.)

*Solid & Hazardous Waste* (Inorganic Parameters: EPA 1311, 1312, 9012, 9014, 9040, 9045, 9050, 9065.)

**Virginia Certificate/Lab ID: 460195. NELAP Accredited.**

*Drinking Water* (Inorganic Parameters: EPA 200.7, 200.8, 300.0, 2510B, 2120B, 2540C, 4500CN-CE, 245.1, 2320B, 4500F-C, 4500NO3-F, 4500H+B, 5310C. Organic Parameters: EPA 504.1, 524.2.)

*Non-Potable Water* (Inorganic Parameters: EPA 120.1, 1664A, 200.7, 200.8, 245.1, 300.0, 350.1, 351.1, 351.2, 3005A, 3015, 1312, 6010B, 6010C, 3060A, 353.2, 420.1, 2340B, 6020, 6020A, SM4500S-D, SM4500-CN-CE, Lachat 10-204-00-1-X, 7196A, 7470A, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 3500Cr-D, 426C, 4500Cl-E, 4500F-B, 4500F-C, 4500NH3-H, 4500NO2-B, 4500NO3-F, 4500 SO3-B, 4500H-B, 4500PE, 510AC, 5210B, 5310B 5310C, 5540C, 9010Cm

9030B, 9040C. Organic Parameters: EPA 3510C, 3630C, 5030B, 8260B, 608, 624, 625, 8011, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, )

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010A, 1030, 3060A, 3050B, 1311, 1312, 6010B, 6010C, 6020, , 7196A, 7471A, 7471B, 6020A, 9010C, 9012B, 9030B, 9014, 9038, 9040C, 9045D, 9251, 9050A, 9065. Organic Parameters: EPA 5030B, 5035, 3540C, 3546, 3550B, 3580A, 3620C, 3630C, 6020A, 8260B, 8260C, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330.)

LA Certificate/Lab ID: L2217.

Drinking Water (Inorganic Parameters: SM 4500H-B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: EPA 200.7, 200.8, 6010C, 6020A, 245.1, 7470A, 9040B, 9010B, 180.1, 300.0, 332.0, 6860, 351.1, 353.2, 9060, 1664A, SM 4500CN-E, 4500H-B, 4500Norg-C, 4500NO3-F, 5310C, 2130B, 2320B, 2340B, 2540C, 5540C, 3005A, 3015, 9056, 7196A, 3500-Cr-D. Organic Parameters: EPA 8015C, 8151A, 8260C, 8270D, 8270D-SIM, 8330A, 8082A, 8081B, 3510C, 5030B, MassDEP EPH, MassDEP VPH.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 200.7, 6010C, 6020A, 7471A, 6860, 1311, 1312, 3050B, 7196A, 9040B, 9045C, 9010C, 9012B, 9251, SM3500-CR-D, 4500CN-CE, 2540G, Organic Parameters: EPA 8015C, 8151A, 8260C, 8270D, 8270D-SIM, 8330A/B-prep, 8082A, 8081B, 3540C, 3546, 3580A, 5035A, MassDEP EPH, MassDEP VPH.)

NELAP TNI S A d

EPA Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether. EPA 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene. EPA N Iodomethane (methyl iodide), Methyl methacrylate. EPA S Tert-amyl methyl ether (TAME), Diisopropyl ether (DIPE), Azobenzene. EPA A PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT. EPA C Methyl naphthalene, Dimethyl naphthalene, Total Methylnaphthalenes, Total Dimethylnaphthalenes, 1,4-Diphenylhydrazine. EPA 4-Chloroaniline, 4-Methylphenol. Total Phosphorus in a soil matrix, TKN in a soil matrix, NO2 in a soil matrix, NO3 in a soil matrix. EPA Total Petroleum Hydrocarbons, Oil & Grease.







## ANALYTICAL REPORT

Lab Number:	L1318168
Client:	Langan Engineering & Environmental 21 Penn Plaza 360 W. 31st Street, 8th Floor New York, NY 10001-2727
ATTN:	Mimi Raygorodetsky
Phone:	(212) 479-5400
Project Name:	GREENPOINT LANDING
Project Number:	170229002
Report Date:	09/25/13

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Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>
L1318168-01	G2_SB-04C_0-0.5	BROOKLYN, NY	09/14/13 08:15
L1318168-02	G2_SB-05B_2.5-3	BROOKLYN, NY	09/14/13 08:43
L1318168-03	CSO_SB-01A_0-0.5	BROOKLYN, NY	09/14/13 09:00
L1318168-04	G2_COMP-04_0-5	BROOKLYN, NY	09/14/13 08:15
L1318168-05	G2_COMP-05_0-5	BROOKLYN, NY	09/14/13 08:55
L1318168-06	CSO_COMP-01_0-10	BROOKLYN, NY	09/14/13 09:15
L1318168-07	TB03_091413	BROOKLYN, NY	09/14/13 00:00

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

#### HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

### Case Narrative (continued)

#### Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

#### Semivolatile Organics

L1318168-04 has elevated detection limits due to the dilution required by the sample matrix.

L1318168-05 has elevated detection limits due to the dilution required by the matrix interferences encountered during the concentration of the sample and the analytical dilution required by the sample matrix.

#### Pesticides

L1318168-04, -05, and -06 have elevated detection limits due to the dilutions required by the sample matrices.

#### Total Metals

L1318168-04, -05, and -06 have elevated detection limits for all elements, with the exception of mercury, due to the dilutions required by matrix interferences encountered during analysis.

The WG637410-1 Method Blank, associated with L1318168-04, -05, and -06, has a concentration above the reporting limit for calcium. Since the associated sample concentrations are greater than 10x the blank concentration, no qualification of the results was performed.

#### Chromium, Hexavalent

The WG636545-5/-8 MS/MSD recoveries (60%/64%), performed on L1318168-04, are below the acceptance criteria; however, the associated LCS recovery is within criteria. This has been attributed to matrix interference.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:

 Kelly Stenstrom

Title: Technical Director/Representative

Date: 09/25/13

# ORGANICS

# VOLATILES

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-01  
**Client ID:** G2\_SB-04C\_0-0.5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/23/13 13:29  
**Analyst:** BN  
**Percent Solids:** 85%

**Date Collected:** 09/14/13 08:15  
**Date Received:** 09/14/13  
**Field Prep:** None

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	870	170	1
1,1-Dichloroethane	ND		ug/kg	130	15.	1
Chloroform	ND		ug/kg	130	32.	1
Carbon tetrachloride	ND		ug/kg	87	18.	1
1,2-Dichloropropane	ND		ug/kg	300	20.	1
Dibromochloromethane	ND		ug/kg	87	27.	1
1,1,2-Trichloroethane	ND		ug/kg	130	26.	1
Tetrachloroethene	ND		ug/kg	87	12.	1
Chlorobenzene	ND		ug/kg	87	30.	1
Trichlorofluoromethane	ND		ug/kg	440	10.	1
1,2-Dichloroethane	43	J	ug/kg	87	13.	1
1,1,1-Trichloroethane	ND		ug/kg	87	9.6	1
Bromodichloromethane	ND		ug/kg	87	20.	1
trans-1,3-Dichloropropene	ND		ug/kg	87	10.	1
cis-1,3-Dichloropropene	ND		ug/kg	87	11.	1
1,1-Dichloropropene	ND		ug/kg	440	40.	1
Bromoform	ND		ug/kg	350	36.	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	87	15.	1
Benzene	3500		ug/kg	87	10.	1
Toluene	9700		ug/kg	130	9.7	1
Ethylbenzene	3000		ug/kg	87	13.	1
Chloromethane	ND		ug/kg	440	68.	1
Bromomethane	ND		ug/kg	170	29.	1
Vinyl chloride	ND		ug/kg	170	12.	1
Chloroethane	ND		ug/kg	170	28.	1
1,1-Dichloroethene	ND		ug/kg	87	18.	1
trans-1,2-Dichloroethene	ND		ug/kg	130	18.	1
Trichloroethene	ND		ug/kg	87	13.	1
1,2-Dichlorobenzene	ND		ug/kg	440	16.	1
1,3-Dichlorobenzene	ND		ug/kg	440	16.	1
1,4-Dichlorobenzene	30	J	ug/kg	440	21.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-01  
 Client ID: G2\_SB-04C\_0-0.5  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: None

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methyl tert butyl ether	ND		ug/kg	170	9.1	1
p/m-Xylene	9900		ug/kg	170	28.	1
o-Xylene	2200		ug/kg	170	24.	1
cis-1,2-Dichloroethene	ND		ug/kg	87	13.	1
Dibromomethane	ND		ug/kg	870	14.	1
Styrene	ND		ug/kg	170	27.	1
Dichlorodifluoromethane	ND		ug/kg	870	19.	1
Acetone	310	J	ug/kg	870	270	1
Carbon disulfide	ND		ug/kg	870	170	1
2-Butanone	ND		ug/kg	870	31.	1
Vinyl acetate	ND		ug/kg	870	42.	1
4-Methyl-2-pentanone	ND		ug/kg	870	21.	1
1,2,3-Trichloropropane	45	J	ug/kg	870	20.	1
2-Hexanone	ND		ug/kg	870	16.	1
Bromochloromethane	ND		ug/kg	440	17.	1
2,2-Dichloropropane	ND		ug/kg	440	20.	1
1,2-Dibromoethane	ND		ug/kg	350	15.	1
1,3-Dichloropropane	ND		ug/kg	440	15.	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	87	28.	1
Bromobenzene	ND		ug/kg	440	18.	1
n-Butylbenzene	480		ug/kg	87	17.	1
sec-Butylbenzene	130		ug/kg	87	18.	1
tert-Butylbenzene	ND		ug/kg	440	49.	1
o-Chlorotoluene	ND		ug/kg	440	14.	1
p-Chlorotoluene	ND		ug/kg	440	13.	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	440	69.	1
Hexachlorobutadiene	ND		ug/kg	440	37.	1
Isopropylbenzene	250		ug/kg	87	14.	1
p-Isopropyltoluene	100		ug/kg	87	17.	1
Naphthalene	2300		ug/kg	440	67.	1
Acrylonitrile	ND		ug/kg	870	21.	1
n-Propylbenzene	1200		ug/kg	87	11.	1
1,2,3-Trichlorobenzene	ND		ug/kg	440	15.	1
1,2,4-Trichlorobenzene	ND		ug/kg	440	69.	1
1,3,5-Trimethylbenzene	1200		ug/kg	440	12.	1
1,2,4-Trimethylbenzene	5300		ug/kg	440	50.	1
Methyl Acetate	ND		ug/kg	1700	66.	1
Cyclohexane	ND		ug/kg	1700	93.	1
1,4-Dioxane	ND		ug/kg	8700	1500	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-01  
 Client ID: G2\_SB-04C\_0-0.5  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: None

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatiles Organics by 8260/5035 - Westborough Lab</b>						
Freon-113	ND		ug/kg	1700	24.	1
p-Diethylbenzene	2300		ug/kg	350	14.	1
p-Ethyltoluene	4600		ug/kg	350	10.	1
1,2,4,5-Tetramethylbenzene	2600		ug/kg	350	11.	1
Ethyl ether	ND		ug/kg	440	23.	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	440	39.	1
Methyl cyclohexane	1000		ug/kg	350	110	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	88		70-130
Dibromofluoromethane	92		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-02  
**Client ID:** G2\_SB-05B\_2.5-3  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/23/13 02:45  
**Analyst:** PP  
**Percent Solids:** 91%

**Date Collected:** 09/14/13 08:43  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	9.3	1.8	1
1,1-Dichloroethane	ND		ug/kg	1.4	0.16	1
Chloroform	ND		ug/kg	1.4	0.34	1
Carbon tetrachloride	ND		ug/kg	0.93	0.20	1
1,2-Dichloropropane	ND		ug/kg	3.2	0.21	1
Dibromochloromethane	ND		ug/kg	0.93	0.28	1
1,1,2-Trichloroethane	ND		ug/kg	1.4	0.28	1
Tetrachloroethene	ND		ug/kg	0.93	0.13	1
Chlorobenzene	ND		ug/kg	0.93	0.32	1
Trichlorofluoromethane	ND		ug/kg	4.6	0.11	1
1,2-Dichloroethane	ND		ug/kg	0.93	0.14	1
1,1,1-Trichloroethane	ND		ug/kg	0.93	0.10	1
Bromodichloromethane	ND		ug/kg	0.93	0.21	1
trans-1,3-Dichloropropene	ND		ug/kg	0.93	0.11	1
cis-1,3-Dichloropropene	ND		ug/kg	0.93	0.12	1
1,1-Dichloropropene	ND		ug/kg	4.6	0.42	1
Bromoform	ND		ug/kg	3.7	0.38	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.93	0.16	1
Benzene	ND		ug/kg	0.93	0.11	1
Toluene	ND		ug/kg	1.4	0.10	1
Ethylbenzene	ND		ug/kg	0.93	0.14	1
Chloromethane	ND		ug/kg	4.6	0.73	1
Bromomethane	ND		ug/kg	1.8	0.31	1
Vinyl chloride	ND		ug/kg	1.8	0.13	1
Chloroethane	ND		ug/kg	1.8	0.29	1
1,1-Dichloroethene	ND		ug/kg	0.93	0.19	1
trans-1,2-Dichloroethene	ND		ug/kg	1.4	0.20	1
Trichloroethene	ND		ug/kg	0.93	0.14	1
1,2-Dichlorobenzene	ND		ug/kg	4.6	0.17	1
1,3-Dichlorobenzene	ND		ug/kg	4.6	0.17	1
1,4-Dichlorobenzene	ND		ug/kg	4.6	0.22	1

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-02  
 Client ID: G2\_SB-05B\_2.5-3  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 08:43  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Methyl tert butyl ether	ND		ug/kg	1.8	0.10	1
p/m-Xylene	ND		ug/kg	1.8	0.30	1
o-Xylene	ND		ug/kg	1.8	0.25	1
cis-1,2-Dichloroethene	ND		ug/kg	0.93	0.14	1
Dibromomethane	ND		ug/kg	9.3	0.15	1
Styrene	ND		ug/kg	1.8	0.29	1
Dichlorodifluoromethane	ND		ug/kg	9.3	0.20	1
Acetone	ND		ug/kg	9.3	2.9	1
Carbon disulfide	ND		ug/kg	9.3	1.8	1
2-Butanone	ND		ug/kg	9.3	0.33	1
Vinyl acetate	ND		ug/kg	9.3	0.44	1
4-Methyl-2-pentanone	ND		ug/kg	9.3	0.23	1
1,2,3-Trichloropropane	ND		ug/kg	9.3	0.21	1
2-Hexanone	ND		ug/kg	9.3	0.17	1
Bromochloromethane	ND		ug/kg	4.6	0.18	1
2,2-Dichloropropane	ND		ug/kg	4.6	0.21	1
1,2-Dibromoethane	ND		ug/kg	3.7	0.16	1
1,3-Dichloropropane	ND		ug/kg	4.6	0.16	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	0.93	0.30	1
Bromobenzene	ND		ug/kg	4.6	0.19	1
n-Butylbenzene	ND		ug/kg	0.93	0.18	1
sec-Butylbenzene	ND		ug/kg	0.93	0.19	1
tert-Butylbenzene	ND		ug/kg	4.6	0.52	1
o-Chlorotoluene	ND		ug/kg	4.6	0.15	1
p-Chlorotoluene	ND		ug/kg	4.6	0.14	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	4.6	0.73	1
Hexachlorobutadiene	ND		ug/kg	4.6	0.39	1
Isopropylbenzene	ND		ug/kg	0.93	0.16	1
p-Isopropyltoluene	ND		ug/kg	0.93	0.18	1
Naphthalene	ND		ug/kg	4.6	0.71	1
Acrylonitrile	ND		ug/kg	9.3	0.22	1
n-Propylbenzene	ND		ug/kg	0.93	0.12	1
1,2,3-Trichlorobenzene	ND		ug/kg	4.6	0.16	1
1,2,4-Trichlorobenzene	ND		ug/kg	4.6	0.73	1
1,3,5-Trimethylbenzene	ND		ug/kg	4.6	0.13	1
1,2,4-Trimethylbenzene	ND		ug/kg	4.6	0.53	1
Methyl Acetate	ND		ug/kg	18	0.71	1
Cyclohexane	ND		ug/kg	18	1.0	1
1,4-Dioxane	ND		ug/kg	93	16.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-02  
 Client ID: G2\_SB-05B\_2.5-3  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 08:43  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Freon-113	ND		ug/kg	18	0.25	1
p-Diethylbenzene	ND		ug/kg	3.7	0.15	1
p-Ethyltoluene	ND		ug/kg	3.7	0.11	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	3.7	0.12	1
Ethyl ether	ND		ug/kg	4.6	0.25	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	4.6	0.42	1
Methyl cyclohexane	ND		ug/kg	3.7	1.2	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	101		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-03  
**Client ID:** CSO\_SB-01A\_0-0.5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/23/13 03:13  
**Analyst:** PP  
**Percent Solids:** 91%

**Date Collected:** 09/14/13 09:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by 8260/5035 - Westborough Lab</b>						
Methylene chloride	ND		ug/kg	10	2.0	1
1,1-Dichloroethane	ND		ug/kg	1.5	0.18	1
Chloroform	ND		ug/kg	1.5	0.37	1
Carbon tetrachloride	ND		ug/kg	1.0	0.21	1
1,2-Dichloropropane	ND		ug/kg	3.5	0.23	1
Dibromochloromethane	ND		ug/kg	1.0	0.31	1
1,1,2-Trichloroethane	ND		ug/kg	1.5	0.30	1
Tetrachloroethene	ND		ug/kg	1.0	0.14	1
Chlorobenzene	ND		ug/kg	1.0	0.35	1
Trichlorofluoromethane	ND		ug/kg	5.0	0.12	1
1,2-Dichloroethane	ND		ug/kg	1.0	0.15	1
1,1,1-Trichloroethane	ND		ug/kg	1.0	0.11	1
Bromodichloromethane	ND		ug/kg	1.0	0.23	1
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.12	1
cis-1,3-Dichloropropene	ND		ug/kg	1.0	0.13	1
1,1-Dichloropropene	ND		ug/kg	5.0	0.46	1
Bromoform	ND		ug/kg	4.0	0.41	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.0	0.17	1
Benzene	ND		ug/kg	1.0	0.12	1
Toluene	ND		ug/kg	1.5	0.11	1
Ethylbenzene	ND		ug/kg	1.0	0.15	1
Chloromethane	ND		ug/kg	5.0	0.78	1
Bromomethane	ND		ug/kg	2.0	0.34	1
Vinyl chloride	ND		ug/kg	2.0	0.14	1
Chloroethane	ND		ug/kg	2.0	0.32	1
1,1-Dichloroethene	ND		ug/kg	1.0	0.20	1
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.21	1
Trichloroethene	ND		ug/kg	1.0	0.15	1
1,2-Dichlorobenzene	ND		ug/kg	5.0	0.18	1
1,3-Dichlorobenzene	ND		ug/kg	5.0	0.18	1
1,4-Dichlorobenzene	ND		ug/kg	5.0	0.24	1

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-03  
 Client ID: CSO\_SB-01A\_0-0.5  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 09:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Methyl tert butyl ether	ND		ug/kg	2.0	0.10	1
p/m-Xylene	ND		ug/kg	2.0	0.32	1
o-Xylene	ND		ug/kg	2.0	0.27	1
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.15	1
Dibromomethane	ND		ug/kg	10	0.16	1
Styrene	ND		ug/kg	2.0	0.31	1
Dichlorodifluoromethane	ND		ug/kg	10	0.22	1
Acetone	3.4	J	ug/kg	10	3.1	1
Carbon disulfide	ND		ug/kg	10	2.0	1
2-Butanone	ND		ug/kg	10	0.36	1
Vinyl acetate	ND		ug/kg	10	0.48	1
4-Methyl-2-pentanone	ND		ug/kg	10	0.24	1
1,2,3-Trichloropropane	ND		ug/kg	10	0.22	1
2-Hexanone	ND		ug/kg	10	0.19	1
Bromochloromethane	ND		ug/kg	5.0	0.20	1
2,2-Dichloropropane	ND		ug/kg	5.0	0.22	1
1,2-Dibromoethane	ND		ug/kg	4.0	0.18	1
1,3-Dichloropropane	ND		ug/kg	5.0	0.17	1
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.0	0.32	1
Bromobenzene	ND		ug/kg	5.0	0.21	1
n-Butylbenzene	ND		ug/kg	1.0	0.20	1
sec-Butylbenzene	ND		ug/kg	1.0	0.20	1
tert-Butylbenzene	ND		ug/kg	5.0	0.56	1
o-Chlorotoluene	ND		ug/kg	5.0	0.16	1
p-Chlorotoluene	ND		ug/kg	5.0	0.15	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	0.79	1
Hexachlorobutadiene	ND		ug/kg	5.0	0.42	1
Isopropylbenzene	ND		ug/kg	1.0	0.17	1
p-Isopropyltoluene	ND		ug/kg	1.0	0.19	1
Naphthalene	ND		ug/kg	5.0	0.77	1
Acrylonitrile	ND		ug/kg	10	0.24	1
n-Propylbenzene	ND		ug/kg	1.0	0.12	1
1,2,3-Trichlorobenzene	ND		ug/kg	5.0	0.17	1
1,2,4-Trichlorobenzene	ND		ug/kg	5.0	0.79	1
1,3,5-Trimethylbenzene	ND		ug/kg	5.0	0.14	1
1,2,4-Trimethylbenzene	ND		ug/kg	5.0	0.57	1
Methyl Acetate	ND		ug/kg	20	0.76	1
Cyclohexane	ND		ug/kg	20	1.1	1
1,4-Dioxane	ND		ug/kg	100	17.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-03

Date Collected: 09/14/13 09:00

Client ID: CSO\_SB-01A\_0-0.5

Date Received: 09/14/13

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by 8260/5035 - Westborough Lab						
Freon-113	ND		ug/kg	20	0.27	1
p-Diethylbenzene	ND		ug/kg	4.0	0.16	1
p-Ethyltoluene	ND		ug/kg	4.0	0.12	1
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.0	0.13	1
Ethyl ether	ND		ug/kg	5.0	0.26	1
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	0.45	1
Methyl cyclohexane	ND		ug/kg	4.0	1.3	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	102		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-07  
**Client ID:** TB03\_091413  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Water  
**Analytical Method:** 1,8260C  
**Analytical Date:** 09/20/13 19:24  
**Analyst:** PD

**Date Collected:** 09/14/13 00:00  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatile Organics by GC/MS - Westborough Lab</b>						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.13	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
1,1-Dichloropropene	ND		ug/l	2.5	0.70	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.33	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.14	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Trichloroethene	ND		ug/l	0.50	0.17	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-07  
 Client ID: TB03\_091413  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 00:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Dibromomethane	ND		ug/l	5.0	1.0	1
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70	1
Acrylonitrile	ND		ug/l	5.0	1.5	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	2.6	J	ug/l	5.0	1.0	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.0	1
Vinyl acetate	ND		ug/l	5.0	1.0	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
2,2-Dichloropropane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
1,3-Dichloropropane	ND		ug/l	2.5	0.70	1
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70	1
Bromobenzene	ND		ug/l	2.5	0.70	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
tert-Butylbenzene	ND		ug/l	2.5	0.70	1
o-Chlorotoluene	ND		ug/l	2.5	0.70	1
p-Chlorotoluene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Hexachlorobutadiene	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
Methyl Acetate	ND		ug/l	2.0	0.23	1
Cyclohexane	ND		ug/l	10	0.24	1
1,4-Dioxane	ND		ug/l	250	41.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-07  
 Client ID: TB03\_091413  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 00:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Volatiles Organics by GC/MS - Westborough Lab</b>						
Freon-113	ND		ug/l	2.5	0.70	1
p-Diethylbenzene	ND		ug/l	2.0	0.70	1
p-Ethyltoluene	ND		ug/l	2.0	0.70	1
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65	1
Ethyl ether	ND		ug/l	2.5	0.70	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70	1
Methyl cyclohexane	ND		ug/l	10	0.29	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	87		70-130
Dibromofluoromethane	104		70-130

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/20/13 12:55  
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07 Batch: WG638014-3					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.13
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
1,1-Dichloropropene	ND		ug/l	2.5	0.70
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.14
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.33
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.14
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.17
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/20/13 12:55  
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07 Batch: WG638014-3					
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Dibromomethane	ND		ug/l	5.0	1.0
1,2,3-Trichloropropane	ND		ug/l	2.5	0.70
Acrylonitrile	ND		ug/l	5.0	1.5
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.0
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.0
Vinyl acetate	ND		ug/l	5.0	1.0
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
2,2-Dichloropropane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
1,3-Dichloropropane	ND		ug/l	2.5	0.70
1,1,1,2-Tetrachloroethane	ND		ug/l	2.5	0.70
Bromobenzene	ND		ug/l	2.5	0.70
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
tert-Butylbenzene	ND		ug/l	2.5	0.70
o-Chlorotoluene	ND		ug/l	2.5	0.70
p-Chlorotoluene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Hexachlorobutadiene	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/20/13 12:55  
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 07 Batch: WG638014-3					
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
Methyl Acetate	ND		ug/l	2.0	0.23
Cyclohexane	ND		ug/l	10	0.24
1,4-Dioxane	ND		ug/l	250	41.
Freon-113	ND		ug/l	2.5	0.70
p-Diethylbenzene	ND		ug/l	2.0	0.70
p-Ethyltoluene	ND		ug/l	2.0	0.70
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	0.65
Ethyl ether	ND		ug/l	2.5	0.70
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	0.70
Methyl cyclohexane	ND		ug/l	10	0.29

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	99		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	91		70-130
Dibromofluoromethane	100		70-130

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 09/22/13 17:50  
 Analyst: PP

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 02-03 Batch: WG638254-3					
Methylene chloride	ND		ug/kg	10	2.0
1,1-Dichloroethane	ND		ug/kg	1.5	0.18
Chloroform	ND		ug/kg	1.5	0.37
Carbon tetrachloride	ND		ug/kg	1.0	0.21
1,2-Dichloropropane	ND		ug/kg	3.5	0.23
Dibromochloromethane	ND		ug/kg	1.0	0.31
1,1,2-Trichloroethane	ND		ug/kg	1.5	0.30
Tetrachloroethene	ND		ug/kg	1.0	0.14
Chlorobenzene	ND		ug/kg	1.0	0.35
Trichlorofluoromethane	ND		ug/kg	5.0	0.12
1,2-Dichloroethane	ND		ug/kg	1.0	0.15
1,1,1-Trichloroethane	ND		ug/kg	1.0	0.11
Bromodichloromethane	ND		ug/kg	1.0	0.23
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.12
cis-1,3-Dichloropropene	ND		ug/kg	1.0	0.13
1,1-Dichloropropene	ND		ug/kg	5.0	0.46
Bromoform	ND		ug/kg	4.0	0.41
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.0	0.17
Benzene	ND		ug/kg	1.0	0.12
Toluene	ND		ug/kg	1.5	0.11
Ethylbenzene	ND		ug/kg	1.0	0.15
Chloromethane	ND		ug/kg	5.0	0.78
Bromomethane	ND		ug/kg	2.0	0.34
Vinyl chloride	ND		ug/kg	2.0	0.14
Chloroethane	ND		ug/kg	2.0	0.32
1,1-Dichloroethene	ND		ug/kg	1.0	0.20
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.21
Trichloroethene	ND		ug/kg	1.0	0.15
1,2-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,3-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,4-Dichlorobenzene	ND		ug/kg	5.0	0.24

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260C  
 Analytical Date: 09/22/13 17:50  
 Analyst: PP

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 02-03 Batch: WG638254-3					
Methyl tert butyl ether	ND		ug/kg	2.0	0.10
p/m-Xylene	ND		ug/kg	2.0	0.32
o-Xylene	ND		ug/kg	2.0	0.27
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.15
Dibromomethane	ND		ug/kg	10	0.16
Styrene	ND		ug/kg	2.0	0.31
Dichlorodifluoromethane	ND		ug/kg	10	0.22
Acetone	ND		ug/kg	10	3.1
Carbon disulfide	ND		ug/kg	10	2.0
2-Butanone	ND		ug/kg	10	0.36
Vinyl acetate	ND		ug/kg	10	0.48
4-Methyl-2-pentanone	ND		ug/kg	10	0.24
1,2,3-Trichloropropane	ND		ug/kg	10	0.22
2-Hexanone	ND		ug/kg	10	0.19
Bromochloromethane	ND		ug/kg	5.0	0.20
2,2-Dichloropropane	ND		ug/kg	5.0	0.22
1,2-Dibromoethane	ND		ug/kg	4.0	0.18
1,3-Dichloropropane	ND		ug/kg	5.0	0.17
1,1,1,2-Tetrachloroethane	ND		ug/kg	1.0	0.32
Bromobenzene	ND		ug/kg	5.0	0.21
n-Butylbenzene	ND		ug/kg	1.0	0.20
sec-Butylbenzene	ND		ug/kg	1.0	0.20
tert-Butylbenzene	ND		ug/kg	5.0	0.56
o-Chlorotoluene	ND		ug/kg	5.0	0.16
p-Chlorotoluene	ND		ug/kg	5.0	0.15
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	0.79
Hexachlorobutadiene	ND		ug/kg	5.0	0.42
Isopropylbenzene	ND		ug/kg	1.0	0.17
p-Isopropyltoluene	ND		ug/kg	1.0	0.19
Naphthalene	ND		ug/kg	5.0	0.77
Acrylonitrile	ND		ug/kg	10	0.24

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 09/22/13 17:50  
 Analyst: PP

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 02-03 Batch: WG638254-3					
n-Propylbenzene	ND		ug/kg	1.0	0.12
1,2,3-Trichlorobenzene	ND		ug/kg	5.0	0.17
1,2,4-Trichlorobenzene	ND		ug/kg	5.0	0.79
1,3,5-Trimethylbenzene	ND		ug/kg	5.0	0.14
1,2,4-Trimethylbenzene	ND		ug/kg	5.0	0.57
Methyl Acetate	ND		ug/kg	20	0.76
Cyclohexane	ND		ug/kg	20	1.1
1,4-Dioxane	ND		ug/kg	100	17.
Freon-113	ND		ug/kg	20	0.27
p-Diethylbenzene	ND		ug/kg	4.0	0.16
p-Ethyltoluene	ND		ug/kg	4.0	0.12
1,2,4,5-Tetramethylbenzene	ND		ug/kg	4.0	0.13
Ethyl ether	ND		ug/kg	5.0	0.26
trans-1,4-Dichloro-2-butene	ND		ug/kg	5.0	0.45
Methyl cyclohexane	ND		ug/kg	4.0	1.3

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	94		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	98		70-130

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
 Analytical Date: 09/23/13 09:30  
 Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01 Batch: WG638377-3					
Methylene chloride	ND		ug/kg	500	100
1,1-Dichloroethane	ND		ug/kg	75	8.9
Chloroform	ND		ug/kg	75	18.
Carbon tetrachloride	ND		ug/kg	50	10.
1,2-Dichloropropane	ND		ug/kg	180	11.
Dibromochloromethane	ND		ug/kg	50	15.
1,1,2-Trichloroethane	ND		ug/kg	75	15.
Tetrachloroethene	ND		ug/kg	50	7.0
Chlorobenzene	ND		ug/kg	50	17.
Trichlorofluoromethane	ND		ug/kg	250	6.1
1,2-Dichloroethane	ND		ug/kg	50	7.3
1,1,1-Trichloroethane	ND		ug/kg	50	5.5
Bromodichloromethane	ND		ug/kg	50	11.
trans-1,3-Dichloropropene	ND		ug/kg	50	6.0
cis-1,3-Dichloropropene	ND		ug/kg	50	6.4
1,1-Dichloropropene	ND		ug/kg	250	23.
Bromoform	ND		ug/kg	200	21.
1,1,2,2-Tetrachloroethane	ND		ug/kg	50	8.5
Benzene	ND		ug/kg	50	5.9
Toluene	ND		ug/kg	75	5.6
Ethylbenzene	ND		ug/kg	50	7.4
Chloromethane	ND		ug/kg	250	39.
Bromomethane	ND		ug/kg	100	17.
Vinyl chloride	ND		ug/kg	100	7.1
Chloroethane	ND		ug/kg	100	16.
1,1-Dichloroethene	ND		ug/kg	50	10.
trans-1,2-Dichloroethene	ND		ug/kg	75	10.
Trichloroethene	ND		ug/kg	50	7.6
1,2-Dichlorobenzene	ND		ug/kg	250	9.2
1,3-Dichlorobenzene	ND		ug/kg	250	9.2
1,4-Dichlorobenzene	ND		ug/kg	250	12.

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

### Method Blank Analysis Batch Quality Control

Analytical Method: 1,8260C  
 Analytical Date: 09/23/13 09:30  
 Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01 Batch: WG638377-3					
Methyl tert butyl ether	ND		ug/kg	100	5.2
p/m-Xylene	ND		ug/kg	100	16.
o-Xylene	ND		ug/kg	100	14.
cis-1,2-Dichloroethene	ND		ug/kg	50	7.5
Dibromomethane	ND		ug/kg	500	8.2
Styrene	ND		ug/kg	100	15.
Dichlorodifluoromethane	ND		ug/kg	500	11.
Acetone	ND		ug/kg	500	160
Carbon disulfide	ND		ug/kg	500	100
2-Butanone	ND		ug/kg	500	18.
Vinyl acetate	ND		ug/kg	500	24.
4-Methyl-2-pentanone	ND		ug/kg	500	12.
1,2,3-Trichloropropane	ND		ug/kg	500	11.
2-Hexanone	ND		ug/kg	500	9.4
Bromochloromethane	ND		ug/kg	250	9.8
2,2-Dichloropropane	ND		ug/kg	250	11.
1,2-Dibromoethane	ND		ug/kg	200	8.9
1,3-Dichloropropane	ND		ug/kg	250	8.6
1,1,1,2-Tetrachloroethane	ND		ug/kg	50	16.
Bromobenzene	ND		ug/kg	250	10.
n-Butylbenzene	ND		ug/kg	50	9.9
sec-Butylbenzene	ND		ug/kg	50	10.
tert-Butylbenzene	ND		ug/kg	250	28.
o-Chlorotoluene	ND		ug/kg	250	8.0
p-Chlorotoluene	ND		ug/kg	250	7.7
1,2-Dibromo-3-chloropropane	ND		ug/kg	250	39.
Hexachlorobutadiene	ND		ug/kg	250	21.
Isopropylbenzene	ND		ug/kg	50	8.4
p-Isopropyltoluene	ND		ug/kg	50	9.6
Naphthalene	ND		ug/kg	250	38.
Acrylonitrile	ND		ug/kg	500	12.

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8260C  
Analytical Date: 09/23/13 09:30  
Analyst: BN

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by EPA 5035 High - Westborough Lab for sample(s): 01 Batch: WG638377-3					
n-Propylbenzene	ND		ug/kg	50	6.3
1,2,3-Trichlorobenzene	ND		ug/kg	250	8.4
1,2,4-Trichlorobenzene	ND		ug/kg	250	39.
1,3,5-Trimethylbenzene	ND		ug/kg	250	7.2
1,2,4-Trimethylbenzene	ND		ug/kg	250	29.
Methyl Acetate	ND		ug/kg	1000	38.
Cyclohexane	ND		ug/kg	1000	54.
1,4-Dioxane	ND		ug/kg	5000	870
Freon-113	ND		ug/kg	1000	14.
p-Diethylbenzene	ND		ug/kg	200	8.0
p-Ethyltoluene	ND		ug/kg	200	5.8
1,2,4,5-Tetramethylbenzene	ND		ug/kg	200	6.5
Ethyl ether	ND		ug/kg	250	13.
trans-1,4-Dichloro-2-butene	ND		ug/kg	250	22.
Methyl cyclohexane	ND		ug/kg	200	63.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	96		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	99		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG638014-1 WG638014-2								
Methylene chloride	108		108		70-130	0		20
1,1-Dichloroethane	115		117		70-130	2		20
Chloroform	114		117		70-130	3		20
2-Chloroethylvinyl ether	78		80		70-130	3		20
Carbon tetrachloride	118		125		63-132	6		20
1,2-Dichloropropane	114		115		70-130	1		20
Dibromochloromethane	111		114		63-130	3		20
1,1,2-Trichloroethane	110		112		70-130	2		20
Tetrachloroethene	112		116		70-130	4		20
Chlorobenzene	110		112		75-130	2		20
Trichlorofluoromethane	106		111		62-150	5		20
1,2-Dichloroethane	106		108		70-130	2		20
1,1,1-Trichloroethane	115		118		67-130	3		20
Bromodichloromethane	108		111		67-130	3		20
trans-1,3-Dichloropropene	111		113		70-130	2		20
cis-1,3-Dichloropropene	112		115		70-130	3		20
1,1-Dichloropropene	117		121		70-130	3		20
Bromoform	109		117		54-136	7		20
1,1,2,2-Tetrachloroethane	110		113		67-130	3		20
Benzene	117		121		70-130	3		20
Toluene	112		115		70-130	3		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG638014-1 WG638014-2								
Ethylbenzene	110		112		70-130	2		20
Chloromethane	89		87		64-130	2		20
Bromomethane	48		50		39-139	4		20
Vinyl chloride	98		102		55-140	4		20
Chloroethane	92		94		55-138	2		20
1,1-Dichloroethene	116		123		61-145	6		20
trans-1,2-Dichloroethene	119		122		70-130	2		20
Trichloroethene	115		118		70-130	3		20
1,2-Dichlorobenzene	109		110		70-130	1		20
1,3-Dichlorobenzene	111		113		70-130	2		20
1,4-Dichlorobenzene	107		109		70-130	2		20
Methyl tert butyl ether	119		120		63-130	1		20
p/m-Xylene	110		111		70-130	1		20
o-Xylene	108		110		70-130	2		20
cis-1,2-Dichloroethene	116		118		70-130	2		20
Dibromomethane	111		115		70-130	4		20
1,2,3-Trichloropropane	116		115		64-130	1		20
Acrylonitrile	122		125		70-130	2		20
Isopropyl Ether	114		116		70-130	2		20
Styrene	109		110		70-130	1		20
Dichlorodifluoromethane	86		86		36-147	0		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG638014-1 WG638014-2								
Acetone	143		133		58-148	7		20
Carbon disulfide	116		123		51-130	6		20
2-Butanone	127		124		63-138	2		20
Vinyl acetate	113		116		70-130	3		20
4-Methyl-2-pentanone	108		110		59-130	2		20
2-Hexanone	103		104		57-130	1		20
Bromochloromethane	121		124		70-130	2		20
2,2-Dichloropropane	116		124		63-133	7		20
1,2-Dibromoethane	108		110		70-130	2		20
1,3-Dichloropropane	110		112		70-130	2		20
1,1,1,2-Tetrachloroethane	112		114		64-130	2		20
Bromobenzene	104		110		70-130	6		20
n-Butylbenzene	105		107		53-136	2		20
sec-Butylbenzene	108		112		70-130	4		20
tert-Butylbenzene	106		110		70-130	4		20
o-Chlorotoluene	111		114		70-130	3		20
p-Chlorotoluene	106		110		70-130	4		20
1,2-Dibromo-3-chloropropane	102		100		41-144	2		20
Hexachlorobutadiene	107		108		63-130	1		20
Isopropylbenzene	105		110		70-130	5		20
p-Isopropyltoluene	109		113		70-130	4		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG638014-1 WG638014-2								
Naphthalene	106		105		70-130	1		20
n-Propylbenzene	104		110		69-130	6		20
1,2,3-Trichlorobenzene	104		102		70-130	2		20
1,2,4-Trichlorobenzene	106		104		70-130	2		20
1,3,5-Trimethylbenzene	108		111		64-130	3		20
1,2,4-Trimethylbenzene	104		108		70-130	4		20
Methyl Acetate	118		119		70-130	1		20
Ethyl Acetate	114		117		70-130	3		20
Cyclohexane	122		128		70-130	5		20
Ethyl-Tert-Butyl-Ether	115		115		70-130	0		20
Tertiary-Amyl Methyl Ether	113		114		66-130	1		20
1,4-Dioxane	160		152		56-162	5		20
Freon-113	124		129		70-130	4		20
p-Diethylbenzene	104		107		70-130	3		20
p-Ethyltoluene	106		110		70-130	4		20
1,2,4,5-Tetramethylbenzene	111		111		70-130	0		20
Ethyl ether	118		120		59-134	2		20
trans-1,4-Dichloro-2-butene	82		84		70-130	2		20
Methyl cyclohexane	117		122		70-130	4		20

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 07 Batch: WG638014-1 WG638014-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	91		91		70-130
Toluene-d8	96		95		70-130
4-Bromofluorobenzene	92		94		70-130
Dibromofluoromethane	100		100		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02-03 Batch: WG638254-1 WG638254-2								
Methylene chloride	78		76		70-130	3		30
1,1-Dichloroethane	84		84		70-130	0		30
Chloroform	84		85		70-130	1		30
Carbon tetrachloride	89		88		70-130	1		30
1,2-Dichloropropane	84		85		70-130	1		30
Dibromochloromethane	94		95		70-130	1		30
1,1,2-Trichloroethane	93		94		70-130	1		30
Tetrachloroethene	98		98		70-130	0		30
Chlorobenzene	93		95		70-130	2		30
Trichlorofluoromethane	96		84		70-139	13		30
1,2-Dichloroethane	82		82		70-130	0		30
1,1,1-Trichloroethane	86		86		70-130	0		30
Bromodichloromethane	84		85		70-130	1		30
trans-1,3-Dichloropropene	92		93		70-130	1		30
cis-1,3-Dichloropropene	85		85		70-130	0		30
1,1-Dichloropropene	86		85		70-130	1		30
Bromoform	100		99		70-130	1		30
1,1,2,2-Tetrachloroethane	94		93		70-130	1		30
Benzene	87		86		70-130	1		30
Toluene	101		95		70-130	6		30
Ethylbenzene	93		94		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02-03 Batch: WG638254-1 WG638254-2								
Chloromethane	85		82		52-130	4		30
Bromomethane	101		102		57-147	1		30
Vinyl chloride	94		95		67-130	1		30
Chloroethane	97		100		50-151	3		30
1,1-Dichloroethene	90		89		65-135	1		30
trans-1,2-Dichloroethene	88		88		70-130	0		30
Trichloroethene	86		86		70-130	0		30
1,2-Dichlorobenzene	97		98		70-130	1		30
1,3-Dichlorobenzene	97		99		70-130	2		30
1,4-Dichlorobenzene	98		98		70-130	0		30
Methyl tert butyl ether	85		85		66-130	0		30
p/m-Xylene	95		96		70-130	1		30
o-Xylene	93		96		70-130	3		30
cis-1,2-Dichloroethene	86		87		70-130	1		30
Dibromomethane	86		85		70-130	1		30
Styrene	95		97		70-130	2		30
Dichlorodifluoromethane	83		81		30-146	2		30
Acetone	93		65		54-140	35	Q	30
Carbon disulfide	87		84		59-130	4		30
2-Butanone	100		79		70-130	23		30
Vinyl acetate	80		79		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02-03 Batch: WG638254-1 WG638254-2								
4-Methyl-2-pentanone	89		83		70-130	7		30
1,2,3-Trichloropropane	96		94		68-130	2		30
2-Hexanone	98		82		70-130	18		30
Bromochloromethane	88		88		70-130	0		30
2,2-Dichloropropane	89		87		70-130	2		30
1,2-Dibromoethane	94		94		70-130	0		30
1,3-Dichloropropane	91		93		69-130	2		30
1,1,1,2-Tetrachloroethane	93		95		70-130	2		30
Bromobenzene	95		96		70-130	1		30
n-Butylbenzene	98		97		70-130	1		30
sec-Butylbenzene	96		96		70-130	0		30
tert-Butylbenzene	96		97		70-130	1		30
o-Chlorotoluene	97		89		70-130	9		30
p-Chlorotoluene	95		96		70-130	1		30
1,2-Dibromo-3-chloropropane	96		97		68-130	1		30
Hexachlorobutadiene	99		100		67-130	1		30
Isopropylbenzene	94		95		70-130	1		30
p-Isopropyltoluene	98		98		70-130	0		30
Naphthalene	97		99		70-130	2		30
Acrylonitrile	88		84		70-130	5		30
Isopropyl Ether	81		82		66-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02-03 Batch: WG638254-1 WG638254-2								
tert-Butyl Alcohol	98		92		70-130	6		30
n-Propylbenzene	94		95		70-130	1		30
1,2,3-Trichlorobenzene	99		100		70-130	1		30
1,2,4-Trichlorobenzene	99		101		70-130	2		30
1,3,5-Trimethylbenzene	96		97		70-130	1		30
1,2,4-Trimethylbenzene	96		98		70-130	2		30
Methyl Acetate	89		84		51-146	6		30
Ethyl Acetate	91		83		70-130	9		30
Acrolein	97		86		70-130	12		30
Cyclohexane	86		83		59-142	4		30
1,4-Dioxane	100		96		65-136	4		30
1,1,2-Trichloro-1,2,2-Trifluoroethane	89		88		50-139	1		30
1,4-Diethylbenzene	99		99		70-130	0		30
4-Ethyltoluene	95		96		70-130	1		30
1,2,4,5-Tetramethylbenzene	96		100		70-130	4		30
Tetrahydrofuran	85		82		66-130	4		30
Ethyl ether	85		78		67-130	9		30
trans-1,4-Dichloro-2-butene	94		92		70-130	2		30
Methyl cyclohexane	88		86		70-130	2		30
Ethyl-Tert-Butyl-Ether	83		84		70-130	1		30
Tertiary-Amyl Methyl Ether	86		87		70-130	1		30

## Lab Control Sample Analysis

Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

Parameter	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>%Recovery</i> Limits	<i>RPD</i>	<i>Qual</i>	<i>RPD</i> Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 02-03 Batch: WG638254-1 WG638254-2								

<i>Surrogate</i>	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>Acceptance</i> <i>Criteria</i>
1,2-Dichloroethane-d4	97		93		70-130
Toluene-d8	103		104		70-130
4-Bromofluorobenzene	95		95		70-130
Dibromofluoromethane	99		98		70-130

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG638377-1 WG638377-2								
Methylene chloride	77		79		70-130	3		30
1,1-Dichloroethane	83		82		70-130	1		30
Chloroform	84		82		70-130	2		30
Carbon tetrachloride	89		86		70-130	3		30
1,2-Dichloropropane	84		84		70-130	0		30
Dibromochloromethane	91		92		70-130	1		30
1,1,2-Trichloroethane	91		90		70-130	1		30
Tetrachloroethene	95		93		70-130	2		30
Chlorobenzene	92		91		70-130	1		30
Trichlorofluoromethane	92		89		70-139	3		30
1,2-Dichloroethane	82		82		70-130	0		30
1,1,1-Trichloroethane	85		83		70-130	2		30
Bromodichloromethane	83		83		70-130	0		30
trans-1,3-Dichloropropene	88		89		70-130	1		30
cis-1,3-Dichloropropene	82		82		70-130	0		30
1,1-Dichloropropene	85		83		70-130	2		30
Bromoform	91		93		70-130	2		30
1,1,2,2-Tetrachloroethane	89		90		70-130	1		30
Benzene	85		84		70-130	1		30
Toluene	93		91		70-130	2		30
Ethylbenzene	92		91		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG638377-1 WG638377-2								
Chloromethane	76		77		52-130	1		30
Bromomethane	98		95		57-147	3		30
Vinyl chloride	79		84		67-130	6		30
Chloroethane	94		95		50-151	1		30
1,1-Dichloroethene	80		82		65-135	2		30
trans-1,2-Dichloroethene	84		83		70-130	1		30
Trichloroethene	85		83		70-130	2		30
1,2-Dichlorobenzene	93		94		70-130	1		30
1,3-Dichlorobenzene	94		95		70-130	1		30
1,4-Dichlorobenzene	94		95		70-130	1		30
Methyl tert butyl ether	78		80		66-130	3		30
p/m-Xylene	94		94		70-130	0		30
o-Xylene	94		92		70-130	2		30
cis-1,2-Dichloroethene	84		83		70-130	1		30
Dibromomethane	83		84		70-130	1		30
Styrene	94		93		70-130	1		30
Dichlorodifluoromethane	51		52		30-146	2		30
Acetone	77		75		54-140	3		30
Carbon disulfide	77		76		59-130	1		30
2-Butanone	93		93		70-130	0		30
Vinyl acetate	78		79		70-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG638377-1 WG638377-2								
4-Methyl-2-pentanone	77		80		70-130	4		30
1,2,3-Trichloropropane	90		91		68-130	1		30
2-Hexanone	88		87		70-130	1		30
Bromochloromethane	86		85		70-130	1		30
2,2-Dichloropropane	86		83		70-130	4		30
1,2-Dibromoethane	90		90		70-130	0		30
1,3-Dichloropropane	89		90		69-130	1		30
1,1,1,2-Tetrachloroethane	92		91		70-130	1		30
Bromobenzene	91		91		70-130	0		30
n-Butylbenzene	96		95		70-130	1		30
sec-Butylbenzene	95		94		70-130	1		30
tert-Butylbenzene	93		93		70-130	0		30
o-Chlorotoluene	94		94		70-130	0		30
p-Chlorotoluene	91		91		70-130	0		30
1,2-Dibromo-3-chloropropane	88		89		68-130	1		30
Hexachlorobutadiene	96		92		67-130	4		30
Isopropylbenzene	91		90		70-130	1		30
p-Isopropyltoluene	95		95		70-130	0		30
Naphthalene	85		90		70-130	6		30
Acrylonitrile	82		83		70-130	1		30
Isopropyl Ether	79		80		66-130	1		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG638377-1 WG638377-2								
tert-Butyl Alcohol	82		86		70-130	5		30
n-Propylbenzene	92		91		70-130	1		30
1,2,3-Trichlorobenzene	91		92		70-130	1		30
1,2,4-Trichlorobenzene	92		94		70-130	2		30
1,3,5-Trimethylbenzene	94		93		70-130	1		30
1,2,4-Trimethylbenzene	95		94		70-130	1		30
Methyl Acetate	78		80		51-146	3		30
Ethyl Acetate	79		80		70-130	1		30
Acrolein	85		85		70-130	0		30
Cyclohexane	83		81		59-142	2		30
1,4-Dioxane	91		95		65-136	4		30
1,1,2-Trichloro-1,2,2-Trifluoroethane	85		83		50-139	2		30
1,4-Diethylbenzene	94		94		70-130	0		30
4-Ethyltoluene	93		92		70-130	1		30
1,2,4,5-Tetramethylbenzene	93		93		70-130	0		30
Tetrahydrofuran	92		79		66-130	15		30
Ethyl ether	70		86		67-130	21		30
trans-1,4-Dichloro-2-butene	87		90		70-130	3		30
Methyl cyclohexane	86		84		70-130	2		30
Ethyl-Tert-Butyl-Ether	80		80		70-130	0		30
Tertiary-Amyl Methyl Ether	82		82		70-130	0		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>%Recovery</i> Limits	<i>RPD</i>	<i>Qual</i>	<i>RPD</i> Limits
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Volatile Organics by EPA 5035 High - Westborough Lab Associated sample(s): 01 Batch: WG638377-1 WG638377-2

<i>Surrogate</i>	<i>LCS</i> %Recovery	<i>Qual</i>	<i>LCSD</i> %Recovery	<i>Qual</i>	<i>Acceptance</i> Criteria
1,2-Dichloroethane-d4	97		97		70-130
Toluene-d8	104		103		70-130
4-Bromofluorobenzene	92		93		70-130
Dibromofluoromethane	100		99		70-130

# SEMIVOLATILES

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-04 D  
 Client ID: G2\_COMP-04\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8270D  
 Analytical Date: 09/20/13 23:55  
 Analyst: PS  
 Percent Solids: 90%

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	120	J	ug/kg	290	75.	2
1,2,4-Trichlorobenzene	ND		ug/kg	360	120	2
Hexachlorobenzene	ND		ug/kg	220	68.	2
Bis(2-chloroethyl)ether	ND		ug/kg	330	100	2
2-Chloronaphthalene	ND		ug/kg	360	120	2
1,2-Dichlorobenzene	ND		ug/kg	360	120	2
1,3-Dichlorobenzene	ND		ug/kg	360	110	2
1,4-Dichlorobenzene	ND		ug/kg	360	110	2
3,3'-Dichlorobenzidine	ND		ug/kg	360	97.	2
2,4-Dinitrotoluene	ND		ug/kg	360	78.	2
2,6-Dinitrotoluene	ND		ug/kg	360	93.	2
Fluoranthene	1800		ug/kg	220	67.	2
4-Chlorophenyl phenyl ether	ND		ug/kg	360	110	2
4-Bromophenyl phenyl ether	ND		ug/kg	360	84.	2
Bis(2-chloroisopropyl)ether	ND		ug/kg	440	130	2
Bis(2-chloroethoxy)methane	ND		ug/kg	390	110	2
Hexachlorobutadiene	ND		ug/kg	360	100	2
Hexachlorocyclopentadiene	ND		ug/kg	1000	230	2
Hexachloroethane	ND		ug/kg	290	66.	2
Isophorone	ND		ug/kg	330	97.	2
Naphthalene	540		ug/kg	360	120	2
Nitrobenzene	ND		ug/kg	330	86.	2
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	290	76.	2
n-Nitrosodi-n-propylamine	ND		ug/kg	360	110	2
Bis(2-Ethylhexyl)phthalate	150	J	ug/kg	360	95.	2
Butyl benzyl phthalate	ND		ug/kg	360	71.	2
Di-n-butylphthalate	ND		ug/kg	360	70.	2
Di-n-octylphthalate	ND		ug/kg	360	90.	2
Diethyl phthalate	ND		ug/kg	360	77.	2
Dimethyl phthalate	ND		ug/kg	360	92.	2
Benzo(a)anthracene	830		ug/kg	220	71.	2

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-04 D

Date Collected: 09/14/13 08:15

Client ID: G2\_COMP-04\_0-5

Date Received: 09/14/13

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)pyrene	830		ug/kg	290	89.	2
Benzo(b)fluoranthene	1100		ug/kg	220	73.	2
Benzo(k)fluoranthene	420		ug/kg	220	69.	2
Chrysene	960		ug/kg	220	71.	2
Acenaphthylene	120	J	ug/kg	290	68.	2
Anthracene	340		ug/kg	220	60.	2
Benzo(ghi)perylene	620		ug/kg	290	76.	2
Fluorene	240	J	ug/kg	360	100	2
Phenanthrene	1500		ug/kg	220	71.	2
Dibenzo(a,h)anthracene	170	J	ug/kg	220	70.	2
Indeno(1,2,3-cd)Pyrene	620		ug/kg	290	81.	2
Pyrene	1700		ug/kg	220	71.	2
Biphenyl	ND		ug/kg	830	120	2
4-Chloroaniline	ND		ug/kg	360	96.	2
2-Nitroaniline	ND		ug/kg	360	100	2
3-Nitroaniline	ND		ug/kg	360	100	2
4-Nitroaniline	ND		ug/kg	360	98.	2
Dibenzofuran	170	J	ug/kg	360	120	2
2-Methylnaphthalene	370	J	ug/kg	440	120	2
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	360	110	2
Acetophenone	ND		ug/kg	360	110	2
2,4,6-Trichlorophenol	ND		ug/kg	220	69.	2
P-Chloro-M-Cresol	ND		ug/kg	360	100	2
2-Chlorophenol	ND		ug/kg	360	110	2
2,4-Dichlorophenol	ND		ug/kg	330	120	2
2,4-Dimethylphenol	ND		ug/kg	360	110	2
2-Nitrophenol	ND		ug/kg	780	110	2
4-Nitrophenol	ND		ug/kg	510	120	2
2,4-Dinitrophenol	ND		ug/kg	1700	500	2
4,6-Dinitro-o-cresol	ND		ug/kg	950	130	2
Pentachlorophenol	ND		ug/kg	290	78.	2
Phenol	ND		ug/kg	360	110	2
2-Methylphenol	ND		ug/kg	360	120	2
3-Methylphenol/4-Methylphenol	ND		ug/kg	520	120	2
2,4,5-Trichlorophenol	ND		ug/kg	360	120	2
Benzoic Acid	ND		ug/kg	1200	370	2
Benzyl Alcohol	ND		ug/kg	360	110	2
Carbazole	120	J	ug/kg	360	78.	2
Benzaldehyde	ND		ug/kg	480	150	2

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-04 D

Date Collected: 09/14/13 08:15

Client ID: G2\_COMP-04\_0-5

Date Received: 09/14/13

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Caprolactam	ND		ug/kg	360	100	2
Atrazine	ND		ug/kg	290	82.	2
2,3,4,6-Tetrachlorophenol	ND		ug/kg	360	62.	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	45		25-120
Phenol-d6	52		10-120
Nitrobenzene-d5	66		23-120
2-Fluorobiphenyl	63		30-120
2,4,6-Tribromophenol	43		0-136
4-Terphenyl-d14	62		18-120

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-05 D  
 Client ID: G2\_COMP-05\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8270D  
 Analytical Date: 09/21/13 00:23  
 Analyst: PS  
 Percent Solids: 86%

Date Collected: 09/14/13 08:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	820		ug/kg	610	160	4
1,2,4-Trichlorobenzene	ND		ug/kg	770	250	4
Hexachlorobenzene	ND		ug/kg	460	140	4
Bis(2-chloroethyl)ether	ND		ug/kg	690	220	4
2-Chloronaphthalene	ND		ug/kg	770	250	4
1,2-Dichlorobenzene	ND		ug/kg	770	250	4
1,3-Dichlorobenzene	ND		ug/kg	770	240	4
1,4-Dichlorobenzene	ND		ug/kg	770	230	4
3,3'-Dichlorobenzidine	ND		ug/kg	770	200	4
2,4-Dinitrotoluene	ND		ug/kg	770	160	4
2,6-Dinitrotoluene	ND		ug/kg	770	200	4
Fluoranthene	6900		ug/kg	460	140	4
4-Chlorophenyl phenyl ether	ND		ug/kg	770	230	4
4-Bromophenyl phenyl ether	ND		ug/kg	770	180	4
Bis(2-chloroisopropyl)ether	ND		ug/kg	920	270	4
Bis(2-chloroethoxy)methane	ND		ug/kg	830	230	4
Hexachlorobutadiene	ND		ug/kg	770	220	4
Hexachlorocyclopentadiene	ND		ug/kg	2200	490	4
Hexachloroethane	ND		ug/kg	610	140	4
Isophorone	ND		ug/kg	690	200	4
Naphthalene	460	J	ug/kg	770	260	4
Nitrobenzene	ND		ug/kg	690	180	4
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	610	160	4
n-Nitrosodi-n-propylamine	ND		ug/kg	770	230	4
Bis(2-Ethylhexyl)phthalate	210	J	ug/kg	770	200	4
Butyl benzyl phthalate	ND		ug/kg	770	150	4
Di-n-butylphthalate	ND		ug/kg	770	150	4
Di-n-octylphthalate	ND		ug/kg	770	190	4
Diethyl phthalate	ND		ug/kg	770	160	4
Dimethyl phthalate	ND		ug/kg	770	200	4
Benzo(a)anthracene	3500		ug/kg	460	150	4

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-05 D

Date Collected: 09/14/13 08:55

Client ID: G2\_COMP-05\_0-5

Date Received: 09/14/13

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)pyrene	3300		ug/kg	610	190	4
Benzo(b)fluoranthene	3400		ug/kg	460	160	4
Benzo(k)fluoranthene	1500		ug/kg	460	150	4
Chrysene	3600		ug/kg	460	150	4
Acenaphthylene	310	J	ug/kg	610	140	4
Anthracene	2000		ug/kg	460	130	4
Benzo(ghi)perylene	1800		ug/kg	610	160	4
Fluorene	870		ug/kg	770	220	4
Phenanthrene	7100		ug/kg	460	150	4
Dibenzo(a,h)anthracene	480		ug/kg	460	150	4
Indeno(1,2,3-cd)Pyrene	1800		ug/kg	610	170	4
Pyrene	7400		ug/kg	460	150	4
Biphenyl	ND		ug/kg	1800	250	4
4-Chloroaniline	ND		ug/kg	770	200	4
2-Nitroaniline	ND		ug/kg	770	220	4
3-Nitroaniline	ND		ug/kg	770	210	4
4-Nitroaniline	ND		ug/kg	770	210	4
Dibenzofuran	320	J	ug/kg	770	260	4
2-Methylnaphthalene	430	J	ug/kg	920	240	4
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	770	240	4
Acetophenone	ND		ug/kg	770	240	4
2,4,6-Trichlorophenol	ND		ug/kg	460	140	4
P-Chloro-M-Cresol	ND		ug/kg	770	220	4
2-Chlorophenol	ND		ug/kg	770	230	4
2,4-Dichlorophenol	ND		ug/kg	690	250	4
2,4-Dimethylphenol	ND		ug/kg	770	230	4
2-Nitrophenol	ND		ug/kg	1600	240	4
4-Nitrophenol	ND		ug/kg	1100	250	4
2,4-Dinitrophenol	ND		ug/kg	3700	1000	4
4,6-Dinitro-o-cresol	ND		ug/kg	2000	280	4
Pentachlorophenol	ND		ug/kg	610	160	4
Phenol	ND		ug/kg	770	230	4
2-Methylphenol	ND		ug/kg	770	250	4
3-Methylphenol/4-Methylphenol	ND		ug/kg	1100	250	4
2,4,5-Trichlorophenol	ND		ug/kg	770	250	4
Benzoic Acid	ND		ug/kg	2500	780	4
Benzyl Alcohol	ND		ug/kg	770	240	4
Carbazole	340	J	ug/kg	770	160	4
Benzaldehyde	ND		ug/kg	1000	310	4

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-05 D

Date Collected: 09/14/13 08:55

Client ID: G2\_COMP-05\_0-5

Date Received: 09/14/13

Sample Location: BROOKLYN, NY

Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Caprolactam	ND		ug/kg	770	210	4
Atrazine	ND		ug/kg	610	170	4
2,3,4,6-Tetrachlorophenol	ND		ug/kg	770	130	4

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	70		25-120
Phenol-d6	72		10-120
Nitrobenzene-d5	102		23-120
2-Fluorobiphenyl	84		30-120
2,4,6-Tribromophenol	91		0-136
4-Terphenyl-d14	76		18-120

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-06  
**Client ID:** CSO\_COMP-01\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 09/21/13 00:51  
**Analyst:** PS  
**Percent Solids:** 90%

**Date Collected:** 09/14/13 09:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Semivolatile Organics by GC/MS - Westborough Lab</b>						
Acenaphthene	350		ug/kg	140	37.	1
1,2,4-Trichlorobenzene	ND		ug/kg	180	59.	1
Hexachlorobenzene	ND		ug/kg	110	34.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	51.	1
2-Chloronaphthalene	ND		ug/kg	180	59.	1
1,2-Dichlorobenzene	ND		ug/kg	180	59.	1
1,3-Dichlorobenzene	ND		ug/kg	180	57.	1
1,4-Dichlorobenzene	ND		ug/kg	180	55.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	48.	1
2,4-Dinitrotoluene	ND		ug/kg	180	39.	1
2,6-Dinitrotoluene	ND		ug/kg	180	46.	1
Fluoranthene	7800	E	ug/kg	110	33.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	55.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	42.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	64.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	55.	1
Hexachlorobutadiene	ND		ug/kg	180	51.	1
Hexachlorocyclopentadiene	ND		ug/kg	520	120	1
Hexachloroethane	ND		ug/kg	140	33.	1
Isophorone	ND		ug/kg	160	48.	1
Naphthalene	140	J	ug/kg	180	60.	1
Nitrobenzene	ND		ug/kg	160	43.	1
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	140	38.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	54.	1
Bis(2-Ethylhexyl)phthalate	68	J	ug/kg	180	47.	1
Butyl benzyl phthalate	ND		ug/kg	180	35.	1
Di-n-butylphthalate	ND		ug/kg	180	35.	1
Di-n-octylphthalate	ND		ug/kg	180	44.	1
Diethyl phthalate	ND		ug/kg	180	38.	1
Dimethyl phthalate	ND		ug/kg	180	46.	1
Benzo(a)anthracene	4500		ug/kg	110	35.	1

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-06  
 Client ID: CSO\_COMP-01\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 09:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Benzo(a)pyrene	4300		ug/kg	140	44.	1
Benzo(b)fluoranthene	5300		ug/kg	110	36.	1
Benzo(k)fluoranthene	1600		ug/kg	110	34.	1
Chrysene	4200		ug/kg	110	35.	1
Acenaphthylene	110	J	ug/kg	140	34.	1
Anthracene	1600		ug/kg	110	30.	1
Benzo(ghi)perylene	2500		ug/kg	140	38.	1
Fluorene	350		ug/kg	180	52.	1
Phenanthrene	4300		ug/kg	110	35.	1
Dibenzo(a,h)anthracene	760		ug/kg	110	35.	1
Indeno(1,2,3-cd)Pyrene	2700		ug/kg	140	40.	1
Pyrene	7400	E	ug/kg	110	35.	1
Biphenyl	ND		ug/kg	410	60.	1
4-Chloroaniline	ND		ug/kg	180	48.	1
2-Nitroaniline	ND		ug/kg	180	51.	1
3-Nitroaniline	ND		ug/kg	180	50.	1
4-Nitroaniline	ND		ug/kg	180	49.	1
Dibenzofuran	170	J	ug/kg	180	60.	1
2-Methylnaphthalene	93	J	ug/kg	220	58.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	56.	1
Acetophenone	ND		ug/kg	180	56.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
P-Chloro-M-Cresol	ND		ug/kg	180	52.	1
2-Chlorophenol	ND		ug/kg	180	54.	1
2,4-Dichlorophenol	ND		ug/kg	160	58.	1
2,4-Dimethylphenol	ND		ug/kg	180	54.	1
2-Nitrophenol	ND		ug/kg	390	56.	1
4-Nitrophenol	ND		ug/kg	250	58.	1
2,4-Dinitrophenol	ND		ug/kg	870	250	1
4,6-Dinitro-o-cresol	ND		ug/kg	470	66.	1
Pentachlorophenol	ND		ug/kg	140	39.	1
Phenol	ND		ug/kg	180	53.	1
2-Methylphenol	ND		ug/kg	180	58.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	260	59.	1
2,4,5-Trichlorophenol	ND		ug/kg	180	58.	1
Benzoic Acid	ND		ug/kg	580	180	1
Benzyl Alcohol	ND		ug/kg	180	56.	1
Carbazole	220		ug/kg	180	39.	1
Benzaldehyde	ND		ug/kg	240	73.	1

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-06  
 Client ID: CSO\_COMP-01\_0-10  
 Sample Location: BROOKLYN, NY

Date Collected: 09/14/13 09:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Caprolactam	ND		ug/kg	180	50.	1
Atrazine	ND		ug/kg	140	41.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	180	31.	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	80		25-120
Phenol-d6	82		10-120
Nitrobenzene-d5	83		23-120
2-Fluorobiphenyl	93		30-120
2,4,6-Tribromophenol	102		0-136
4-Terphenyl-d14	100		18-120

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-06 D  
**Client ID:** CSO\_COMP-01\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8270D  
**Analytical Date:** 09/25/13 00:06  
**Analyst:** PS  
**Percent Solids:** 90%

**Date Collected:** 09/14/13 09:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Fluoranthene	9400		ug/kg	220	66.	2
Pyrene	9000		ug/kg	220	70.	2

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8270D  
 Analytical Date: 09/18/13 11:04  
 Analyst: PS

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 04-06 Batch: WG636555-1					
Acenaphthene	ND		ug/kg	130	33.
1,2,4-Trichlorobenzene	ND		ug/kg	160	53.
Hexachlorobenzene	ND		ug/kg	97	30.
Bis(2-chloroethyl)ether	ND		ug/kg	140	45.
2-Chloronaphthalene	ND		ug/kg	160	53.
1,2-Dichlorobenzene	ND		ug/kg	160	53.
1,3-Dichlorobenzene	ND		ug/kg	160	51.
1,4-Dichlorobenzene	ND		ug/kg	160	49.
3,3'-Dichlorobenzidine	ND		ug/kg	160	43.
2,4-Dinitrotoluene	ND		ug/kg	160	35.
2,6-Dinitrotoluene	ND		ug/kg	160	41.
Fluoranthene	ND		ug/kg	97	30.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	49.
4-Bromophenyl phenyl ether	ND		ug/kg	160	37.
Bis(2-chloroisopropyl)ether	ND		ug/kg	190	57.
Bis(2-chloroethoxy)methane	ND		ug/kg	170	49.
Hexachlorobutadiene	ND		ug/kg	160	46.
Hexachlorocyclopentadiene	ND		ug/kg	460	100
Hexachloroethane	ND		ug/kg	130	29.
Isophorone	ND		ug/kg	140	43.
Naphthalene	ND		ug/kg	160	54.
Nitrobenzene	ND		ug/kg	140	38.
NitrosoDiPhenylAmine(NDPA)/DPA	ND		ug/kg	130	34.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	48.
Bis(2-Ethylhexyl)phthalate	ND		ug/kg	160	42.
Butyl benzyl phthalate	ND		ug/kg	160	32.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	40.
Diethyl phthalate	ND		ug/kg	160	34.
Dimethyl phthalate	ND		ug/kg	160	41.
Benzo(a)anthracene	ND		ug/kg	97	32.

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8270D  
 Analytical Date: 09/18/13 11:04  
 Analyst: PS

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 04-06 Batch: WG636555-1					
Benzo(a)pyrene	ND		ug/kg	130	40.
Benzo(b)fluoranthene	ND		ug/kg	97	33.
Benzo(k)fluoranthene	ND		ug/kg	97	31.
Chrysene	ND		ug/kg	97	32.
Acenaphthylene	ND		ug/kg	130	30.
Anthracene	ND		ug/kg	97	27.
Benzo(ghi)perylene	ND		ug/kg	130	34.
Fluorene	ND		ug/kg	160	46.
Phenanthrene	ND		ug/kg	97	32.
Dibenzo(a,h)anthracene	ND		ug/kg	97	31.
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	130	36.
Pyrene	ND		ug/kg	97	31.
Biphenyl	ND		ug/kg	370	53.
4-Chloroaniline	ND		ug/kg	160	43.
2-Nitroaniline	ND		ug/kg	160	46.
3-Nitroaniline	ND		ug/kg	160	45.
4-Nitroaniline	ND		ug/kg	160	44.
Dibenzofuran	ND		ug/kg	160	54.
2-Methylnaphthalene	ND		ug/kg	190	52.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	50.
Acetophenone	ND		ug/kg	160	50.
2,4,6-Trichlorophenol	ND		ug/kg	97	30.
P-Chloro-M-Cresol	ND		ug/kg	160	47.
2-Chlorophenol	ND		ug/kg	160	49.
2,4-Dichlorophenol	ND		ug/kg	140	52.
2,4-Dimethylphenol	ND		ug/kg	160	48.
2-Nitrophenol	ND		ug/kg	350	50.
4-Nitrophenol	ND		ug/kg	230	52.
2,4-Dinitrophenol	ND		ug/kg	780	220
4,6-Dinitro-o-cresol	ND		ug/kg	420	59.
Pentachlorophenol	ND		ug/kg	130	35.

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8270D  
 Analytical Date: 09/18/13 11:04  
 Analyst: PS

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 20:31

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 04-06 Batch: WG636555-1					
Phenol	ND		ug/kg	160	48.
2-Methylphenol	ND		ug/kg	160	52.
3-Methylphenol/4-Methylphenol	ND		ug/kg	230	53.
2,4,5-Trichlorophenol	ND		ug/kg	160	52.
Benzoic Acid	ND		ug/kg	520	160
Benzyl Alcohol	ND		ug/kg	160	50.
Carbazole	ND		ug/kg	160	35.
Benzaldehyde	ND		ug/kg	210	65.
Caprolactam	ND		ug/kg	160	45.
Atrazine	ND		ug/kg	130	37.
2,3,4,6-Tetrachlorophenol	ND		ug/kg	160	28.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	82		25-120
Phenol-d6	79		10-120
Nitrobenzene-d5	81		23-120
2-Fluorobiphenyl	74		30-120
2,4,6-Tribromophenol	83		0-136
4-Terphenyl-d14	81		18-120

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 04-06 Batch: WG636555-2 WG636555-3								
Acenaphthene	87		92		31-137	6		50
1,2,4-Trichlorobenzene	72		76		38-107	5		50
Hexachlorobenzene	98		98		40-140	0		50
Bis(2-chloroethyl)ether	70		75		40-140	7		50
2-Chloronaphthalene	79		86		40-140	8		50
1,2-Dichlorobenzene	71		77		40-140	8		50
1,3-Dichlorobenzene	69		76		40-140	10		50
1,4-Dichlorobenzene	69		76		28-104	10		50
3,3'-Dichlorobenzidine	63		58		40-140	8		50
2,4-Dinitrotoluene	109	Q	110	Q	28-89	1		50
2,6-Dinitrotoluene	102		106		40-140	4		50
Fluoranthene	110		110		40-140	0		50
4-Chlorophenyl phenyl ether	92		96		40-140	4		50
4-Bromophenyl phenyl ether	99		103		40-140	4		50
Bis(2-chloroisopropyl)ether	73		78		40-140	7		50
Bis(2-chloroethoxy)methane	74		79		40-117	7		50
Hexachlorobutadiene	71		77		40-140	8		50
Hexachlorocyclopentadiene	79		82		40-140	4		50
Hexachloroethane	71		78		40-140	9		50
Isophorone	80		85		40-140	6		50
Naphthalene	74		79		40-140	7		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 04-06 Batch: WG636555-2 WG636555-3								
Nitrobenzene	78		85		40-140	9		50
NitrosoDiPhenylAmine(NDPA)/DPA	106		108			2		50
n-Nitrosodi-n-propylamine	83		89		32-121	7		50
Bis(2-Ethylhexyl)phthalate	103		105		40-140	2		50
Butyl benzyl phthalate	126		120		40-140	5		50
Di-n-butylphthalate	119		118		40-140	1		50
Di-n-octylphthalate	111		112		40-140	1		50
Diethyl phthalate	109		109		40-140	0		50
Dimethyl phthalate	99		102		40-140	3		50
Benzo(a)anthracene	106		107		40-140	1		50
Benzo(a)pyrene	104		108		40-140	4		50
Benzo(b)fluoranthene	103		101		40-140	2		50
Benzo(k)fluoranthene	96		103		40-140	7		50
Chrysene	98		101		40-140	3		50
Acenaphthylene	89		96		40-140	8		50
Anthracene	110		111		40-140	1		50
Benzo(ghi)perylene	98		103		40-140	5		50
Fluorene	96		100		40-140	4		50
Phenanthrene	100		104		40-140	4		50
Dibenzo(a,h)anthracene	101		104		40-140	3		50
Indeno(1,2,3-cd)Pyrene	106		108		40-140	2		50

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 04-06 Batch: WG636555-2 WG636555-3								
Pyrene	108		106		35-142	2		50
Biphenyl	77		83			8		50
4-Chloroaniline	60		55		40-140	9		50
2-Nitroaniline	102		108		47-134	6		50
3-Nitroaniline	71		64		26-129	10		50
4-Nitroaniline	108		106		41-125	2		50
Dibenzofuran	91		95		40-140	4		50
2-Methylnaphthalene	74		80		40-140	8		50
1,2,4,5-Tetrachlorobenzene	77		81		40-117	5		50
Acetophenone	77		84		14-144	9		50
2,4,6-Trichlorophenol	96		103		30-130	7		50
P-Chloro-M-Cresol	103		110	Q	26-103	7		50
2-Chlorophenol	78		85		25-102	9		50
2,4-Dichlorophenol	84		92		30-130	9		50
2,4-Dimethylphenol	84		90		30-130	7		50
2-Nitrophenol	80		88		30-130	10		50
4-Nitrophenol	114		112		11-114	2		50
2,4-Dinitrophenol	102		96		4-130	6		50
4,6-Dinitro-o-cresol	121		116		10-130	4		50
Pentachlorophenol	103		100		17-109	3		50
Phenol	78		83		26-90	6		50

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 04-06 Batch: WG636555-2 WG636555-3								
2-Methylphenol	84		90		30-130.	7		50
3-Methylphenol/4-Methylphenol	83		91		30-130	9		50
2,4,5-Trichlorophenol	96		103		30-130	7		50
Benzoic Acid	25		25			0		50
Benzyl Alcohol	83		87		40-140	5		50
Carbazole	108		108		54-128	0		50
Benzaldehyde	70		74			6		50
Caprolactam	114		116			2		50
Atrazine	120		126			5		50
2,3,4,6-Tetrachlorophenol	102		103			1		50

Surrogate	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
2-Fluorophenol	75		79		25-120
Phenol-d6	75		78		10-120
Nitrobenzene-d5	77		80		23-120
2-Fluorobiphenyl	72		77		30-120
2,4,6-Tribromophenol	105		104		0-136
4-Terphenyl-d14	88		85		18-120



# PETROLEUM HYDROCARBONS

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-04  
 Client ID: G2\_COMP-04\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8015C(M)  
 Analytical Date: 09/20/13 15:53  
 Analyst: GT  
 Percent Solids: 90%

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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## Gasoline Range Organics - Westborough Lab

Gasoline Range Organics	6100		ug/kg	2800	54.	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	99		70-130
4-Bromofluorobenzene	98		70-130

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-04 D  
 Client ID: G2\_COMP-04\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8015C(M)  
 Analytical Date: 09/18/13 16:46  
 Analyst: AR  
 Percent Solids: 90%

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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Petroleum Hydrocarbon Quantitation - Westborough Lab						
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TPH	537000		ug/kg	175000	17100	5
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	67		40-140

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-05  
**Client ID:** G2\_COMP-05\_0-5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8015C(M)  
**Analytical Date:** 09/20/13 16:34  
**Analyst:** GT  
**Percent Solids:** 86%

**Date Collected:** 09/14/13 08:55  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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## Gasoline Range Organics - Westborough Lab

Gasoline Range Organics	5400		ug/kg	2900	56.	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	85		70-130
4-Bromofluorobenzene	103		70-130

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-05 D  
 Client ID: G2\_COMP-05\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8015C(M)  
 Analytical Date: 09/18/13 17:17  
 Analyst: AR  
 Percent Solids: 86%

Date Collected: 09/14/13 08:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 14:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbon Quantitation - Westborough Lab						
TPH	1060000		ug/kg	186000	18200	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	100		40-140



**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-06  
**Client ID:** CSO\_COMP-01\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8015C(M)  
**Analytical Date:** 09/18/13 22:57  
**Analyst:** AR  
**Percent Solids:** 90%

**Date Collected:** 09/14/13 09:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 14:45

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbon Quantitation - Westborough Lab						
TPH	182000		ug/kg	35100	3430	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	95		40-140

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-06  
**Client ID:** CSO\_COMP-01\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8015C(M)  
**Analytical Date:** 09/20/13 17:15  
**Analyst:** GT  
**Percent Solids:** 90%

**Date Collected:** 09/14/13 09:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
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## Gasoline Range Organics - Westborough Lab

Gasoline Range Organics	82	J	ug/kg	2800	54.	1
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Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	87		70-130
4-Bromofluorobenzene	87		70-130

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8015C(M)  
 Analytical Date: 09/17/13 14:10  
 Analyst: AR

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 12:15

Parameter	Result	Qualifier	Units	RL	MDL
Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 04 Batch: WG636406-1					
TPH	ND		ug/kg	32900	3220

Surrogate	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	85		40-140

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8015C(M)  
 Analytical Date: 09/18/13 11:42  
 Analyst: AR

Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 14:45

Parameter	Result	Qualifier	Units	RL	MDL
Petroleum Hydrocarbon Quantitation - Westborough Lab for sample(s): 05-06 Batch: WG636471-1					
TPH	ND		ug/kg	32200	3160

Surrogate	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	105		40-140

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 1,8015C(M)  
 Analytical Date: 09/20/13 10:26  
 Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Gasoline Range Organics - Westborough Lab for sample(s): 04-06 Batch: WG637313-3					
Gasoline Range Organics	ND		ug/kg	2500	48.

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	81		70-130
4-Bromofluorobenzene	86		70-130

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

<b>Parameter</b>	<b>LCS %Recovery</b>	<b>Qual</b>	<b>LCSD %Recovery</b>	<b>Qual</b>	<b>%Recovery Limits</b>	<b>RPD</b>	<b>Qual</b>	<b>RPD Limits</b>
Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 04 Batch: WG636406-2								
TPH	113		-		40-140	-		40

<b>Surrogate</b>	<b>LCS %Recovery</b>	<b>Qual</b>	<b>LCSD %Recovery</b>	<b>Qual</b>	<b>Acceptance Criteria</b>
o-Terphenyl	101				40-140

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

<b>Parameter</b>	<b>LCS %Recovery</b>	<b>Qual</b>	<b>LCSD %Recovery</b>	<b>Qual</b>	<b>%Recovery Limits</b>	<b>RPD</b>	<b>Qual</b>	<b>RPD Limits</b>
Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 05-06 Batch: WG636471-2								
TPH	109		-		40-140	-		40

<b>Surrogate</b>	<b>LCS %Recovery</b>	<b>Qual</b>	<b>LCSD %Recovery</b>	<b>Qual</b>	<b>Acceptance Criteria</b>
o-Terphenyl	97				40-140

## Lab Control Sample Analysis

Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Gasoline Range Organics - Westborough Lab Associated sample(s): 04-06 Batch: WG637313-1 WG637313-2								
Gasoline Range Organics	94		104		80-120	10		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,1,1-Trifluorotoluene	92		101		70-130
4-Bromofluorobenzene	92		101		70-130

### Matrix Spike Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Gasoline Range Organics - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637313-5 QC Sample: L1318253-02 Client ID: MS Sample												
Gasoline Range Organics	8600	23100	30000	91		-	-		80-120	-		20

<i>Surrogate</i>	<i>MS % Recovery</i>	<i>Qualifier</i>	<i>MSD % Recovery</i>	<i>Qualifier</i>	<i>Acceptance Criteria</i>
1,1,1-Trifluorotoluene	81				70-130
4-Bromofluorobenzene	83				70-130

**Lab Duplicate Analysis**  
Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 04 QC Batch ID: WG636406-3 QC Sample: L1318009-02 Client ID: DUP Sample						

TPH	653000	959000	ug/kg	38		40
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Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	74		90		40-140

Petroleum Hydrocarbon Quantitation - Westborough Lab Associated sample(s): 05-06 QC Batch ID: WG636471-3 QC Sample: L1318095-01 Client ID: DUP Sample						
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TPH	78100	64800	ug/kg	19		40
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Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
o-Terphenyl	105		105		40-140



**Lab Duplicate Analysis**  
Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318168

**Report Date:** 09/25/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Gasoline Range Organics - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637313-4 QC Sample: L1318253-02 Client ID: DUP Sample					
Gasoline Range Organics	8600	13000	ug/kg	39	Q 20

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
1,1,1-Trifluorotoluene	70		80		70-130
4-Bromofluorobenzene	79		83		70-130



# PCBS

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-04  
**Client ID:** G2\_COMP-04\_0-5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 09/21/13 05:28  
**Analyst:** KB  
**Percent Solids:** 90%

**Date Collected:** 09/14/13 08:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 10:25  
**Cleanup Method1:** EPA 3665A  
**Cleanup Date1:** 09/17/13  
**Cleanup Method2:** EPA 3660B  
**Cleanup Date2:** 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	36.7	7.24	1	A
Aroclor 1221	ND		ug/kg	36.7	11.1	1	A
Aroclor 1232	ND		ug/kg	36.7	7.79	1	A
Aroclor 1242	ND		ug/kg	36.7	6.96	1	A
Aroclor 1248	ND		ug/kg	36.7	4.44	1	A
Aroclor 1254	31.8	J	ug/kg	36.7	5.78	1	B
Aroclor 1260	49.2		ug/kg	36.7	6.36	1	B
Aroclor 1262	ND		ug/kg	36.7	2.71	1	A
Aroclor 1268	ND		ug/kg	36.7	5.32	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	72		30-150	A
Decachlorobiphenyl	93		30-150	A
2,4,5,6-Tetrachloro-m-xylene	67		30-150	B
Decachlorobiphenyl	102		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

**Lab ID:** L1318168-05  
**Client ID:** G2\_COMP-05\_0-5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil  
**Analytical Method:** 1,8082A  
**Analytical Date:** 09/21/13 05:41  
**Analyst:** KB  
**Percent Solids:** 86%

**Date Collected:** 09/14/13 08:55  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified  
**Extraction Method:** EPA 3546  
**Extraction Date:** 09/16/13 10:25  
**Cleanup Method1:** EPA 3665A  
**Cleanup Date1:** 09/17/13  
**Cleanup Method2:** EPA 3660B  
**Cleanup Date2:** 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	37.6	7.43	1	A
Aroclor 1221	ND		ug/kg	37.6	11.4	1	A
Aroclor 1232	ND		ug/kg	37.6	8.00	1	A
Aroclor 1242	ND		ug/kg	37.6	7.14	1	A
Aroclor 1248	ND		ug/kg	37.6	4.55	1	A
Aroclor 1254	ND		ug/kg	37.6	5.93	1	A
Aroclor 1260	26.5	J	ug/kg	37.6	6.53	1	B
Aroclor 1262	ND		ug/kg	37.6	2.78	1	A
Aroclor 1268	ND		ug/kg	37.6	5.46	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	60		30-150	A
Decachlorobiphenyl	72		30-150	A
2,4,5,6-Tetrachloro-m-xylene	57		30-150	B
Decachlorobiphenyl	83		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-06  
 Client ID: CSO\_COMP-01\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8082A  
 Analytical Date: 09/21/13 05:54  
 Analyst: KB  
 Percent Solids: 90%

Date Collected: 09/14/13 09:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/16/13 10:25  
 Cleanup Method1: EPA 3665A  
 Cleanup Date1: 09/17/13  
 Cleanup Method2: EPA 3660B  
 Cleanup Date2: 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Polychlorinated Biphenyls by GC - Westborough Lab</b>							
Aroclor 1016	ND		ug/kg	35.9	7.10	1	A
Aroclor 1221	ND		ug/kg	35.9	10.8	1	A
Aroclor 1232	ND		ug/kg	35.9	7.64	1	A
Aroclor 1242	ND		ug/kg	35.9	6.82	1	A
Aroclor 1248	ND		ug/kg	35.9	4.35	1	A
Aroclor 1254	ND		ug/kg	35.9	5.67	1	A
Aroclor 1260	ND		ug/kg	35.9	6.24	1	A
Aroclor 1262	ND		ug/kg	35.9	2.66	1	A
Aroclor 1268	ND		ug/kg	35.9	5.21	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	67		30-150	A
Decachlorobiphenyl	79		30-150	A
2,4,5,6-Tetrachloro-m-xylene	64		30-150	B
Decachlorobiphenyl	87		30-150	B

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8082A  
Analytical Date: 09/21/13 02:36  
Analyst: KB

Extraction Method: EPA 3546  
Extraction Date: 09/16/13 10:25  
Cleanup Method1: EPA 3665A  
Cleanup Date1: 09/17/13  
Cleanup Method2: EPA 3660B  
Cleanup Date2: 09/17/13

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 04-06 Batch: WG636368-1						
Aroclor 1016	ND		ug/kg	32.4	6.40	A
Aroclor 1221	ND		ug/kg	32.4	9.77	A
Aroclor 1232	ND		ug/kg	32.4	6.88	A
Aroclor 1242	ND		ug/kg	32.4	6.15	A
Aroclor 1248	ND		ug/kg	32.4	3.92	A
Aroclor 1254	ND		ug/kg	32.4	5.11	A
Aroclor 1260	ND		ug/kg	32.4	5.62	A
Aroclor 1262	ND		ug/kg	32.4	2.40	A
Aroclor 1268	ND		ug/kg	32.4	4.70	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	74		30-150	A
Decachlorobiphenyl	88		30-150	A
2,4,5,6-Tetrachloro-m-xylene	71		30-150	B
Decachlorobiphenyl	100		30-150	B

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 04-06 Batch: WG636368-2 WG636368-3									
Aroclor 1016	78		84		40-140	7		50	A
Aroclor 1260	81		88		40-140	8		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		88		30-150	A
Decachlorobiphenyl	87		97		30-150	A
2,4,5,6-Tetrachloro-m-xylene	71		81		30-150	B
Decachlorobiphenyl	100		111		30-150	B

# PESTICIDES

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-04  
 Client ID: G2\_COMP-04\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 21:02  
 Analyst: SH  
 Percent Solids: 90%

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21  
 Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	184	22.3	1	A
2,4,5-T	ND		ug/kg	184	11.5	1	A
2,4,5-TP (Silvex)	ND		ug/kg	184	10.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	107		30-150	A
DCAA	129		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-04 D  
 Client ID: G2\_COMP-04\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 09/20/13 18:25  
 Analyst: SH  
 Percent Solids: 90%

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/17/13 20:56  
 Cleanup Method1: EPA 3620B  
 Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	17.3	3.39	10	A
Lindane	ND		ug/kg	7.21	3.22	10	A
Alpha-BHC	ND		ug/kg	7.21	2.05	10	A
Beta-BHC	ND		ug/kg	17.3	6.56	10	A
Heptachlor	ND		ug/kg	8.65	3.88	10	A
Aldrin	ND		ug/kg	17.3	6.09	10	A
Heptachlor epoxide	ND		ug/kg	32.4	9.73	10	A
Endrin	ND		ug/kg	7.21	2.95	10	A
Endrin ketone	ND		ug/kg	17.3	4.45	10	A
Dieldrin	ND		ug/kg	10.8	5.40	10	A
4,4'-DDE	ND		ug/kg	17.3	4.00	10	A
4,4'-DDD	33.1		ug/kg	17.3	6.17	10	B
4,4'-DDT	20.7	J	ug/kg	32.4	13.9	10	A
Endosulfan I	ND		ug/kg	17.3	4.09	10	A
Endosulfan II	ND		ug/kg	17.3	5.78	10	A
Endosulfan sulfate	ND		ug/kg	7.21	3.29	10	A
Methoxychlor	ND		ug/kg	32.4	10.1	10	A
Toxaphene	ND		ug/kg	324	90.8	10	A
cis-Chlordane	ND		ug/kg	21.6	6.02	10	A
trans-Chlordane	ND		ug/kg	21.6	5.71	10	A
Chlordane	ND		ug/kg	140	57.3	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	233	Q	30-150	A
Decachlorobiphenyl	92		30-150	A
2,4,5,6-Tetrachloro-m-xylene	94		30-150	B
Decachlorobiphenyl	113		30-150	B

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-05  
 Client ID: G2\_COMP-05\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 21:22  
 Analyst: SH  
 Percent Solids: 86%

Date Collected: 09/14/13 08:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21  
 Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	189	23.0	1	A
2,4,5-T	ND		ug/kg	189	11.8	1	A
2,4,5-TP (Silvex)	ND		ug/kg	189	10.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	37		30-150	A
DCAA	18	Q	30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-05 D  
 Client ID: G2\_COMP-05\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 09/20/13 18:38  
 Analyst: SH  
 Percent Solids: 86%

Date Collected: 09/14/13 08:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/17/13 20:56  
 Cleanup Method1: EPA 3620B  
 Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	17.9	3.50	10	A
Lindane	ND		ug/kg	7.45	3.33	10	A
Alpha-BHC	ND		ug/kg	7.45	2.12	10	A
Beta-BHC	ND		ug/kg	17.9	6.78	10	A
Heptachlor	ND		ug/kg	8.94	4.01	10	A
Aldrin	ND		ug/kg	17.9	6.30	10	A
Heptachlor epoxide	ND		ug/kg	33.5	10.0	10	A
Endrin	ND		ug/kg	7.45	3.05	10	A
Endrin ketone	ND		ug/kg	17.9	4.60	10	A
Dieldrin	ND		ug/kg	11.2	5.59	10	A
4,4'-DDE	ND		ug/kg	17.9	4.14	10	A
4,4'-DDD	ND		ug/kg	17.9	6.38	10	A
4,4'-DDT	34.8		ug/kg	33.5	14.4	10	A
Endosulfan I	ND		ug/kg	17.9	4.22	10	A
Endosulfan II	ND		ug/kg	17.9	5.98	10	A
Endosulfan sulfate	ND		ug/kg	7.45	3.40	10	A
Methoxychlor	ND		ug/kg	33.5	10.4	10	A
Toxaphene	ND		ug/kg	335	93.9	10	A
cis-Chlordane	ND		ug/kg	22.4	6.23	10	A
trans-Chlordane	ND		ug/kg	22.4	5.90	10	A
Chlordane	ND		ug/kg	145	59.2	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	117		30-150	A
Decachlorobiphenyl	121		30-150	A
2,4,5,6-Tetrachloro-m-xylene	51		30-150	B
Decachlorobiphenyl	102		30-150	B

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-06  
 Client ID: CSO\_COMP-01\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 21:42  
 Analyst: SH  
 Percent Solids: 90%

Date Collected: 09/14/13 09:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21  
 Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Chlorinated Herbicides by GC - Westborough Lab							
2,4-D	ND		ug/kg	184	22.4	1	A
2,4,5-T	ND		ug/kg	184	11.5	1	A
2,4,5-TP (Silvex)	ND		ug/kg	184	10.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DCAA	86		30-150	A
DCAA	67		30-150	B

**Project Name:** GREENPOINT LANDING**Lab Number:** L1318168**Project Number:** 170229002**Report Date:** 09/25/13**SAMPLE RESULTS**

Lab ID: L1318168-06 D  
 Client ID: CSO\_COMP-01\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Analytical Method: 1,8081B  
 Analytical Date: 09/20/13 18:51  
 Analyst: SH  
 Percent Solids: 90%

Date Collected: 09/14/13 09:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 Extraction Method: EPA 3546  
 Extraction Date: 09/17/13 20:56  
 Cleanup Method1: EPA 3620B  
 Cleanup Date1: 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
<b>Organochlorine Pesticides by GC - Westborough Lab</b>							
Delta-BHC	ND		ug/kg	17.1	3.34	10	A
Lindane	ND		ug/kg	7.12	3.18	10	A
Alpha-BHC	ND		ug/kg	7.12	2.02	10	A
Beta-BHC	ND		ug/kg	17.1	6.48	10	A
Heptachlor	ND		ug/kg	8.54	3.83	10	A
Aldrin	ND		ug/kg	17.1	6.01	10	A
Heptachlor epoxide	ND		ug/kg	32.0	9.61	10	A
Endrin	ND		ug/kg	7.12	2.92	10	A
Endrin ketone	ND		ug/kg	17.1	4.40	10	A
Dieldrin	ND		ug/kg	10.7	5.34	10	A
4,4'-DDE	ND		ug/kg	17.1	3.95	10	A
4,4'-DDD	ND		ug/kg	17.1	6.09	10	A
4,4'-DDT	24.9	J	ug/kg	32.0	13.7	10	A
Endosulfan I	ND		ug/kg	17.1	4.03	10	A
Endosulfan II	ND		ug/kg	17.1	5.71	10	A
Endosulfan sulfate	ND		ug/kg	7.12	3.25	10	A
Methoxychlor	ND		ug/kg	32.0	9.96	10	A
Toxaphene	ND		ug/kg	320	89.6	10	A
cis-Chlordane	ND		ug/kg	21.3	5.95	10	A
trans-Chlordane	ND		ug/kg	21.3	5.64	10	A
Chlordane	ND		ug/kg	139	56.6	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	142		30-150	A
2,4,5,6-Tetrachloro-m-xylene	71		30-150	B
Decachlorobiphenyl	167	Q	30-150	B

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 1,8151A  
 Analytical Date: 09/17/13 15:05  
 Analyst: SH

Extraction Method: EPA 8151A  
 Extraction Date: 09/16/13 09:21

Methylation Date: 09/17/13 04:54

Parameter	Result	Qualifier	Units	RL	MDL	Column
Chlorinated Herbicides by GC - Westborough Lab for sample(s): 04-06 Batch: WG636326-1						
2,4-D	ND		ug/kg	162	19.7	A
2,4,5-T	ND		ug/kg	162	10.1	A
2,4,5-TP (Silvex)	ND		ug/kg	162	8.95	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DCAA	90		30-150	A
DCAA	71		30-150	B

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

**Analytical Method:** 1,8081B  
**Analytical Date:** 09/20/13 20:33  
**Analyst:** SH

**Extraction Method:** EPA 3546  
**Extraction Date:** 09/17/13 20:56  
**Cleanup Method1:** EPA 3620B  
**Cleanup Date1:** 09/19/13

Parameter	Result	Qualifier	Units	RL	MDL	Column
Organochlorine Pesticides by GC - Westborough Lab for sample(s): 04-06 Batch: WG636910-1						
Delta-BHC	ND		ug/kg	1.52	0.298	A
Lindane	ND		ug/kg	0.634	0.283	A
Alpha-BHC	ND		ug/kg	0.634	0.180	A
Beta-BHC	ND		ug/kg	1.52	0.577	A
Heptachlor	ND		ug/kg	0.760	0.341	A
Aldrin	ND		ug/kg	1.52	0.535	A
Heptachlor epoxide	ND		ug/kg	2.85	0.856	A
Endrin	ND		ug/kg	0.634	0.260	A
Endrin ketone	ND		ug/kg	1.52	0.392	A
Dieldrin	ND		ug/kg	0.950	0.475	A
4,4'-DDE	ND		ug/kg	1.52	0.352	A
4,4'-DDD	ND		ug/kg	1.52	0.542	A
4,4'-DDT	ND		ug/kg	2.85	1.22	A
Endosulfan I	ND		ug/kg	1.52	0.359	A
Endosulfan II	ND		ug/kg	1.52	0.508	A
Endosulfan sulfate	ND		ug/kg	0.634	0.290	A
Methoxychlor	ND		ug/kg	2.85	0.887	A
Toxaphene	ND		ug/kg	28.5	7.98	A
cis-Chlordane	ND		ug/kg	1.90	0.530	A
trans-Chlordane	ND		ug/kg	1.90	0.502	A
Chlordane	ND		ug/kg	12.4	5.04	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	93		30-150	A
Decachlorobiphenyl	93		30-150	A
2,4,5,6-Tetrachloro-m-xylene	65		30-150	B
Decachlorobiphenyl	106		30-150	B

### Lab Control Sample Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Chlorinated Herbicides by GC - Westborough Lab Associated sample(s): 04-06 Batch: WG636326-2 WG636326-3									
2,4-D	99		113		30-150	13		30	A
2,4,5-T	93		96		30-150	3		30	A
2,4,5-TP (Silvex)	89		89		30-150	0		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DCAA	91		96		30-150	A
DCAA	77		73		30-150	B

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 04-06 Batch: WG636910-2 WG636910-3									
Delta-BHC	82		88		30-150	7		30	A
Lindane	64		79		30-150	21		30	A
Alpha-BHC	70		75		30-150	7		30	A
Beta-BHC	70		74		30-150	6		30	A
Heptachlor	86		87		30-150	1		30	A
Aldrin	80		84		30-150	5		30	A
Heptachlor epoxide	77		82		30-150	6		30	A
Endrin	87		93		30-150	7		30	A
Endrin ketone	74		81		30-150	9		30	A
Dieldrin	81		86		30-150	6		30	A
4,4'-DDE	78		81		30-150	4		30	A
4,4'-DDD	80		86		30-150	7		30	A
4,4'-DDT	84		90		30-150	7		30	A
Endosulfan I	79		84		30-150	6		30	A
Endosulfan II	84		89		30-150	6		30	A
Endosulfan sulfate	81		88		30-150	8		30	A
Methoxychlor	69		75		30-150	8		30	A
cis-Chlordane	76		81		30-150	6		30	A
trans-Chlordane	77		81		30-150	5		30	A

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
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Organochlorine Pesticides by GC - Westborough Lab Associated sample(s): 04-06 Batch: WG636910-2 WG636910-3

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	86		87		30-150	A
Decachlorobiphenyl	78		84		30-150	A
2,4,5,6-Tetrachloro-m-xylene	58		58		30-150	B
Decachlorobiphenyl	115		86		30-150	B

## METALS

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-04  
 Client ID: G2\_COMP-04\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 90%

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 TCLP/SPLP Ext. Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab</b>											
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 13:05	09/20/13 13:53	EPA 3015	1,6010C	TT
Barium, TCLP	0.41	J	mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 13:53	EPA 3015	1,6010C	TT
Cadmium, TCLP	0.01	J	mg/l	0.10	0.01	1	09/19/13 13:05	09/20/13 13:53	EPA 3015	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 13:05	09/20/13 13:53	EPA 3015	1,6010C	TT
Lead, TCLP	0.27	J	mg/l	0.50	0.02	1	09/19/13 13:05	09/20/13 13:53	EPA 3015	1,6010C	TT
Mercury, TCLP	ND		mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 13:04	EPA 7470A	1,7470A	JH
Selenium, TCLP	ND		mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 13:53	EPA 3015	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 13:05	09/20/13 13:53	EPA 3015	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-04  
 Client ID: G2\_COMP-04\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 90%

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	7200		mg/kg	8.7	1.7	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.4	0.70	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Arsenic, Total	10		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Barium, Total	280		mg/kg	0.87	0.26	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Beryllium, Total	1.5		mg/kg	0.44	0.09	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Cadmium, Total	1.4		mg/kg	0.87	0.06	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Calcium, Total	46000		mg/kg	8.7	2.6	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Chromium, Total	33		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Cobalt, Total	14		mg/kg	1.7	0.44	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Copper, Total	270		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Iron, Total	21000		mg/kg	4.4	1.7	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Lead, Total	440		mg/kg	4.4	0.17	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Magnesium, Total	12000		mg/kg	8.7	0.87	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Manganese, Total	320		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Mercury, Total	0.59		mg/kg	0.09	0.02	1	09/21/13 12:30	09/23/13 10:39	EPA 7471B	1,7471B	MC
Nickel, Total	32		mg/kg	2.2	0.35	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Potassium, Total	850		mg/kg	220	35.	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Selenium, Total	1.3	J	mg/kg	1.7	0.26	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.87	0.17	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Sodium, Total	330		mg/kg	170	26.	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.7	0.35	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Vanadium, Total	21		mg/kg	0.87	0.09	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT
Zinc, Total	1400		mg/kg	4.4	0.61	2	09/19/13 11:28	09/19/13 20:24	EPA 3050B	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-05  
 Client ID: G2\_COMP-05\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 86%

Date Collected: 09/14/13 08:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 TCLP/SPLP Ext. Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab</b>											
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 13:05	09/20/13 14:47	EPA 3015	1,6010C	TT
Barium, TCLP	0.44	J	mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 14:47	EPA 3015	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 13:05	09/20/13 14:47	EPA 3015	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 13:05	09/20/13 14:47	EPA 3015	1,6010C	TT
Lead, TCLP	0.06	J	mg/l	0.50	0.02	1	09/19/13 13:05	09/20/13 14:47	EPA 3015	1,6010C	TT
Mercury, TCLP	ND		mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 13:06	EPA 7470A	1,7470A	JH
Selenium, TCLP	0.03	J	mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 14:47	EPA 3015	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 13:05	09/20/13 14:47	EPA 3015	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-05  
 Client ID: G2\_COMP-05\_0-5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 86%

Date Collected: 09/14/13 08:55  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	6800		mg/kg	9.0	1.8	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.5	0.72	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Arsenic, Total	9.4		mg/kg	0.90	0.18	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Barium, Total	190		mg/kg	0.90	0.27	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Beryllium, Total	0.98		mg/kg	0.45	0.09	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Cadmium, Total	1.1		mg/kg	0.90	0.06	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Calcium, Total	23000		mg/kg	9.0	2.7	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Chromium, Total	22		mg/kg	0.90	0.18	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Cobalt, Total	14		mg/kg	1.8	0.45	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Copper, Total	320		mg/kg	0.90	0.18	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Iron, Total	20000		mg/kg	4.5	1.8	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Lead, Total	220		mg/kg	4.5	0.18	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Magnesium, Total	5200		mg/kg	9.0	0.90	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Manganese, Total	350		mg/kg	0.90	0.18	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Mercury, Total	0.31		mg/kg	0.09	0.02	1	09/21/13 12:30	09/23/13 10:41	EPA 7471B	1,7471B	MC
Nickel, Total	28		mg/kg	2.2	0.36	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Potassium, Total	1200		mg/kg	220	36.	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Selenium, Total	0.44	J	mg/kg	1.8	0.27	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.90	0.18	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Sodium, Total	330		mg/kg	180	27.	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.8	0.36	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Vanadium, Total	26		mg/kg	0.90	0.09	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT
Zinc, Total	920		mg/kg	4.5	0.63	2	09/19/13 11:28	09/19/13 20:28	EPA 3050B	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-06  
 Client ID: CSO\_COMP-01\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 90%

Date Collected: 09/14/13 09:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified  
 TCLP/SPLP Ext. Date: 09/18/13 16:44

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab</b>											
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 13:05	09/20/13 14:51	EPA 3015	1,6010C	TT
Barium, TCLP	0.50		mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 14:51	EPA 3015	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 13:05	09/20/13 14:51	EPA 3015	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 13:05	09/20/13 14:51	EPA 3015	1,6010C	TT
Lead, TCLP	0.13	J	mg/l	0.50	0.02	1	09/19/13 13:05	09/20/13 14:51	EPA 3015	1,6010C	TT
Mercury, TCLP	ND		mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 13:07	EPA 7470A	1,7470A	JH
Selenium, TCLP	ND		mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 14:51	EPA 3015	1,6010C	TT
Silver, TCLP	ND		mg/l	0.10	0.02	1	09/19/13 13:05	09/20/13 14:51	EPA 3015	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

Lab ID: L1318168-06  
 Client ID: CSO\_COMP-01\_0-10  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil  
 Percent Solids: 90%

Date Collected: 09/14/13 09:15  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
<b>Total Metals - Westborough Lab</b>											
Aluminum, Total	7100		mg/kg	8.6	1.7	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Antimony, Total	ND		mg/kg	4.3	0.69	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Arsenic, Total	4.8		mg/kg	0.86	0.17	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Barium, Total	110		mg/kg	0.86	0.26	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Beryllium, Total	0.34	J	mg/kg	0.43	0.09	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Cadmium, Total	0.60	J	mg/kg	0.86	0.06	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Calcium, Total	4700		mg/kg	8.6	2.6	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Chromium, Total	14		mg/kg	0.86	0.17	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Cobalt, Total	6.8		mg/kg	1.7	0.43	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Copper, Total	42		mg/kg	0.86	0.17	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Iron, Total	15000		mg/kg	4.3	1.7	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Lead, Total	160		mg/kg	4.3	0.17	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Magnesium, Total	2800		mg/kg	8.6	0.86	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Manganese, Total	280		mg/kg	0.86	0.17	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Mercury, Total	0.36		mg/kg	0.08	0.02	1	09/21/13 12:30	09/23/13 10:42	EPA 7471B	1,7471B	MC
Nickel, Total	12		mg/kg	2.1	0.34	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Potassium, Total	1000		mg/kg	210	34.	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Selenium, Total	ND		mg/kg	1.7	0.26	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Silver, Total	ND		mg/kg	0.86	0.17	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Sodium, Total	78	J	mg/kg	170	26.	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Thallium, Total	ND		mg/kg	1.7	0.34	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Vanadium, Total	19		mg/kg	0.86	0.09	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT
Zinc, Total	360		mg/kg	4.3	0.60	2	09/19/13 11:28	09/19/13 20:47	EPA 3050B	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

## Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>Total Metals - Westborough Lab for sample(s): 04-06 Batch: WG637410-1</b>										
Aluminum, Total	2.0	J	mg/kg	4.0	0.80	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Antimony, Total	ND		mg/kg	2.0	0.32	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Arsenic, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Barium, Total	ND		mg/kg	0.40	0.12	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Beryllium, Total	ND		mg/kg	0.20	0.04	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Cadmium, Total	ND		mg/kg	0.40	0.03	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Calcium, Total	4.2		mg/kg	4.0	1.2	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Chromium, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Cobalt, Total	ND		mg/kg	0.80	0.20	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Copper, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Iron, Total	ND		mg/kg	2.0	0.80	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Lead, Total	ND		mg/kg	2.0	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Magnesium, Total	ND		mg/kg	4.0	0.40	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Manganese, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Nickel, Total	ND		mg/kg	1.0	0.16	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Potassium, Total	ND		mg/kg	100	16.	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Selenium, Total	ND		mg/kg	0.80	0.12	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Silver, Total	ND		mg/kg	0.40	0.08	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Sodium, Total	ND		mg/kg	80	12.	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Thallium, Total	ND		mg/kg	0.80	0.16	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Vanadium, Total	ND		mg/kg	0.40	0.04	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT
Zinc, Total	ND		mg/kg	2.0	0.28	1	09/19/13 11:28	09/19/13 16:02	1,6010C	TT

### Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>TCLP Metals by EPA 1311 - Westborough Lab for sample(s): 04-06 Batch: WG637446-1</b>										
Arsenic, TCLP	ND		mg/l	1.0	0.02	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Barium, TCLP	0.04	J	mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Cadmium, TCLP	ND		mg/l	0.10	0.01	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Chromium, TCLP	ND		mg/l	0.20	0.02	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

### Method Blank Analysis Batch Quality Control

Lead, TCLP	ND	mg/l	0.50	0.02	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Selenium, TCLP	ND	mg/l	0.50	0.03	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT
Silver, TCLP	ND	mg/l	0.10	0.02	1	09/19/13 13:05	09/20/13 11:07	1,6010C	TT

#### Prep Information

Digestion Method: EPA 3015  
TCLP/SPLP Extraction Date: 09/18/13 16:44

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Westborough Lab for sample(s): 04-06 Batch: WG637778-1									
Mercury, Total	ND	mg/kg	0.08	0.02	1	09/21/13 12:30	09/23/13 09:53	1,7471B	MC

#### Prep Information

Digestion Method: EPA 7471B

Parameter	Result Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
TCLP Metals by EPA 1311 - Westborough Lab for sample(s): 04-06 Batch: WG638031-1									
Mercury, TCLP	ND	mg/l	0.0010	0.0003	1	09/21/13 10:30	09/23/13 12:32	1,7470A	JH

#### Prep Information

Digestion Method: EPA 7470A  
TCLP/SPLP Extraction Date: 09/18/13 16:44

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Lab Number:** L1318168

**Project Number:** 170229002

**Report Date:** 09/25/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
Total Metals - Westborough Lab Associated sample(s): 04-06 Batch: WG637410-2 SRM Lot Number: 0518-10-02								
Aluminum, Total	85		-		29-171	-		
Antimony, Total	122		-		4-196	-		
Arsenic, Total	104		-		81-119	-		
Barium, Total	100		-		83-118	-		
Beryllium, Total	98		-		83-117	-		
Cadmium, Total	94		-		82-117	-		
Calcium, Total	90		-		83-117	-		
Chromium, Total	92		-		80-119	-		
Cobalt, Total	99		-		83-117	-		
Copper, Total	101		-		83-117	-		
Iron, Total	94		-		51-150	-		
Lead, Total	96		-		80-120	-		
Magnesium, Total	78		-		74-126	-		
Manganese, Total	97		-		83-117	-		
Nickel, Total	94		-		82-117	-		
Potassium, Total	99		-		74-126	-		
Selenium, Total	109		-		80-120	-		
Silver, Total	105		-		66-134	-		
Sodium, Total	106		-		74-127	-		
Thallium, Total	96		-		79-120	-		
Vanadium, Total	89		-		79-121	-		

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** GREENPOINT LANDING

**Project Number:** 170229002

**Lab Number:** L1318168

**Report Date:** 09/25/13

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 04-06 Batch: WG637410-2 SRM Lot Number: 0518-10-02					
Zinc, Total	94	-	82-119	-	
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 04-06 Batch: WG637446-2					
Arsenic, TCLP	108	-	75-125	-	20
Barium, TCLP	100	-	75-125	-	20
Cadmium, TCLP	106	-	75-125	-	20
Chromium, TCLP	105	-	75-125	-	20
Lead, TCLP	100	-	75-125	-	20
Selenium, TCLP	108	-	75-125	-	20
Silver, TCLP	104	-	75-125	-	20
Total Metals - Westborough Lab Associated sample(s): 04-06 Batch: WG637778-2 SRM Lot Number: 0518-10-02					
Mercury, Total	105	-	67-133	-	
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 04-06 Batch: WG638031-2					
Mercury, TCLP	111	-	80-120	-	

## Matrix Spike Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637410-4 QC Sample: L1318142-43 Client ID: MS Sample												
Aluminum, Total	1500	194	2700	618	Q	-	-		75-125	-		35
Antimony, Total	4.4J	48.5	52	107		-	-		75-125	-		35
Arsenic, Total	12.	11.6	23	86		-	-		75-125	-		35
Barium, Total	360	194	670	154	Q	-	-		75-125	-		35
Beryllium, Total	0.22J	4.85	5.1	105		-	-		75-125	-		35
Cadmium, Total	4.5	4.95	7.1	50	Q	-	-		75-125	-		35
Calcium, Total	620	971	4700	419	Q	-	-		75-125	-		35
Chromium, Total	14.	19.4	27	62	Q	-	-		75-125	-		35
Cobalt, Total	3.4	48.5	49	94		-	-		75-125	-		35
Copper, Total	130	24.3	120	0	Q	-	-		75-125	-		35
Iron, Total	5800	97.1	5200	0	Q	-	-		75-125	-		35
Lead, Total	420	49.5	280	0	Q	-	-		75-125	-		35
Magnesium, Total	290	971	1200	93		-	-		75-125	-		35
Manganese, Total	56.	48.5	110	107		-	-		75-125	-		35
Nickel, Total	15.	48.5	56	84		-	-		75-125	-		35
Potassium, Total	220J	971	1300	134	Q	-	-		75-125	-		35
Selenium, Total	6.1	11.6	16	84		-	-		75-125	-		35
Silver, Total	0.26J	29.1	28	96		-	-		75-125	-		35
Sodium, Total	120J	971	1200	124		-	-		75-125	-		35
Thallium, Total	ND	11.6	10	86		-	-		75-125	-		35
Vanadium, Total	8.1	48.5	54	94		-	-		75-125	-		35

### Matrix Spike Analysis Batch Quality Control

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637410-4 QC Sample: L1318142-43 Client ID: MS Sample									
Zinc, Total	1800	48.5	960	0	Q	-	75-125	-	35
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637446-4 QC Sample: L1318167-01 Client ID: MS Sample									
Arsenic, TCLP	0.03J	1.2	1.3	108	-	-	75-125	-	20
Barium, TCLP	0.59	20	21	102	-	-	75-125	-	20
Cadmium, TCLP	ND	0.51	0.54	106	-	-	75-125	-	20
Chromium, TCLP	ND	2	2.1	105	-	-	75-125	-	20
Lead, TCLP	0.62	5.1	5.7	100	-	-	75-125	-	20
Selenium, TCLP	ND	1.2	1.4	117	-	-	75-125	-	20
Silver, TCLP	ND	0.5	0.52	104	-	-	75-125	-	20
Total Metals - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637778-4 QC Sample: L1318158-03 Client ID: MS Sample									
Mercury, Total	0.72	0.192	0.77	26	Q	-	70-130	-	35
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG638031-4 QC Sample: L1318158-03 Client ID: MS Sample									
Mercury, TCLP	ND	0.025	0.0263	105	-	-	70-130	-	20

## Lab Duplicate Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318168

Report Date: 09/25/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637410-3 QC Sample: L1318142-43 Client ID: DUP Sample						
Aluminum, Total	1500	1400	mg/kg	7		35
Antimony, Total	4.4J	4.0J	mg/kg	NC		35
Arsenic, Total	12.	15	mg/kg	14		35
Barium, Total	360	380	mg/kg	3		35
Beryllium, Total	0.22J	0.25J	mg/kg	NC		35
Cadmium, Total	4.5	3.0	mg/kg	42	Q	35
Calcium, Total	620	570	mg/kg	10		35
Chromium, Total	14.	14	mg/kg	7		35
Cobalt, Total	3.4	3.2	mg/kg	6		35
Copper, Total	130	140	mg/kg	0		35
Iron, Total	5800	5200	mg/kg	13		35
Lead, Total	420	370	mg/kg	15		35
Magnesium, Total	290	320	mg/kg	6		35
Manganese, Total	56.	57	mg/kg	2		35
Nickel, Total	15.	14	mg/kg	7		35
Potassium, Total	220J	210J	mg/kg	NC		35
Selenium, Total	6.1	5.1	mg/kg	19		35
Silver, Total	0.26J	0.29J	mg/kg	NC		35
Sodium, Total	120J	150J	mg/kg	NC		35

## Lab Duplicate Analysis

Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
<b>Total Metals - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637410-3 QC Sample: L1318142-43 Client ID: DUP Sample</b>					
Thallium, Total	ND	ND	mg/kg	NC	35
Vanadium, Total	8.1	9.8	mg/kg	17	35
Zinc, Total	1800	1300	mg/kg	32	35
<b>TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637446-3 QC Sample: L1318167-01 Client ID: DUP Sample</b>					
Arsenic, TCLP	0.03J	0.05J	mg/l	NC	20
Barium, TCLP	0.59	0.57	mg/l	3	20
Cadmium, TCLP	ND	ND	mg/l	NC	20
Chromium, TCLP	ND	ND	mg/l	NC	20
Lead, TCLP	0.62	0.60	mg/l	3	20
Selenium, TCLP	ND	ND	mg/l	NC	20
Silver, TCLP	ND	ND	mg/l	NC	20
<b>Total Metals - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637778-3 QC Sample: L1318158-03 Client ID: DUP Sample</b>					
Mercury, Total	0.72	0.69	mg/kg	4	35
<b>TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG638031-3 QC Sample: L1318158-03 Client ID: DUP Sample</b>					
Mercury, TCLP	ND	ND	mg/l	NC	20

# **INORGANICS & MISCELLANEOUS**

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

### SAMPLE RESULTS

**Lab ID:** L1318168-04  
**Client ID:** G2\_COMP-04\_0-5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 08:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

Parameter	Result	Date Analyzed	Analytical Method	Analyst
Ignitability of Solids - Westborough Lab				
Ignitability	NI	09/19/13 08:33	1,1030	DM



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

### SAMPLE RESULTS

**Lab ID:** L1318168-05  
**Client ID:** G2\_COMP-05\_0-5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 08:55  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

Parameter	Result	Date Analyzed	Analytical Method	Analyst
Ignitability of Solids - Westborough Lab				
Ignitability	NI	09/19/13 08:33	1,1030	DM



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

### SAMPLE RESULTS

**Lab ID:** L1318168-06  
**Client ID:** CSO\_COMP-01\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 09:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

### Test Material Information

**Source of Material:** Unknown  
**Description of Material:** Non-Metallic - Damp Soil  
**Particle Size:** Medium  
**Preliminary Burning Time (sec):** 120

Parameter	Result	Date Analyzed	Analytical Method	Analyst
Ignitability of Solids - Westborough Lab				
Ignitability	NI	09/19/13 08:33	1,1030	DM



Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-01  
 Client ID: G2\_SB-04C\_0-0.5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil

Date Collected: 09/14/13 08:15  
 Date Received: 09/14/13  
 Field Prep: None

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	84.5		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT



Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-02  
 Client ID: G2\_SB-05B\_2.5-3  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil

Date Collected: 09/14/13 08:43  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.3		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT



Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## SAMPLE RESULTS

Lab ID: L1318168-03  
 Client ID: CSO\_SB-01A\_0-0.5  
 Sample Location: BROOKLYN, NY  
 Matrix: Soil

Date Collected: 09/14/13 09:00  
 Date Received: 09/14/13  
 Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	90.9		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

**Lab ID:** L1318168-04  
**Client ID:** G2\_COMP-04\_0-5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 08:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Chromium, Trivalent	33		mg/kg	0.89	0.89	1	-	09/23/13 11:29	107,-	JO
Solids, Total	89.7		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT
Cyanide, Total	ND		mg/kg	1.1	0.25	1	09/18/13 10:00	09/18/13 15:24	1,9010C/9012A	JO
pH (H)	9.1		SU	-	NA	1	-	09/14/13 21:00	1,9045D	EL
Chromium, Hexavalent	ND		mg/kg	0.89	0.20	1	09/16/13 17:50	09/17/13 22:40	1,7196A	TA
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/18/13 19:30	09/18/13 20:49	1,7.3	TL
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/18/13 19:30	09/18/13 20:41	1,7.3	TL



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

**Lab ID:** L1318168-05  
**Client ID:** G2\_COMP-05\_0-5  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 08:55  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Chromium, Trivalent	22		mg/kg	0.93	0.93	1	-	09/23/13 11:29	107,-	JO
Solids, Total	86.2		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT
Cyanide, Total	ND		mg/kg	1.1	0.26	1	09/18/13 10:00	09/18/13 15:26	1,9010C/9012A	JO
pH (H)	8.3		SU	-	NA	1	-	09/14/13 21:00	1,9045D	EL
Chromium, Hexavalent	ND		mg/kg	0.93	0.21	1	09/16/13 17:50	09/17/13 22:43	1,7196A	TA
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/18/13 19:30	09/18/13 20:49	1,7.3	TL
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/18/13 19:30	09/18/13 20:41	1,7.3	TL



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**SAMPLE RESULTS**

**Lab ID:** L1318168-06  
**Client ID:** CSO\_COMP-01\_0-10  
**Sample Location:** BROOKLYN, NY  
**Matrix:** Soil

**Date Collected:** 09/14/13 09:15  
**Date Received:** 09/14/13  
**Field Prep:** Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>General Chemistry - Westborough Lab</b>										
Chromium, Trivalent	14		mg/kg	0.89	0.89	1	-	09/23/13 11:29	107,-	JO
Solids, Total	89.8		%	0.100	NA	1	-	09/17/13 22:44	30,2540G	RT
Cyanide, Total	ND		mg/kg	1.1	0.26	1	09/18/13 10:00	09/18/13 15:27	1,9010C/9012A	JO
pH (H)	9.0		SU	-	NA	1	-	09/14/13 21:00	1,9045D	EL
Chromium, Hexavalent	0.23	J	mg/kg	0.89	0.20	1	09/16/13 17:50	09/17/13 22:44	1,7196A	TA
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/18/13 19:30	09/18/13 20:49	1,7.3	TL
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/18/13 19:30	09/18/13 20:41	1,7.3	TL



Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 04-06 Batch: WG636545-1										
Chromium, Hexavalent	ND		mg/kg	0.80	0.18	1	09/16/13 17:50	09/17/13 22:28	1,7196A	TA
General Chemistry - Westborough Lab for sample(s): 04-06 Batch: WG637047-1										
Cyanide, Total	ND		mg/kg	0.91	0.21	1	09/18/13 10:00	09/18/13 14:57	1,9010C/9012A	JO
General Chemistry - Westborough Lab for sample(s): 04-06 Batch: WG637207-1										
Cyanide, Reactive	ND		mg/kg	10	10.	1	09/18/13 19:30	09/18/13 20:46	1,7.3	TL
General Chemistry - Westborough Lab for sample(s): 04-06 Batch: WG637208-1										
Sulfide, Reactive	ND		mg/kg	10	10.	1	09/18/13 19:30	09/18/13 20:37	1,7.3	TL

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318168

Report Date: 09/25/13

Parameter	LCS		LCSD		%Recovery Limits	RPD	Qual	RPD Limits
	%Recovery	Qual	%Recovery	Qual				
General Chemistry - Westborough Lab Associated sample(s): 04-06 Batch: WG636188-1								
pH	100		-		99-101	-		
General Chemistry - Westborough Lab Associated sample(s): 04-06 Batch: WG636545-2								
Chromium, Hexavalent	89		-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 04-06 Batch: WG637047-2 WG637047-3								
Cyanide, Total	103		104		80-120	1		35
General Chemistry - Westborough Lab Associated sample(s): 04-06 Batch: WG637207-2								
Cyanide, Reactive	36		-		30-125	-		40
General Chemistry - Westborough Lab Associated sample(s): 04-06 Batch: WG637208-2								
Sulfide, Reactive	117		-		60-125	-		40

### Matrix Spike Analysis Batch Quality Control

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG636545-5 WG636545-8 QC Sample: L1318168-04 Client ID: G2_COMP-04_0-5												
Chromium, Hexavalent	ND	1370	820	60	Q	860	64	Q	75-125	5		20
General Chemistry - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637047-4 WG637047-5 QC Sample: L1318168-04 Client ID: G2_COMP-04_0-5												
Cyanide, Total	ND	10	10	98		9.9	95		65-135	1		35



## Lab Duplicate Analysis

Batch Quality Control

Project Name: GREENPOINT LANDING

Project Number: 170229002

Lab Number: L1318168

Report Date: 09/25/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG636188-2 QC Sample: L1318166-02 Client ID: DUP Sample						
pH	10.	10.0	SU	1		5
General Chemistry - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG636545-4 QC Sample: L1318168-04 Client ID: G2_COMP-04_0-5						
Chromium, Hexavalent	ND	ND	mg/kg	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01-06 QC Batch ID: WG636931-1 QC Sample: L1318141-01 Client ID: DUP Sample						
Solids, Total	89.9	91.1	%	1		20
General Chemistry - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637207-3 QC Sample: L1318181-01 Client ID: DUP Sample						
Cyanide, Reactive	ND	ND	mg/kg	NC		40
General Chemistry - Westborough Lab Associated sample(s): 04-06 QC Batch ID: WG637208-3 QC Sample: L1318181-01 Client ID: DUP Sample						
Sulfide, Reactive	ND	ND	mg/kg	NC		40

Project Name: GREENPOINT LANDING

Lab Number: L1318168

Project Number: 170229002

Report Date: 09/25/13

## Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: 09/14/2013 19:31

## Cooler Information Custody Seal

## Cooler

A Absent

## Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318168-01A	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-01B	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-01C	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-01D	Plastic 2oz unpreserved for TS	A	N/A	2.8	Y	Absent	TS(7)
L1318168-01X	Vial MeOH preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-01Y	Vial Water preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-01Z	Vial Water preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-02A	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-02B	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-02C	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-02D	Plastic 2oz unpreserved for TS	A	N/A	2.8	Y	Absent	TS(7)
L1318168-02X	Vial MeOH preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-02Y	Vial Water preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-02Z	Vial Water preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-03A	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-03B	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-03C	5 gram Encore Sampler	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(2)
L1318168-03D	Plastic 2oz unpreserved for TS	A	N/A	2.8	Y	Absent	TS(7)
L1318168-03X	Vial MeOH preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-03Y	Vial Water preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-03Z	Vial Water preserved split	A	N/A	2.8	Y	Absent	NYTCL-8260HLW(14)
L1318168-04A	Vial Large Septa unpreserved	A	N/A	2.8	Y	Absent	TPH-GRO(14)

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318168-04B	Amber 500ml unpreserved	A	N/A	2.8	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318168-04C	Amber 500ml unpreserved	A	N/A	2.8	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318168-04X	Plastic 250ml HNO3 preserved spl	A	<2	2.8	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)
L1318168-05A	Vial Large Septa unpreserved	A	N/A	2.8	Y	Absent	TPH-GRO(14)

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318168-05B	Amber 500ml unpreserved	A	N/A	2.8	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318168-05C	Amber 500ml unpreserved	A	N/A	2.8	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318168-05X	Plastic 250ml HNO3 preserved spl	A	<2	2.8	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)
L1318168-06A	Vial Large Septa unpreserved	A	N/A	2.8	Y	Absent	TPH-GRO(14)

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Container Information**

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1318168-06B	Amber 500ml unpreserved	A	N/A	2.8	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318168-06C	Amber 500ml unpreserved	A	N/A	2.8	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318168-06D	Amber 500ml unpreserved	A	N/A	2.8	Y	Absent	BE-TI(180),IGNIT-1030(14),NYTCL-8270(14),REACTS(14),TCN-9010(14),AS-TI(180),BA-TI(180),AG-TI(180),HERB-APA(14),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),TRICR-CALC(30),TS(7),CU-TI(180),PB-TI(180),PH-9045(1),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),NYTCL-8081(14),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),NYTCL-8082(14),REACTCN(14),TPH-DRO-D(14),CA-TI(180),CD-TI(180),HEXCR-7196(30),K-TI(180),NA-TI(180)
L1318168-06X	Plastic 250ml HNO3 preserved spl	A	<2	2.8	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)

\*Values in parentheses indicate holding time in days



**Project Name:** GREENPOINT LANDING**Project Number:** 170229002**Lab Number:** L1318168**Report Date:** 09/25/13**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Analysis(*)</b>
L1318168-07A	Vial HCl preserved	A	N/A	2.8	Y	Absent	NYTCL-8260(14)
L1318168-07B	Vial HCl preserved	A	N/A	2.8	Y	Absent	NYTCL-8260(14)

**Container Comments**

L1318168-05C

L1318168-06B

\*Values in parentheses indicate holding time in days

**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

## GLOSSARY

### Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

### Data Qualifiers

- A** - Spectra identified as "Aldol Condensation Product".
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.

Report Format: DU Report with "J" Qualifiers



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

**Data Qualifiers**

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- J** - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with "J" Qualifiers



**Project Name:** GREENPOINT LANDING  
**Project Number:** 170229002

**Lab Number:** L1318168  
**Report Date:** 09/25/13

## REFERENCES

- 1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.
- 30 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.
- 107 Alpha Analytical - In-house calculation method.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



**C** **A** **P** **S**  
Last revised August 29, 2013 - Westboro Facility

The following list includes only those analytes/methods for which certification/approval is currently held.  
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

**C** **P** **Certificate/Lab ID: PH-0574. NELAP Accredited Solid Waste/Soil.**

*Drinking Water (Inorganic Parameters:* Color, pH, Turbidity, Conductivity, Alkalinity, Chloride, Free Residual Chlorine, Fluoride, Calcium Hardness, Sulfate, Nitrate, Nitrite, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Silver, Sodium, Thallium, Zinc, Total Dissolved Solids, Total Organic Carbon, Total Cyanide, Perchlorate. *Organic Parameters:* Volatile Organics 524.2, Total Trihalomethanes 524.2, 1,2-Dibromo-3-chloropropane (DBCP) 504.1, Ethylene Dibromide (EDB) 504.1, 1,4-Dioxane (Mod 8270). *Microbiology Parameters:* Total Coliform-MF mEndo (SM9222B), Total Coliform – Colilert (SM9223, Enumeration and P/A), E. Coli. – Colilert (SM9223, Enumeration and P/A), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform-EC Medium (SM 9221E).

*Wastewater/Non-Potable Water (Inorganic Parameters:* Color, pH, Conductivity, Acidity, Alkalinity, Chloride, Total Residual Chlorine, Fluoride, Total Hardness, Silica, Sulfate, Sulfide, Ammonia, Kjeldahl Nitrogen, Nitrate, Nitrite, O-Phosphate, Total Phosphorus, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Dissolved Solids, Total Suspended Solids (non-filterable), BOD, CBOD, COD, TOC, Total Cyanide, Phenolics, Foaming Agents (MBAS), Bromide, Oil and Grease. *Organic Parameters:* PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables (Phenols), Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, Polynuclear Aromatic Hydrocarbons, Haloethers, Chlorinated Hydrocarbons, Volatile Organics, TPH (HEM/SGT), CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH. *Microbiology Parameters:* Total Coliform – MF mEndo (SM9222B), Total Coliform – MTF (SM9221B), E. Coli – Colilert (SM9223 Enumeration), HPC – Pour Plate (SM9215B), Fecal Coliform – MF m-FC (SM9222D), Fecal Coliform – A-1 Broth (SM9221E), Enterococcus - Enterolert.

*Solid Waste/Soil (Inorganic Parameters:* pH, Sulfide, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Tin, Vanadium, Zinc, Total Cyanide, Ignitability, Phenolics, Corrosivity, TCLP Leach (1311), SPLP Leach (1312 metals only), Reactivity. *Organic Parameters:* PCBs, PCBs in Oil, Organochlorine Pesticides, Technical Chlordane, Toxaphene, CT-Extractable Petroleum Hydrocarbons (ETPH), MA-EPH, MA-VPH, Dicamba, 2,4-D, 2,4,5-T, 2,4,5-TP(Silvex), Dalapon, Volatile Organics (SW 8260), Acid Extractables (Phenols) (SW 8270), Benzidines (SW 8270), Phthalates (SW 8270), Nitrosamines (SW 8270), Nitroaromatics & Cyclic Ketones (SW 8270), PAHs (SW 8270), Haloethers (SW 8270), Chlorinated Hydrocarbons (SW 8270). )

**S** **Certificate/Lab ID: 003155. NELAP Accredited.**

*Drinking Water (Inorganic Parameters:* SM2120B, 2320B, 2510B, 2540C, SM4500CN-CE, 4500F-C, 4500H-B, 4500NO3-F, 5310C, EPA 200.7, 200.8, 245.1, 300.0. *Organic Parameters:* EPA 504.1, 524.2.)

*Wastewater/Non-Potable Water (Inorganic Parameters:* SM2120B, 2310B, 2320B, 2340B, 2510B, 2540B, 2540C, 2540D, SM4500CL-E, 4500CN-E, 4500F-C, 4500H-B, 4500NH3-H, 4500NO2-B, 4500NO3-F, 4500P-E, 4500S-D, 4500SO3-B, 5210B, 5220D, 5310C, 5540C, EPA 120.1, 1664A, 200.7, 200.8, 245.1, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1. *Organic Parameters:* EPA 608, 624, 625.)

*Hazardous and Solid Waste (Inorganic Parameters:* EPA 1010A, 1030, 1311, 1312, 6010C, 6020A, 7196A, 7470A, 7471B, 9012B, 9014, 9038, 9040C, 9045D, 9050A, 9065, 9251. *Organic Parameters:* 8011 (NPW only), 8015C, 8081B, 8082A, 8151A, 8260C, 8270D, 8315A, 8330.)

**M** **S** **Certificate/Lab ID: 2009024.**

*Drinking Water (Inorganic Parameters:* SM9215B, 9222D, 9223B, EPA 180.1, 353.2, SM2120B, 2130B, 2320B, 2510C, 2540C, 4500CI-D, 4500CN-C, 4500CN-E, 4500F-C, 4500H+B, 4500NO3-F, 5310C, EPA 200.7, EPA 200.8, 245.1, EPA 300.0. *Organic Parameters:* 504.1, 524.2.)

*Wastewater/Non-Potable Water (Inorganic Parameters:* EPA 120.1, 1664A, 300.0, 350.1, 351.1, 353.2, 410.4, 420.1, 8315A, 9010C, SM2120B, 2310B, 2320B, 2510B, 2540B, 2540C, 2540D, 426C, 4500CI-E, 4500CN-C, 4500CN-E, 4500F-B, 4500F-C, 4500H+B, 4500Norg-C, 4500NH3-B, 4500NH3-H, 4500NO2-B, 4500NO3-F, 4500P-B, 4500P-E, 4500S2-D, 4500SO3-B, 5540C, 5210B, 5220D, 5310C, 9010B, 9030B, 9040C, 7470A, 7196A, 2340B, EPA 200.7, 6010C, 200.8, 6020A, 245.1, 1311, 1312, 3005A, Enterolert, 9223B, 9222D. *Organic Parameters:* 608, 624, 625, 8011, 8081B, 8082A, 8330, 8151A, 8260C, 8270D, 3510C, 3630C, 5030B, ME-DRO, ME-GRO, MA-EPH, MA-VPH.)

*Solid Waste/Soil* (Inorganic Parameters: 9010B, 9012A, 9014, 9040B, 9045C, 6010C, 6020A, 7471B, 7196A, 9050A, 1010, 1030, 9065, 1311, 1312, 3005A, 3050B, 9038, 9251. Organic Parameters: ME-DRO, ME-GRO, MA-EPH, MA-VPH, 8260C, 8270D, 8330, 8151A, 8081B, 8082A, 3540C, 3546, 3580A, 3620C, 3630C, 5030B, 5035.)

**M** **E** **P** **Certificate/Lab ID**: M-MA086.

*Drinking Water* (Inorganic Parameters: (EPA 200.8 for: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl) (EPA 200.7 for: Ba,Be,Ca,Cd,Cr,Cu,Na,Ni) 245.1, (300.0 for: Nitrate-N, Fluoride, Sulfate); (EPA 353.2 for: Nitrate-N, Nitrite-N); (SM4500NO3-F for: Nitrate-N and Nitrite-N); 4500F-C, 4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, 2320B, SM2540C, SM4500H-B. Organic Parameters: (EPA 524.2 for: Trihalomethanes, Volatile Organics); (504.1 for: 1,2-Dibromoethane, 1,2-Dibromo-3-Chloropropane), EPA 332. Microbiology Parameters: SM9215B; ENZ. SUB. SM9223; ColilertQT SM9223B; MF-SM9222D.)

*Non-Potable Water* (Inorganic Parameters: (EPA 200.8 for: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn); (EPA 200.7 for: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn); 245.1, SM4500H,B, EPA 120.1, SM2510B, 2540C, 2340B, 2320B, 4500CL-E, 4500F-BC, 426C, SM4500NH3-BH, (EPA 350.1 for: Ammonia-N), LACHAT 10-107-06-1-B for Ammonia-N, SM4500NO3-F, 353.2 for Nitrate-N, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, 4500P-B,E, 5220D, EPA 410.4, SM 5210B, 5310C, 4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.

Organic Parameters: (EPA 624 for Volatile Halocarbons, Volatile Aromatics),(608 for: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT,Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs-Water), (EPA 625 for SVOC Acid Extractables and SVOC Base/Neutral Extractables), 600/4-81-045-PCB-Oil. Microbiology Parameters: (ColilertQT SM9223B; Enterolert-QT: SM9222D-MF.)

**N** **E** **S** **Certificate/Lab ID**: 200307. **NELAP Accredited.**

*Drinking Water* (Inorganic Parameters: SM 9222B, 9223B, 9215B, EPA 200.7, 200.8, 300.0, SM4500CN-E, 4500H+B, 4500NO3-F, 2320B, 2510B, 2540C, 4500F-C, 5310C, 2120B, EPA 332.0. Organic Parameters: 504.1, 524.2.)

*Non-Potable Water* (Inorganic Parameters: SM9222D, 9221B, 9222B, 9221E-EC, EPA 3005A, 200.7, 200.8, 245.1, SW-846 6010C, 6020A, 7196A, 7470A, SM3500-CR-D, EPA 120.1, 300.0, 350.1, 350.2, 351.1, 353.2, 410.4, 420.1, 426C, 1664A, SW-846 9010B, 9010C, 9030, 9040B, 9040C, SM2120B, 2310B, 2320B, 2340B, 2540B, 2540D, 4500H+B, 4500CL-E, 4500CN-E, 4500NH3-H, 4500NO3-F, 4500NO2-B, 4500P-E, 4500-S2-D, 4500SO3-B, 5210B, 5220D, 2510B, 2540C, 4500F-C, 5310C, 5540C, LACHAT 10-204-00-1-A, LACHAT 10-107-06-2-D, 3060A. Organic Parameters: SW-846 3510C, 3630C, 5030B, 8260C, 8270D, 8330, EPA 624, 625, 608, SW-846 8082A, 8081B, 8015C, 8151A, 8330, 8270D-SIM.)

*Solid & Chemical Materials* (Inorganic Parameters: SW-846 6010C, 6020A, 7196A, 7471B, 1010, 1010A, 1030, 9010C, 9012B, 9014, 9030B, 9040C, 9045C, 9045D, 9050, 9065, 9251, 1311, 1312, 3005A, 3050B, 3060A. Organic Parameters: SW-846 3540C, 3546, 3050B, 3580A, 3620D, 3630C, 5030B, 5035, 8260C, 8270D, 8270D-SIM, 8330, 8151A, 8015B, 8015C, 8082A, 8081B.)

**N** **E** **S** **Certificate/Lab ID**: 2064. **NELAP Accredited.**

*Drinking Water* (Organic Parameters: **EPA** Di-isopropyl ether (DIPE), Ethyl-t-butyl ether (ETBE), Tert-amyl methyl ether (TAME)).

*Non-Potable Water* (Organic Parameters: **EPA** 1,3,5-Trichlorobenzene. **EPA** MTPH.)

*Solid & Chemical Materials* (Organic Parameters: **EPA** 1,3,5-Trichlorobenzene.)

**N** **P** **Certificate/Lab ID**: MA935. **NELAP Accredited.**

*Drinking Water* (Inorganic Parameters: SM9222B, 9221E, 9223B, 9215B, 4500CN-CE, 4500NO3-F, 4500F-C, EPA 300.0, 200.7, 200.8, 245.1, 2540C, SM2120B, 2320B, 2510B, 5310C, SM4500H-B. Organic Parameters: EPA 332, 504.1, 524.2.)

*Non-Potable Water* (Inorganic Parameters: SM5210B, EPA 410.4, SM5220D, 4500CI-E, EPA 300.0, SM2120B, 2340B, SM4500F-BC, EPA 200.7, 200.8, 351.1, LACHAT 10-107-06-2-D, EPA 353.2, SM4500NO3-F, 4500NO2-B, EPA 1664A, SM5310B, C or D, 4500-PE, EPA 420.1, SM510ABC, SM4500P-B5+E, 2540B, 2540C, 2540D, EPA 120.1, SM2510B, SM15 426C, 9222D, 9221B, 9221C, 9221E, 9222B, 9215B, 2310B, 2320B, 4500NH3-H, 4500-S D, EPA 350.1, 350.2, SW-846 1312, 7470A, 5540C, SM4500H-B, 4500SO3-B, SM3500Cr-D, 4500CN-CE, EPA 245.1, SW-846 9040B, 9040C, 3005A, 3015, EPA 6010B, 6010C, 6020, 6020A, 7196A, 3060A, SW-846 9010C, 9030B. Organic Parameters: SW-846 8260B, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 3510C, EPA 608, 624, 625, SW-846 3630C, 5030B, 8011, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8330, 1,4-Dioxane by NJ Modified 8270, 8015B, NJ EPH.)



9030B, 9040C. Organic Parameters: EPA 3510C, 3630C, 5030B, 8260B, 608, 624, 625, 8011, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8260C, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330, )

Solid & Hazardous Waste (Inorganic Parameters: EPA 1010A, 1030, 3060A, 3050B, 1311, 1312, 6010B, 6010C, 6020, , 7196A, 7471A, 7471B, 6020A, 9010C, 9012B, 9030B, 9014, 9038, 9040C, 9045D, 9251, 9050A, 9065. Organic Parameters: EPA 5030B, 5035, 3540C, 3546, 3550B, 3580A, 3620C, 3630C, 6020A, 8260B, 8260C, 8015B, 8015C, 8081A, 8081B, 8082, 8082A, 8151A, 8270C, 8270D, 8270C-SIM, 8270D-SIM, 8330.)

LA Certificate/Lab ID: L2217.

Drinking Water (Inorganic Parameters: SM 4500H-B. Organic Parameters: EPA 524.2, 504.1.)

Non-Potable Water (Inorganic Parameters: EPA 200.7, 200.8, 6010C, 6020A, 245.1, 7470A, 9040B, 9010B, 180.1, 300.0, 332.0, 6860, 351.1, 353.2, 9060, 1664A, SM 4500CN-E, 4500H-B, 4500Norg-C, 4500NO3-F, 5310C, 2130B, 2320B, 2340B, 2540C, 5540C, 3005A, 3015, 9056, 7196A, 3500-Cr-D. Organic Parameters: EPA 8015C, 8151A, 8260C, 8270D, 8270D-SIM, 8330A, 8082A, 8081B, 3510C, 5030B, MassDEP EPH, MassDEP VPH.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 200.7, 6010C, 6020A, 7471A, 6860, 1311, 1312, 3050B, 7196A, 9040B, 9045C, 9010C, 9012B, 9251, SM3500-CR-D, 4500CN-CE, 2540G, Organic Parameters: EPA 8015C, 8151A, 8260C, 8270D, 8270D-SIM, 8330A/B-prep, 8082A, 8081B, 3540C, 3546, 3580A, 5035A, MassDEP EPH, MassDEP VPH.)

NELAP TNI S A d

EPA Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether. EPA 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene. EPA N Iodomethane (methyl iodide), Methyl methacrylate. EPA S Tert-amyl methyl ether (TAME), Diisopropyl ether (DIPE), Azobenzene. EPA A PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT. EPA C Methyl naphthalene, Dimethyl naphthalene, Total Methylnaphthalenes, Total Dimethylnaphthalenes, 1,4-Diphenylhydrazine. EPA 4-Chloroaniline, 4-Methylphenol. Total Phosphorus in a soil matrix, TKN in a soil matrix, NO2 in a soil matrix, NO3 in a soil matrix. EPA Total Petroleum Hydrocarbons, Oil & Grease.





# CHAIN OF CUSTODY

PAGE 1 OF 1

Serial No: 09251312-00

WESTBORO, MA  
TEL: 508-898-9220  
FAX: 508-898-9193

MANSFIELD, MA  
TEL: 508-822-9300  
FAX: 508-822-3288

Date Rec'd in Lab: 9/14/13

ALPHA Job #: 43/8/08

**Project Information**

Project Name: Greenpoint Landing

Project Location: Brooklyn, NY

Project #: 170229002

Project Manager: Mimi Poyurovsky

ALPHA Quote #: 2013963

**Turn-Around Time** Standard  RUSH (only confirmed if pre-approved!)

Date Due: 9/23/13 Time:

**Report Information - Data Deliverables** FAX  EMAIL  
 ADEX  Add'l Deliverables**Billing Information** Same as Client info PO #:**Client Information**

Client: Langan, P.C.

Address: 300 W 31st St, 8th Fl.

New York, NY 10001

Phone: 212-479-5400

Fax: 212-479-5444

Email: GWYKA@LANGAN.COM

 These samples have been previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:  
 1) Report TCL and part 375 parameters; 2) provide category A data deliverables; 3) provide NYSDCL EDD.

**Regulatory Requirements/Report Limits**

State /Fed Program	Criteria
NYSDCL	6 NYSDCL 375 Unrestricted use SCOs

**ANALYSIS**

VOC  
 Toluene, Total CHL  
 Hex Chlorocyclopentadiene  
 Total PCBs  
 PCBs  
 TS  
 CHL  
 PCBs  
 TPT  
 GPO

**SAMPLE HANDLING**

Filtration \_\_\_\_\_

Done  
 Not needed  
 Lab to do Preservation  
 Lab to do

(Please specify below)

**SAMPLE SPECIFIC COMMENTS**

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials	ANALYSIS						TOTAL # BOTTLES
		Date	Time			VOC	TS	CHL	PCB	TPT	GPO	
18/08.1	G2-SB-01C-0-0.5	9/14/13	8:15	SO	NB	X	X	X	X	X	X	4
2	G2-SB-05B-2.5-3	9/14/13	8:43	SO	NB	X	X	X	X	X	X	4
3	CSO-SB-01A-0-0.5	9/14/13	9:00	SO	NB	X	X	X	X	X	X	4
4	G2-COMP-04-0-5	9/14/13	8:15	SO	NB	X	X	X	X	X	X	3
5	G2-COMP-05-0-5	9/14/13	8:55	SO	NB	X	X	X	X	X	X	3
6	CSO-COMP-01-0-10	9/14/13	9:15	SO	NB	X	X	X	X	X	X	3
7	TRIP BLANK-091413	9/14/13	13:30	AQ	NB							2

Container Type	E	A	P	A	A	A
Preservative	A	A	A	A	A	B

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	9/14/13 13:31	<i>[Signature]</i>	9/14/13 13:32
<i>[Signature]</i>	9/14/13 17:35	<i>[Signature]</i>	9/14/13 17:35

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

**ATTACHMENT E**

**SITE-SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN**

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# **SITE-SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN**

**CSO Relocation, Parcel F  
Greenpoint Landing  
Brooklyn, New York  
OER Project #13EHAN466K**

*Prepared For:*

**Greenpoint Storage Terminal, LLC  
535 Madison Avenue  
New York, NY 10022**

*Prepared By:*

**Langan Engineering, Environmental, Surveying  
and Landscape Architecture, D.P.C.  
21 Penn Plaza  
360 West 31<sup>st</sup> Street, 8<sup>th</sup> Floor  
New York, New York 10001**

***LANGAN***

**March 28, 2014  
170229002**

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## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>5</b>
1.1	General.....	5
1.2	Objectives .....	5
1.3	Roles and Responsibilities .....	6
1.3.1	Project Manager.....	6
1.3.2	Corporate Health and Safety Manager .....	6
1.3.3	Health and Safety Officer .....	7
1.3.4	Key Personnel and Contact Information.....	8
1.3.5	Subcontractor Responsibilities .....	8
<b>2.0</b>	<b>EMERGENCY RESPONSE PLAN .....</b>	<b>10</b>
2.1	Emergency Prevention, Recognition, Response and Notification .....	10
2.2	Hospital Route Map .....	11
2.3	Emergency Contact Information.....	12
<b>3.0</b>	<b>SITE LOCATION AND BACKGROUND .....</b>	<b>13</b>
<b>4.0</b>	<b>SCOPE OF WORK.....</b>	<b>18</b>
4.1	Construction .....	18
4.2	Task Descriptions.....	20
4.2.1	Task #1 – Excavation Oversight .....	21
4.2.2	Task #2 – Community Air Monitoring Program .....	21
4.2.3	Task #3 – Endpoint Sampling .....	21
4.2.4	Task #4 – Dewatering .....	21
<b>5.0</b>	<b>HAZARD EVALUATION .....</b>	<b>23</b>
5.1	Chemical Hazard Evaluation.....	23
5.2	Summary of Potential Chemical Hazards .....	23
5.3	Radiation Hazard Evaluation .....	30
5.4	Biological Hazard Evaluation.....	30
5.4.1	Animals .....	30
5.4.2	Insects.....	30
5.5	Physical Hazard Evaluation .....	31
5.5.1	Operation of Heavy Equipment.....	31
5.5.2	Excavation and Earthwork.....	32
5.5.3	Utilities .....	33
5.5.4	Work in Extreme Temperatures .....	33
5.5.5	Noise.....	33
5.5.6	Miscellaneous .....	33
5.6	Summary of Potential Physical Hazards.....	34
<b>6.0</b>	<b>PERSONAL PROTECTIVE EQUIPMENT .....</b>	<b>37</b>
6.1	OSHA PPE Requirements .....	38
<b>7.0</b>	<b>AIR MONITORING.....</b>	<b>39</b>
7.1	General.....	39
7.2	Instrumentation .....	39
7.3	Community Air Monitoring Plan .....	39
7.4	Major Vapor Emissions and Response Plan.....	41
<b>8.0</b>	<b>SITE CONTROL.....</b>	<b>43</b>

<b>8.1</b>	<b>Work Zones</b> .....	<b>43</b>
<b>8.2</b>	<b>General Safe Work Practices</b> .....	<b>43</b>
<b>8.3</b>	<b>Site Safety Meetings</b> .....	<b>44</b>
<b>8.4</b>	<b>Site Communications</b> .....	<b>44</b>
<b>8.5</b>	<b>Buddy System</b> .....	<b>45</b>
<b>8.6</b>	<b>Personnel Hygiene</b> .....	<b>45</b>
<b>8.7</b>	<b>Decontamination</b> .....	<b>45</b>
<b>9.0</b>	<b>HEALTH AND SAFETY TRAINING AND MEDICAL SURVEILLANCE</b> .....	<b>47</b>
<b>9.1</b>	<b>Respirator Fit Testing Requirements</b> .....	<b>47</b>
<b>9.2</b>	<b>Medical Monitoring Requirements</b> .....	<b>47</b>
<b>9.3</b>	<b>Confined Space Entry</b> .....	<b>47</b>
<b>10.0</b>	<b>HEALTH AND SAFETY PLAN APPROVAL</b> .....	<b>48</b>
<b>11.0</b>	<b>CHASP COMPLIANCE AGREEMENT</b> .....	<b>49</b>

### **LIST OF TABLES**

Table 1	Potential Chemical Hazards Summary
Table 2	Potential Physical Hazards Summary

### **LIST OF FIGURES**

Figure 1	Site Plan
Figure 2	Route Map to Hospital
Figure 3	Site Location Map
Figure 4	Current Tax Blocks and Lots
Figure 5	Proposed CSO and Outfall Plan

### **LIST OF APPENDICES**

Appendix A	OSHA Right-To-Know Fact Sheet
Appendix B	Employee Exposure/Injury Incident Report
Appendix C	Material Safety Data Sheets
Appendix D	Heat and Cold Stress Fact Sheets
Appendix E	Jobsite Safety Inspection Form
Appendix F	Site Safety Meeting Form
Appendix G	Decontamination Procedures

## **1.0 INTRODUCTION**

### **1.1 General**

This Site-Specific Construction Health and Safety Plan (CHASP) has been developed by Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. (Langan) to comply with Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1910.120(b)(4), Hazardous Waste Operations and Emergency Response (HAZWOPER). The plan addresses the activities related to the construction of a public New York City Department of Environmental Protection (NYCDEP) combined sewer overflow (CSO) and outfall in Parcel F of the Greenpoint Landing development in Brooklyn, New York. The site is defined as Parcel F and G. This CHASP is to be implemented by Langan personnel while on-site. Compliance with this CHASP is required of all Langan personnel who enter this area of site operations. The management of the day-to-day activities concerning this site and implementation of this CHASP in the field is the responsibility of the site Health and Safety Officer (HSO). Assistance in the implementation of this CHASP can also be obtained from the Langan Health and Safety Manager (HSM). The content of this CHASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the scope of work. Any changes proposed must be reviewed by Health and Safety staff and are subject to the approval of the Langan HSM.

### **1.2 Objectives**

The purpose of this CHASP is to establish personnel protection standards and mandatory safety practices and procedures for potential encounters with non-hazardous soil or groundwater during construction and to inform employees of the potential hazards that may be encountered during work activities pursuant to the OSHA Hazard Communication Standard (29 CFR 1910 and 1926), also known as the "Right-To-Know" law (Appendix A). This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted during construction.

Langan's primary responsibility is to implement the *Soil and Fill Material and Groundwater Management* pursuant to the Notice of No Objection issued by the New York City Office of Environmental Remediation (NYCOER).

Construction activities will include, but are not limited to, soil and fill management, a

community air monitoring program (CAMP), and dewatering and treatment of impacted groundwater prior to discharge or off-site disposal.

### **1.3 Roles and Responsibilities**

The following briefly describes the health and safety (H&S) designations and general responsibilities that may be employed for this phase of work. The titles have been established to accommodate the site requirements in order to ensure the safe conduct of on-site work. The number and type of H&S personnel for a given work location is to be based upon the particular H&S requirements relative to the proposed site activities or operations.

#### **1.3.1 Project Manager**

The project manager (PM) has overall responsibility to ensure that personnel working on-site are safe. The specific responsibilities of the project manager include:

- Ensuring that the CHASP is developed prior to the field work or site visit;
- Reviewing and approving the CHASP prior to the field work or site visit;
- Ensuring employee understanding of and compliance with the CHASP; and
- Ensuring that project tasks are performed in a manner consistent with Langan's comprehensive *Health and Safety Program for Hazardous Waste Operations* and the CHASP.

#### **1.3.2 Corporate Health and Safety Manager**

The corporate health and safety manager (HSM) provides guidance to the project manager and health and safety officer (HSO) on CHASP preparation and reviews and approves the CHASP. The specific responsibilities of the corporate health and safety manager include:

- Serving as a resource in the development and implementation of CHASPs;
- Providing guidance and serving as a resource to the Langan HSO;
- Assisting the HSO with development of the CHASP, updating CHASP as dictated by changing conditions, jobsite inspection results, etc.;
- Assisting the HSO to conduct jobsite safety Inspections and assisting with the

correction of shortcomings found;

- Ensuring training requirements are satisfied in a timely manner;
- Ensuring medical evaluations of Langan personnel are current; and
- Maintaining records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).

### **1.3.3 Health and Safety Officer**

The health and safety officer (HSO) is responsible and authorized to implement this CHASP and verify compliance. The HSO reports to the PM and is on-site or readily accessible to the site during all work operations. The HSO is responsible for assessing site conditions and direction and controlling emergency response activities. The specific responsibilities of the HSO include the following:

- Participating in the development and implementation of this CHASP;
- Conducting jobsite safety inspections and correcting any shortcomings in a timely manner;
- Helping to select proper PPE (Personal Protective Equipment) and periodically inspecting it;
- Ensuring that PPE is properly stored and maintained;
- Controlling entry into and exit from the contaminated areas or zones of the site;
- Monitoring the work parties for signs of stress, such as heat stress, fatigue, and cold exposure;
- Monitoring site hazards and conditions;
- Knowing (and ensuring that all site personnel also know) emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department; and
- Resolving conflicting situations which may arise concerning safety requirements and working conditions.

**1.3.4 Key Personnel and Contact Information**

<b>Title</b>	<b>Name</b>	<b>Affiliation</b>	<b>Work Telephone</b>	<b>Cell Phone</b>
Project Manager	Mimi Raygorodetsky	Langan	212-479-5441	917-952-9906
HSO	Gregory Wyka	Langan	212-479-5476	347-267-2679
HSM	Tony Moffa	Langan	212-491-6545	212-756-2523
N/A	Incident/Injury Hotline	Langan	201-398-4699	N/A
Site Contact	Al Bradshaw	GST	212-310-9796	212-355-7570
Client Contact	Al Bradshaw	GST	212-310-9796	212-355-7570

**1.3.5 Subcontractor Responsibilities**

Each subcontractor shall develop and implement their own CHASP, which identifies a lead individual responsible for H&S compliance for each of their employees, lower-tier subcontractors, and consultants. The subcontractor's CHASP will be at least as stringent as this Langan CHASP. The subcontractor must be familiar with and abide by the requirements outlined in their own CHASP. A subcontractor may elect to adopt Langan's CHASP as its own provided that it has given written notification to Langan, but where Langan's CHASP excludes provisions pertinent to the subcontractor's work (i.e., confined space entry), the subcontractor must provide written addendums to this CHASP. Additionally, the subcontractor must:

- Ensure their employees are trained in the use of all appropriate PPE for the tasks involved;
- Notify Langan of any hazardous material brought onto the job site, the hazards associated with the material, and must provide a MSDS for the material;
- Have knowledge of, understand, and abide by all current federal, state, and local health and safety regulations pertinent to the work;

- Ensure their employees have received current training in the appropriate levels of 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER);
- Ensure their employees have been medically cleared to work in Hazardous Waste Sites and to wear a respirator, if necessary;
- Ensure their employees have been fit-tested within the year on the type respirator they will wear;
- Ensure that its employees have been briefed on this CHASP and have signed the CHASP Compliance Agreement.

## **2.0 EMERGENCY RESPONSE PLAN**

The following section discusses emergency recognition and prevention and emergency response and notification. Emergency situations include, but are not limited to, injury or chemical exposure to personnel, fire or explosion, environmental release, or serious weather conditions.

### **2.1 Emergency Prevention, Recognition, Response and Notification**

It is the responsibility of all personnel to monitor work at the site for potential safety hazards. All personnel are required to immediately report any unsafe conditions to the HSO. The HSO is responsible to immediately take steps to remedy any unsafe conditions observed at the site.

If an emergency at the site warrants evacuation, all personnel shall immediately evacuate the affected area, report to the predetermined emergency assembly location, and then report the emergency to the HSO. The predetermined emergency assembly location will be at the **southwest corner of Commercial Street and Franklin Street**. The predetermined emergency assembly location is illustrated on Figure 1.

In case of injury, field personnel should take precautions to protect the victim from further harm, immediately administer emergency first aid (as necessary), and notify local or facility emergency services and the HSM immediately. Emergency medical care will be provided by the FDNY/NYPD.

All work-related incidents, injuries of any personnel (e.g., Langan employees, subcontractors, property owners, visitors, etc.) associated with field activities, and near-misses and all property damage and injuries must immediately be report to the Langan Incident/Injury Hotline. The affected employee and the HSO must complete and submit the Employee Exposure/Injury Incident Report (Appendix A) as soon as possible following the incident.

In all situations when an on-site emergency results in an evacuation, Langan personnel shall not re-enter until:

- The conditions resulting in the emergency have been corrected;
- The hazards have been reassessed;
- This CHASP has been reviewed and revised, as necessary; and
- Langan field personnel have been briefed on changes to this CHASP.

## **2.2 Hospital Route Map**

In case of emergency, the nearest hospital to the site is New York University Medical Center located at 550 First Avenue, Manhattan, New York. A route map to the hospital is provided as Figure 2. Travel time from the site to NYU Medical Center is about 10 minutes.

### **Directions to NYU Medical Center**

#### ***START: Corner of Franklin and Commercial Streets, Brooklyn, NY 11222***

1. Head south on Franklin Street toward Dupont Street
2. Turn left Green Street
3. Take the 2nd left onto McGuinness Boulevard
4. Slight left onto Pulaski Bridge
5. Take the 1st right onto 49th Avenue
6. Turn right onto 11th Place
7. Turn right onto 50th Avenue
8. Turn left onto the I-495 W ramp
9. Slight right onto I-495 W
10. Exit on the left onto Tunnel Exit Street
11. Turn left onto E 34th Street
12. Take the 1st right onto 2nd Avenue
13. Turn left onto E 30th Street
14. Turn left onto 1st Avenue

#### ***END: 550 1st Ave, New York, NY 10016***

### 2.3 Emergency Contact Information

<b>Local Resource</b>	<b>Name</b>	<b>Telephone</b>
Fire	FDNY	911
Police	NYPD	911
Ambulance	FDNY	911
Hospital	NYU Medical Center	212-263-7300
Poison Control Center	N/A	1-800-222-1222
Pollution Toxic Chemical Oil Spills	N/A	1-800-424-8802

### **3.0 SITE LOCATION AND BACKGROUND**

#### **Site Description**

The CSO site comprises Parcels F and G. Parcel F comprises Lot 50 of Block 2472 and Parcel G comprises Lots 60 and 65 of Block 2472. Parcel F is currently vacant and encompasses an asphalt-paved area of 73,634 square feet. Parcel F is bound by Commercial Street to the south, Newtown Barge Playground to the west, Parcel G to the east, and the East River and Newtown Creek to the north. Current site grade within the footprint of the proposed CSO ranges from about el. 6 to 11 BBHD<sup>1</sup>. The groundwater surface in the vicinity of the proposed CSO and outfall is about 6 to 8 feet below ground surface (about el. 2 to el. 0 BBHD). The groundwater surface is expected to be shallower towards the East River and deeper towards Commercial Street. Groundwater flow is generally from east to west across Parcel F from Commercial Street towards the East River.

The existing CSO is located in Parcel G and will be abandoned in place until a portion of it is removed as part of foundation construction for the proposed redevelopment on Parcel G. A site location map is provided as Figure 3. A layout of the current blocks and lots is provided as Figure 4.

The E-Designations for Hazardous Materials and Noise (E-138) pursuant to the May 11, 2005 Greenpoint-Williamsburg Rezoning (04DCP003K) apply to Lots 50, 60, and 65 of Block 2472. The site is currently under the regulatory oversight of the New York City Office of Environmental Remediation (OER).

#### **Site History**

The previous environmental site assessments indicated the development site was historically and primarily used for low-impact industrial activities, including the transfer and storage of lumber, coal, and construction materials and equipment.

#### **Proposed CSO Project**

The proposed project involves relocating a public 24-inch NYCDEP CSO and outfall from Parcel G to Parcel F (Figure 5). The CSO relocation allows for the construction of an affordable

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<sup>1</sup> All elevations referenced herein are with respect to the Borough of Brooklyn Highway Datum (BBHD), which is 2.56 feet above mean sea level datum at Sandy Hook New Jersey as defined by the United States Geologic Survey (USGS NGVD 1929).

housing building on Parcel G. The construction of the affordable housing building on Parcel G will proceed immediately after the CSO relocation is completed.

The existing CSO drains the regulating chamber at the intersection of Commercial and Franklin streets. The new CSO will drain the same regulating chamber, but will be rerouted to Parcel F to accommodate the future development on Parcel G. The new CSO will be approximately 500 linear feet of 24-inch reinforced concrete pipe set in a concrete cradle supported by driven timber piles and will discharge to the East River through a new precast concrete outfall approved and permitted by the United States Army Corps of Engineers (USACE) and the New York State Department of Environmental Conservation (NYSDEC).

The first approximately 100 feet of the CSO will be installed in the sidewalk of the public right-of-way (ROW) on Commercial Street; the remaining approximately 400 feet of the CSO will be installed within Parcel F. The segment of the CSO in the sidewalk will be restored to Department of Transportation (DOT) specifications, which requires a 4-inch thick concrete sidewalk. The segment of the CSO within Parcel F will be backfilled with excavated soil/fill from the CSO and/or imported fill material, temporarily covered with quarry gravel or RCA from a Part 360 registered facility to protect the ground surface from erosion. Langan will meet DEP requirements and specifications for reusing excavated soil as backfill in the new CSO trench. A private, asphalt-paved driveway will be built over the CSO in the future. The existing CSO within Parcel G will be capped at the Commercial Street sidewalk and will be abandoned in place until a portion of it is removed as part of foundation construction for the proposed redevelopment on Parcel G. The entire CSO relocation project is subject to NYCDEP approval.

Construction of the Parcel F CSO will require excavating a 400-foot long 10-foot wide trench to a depth of 10 feet below surface grade. Trench boxes may be used for safety and to minimize soil disturbance. We estimate about 1,600 cubic yards of subsurface material will be excavated during construction.

Excavated soil/fill material generated during CSO construction will be visually screened by a Langan geotechnical field engineer to determine its potential for reuse as backfill in the CSO trench. Backfill material shall meet the specifications for "Approved Excavated Suitable Fill" as described in the DEP's Standard Sewer Specifications (2009) Sections 2.24.2(C) and 4.06.2. According to the DEP specifications, approved excavated suitable fill shall be earth, free of bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign matter, shall not contain oversized

material, and shall exhibit a fines content equal to or less than 20 percent (portion of material passing a No. 200 sieve). If excavated soil/fill material is found to contain any of the non-complaint, oversized materials referenced above, the excavated soil/fill material may be screened as a standard construction measure using small soil screener (i.e., Screen Pro 200XL manufactured by CWM, Inc., or equivalent) to remove oversized material. Screening out oversized material and objects will consist of an excavator or front-end loader placing excavated soil/fill material into the hopper of the soil screener, allowing the finer soil/fill material to fall through the screen, and then placing the screened soil/fill material directly back into the CSO trench as backfill or staged in temporary stockpiles (no more than 900 cubic yards in total for up to 60 days, on a rolling basis, unless otherwise approved by the DEC) or in covered roll-off containers for up to 60 days pending a decision on its reuse by the DEC. Screened-out materials will be managed in accordance with applicable federal, state and local regulations.

Excavated soil/fill material from within Parcel F will be reused as backfill in the CSO trench provided it meets geotechnical requirements and DEP specifications for backfill material. Excavated soil from the sidewalk portion of the CSO shall not be used as backfill in Parcel F, but may be used as backfill in the sidewalk portion of the CSO provided it also meets geotechnical requirements and DEP specifications for backfill material. The soil/fill material to be excavated in Parcel F was characterized and is non-hazardous with characteristics typical of historic fill. Excavated soil/fill material that cannot be reused as backfill in the CSO trench or excess excavated soil/fill material will be either transported off-site for disposal at a receiving facility with permit authorizing it to receive the excavated soil/fill material or placed in one or more covered roll-offs for up to 60 days. During this 60-day period, and commencing promptly after issuance of the NNO, the Applicant will work with the NYSDEC and the OER with regard to any on-site disposition of excavated material that is not used as backfill in the CSO trench.

The excavation and construction work for the new CSO outfall will also require temporary dewatering. The groundwater surface in the vicinity of the proposed excavation area is about 6 to 8 feet below ground surface (about el. 2 to el. 0 BBHD). The groundwater surface is expected to be shallower towards the East River and deeper towards Commercial Street. Based on the local hydrogeological conditions and proximity to the East River/Newtown Creek, a temporary dewatering effort is required to facilitate construction of CSO outfall pipe platform, concrete placement and curing, pipe laying and placement, and backfilling. Dewatering fluids will be managed by the Contractor in accordance with the *Soil-Fill and Groundwater Management Plan* and applicable laws and regulations.

## **Surrounding Properties**

The Greenpoint Landing development site is located on waterfront property in a dense urban area. The site is adjoined to the south and east by residential, commercial and industrial-manufacturing uses as well as vacant land, vacant buildings, and city-owned outdoor recreation space. The site is located at the confluence of the East River and Newtown Creek, which are the two closest ecological receptors to the site. The adjoining property to the south of Parcels F and G, across Commercial Street, is the Former NuHart Plastics State Superfund Site (Site No. 224136), located at 280 Franklin Street, Brooklyn, NY and further identified as Block 2487, Lots 1, 10 and 78. The Newtown Barge Playground is a 0.98-acre outdoor area with recreation fields and courts owned by the DPR located between Parcel F and D1 on Block 2486, Lot 1. The Greenpoint Playground is a 0.50-acre playground owned by the DPR located a triangular-shaped block (Block 2472, Lot 75) bordered by Commercial Street to the north, Dupont Street to the south and Franklin Street to the east. The surrounding properties beyond the adjoining properties consist of multi-story residential buildings, some with ground-level retail and restaurants; houses of worship; office buildings; television and movie production studios; and small-scale industrial and manufacturing facilities. The zoning classifications of the surrounding area include R6, R6A, R6B, R8, M1-1, and M1-2.

A search was performed for sensitive receptors, including, but not limited to, schools, daycare facilities, hospitals, and senior care facilities, were identified within an approximate 500-foot radius of the site boundary. Three sensitive receptors (Newtown Barge Playground, Greenpoint Playground, and Mary D's Senior Housing, 80 Dupont Street, Brooklyn, NY) were identified within the search radius.

## **Environmental Background**

The CSO site was subjected to three environmental studies since 2001. The previous environmental site assessments indicated the site was historically and primarily used for low-impact industrial activities, including the transfer and storage of lumber, coal, and construction materials and equipment. The previous environmental site investigations confirmed the presence of historic fill material on the site, a finding consistent with urban waterfront property across New York City. In addition, previous subsurface investigations did not identify significant soil and groundwater contamination. The results of six previous site assessments and investigations on the CSO site and the larger Greenpoint Landing property are presented

and summarized in Langan's *Remedial Investigation Work Plan* (RIWP) dated July 24, 2013, which is on file with the OER.

Langan is currently implementing a supplemental environmental site investigation in accordance with the OER-approved RIWP on Parcel F and G (as well as Parcels E3, D1, D2, and H). These parcels are identified on Figure 1. The objectives of the remedial investigation are to supplement the findings of previous environmental studies and to evaluate soil, groundwater and soil vapor quality across these parcels to satisfy the requirements of the Hazardous Materials E-Designation Program. Langan was also retained by GST to perform a waste characterization investigation of the proposed CSO. A memo providing an overview of the investigation is included as an attachment to the *Soil-Fill and Groundwater Management Plan*.

## **4.0 SCOPE OF WORK**

### **4.1 Construction**

The construction of the replacement CSO and outfall will require excavating an approximately 400-foot long trench to a depth of 10 feet below current surface grade (about el. -2 to el. -5 BBHD) on Parcel F. The first approximately 100 feet of the CSO will be installed in the public right-of-way (ROW) on Commercial Street; the remaining approximately 400 feet of the CSO will be installed within Parcel F. The segment of the CSO in the public ROW will be restored to Department of Transportation (DOT) specifications, which requires a 4-inch concrete sidewalk. The segment of the CSO within Parcel F will be backfilled with excavated soil/fill from the CSO and/or imported fill material, temporarily covered with quarry gravel or RCA from a Part 360 registered facility to protect the ground surface from erosion. Langan will meet DEP requirements and specifications for reusing excavated soil as backfill in the new CSO trench. A private, asphalt-paved driveway will be built over the CSO in the future. The existing CSO within Parcel G will be capped at the Commercial Street sidewalk and will be abandoned in place until a portion of it is removed as part of foundation construction for the proposed redevelopment on Parcel G. We estimate about 1,600 cubic yards of subsurface material will be excavated during construction.

Excavated soil/fill material from within Parcel F will be reused as backfill in the CSO trench provided it meets geotechnical requirements and DEP specifications for backfill material. Excavated soil from the sidewalk portion of the CSO shall not be used as backfill in Parcel F, but may be used as backfill in the sidewalk portion of the CSO provided it also meets geotechnical requirements and DEP specifications for backfill material. The soil/fill material to be excavated in Parcel F was characterized and is non-hazardous with characteristics typical of historic fill. Excavated soil/fill material that cannot be reused as backfill in the CSO trench or excess excavated soil/fill material will be either transported off-site for disposal at a receiving facility with permit authorizing it to receive the excavated soil/fill material or placed in one or more roll-offs for up to 60 days.

Excavated soil/fill material generated during CSO construction will be visually screened by a Langan geotechnical field engineer to determine its potential for reuse as backfill in the CSO trench. Backfill material shall meet the specifications for "Approved Excavated Suitable Fill" as described in the DEP's Standard Sewer Specifications (2009) Sections 2.24.2(C) and 4.06.2. According to the DEP specifications, approved excavated suitable fill shall be earth, free of

bricks, blocks, excavated pavement materials and debris, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign matter, shall not contain oversized material, and shall exhibit a fines content equal to or less than 20 percent (portion of material passing a No. 200 sieve). If excavated soil/fill material is found to contain any of the non-complaint materials referenced above larger than 6 inches, the excavated soil/fill material may be screened as a standard construction measure using small soil screener (i.e., Screen Pro 200XL manufactured by CWM, Inc., or equivalent) to remove oversized material. Screening out oversized material and objects will consist of an excavator or front-end loader placing excavated soil/fill material into the hopper of the soil screener, allowing the finer soil/fill material to fall through the screen, and then placing the screened soil/fill material directly back into the CSO trench as backfill or staged in temporary stockpiles no more than 900 cubic yards in total for up to 60 days, on a rolling basis, unless otherwise approved by the DEC) or in covered roll-off containers for up to 60 days pending a decision on its reuse by the DEC. Screened-out materials will be managed in accordance with applicable federal, state and local regulations.

The excavation and construction work for the new CSO outfall will also require temporary dewatering. The groundwater surface in the vicinity of the proposed excavation area is about 6 to 8 feet below ground surface (about el. 1 BBHD). The groundwater surface is expected to be shallower towards the East River and deeper towards Commercial Street. Based on the local hydrogeological conditions and proximity to the East River/Newtown Creek, a temporary dewatering effort is required to facilitate construction of CSO outfall pipe platform, concrete placement and curing, pipe laying and placement, and backfilling.

Dewatering liquids removed from the site will be managed by the Contractor in accordance with applicable laws and regulations. The Contractor shall be responsible for handling, treating, and disposing all contaminated groundwater removed from the site. The methods of dewatering shall be at the option of the Contractor, provided that dewatering be accomplished in a manner that shall preserve the strength of foundation strata; shall not cause instability of the excavation sides; shall not result in loss of ground from beyond the property lines; shall not cause damage to existing structures, streets, pavements, and utilities; and complies with all applicable regulations.

Dewatering fluids from temporary construction dewatering will be managed through one or more of the following methods:

- Discharge the surface waters of the East River / Newtown Creek;
- Discharge to the NYCDEP municipal sewer system;
- Discharge to groundwater; and/or
- Containerization and off-site disposal.

The construction project also includes the following work activities:

1. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a photoionization detector (PID);
2. Transportation and off-site disposal of excavated soil and fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated soil and fill material as required by disposal facilities. Appropriate segregation of excavated materials on-site;
3. Management of excavated materials including debris screening, temporarily stockpiling and segregating to prevent comingling of contaminated material and non-contaminated materials;
4. Performance of a Community Air Monitoring Program (CAMP) for particulates and volatile organic compounds;
5. Site mobilization involving site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
6. Implementation of stormwater pollution prevention measures in compliance with applicable laws and regulations;
7. Removal of underground storage tanks (if encountered), and closure of petroleum spills, in compliance with applicable local, state and federal laws and regulations;
8. Import of material to be used as backfill in the trench in compliance with the *Soil and Fill Material and Groundwater Management Plan* and in accordance with applicable laws and regulations.

## **4.2 Task Descriptions**

#### **4.2.1 Task #1 – Excavation Oversight**

Soil and fill management on-site and off-site, including excavation, screening, handling and disposal, import, and reuse will be conducted in accordance with the *Soil and Fill Material and Groundwater Management Plan*. The Contractor shall be responsible for all excavation and earthwork. Langan field personnel will be on site to oversee excavation, screening, and earthwork and document and compliance with the remedial action requirements described in the *Soil and Fill Material and Groundwater Management Plan*. In addition, Langan field personnel will be monitoring trucks loaded with excavated materials and may be signing waste manifests on behalf of the owner/generator.

#### **4.2.2 Task #2 – Community Air Monitoring Program**

Real-time air monitoring for VOCs and particulate matter at the upwind and downwind perimeter of the construction area will be performed by Langan field personnel on a continuous basis during soil disturbance activities and the handling of contaminated soil and fill material. Soil disturbance activities include, but are not limited to, soil/fill material excavation, screening of soil/fill material, handling, stockpiling, and loading, trenching, sheeting and lagging. Particulate matter will be monitored using a real-time Dust Trak aerosol monitor. A PID (MiniRAE 2000 or equivalent) will be used to monitor for VOCs.

#### **4.2.3 Task #3 – Endpoint Sampling**

No over-excavation beyond the proposed trench is anticipated. If unknown areas of grossly-contaminated soil (i.e., hotspots) are identified at or beyond the bottom of the trench during construction, impacted soil/fill material associated with these areas will be removed during construction to the extent practicable with the approval of the OER. If encountered, areas of grossly-contaminated soil will be delineated horizontally and vertically by GPS or survey. If this scenario unfolds during construction, an endpoint sampling plan will be developed in coordination with the OER.

#### **4.2.4 Task #4 – Dewatering**

The excavation and construction work for the new CSO outfall will also require temporary construction dewatering. Dewatering liquids removed from the site will be managed by the Contractor in accordance with applicable laws and regulations. The Contractor shall be

responsible for handling, treating, and disposing all contaminated groundwater removed from the site. The methods of dewatering shall be at the option of the Contractor, provided that dewatering be accomplished in a manner that shall preserve the strength of foundation strata; shall not cause instability of the excavation sides; shall not result in loss of ground from beyond the property lines; shall not cause damage to existing structures, streets, pavements, and utilities; and complies with all applicable regulations.

Dewatering fluids from temporary construction dewatering will be managed through one or more of the following methods:

- Discharge the surface waters of the East River / Newtown Creek;
- Discharge to the NYCDEP municipal sewer system;
- Discharge to groundwater; and/or
- Containerization and off-site disposal.

Dewatering activities will be conducted in accordance with the *Soil and Fill Material and Groundwater Management Plan*. Langan staff, under the supervision and direction of a QEP, will be on-site to oversee dewatering activities and document and verify compliance with the requirements described in the *Soil and Fill Material and Groundwater Management Plan*.

## **5.0 HAZARD EVALUATION**

This section provides an assessment of the general hazards that may be encountered during field work activities through a task-by-task risk analysis. Potential hazards as chemical exposure and physical hazards are presented below.

### **5.1 Chemical Hazard Evaluation**

Potentially hazardous constituents known to exist at the site are volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, and metals. Exposure to chemical hazards is possible during all proposed tasks. These potentially hazardous constituents have been documented to exceed applicable regulatory criteria (e.g. soil cleanup objectives and ambient water quality standards). Petroleum-contaminated soil and groundwater as well as solvent-contaminated groundwater have been previously documented at the site. The subsurface stratigraphy consists of historic fill material composed of brown to black fine to coarse sand with varying percentages of gravel and silt from ground surface to approximately 15 feet below ground surface (bgs). Native soil composed of orange to brown silt and clay was encountered below the layer of fill material to approximately 20 feet bgs. Wood, coal, slag and brick fragments and ash were noted in the historic fill material. The dark color of the fill material is attributed to its high coal content (most of the site was historically used as coal storage yards).

### **5.2 Summary of Potential Chemical Hazards**

The following table (Table 1) lists the potentially hazardous constituents that may exist at the site. The table also lists the chemical properties and OSHA permissible exposure limit (PEL), short-term exposure limit (STEL), and immediately dangerous to life and health (IDLH) level.

More information about the potentially hazardous constituents at the site, including acute toxicological symptoms and first aid procedures, can be found on their Material Safety Data Sheets (MSDS) in Appendix B. The MSDS in Appendix B are listed in alphabetical order.

**Table 1: Potential Chemical Hazards Summary**

<b>Constituent of Concern</b>	<b>Environmental Medium</b>	<b>OSHA PEL</b>	<b>OSHA STEL</b>	<b>OSHA IDLH</b>	<b>IP (eV)</b>	<b>Hazards</b>	<b>Route of Exposure</b>	<b>Monitoring Device</b>
<b>Volatile Organic Compounds</b>								
1,2,4-Trimethylbenzene	Soil/Groundwater	NIOSH REL 25ppm	--	--	8.27	Flammable	Inhalation Ingestion Contact	PID
1,3,5-Trimethylbenzene	Soil/Groundwater	NIOSH REL 25ppm	--	--	8.39	Flammable	Inhalation Ingestion Contact	PID
Benzene	Groundwater	1ppm	5ppm	500ppm	9.24	Ca, Flammable	Inhalation Ingestion Absorption Contact	PID
Ethylbenzene	Soil/Groundwater	100ppm	NIOSH ST 125ppm	800ppm	8.76	Flammable	Inhalation Ingestion Contact	PID
Toluene	Groundwater	200ppm	300ppm	500ppm	8.82	Flammable	Inhalation Ingestion Absorption Contact	PID
Total Xylenes	Soil/Groundwater	100ppm	NIOSH ST 150ppm	900ppm	8.56	Flammable	Inhalation Ingestion Absorption Contact	PID
Styrene	Groundwater	100ppm	NIOSH ST 100ppm	700ppm	8.40	Flammable	Inhalation Ingestion Absorption Contact	PID
Tetrachloroethene	Groundwater	100ppm	200 for	150ppm	9.32	Ca	Inhalation	PID

<b>Table 1: Potential Chemical Hazards Summary</b>								
<b>Constituent of Concern</b>	<b>Environmental Medium</b>	<b>OSHA PEL</b>	<b>OSHA STEL</b>	<b>OSHA IDLH</b>	<b>IP (eV)</b>	<b>Hazards</b>	<b>Route of Exposure</b>	<b>Monitoring Device</b>
			5 minutes in 3-hour period				Ingestion Absorption Contact	
4-Isopropyltoluene	Soil/Groundwater	--	--	--	--	--	--	PID
Naphthalene	Soil/Groundwater	10ppm	NIOSH ST 15ppm	250ppm	8.12	Combustible Solid	Inhalation Ingestion Absorption Contact	PID
p-Diethylbenzene	Soil	--	--	--	--	--	--	PID
p-Ethyltoluene	Soil	--	--	--	--	--	--	PID
<b>Semi-Volatile Organic Compounds</b>								
Anthracene (CTPV)	Soil	0.2 mg/m <sup>3</sup>	--	80 mg/m <sup>3</sup>	--	Ca, Combustible Solid	Inhalation Contact	--
Benzo[a]anthracene (CTPV)	Soil	0.2 mg/m <sup>3</sup>	--	80 mg/m <sup>3</sup>	--	Ca, Combustible Solid	Inhalation Contact	--
Benzo[a]pyrene (CTPV)	Soil	0.2 mg/m <sup>3</sup>	--	80 mg/m <sup>3</sup>	--	Ca, Combustible Solid	Inhalation Contact	--
Benzo[b]fluoranthene (CTPV)	Soil	0.2 mg/m <sup>3</sup>	--	80 mg/m <sup>3</sup>	--	Ca, Combustible Solid	Inhalation Contact	--
Benzo[k]fluoranthene	Soil	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	Soil	--	--	--	--	--	--	--
Chrysene (CTPV)	Soil	0.2 mg/m <sup>3</sup>	--	80 mg/m <sup>3</sup>	--	Ca, Combustible	Inhalation Contact	--

<b>Table 1: Potential Chemical Hazards Summary</b>								
<b>Constituent of Concern</b>	<b>Environmental Medium</b>	<b>OSHA PEL</b>	<b>OSHA STEL</b>	<b>OSHA IDLH</b>	<b>IP (eV)</b>	<b>Hazards</b>	<b>Route of Exposure</b>	<b>Monitoring Device</b>
						Solid		
Dibenzo(a,h)anthracene	Soil	--	--	--	--	Suspect Ca	Inhalation Ingestion Absorption Contact	--
Indeno(1,2,3-c,d)pyrene	Soil	--	--	--	--	--	--	--
Fluoranthene	Soil	--	--	--	--	--	--	--
Fluorene	Soil	--	--	--	--	--	--	--
Phenanthrene (CTPV)	Soil	0.2 mg/m <sup>3</sup>	--	80 mg/m <sup>3</sup>	--	Ca, Combustible Solid	Inhalation Contact	--
Phenol	Groundwater	5ppm	--	250ppm	8.50	Combustible Solid	Inhalation Ingestion Absorption Contact	--
Pyrene (CTPV)	Soil	0.2 mg/m <sup>3</sup>	--	80 mg/m <sup>3</sup>	--	Ca, Combustible Solid	Inhalation Contact	--
<b>Polychlorinated Biphenyls</b>								
Polychlorinated biphenyls	Soil	1 mg/m <sup>3</sup> (1242)  0.5 mg/m <sup>3</sup> (1254)	--	5 mg/m <sup>3</sup>	--	Ca	Inhalation Ingestion Absorption Contact	--

<b>Table 1: Potential Chemical Hazards Summary</b>								
<b>Constituent of Concern</b>	<b>Environmental Medium</b>	<b>OSHA PEL</b>	<b>OSHA STEL</b>	<b>OSHA IDLH</b>	<b>IP (eV)</b>	<b>Hazards</b>	<b>Route of Exposure</b>	<b>Monitoring Device</b>
<b>Pesticides</b>								
4,4'-DDT	Soil	1 mg/m <sup>3</sup> (skin)	--	500ppm	--	Ca	Inhalation Ingestion Absorption Contact	--
4,4'-DDD	Soil	--	--	--	--	--	--	--
4,4'-DDE	Soil	--	--	--	--	--	--	--
Chlordane	Soil	0.5 mg/m <sup>3</sup> (skin)	--	100 mg/m <sup>3</sup>	--	Ca	Inhalation Ingestion Absorption Contact	--
Endrin	Soil	0.1 mg/m <sup>3</sup> (skin)	--	2 mg/m <sup>3</sup>	--	--	Inhalation Ingestion Absorption Contact	--
Hexachlorobenzene	Groundwater	TLV 0.002 mg/m <sup>3</sup>	--	--	--	Suspect Ca	Inhalation Ingestion Absorption Contact	--
<b>Metals</b>								
Antimony	Groundwater	0.5 mg/m <sup>3</sup>	--	50 mg/m <sup>3</sup>	--	--	Inhalation Ingestion Contact	--
Arsenic (Inorganic)	Soil	0.010 mg/m <sup>3</sup>	--	5 mg/m <sup>3</sup>	--	Ca	Inhalation Ingestion	--

**Table 1: Potential Chemical Hazards Summary**

Constituent of Concern	Environmental Medium	OSHA PEL	OSHA STEL	OSHA IDLH	IP (eV)	Hazards	Route of Exposure	Monitoring Device
							Absorption Contact	
Barium (as BaCl <sub>2</sub> )	Soil/Groundwater	0.5 mg/m <sup>3</sup>	--	50 mg/m <sup>3</sup>	--	--	Inhalation Ingestion Contact	--
Copper (as Cu)	Soil	1 mg/m <sup>3</sup>	--	100 mg/m <sup>3</sup>	--	--	Inhalation Ingestion Contact	--
Cadmium (as Cd)	Soil	0.005 mg/m <sup>3</sup>	--	9 mg/m <sup>3</sup>	--	Ca	--	--
Chromium (as Cr)	Soil/Groundwater	1 mg/m <sup>3</sup>	--	250 mg/m <sup>3</sup>	--	--	Inhalation Ingestion Absorption Contact	--
Iron (Iron Oxide)	Groundwater	10 mg/m <sup>3</sup>	--	2500 mg/m <sup>3</sup>	--	--	Inhalation	--
Lead (as Pb)	Soil/Groundwater	0.050 mg/m <sup>3</sup>	--	100 mg/m <sup>3</sup>	--	--	Ingestion Absorption Contact	--
Magnesium	Groundwater	--	--	--	--	--	--	--
Manganese (as Mn)	Groundwater	1 mg/m <sup>3</sup>	NIOSH ST 3 mg/m <sup>3</sup>	500 mg/m <sup>3</sup>	--	Combustible Solid	Inhalation Ingestion	--
Mercury (as Hg)	Soil/Groundwater	0.1 mg/m <sup>3</sup> (skin)	--	10 mg/m <sup>3</sup>	--	--	Inhalation Ingestion Absorption Contact	--
Nickel (as Ni)	Soil/Groundwater	1 mg/m <sup>3</sup>	--	10 mg/m <sup>3</sup>	--	Ca, Combustible Solid	Inhalation Ingestion Contact	--

**Table 1: Potential Chemical Hazards Summary**

Constituent of Concern	Environmental Medium	OSHA PEL	OSHA STEL	OSHA IDLH	IP (eV)	Hazards	Route of Exposure	Monitoring Device
Sodium	Groundwater	--	--	--	--	--	--	--
Silver (as Ag)	Groundwater	0.01 mg/m <sup>3</sup>	--	10 mg/m <sup>3</sup>	--	--	Inhalation Ingestion Contact	--
Thallium (as Tl)	Groundwater	0.1 (skin) mg/m <sup>3</sup>	--	15 mg/m <sup>3</sup>	--	--	Inhalation Ingestion Absorption Contact	--
Zinc (Zinc Oxide)	Soil	15 mg/m <sup>3</sup> (total dust)	--	500 mg/m <sup>3</sup>	--	--	Inhalation	--

*Notes:*

NIOSH – National Institute for Occupational Safety and Health

REL – Recommended Exposure Limit

OSHA – Occupational Safety and Health Administration

PEL – Permissible Exposure Limit

STEL – Short-Term Exposure Limit

IDLH – Immediate Danger to Life and Health

TLV – Threshold Limit Value

CPTV – Coal Tar Pitch Volatiles

IP – Ionization Potential

Ca – Carcinogen

*Sources:* NIOSH Pocket Guide to Chemical Hazards (Department of Health and Human Services, Centers for Disease Control and Prevention, September 2007); OSHA Chemical Sampling Information Search ([http://www.osha.gov/dts/chemicalsampling/toc/toc\\_chemsamp.html](http://www.osha.gov/dts/chemicalsampling/toc/toc_chemsamp.html))

### **5.3 Radiation Hazard Evaluation**

No radiation hazards are known or expected at the site.

### **5.4 Biological Hazard Evaluation**

#### **5.4.1 Animals**

Animals, such as dogs, pigeons, sea gulls, mice, and rats may be encountered during construction activities. Workers shall use discretion and avoid all contact with animals. Bites and scratches from dogs can be painful and can lead to the worker contracting the rabies virus if the dog is rabid. Contact with rat and mice droppings may lead to the worker contracting hantavirus. Inhalation of dried pigeon droppings may lead to the worker contracting psittacosis; cryptococcosis and histoplasmosis are also diseases associated with exposure to dried bird droppings, but these diseases are less likely to occur in a construction-type occupational setting.

#### **5.4.2 Insects**

Insects, including bees, wasps, hornets, mosquitoes, and spiders, may be encountered during construction activities. Individuals allergic to insect bites or stings may succumb to anaphylactic shock, which is a life-threatening condition and may result in death. In addition, mosquito bites may lead to a worker contracting West Nile encephalitis or other contagious diseases known to be carried by a mosquito host. Personnel bitten or stung by an insect should notify the HSO immediately. The following is a list of preventive measures related to insect bites or stings:

- Apply insect repellent prior to work and or as often as needed throughout the work shift;
- Wear protective clothing (work boots, socks and light colored pants);
- When walking in wooded areas, to the extent possible avoid contact with bushes, tall grass, or brush; and

- Field personnel who are allergic to insects or are otherwise susceptible to insect bites and stings should notify the HSO prior to commencing work and shall be responsible for supplying allergy medication for their own use throughout the work shift.
- The HSO or FSO will instruct the project personnel in the recognition and procedures for encountering potentially hazardous insects at the site.

## **Lyme Disease**

Lyme disease is caused by infection from a deer tick that carries *Borrelia burgdorferi*, *B. garinii*, or *B. afzelii*, all spirochaete bacteria. Lyme disease is a flu-like illness most commonly observed in patients between May and October when ticks are the most active. Symptoms of lyme disease may include a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. Early signs of an infection may include the characteristic circular and bulls-eye-shaped skin rash (*erythema chronicum migrans*) and joint pain. Lyme disease can cause serious nerve or heart problems as well as a disabling arthritis if left untreated. If a worker feels sick or exhibits any of the symptoms identified above, he or she should notify the HSO immediately.

This CHASP recommends personnel check themselves when working and after working in areas that could harbor deer ticks and wear light-colored clothing. If a worker finds a tick on his or her body, he or she should notify the HSO immediately. The tick can be removed by pulling gently at the tick's head with tweezers. The affected area should then be disinfected with an antiseptic wipe.

## **5.5 Physical Hazard Evaluation**

### **5.5.1 Operation of Heavy Equipment**

Heavy motorized equipment (i.e., track-mounted excavators, front loaders, pile-driving rigs, and support vehicles) will be used during the construction project. Working with heavy motorized equipment will be a major physical hazard during construction. Injuries may result from equipment hitting, running over, or overturning on personnel and equipment kicking up potentially harmful objects (i.e. rock, concrete, scrap metal, etc.). Occupational Safety and Health Administration (OSHA) guidelines will be followed for operating heavy equipment as outlined in 29 CFR 1926.600-602. To help prevent injuries/accidents, the following precautions will be implemented:

- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be checked at the beginning of each shift.
- Large construction motor vehicles will not be backed up unless the vehicle has a reverse signal alarm audible above the surrounding noise level or the vehicle is backed up only when an observer signals that it is safe to do so.
- Heavy equipment or motor vehicle cable will be kept free of all nonessential items, and all loose items will be secured.
- Large construction motor vehicles and heavy equipment will be provided with necessary safety equipment (such as seat belts, roll-over protection, emergency shut-off in case of roll-over, backup warning lights and audible alarms).
- Blades and buckets will be lowered to the ground and parking brakes will be set before shutting off any heavy equipment or vehicles.

### **5.5.2 Excavation and Earthwork**

Soil and fill material will be excavated to accommodate the new CSO. The OSHA 29 CFR 1926.651 construction industry standards relating to excavations will be followed during excavation and earthwork activities. These standards include shoring and cutback requirements, equipment specifications, entry requirements, etc. To avoid exposure to site-specific contaminants and to ensure acceptable atmospheric conditions, the following additional requirements apply for excavation work at the site:

- Open excavations should be backfilled as soon as practicable. While excavations remain open, appropriate warnings should be posted and barricades will be erected to protect pedestrian and worker safety. Where possible, excavation side walls should be cut at a gradual slope to maximize egress and access. Workers should not enter excavations unless absolutely required.
- To ensure atmospheric quality, appropriate tests (i.e., flammable gas, oxygen deficiency, etc.) shall be conducted as often as necessary as determined by the HSO.

- When the HSO identifies hazardous atmospheres, emergency rescue equipment and appropriate PPE should be available at the work site and readily accessible to employees (29 CFR 1926.651(g)(2)(I)).
- Daily site safety inspections shall be conducted by the SSO.

### **5.5.3 Utilities**

Encountering underground utilities poses fire, explosion, and electrocution hazards is possible during excavation and earthwork. All excavation work will be preceded by review of available utility drawings and by notification of the subsurface work to the New York One-Call Center. Potential adverse effects of electrical hazards include burns and electrocution, which can result in death.

### **5.5.4 Work in Extreme Temperatures**

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress. OSHA guidelines will be followed regarding work in excessive hot or cold temperatures.

### **5.5.5 Noise**

The use of excavation and drilling equipment may generate noise levels that will require the use of hearing protection in the immediate vicinity. Hearing protection will be used around drilling equipment. Appropriate earplugs or earmuffs with a NRR greater than 25 will be worn to prevent overexposure.

### **5.5.6 Miscellaneous**

Applicable OSHA 29 CFR 1910.120(m) standards for illumination shall apply. Work should be conducted during daylight hours whenever possible.

Electrical power should be provided through a ground fault circuit interrupter. Equipment that will enter an excavation must be suitable and approved (i.e. intrinsically safe) for use in potentially explosive environments. Applicable OSHA 29 CFR 1926 Subpart K standards for use of electricity shall apply.

Work where there is a fall hazard should be performed using appropriate ladders and/or protection (e.g. body harness and lifeline). All work should be conducted at the ground surface.

In accordance with 29 CFR 1910.151(c), workers involved in operations where there is the risk of eye injury, (chemical splash, etc.), should have ready access to an approved eye wash unit. Protective eye wear shall be donned in Level D. The full-face APR required by Level C and the pressure demand self-contained breathing apparatus mask required by Level B provide eye protection.

Operations where there is a potential for fire should be conducted in a manner that minimizes risk. Non-sparking tools and fire extinguishers shall be used or available as directed by the site safety officer when work is in potentially explosive atmospheres. Ignition sources shall be removed from work areas. Explosion-proof instruments and/or bonding and grounding should be used to prevent fire or explosion when the site safety officer directs their use.

Overhead utilities should be identified and/or inspected by the Contractor and appropriate safety precautions taken before conducting operations where there is potential for contact or interference.

## **5.6 Summary of Potential Physical Hazards**

The following table (Table 2) presents a summary of possible physical hazardous that are likely to be encountered during completion of field task. Fact sheets for cold and heat stress are included as Appendix C.

<b>Table 2: Potential Physical Hazards Summary</b>			
<b>Task</b>	<b>Possible Hazard</b>	<b>Description</b>	<b>Safety/Control Procedures</b>
#1, #2, #3, #4	Heavy equipment	Excavator, front loaders, pile-driving rigs and support vehicles.	Stay back from operating equipment; wear safety vests and hard hats, coordinate and maintain eye contact with equipment operator.
#1, #2, #3, #4	Noise	Excavator, front loaders, pile-driving rigs, support vehicles, power tools.	Wear hearing protection.
#1, #2, #3, #4	Falling objects	Tools and other equipment falling heavy equipment or from support of excavation.	Wear hard hat.
#1, #2, #3, #4	Underground/overhead utilities	Drill rig probe or auger or subsurface probing tool makes contact with underground object; boom touches overhead power line.	Follow mark-out policy and safe drilling practices.
#1, #2, #3, #4	Biological	Bee stings; dog, tick, snake bites; poison ivy; mosquitoes.	Wear proper PPE; be vigilant; follow safe work practices; wear insect repellent.
#1, #2, #3	Improper material handling	Improper lifting/carrying of equipment and materials causing strains.	Follow safe lifting and general material handling techniques.
#1, #2, #3, #4	Slips, trips, and falls	Various injuries could occur from slips, trips, and falls in carrying out field activities.	Good housekeeping, constant awareness and focus on the task.
#1, #2, #3, #4	Vehicular traffic	Various injuries or incidents could result from vehicular traffic.	Wear high visibility safety vests; use cones to designate work area; follow safe work practices.
#1, #2, #3, #4	Sunburn	Exposure to ultraviolet solar radiation.	Wear broad spectrum sunscreen.
#1, #2, #3, #4	Adverse weather	Severe thunderstorms with strong winds and lightning; heavy precipitation (rain).	Seek shelter; work in adverse weather conditions only with proper training and equipment. In the event of heavy precipitation

<b>Table 2: Potential Physical Hazards Summary</b>			
<b>Task</b>	<b>Possible Hazard</b>	<b>Description</b>	<b>Safety/Control Procedures</b>
			(rain) conditions will be assessed to determine if the work can proceed safely. If it is determined that the weather poses a significant hazard, site operations will be stopped and rescheduled.
#1, #2, #3, #4	Heat stress	Heat exhaustion, heat stroke, dehydration.	Proper and consistent hydration; seek shade during work breaks; wear light-colored and breathable clothing; in cases of heat stroke call for emergency help.
#1, #2, #3, #4	Cold stress	Frostbite, hypothermia.	Proper and consistent hydration; wear warm clothing in cold weather; seek warmth during work breaks; in cases of hypothermia call for emergency help

## **6.0 PERSONAL PROTECTIVE EQUIPMENT**

PPE must protect workers from the specific hazards they are likely to encounter on-site. Selection of the appropriate PPE must be taken into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards. Based on anticipated site conditions, engineering controls and the proposed work tasks to be performed at the site, Level D Protection should be used. The decision to modify standard PPE will be made by the site. The general levels of protection are described below.

### **Level D**

- Safety glasses with side-shields or chemical splash goggles if a splash hazard is present;
- Safety boots/shoes (toe-protected);
- Hard hat;
- Long sleeve work shirt and work pants;
- Nitrile gloves;
- Hearing protection (as needed);
- Traffic vest (if working or adjacent to roadway);
- Coveralls (Tyvek or equivalent) if extensive splashing or contaminated media is expected.

### **Level C**

- Full or half mask respirator, air-purifying, cartridge-equipped, NIOSH approved respirator suitable for the compound of concern
- Inner (latex) and outer (nitrile) chemical resistant gloves;
- Chemical-resistant safety boots/shoes (toe-protected);
- Hard hat;

- Long sleeve work shirt and work pants;
- Coveralls (Tyvek or equivalent);
- Hearing protection (as needed);
- Traffic vest (if working on or adjacent to roadway).

### 6.1 OSHA PPE Requirements

All personal protective equipment used during construction must meet the following OSHA standards:

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133 29 CFR 1926.102	ANSI Z87.1-1968
Respiratory	29 CFR 1910.134 29 CFR 1926.103	ANSI Z88.1-1980
Head	29 CFR 1910.135 29 CFR 1926.100	ANSI Z89.1-1969
Foot	29 CFR 1910.136 29 CFR 1926.96	ANSI Z41.1-1967
Notes: 1. ANSI – American National Standards Institute		

Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.1025; 29 CFR 1910.134). Based on performance criteria of air purifying respirators, they cannot be worn under the following conditions:

- Oxygen deficiency;
- Immediately Dangerous to Life or Health (IDLH) concentrations;
- High relative humidity; and
- If contaminant levels exceed designated use concentrations.

## **7.0 AIR MONITORING**

### **7.1 General**

Continuous, real-time air monitoring for VOCs and particulate matter at the perimeter of the construction area will be performed by Langan during excavation, earthwork, and soil disturbance activities. Soil disturbance activities include, but are not limited to, soil/fill material excavation, handling, stockpiling, and loading, trenching, sheeting and lagging.

In addition, Langan field personnel will monitor atmospheric conditions in the breathing zone during construction activities (as necessary) to identify potentially hazardous environments, determine reference or background concentrations, determine the appropriate level of PPE to be worn by Langan field personnel, and define work zones. Air monitoring will be performed at the breathing zone. Upgrades/downgrades to PPE will be made based on air monitoring results in the breathing zone. In general, work shall be initiated in Level D PPE with a contingency to upgrade the level of PPE based on exceedances of action levels.

### **7.2 Instrumentation**

Langan field personnel will be equipped with photoionization detectors (PID) (RAE Systems MultiRAE 2000 or 3000 with a 10.6eV lamp) to monitor for total VOCs and real-time Dust Trak aerosol meters to monitor levels of particulate matter (i.e., fugitive dust and aerosols). Instruments will be calibrated before each use; calibration readings will be recorded in the field log book. The PID and Dust Traks must be calibrated daily in accordance with the manufacturer's specifications. The PID calibration typically requires the use of a span gas (e.g., 100 ppm isobutylene) and zero gas (e.g., fresh air). Be sure that all the required calibration equipment and supplies are provided with the PID (e.g., span gas cylinder, regulator, tubing, and Tedlar™ bag).

### **7.3 Community Air Monitoring Plan**

The CAMP requires continuous, real-time air monitoring for VOCs and particulate matter at the perimeter of the construction area during excavation, earthwork, and soil disturbance activities. Soil disturbance activities include, but are not limited to, soil/fill material excavation, handling, stockpiling, and loading, trenching, sheeting and lagging.

### **VOC Monitoring, Action Levels, Responses**

Concentrations of VOCs will be monitored at the upwind and downwind site perimeter on a continuous basis during soil disturbance activities. Upwind concentrations will be used to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated daily. The equipment will be equipped with an audible alarm to indicate exceedance of the action levels described below. The equipment will be programmed to record 15-minute average concentrations, which will be compared to the levels specified below:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the work area 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.
- If the organic vapor level is above 25 ppm at the site perimeter, activities will be shutdown.

The 15-minute average readings will be recorded and presented in the daily reports. Instantaneous readings, if any, will also be recorded by Langan field staff on routine inspection of CAMP stations and used for decision-making purposes.

### **Particulate Monitoring, Action Levels, Responses**

Concentrations of particulate matter will be monitored continuously at the upwind and downwind site perimeters during soil disturbance activities. The particulate monitoring will be

performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers (PM10) in size. The equipment will be calibrated daily. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. The equipment will be programmed to record 15-minute average concentrations, which will be compared to the levels specified below:

- If the downwind PM10 particulate level is 100 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM10 particulate levels do not exceed 150  $\mu\text{g}/\text{m}^3$  above the upwind concentration and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 particulate levels are greater than 150  $\mu\text{g}/\text{m}^3$  above the upwind level, work will be stopped and work activities will be reevaluated. Work will resume provided dust suppression measures and other controls are successful in reducing the downwind PM10 particulate concentration to within 150  $\mu\text{g}/\text{m}^3$  of the upwind concentration and in preventing visible migration of dust off-site.

In addition, to continuous, real-time monitoring of particulate matter, fugitive dust migration will be visually assessed during all soil disturbance activities by Langan field staff. The 15-minute average readings will be recorded and presented in the daily reports. Instantaneous readings, if any, will also be recorded by Langan field staff on routine inspection of CAMP stations and used for decision-making purposes.

#### **7.4 Major Vapor Emissions and Response Plan**

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or odor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the hot zone, the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20-foot

zone).

The Major Vapor Emission Response Plan shall be implemented if either of the following criteria is exceeded in the 20-foot zone:

- Sustained organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes; or
- Organic vapor levels greater than 5 ppm above background for any time period.

If conditions warrant the activation of the Major Vapor Emission Response Plan, the following activities shall be performed:

- The HSO shall immediately contact the local police authority and inform the police of the situation;
- Air monitoring shall be conducted at 30-minute intervals within the 20-foot zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO; and
- Emergency contacts will be contacted and informed (as necessary).

## **8.0 SITE CONTROL**

### **8.1 Work Zones**

The need to formally establish specific work zones (e.g., support zone, contamination reduction zone, and exclusion zone) during work activities will be determined by the HSO. The support zone is any area of the site that is outside of the exclusion and contamination reduction zones. The contamination reduction zone is the area between the exclusion and support zones that provides a transition between contaminated and clean areas. The exclusion zone is any area of the site where hazardous substances are present, or are reasonably suspected to be present, and pose an exposure hazard to personnel.

### **8.2 General Safe Work Practices**

Hazards should be controlled at site areas by limiting entrance to exclusion zones to essential personnel and by implementing the following rules:

- Non-essential (as judged by the HSO) personnel and unauthorized persons shall not enter the exclusion or decontamination zone;
- Before entering the exclusion or decontamination zones, all personnel should be familiar with emergency response procedures, site safety locations, first aid and communication equipment, and the location of the map to the hospital and the list of emergency telephone numbers;
- The buddy system should be used at all times by field personnel in the exclusion zone; no one is to perform work within the exclusion zone alone. When in Level D or C, visual contact or radio contact should be maintained at all times;
- Contact with contaminated and potentially contaminated surfaces should be avoided. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or place equipment on the ground. Protect equipment from contamination;
- No open flames in the work zone;
- Always use the appropriate level of personal protective equipment (PPE);
- Report any unusual conditions;

- Work areas will be kept clear and uncluttered. Debris and other slip, trip, and fall hazards will be removed as frequently as possible;
- The number of personnel and equipment in the work zone will be kept to an essential minimum;
- Be alert to the symptoms of fatigue and heat/cold stress and their effects on the normal caution and judgment of personnel;
- All personnel exiting the exclusion zone should exercise the decontamination procedures described in this CHASP;
- Beards or other facial hair that interferes with respirator fit will preclude admission to the exclusion zone;
- Each worker will be supplied with and maintain his/her own personal protective equipment;
- No person will eat, drink, or chew gum or tobacco in potentially contaminated areas. Single portion drink containers and drinking of replacement fluids for heat stress control will be permitted only in support areas; and
- Smoking is prohibited by Langan personnel and subcontractors in all areas of the site because of the potential for contaminating samples and for the health of the field team.

### **8.3 Site Safety Meetings**

Langan field personnel will be given briefings by the HSO on a daily or as-needed basis to further assist personnel in conducting the work activities safely. Briefings will be provided when new activities are to be conducted, new staff enters the site, changes in work practices are to be implemented due to new information, or if site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safe practices when performance deficiencies are identified during routine daily activities or as a result of jobsite safety inspections. The jobsite safety inspection form is included as Appendix D. The site safety meeting form is included as Appendix E.

### **8.4 Site Communications**

Each field team will carry a cell phone or satellite phone that is in good working order. If there

is any type of emergency that requires the site to be evacuated (e.g., severe thunderstorm with lightening), the field team leader will lead the team to the predetermined emergency assembly location. All other emergency notifications that do not require evacuation will be conducted using a cell phone or satellite. Emergency phone numbers are listed above in Section 2.3.

## **8.5 Buddy System**

The buddy system will be used at the site at all times. The buddy system is a system of organizing employees into field teams in such a manner that each employee of the field team is designated to be observed by at least one other employee in the field team. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

## **8.6 Personnel Hygiene**

The following personnel hygiene practices will be used at the site to reduce exposure to hazards:

- Long hair will be secured away from the face so it does not interfere with any work activities;
- Personnel leaving potentially contaminated areas will wash their hands, forearms and faces in the contamination reduction zone prior to entering any clean areas or eating areas.
- Personnel leaving potentially contaminated areas will shower (including washing hair) and change to clean clothing as soon as possible after leaving the site.
- No person will eat, drink, or chew gum or tobacco in potentially contaminated areas. Single portion drink containers and drinking of replacement fluids for heat stress control will be permitted only in support areas.
- Smoking is prohibited by Langan personnel and subcontractors in all areas of the site because of the potential for contaminating samples and for the health of the field team.

## **8.7 Decontamination**

Personnel, clothing, equipment, and samples leaving contaminated areas of the site must be decontaminated. Decontamination for this operation is achieved through physical removal and chemical detoxification/disinfection/sterilization. The first step in decontamination is prevention.

Detailed procedures for personnel and equipment decontamination are provided in Appendix F. The following standard operating procedures were established to minimize contact with wastes:

- Wear disposable clothing;
- Practice work habits that minimize contact with hazardous or potentially hazardous substances;
- Use disposable equipment, where appropriate.

Boots and other potentially contaminated garments that have come in contact with hazardous materials should be cleaned in wash tubs with detergent/water solution and rinsed with water and should remain on-site. Decontamination waste (e.g. solutions, etc.) resulting from the decontamination of field equipment (e.g., sampling equipment, etc.) will be collected, containerized in tightly-sealed, well-marked drums, characterized, and properly disposed of. Disposable contaminated clothing and equipment will be collected in plastic bags, containerized in tightly-sealed, well-marked drums, and properly disposed of.

## **9.0 HEALTH AND SAFETY TRAINING AND MEDICAL SURVEILLANCE**

The completion of an initial 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training program (or its equivalent) as detailed in OSHA's 29 CFR 1910.120(e) is required for all employees who will perform work in areas where the potential exposure to hazardous substances exists. Annual 8-hour refresher training is also required to maintain competencies to ensure a safe work environment. In addition to these training requirements, supervisory personnel must also receive eight additional hours of specialized management training. Training records are maintained by the HSM.

The HSO shall inform Langan employees about the activities, procedures, monitoring, and equipment for site operations (including site and facility layout, chemical and physical hazards, emergency services at the site, and the provisions set forth in the CHASP).

### **9.1 Respirator Fit Testing Requirements**

Langan personnel who may be required to perform work activities while wearing a respirator must receive medical clearance to do so consistent with 29 CFR 1910.134(e), Respiratory Protection. Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine. Langan employees who have medical clearance to wear a respirator and could be potentially exposed to hazardous substances at the site shall possess a full face-piece, air-purifying respirator and have been successfully quantitative fit-tested within the past year. Results of medical evaluations and quantitative fit-test records are maintained by the HSM.

### **9.2 Medical Monitoring Requirements**

Langan personnel who will be performing work activities involving potential exposure hazardous substances will be required to have passed an initial baseline medical examination, with annual follow-up medical exams thereafter, consistent with 29 CFR 1910.120(f). Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine.

### **9.3 Confined Space Entry**

Entry into confined space is not anticipated as part of the Phase II ESI. If a project area were identified as a confined space, entry into this confined space by Langan personnel is prohibited by its own policy.

**10.0 HEALTH AND SAFETY PLAN APPROVAL**

By their signature, the undersigned certify that this CHASP is approved.

\_\_\_\_\_  
Mimi S. Raygorodetsky, Project Manager (PM)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Tony Moffa, CHMM, Health & Safety Manager (HSM)

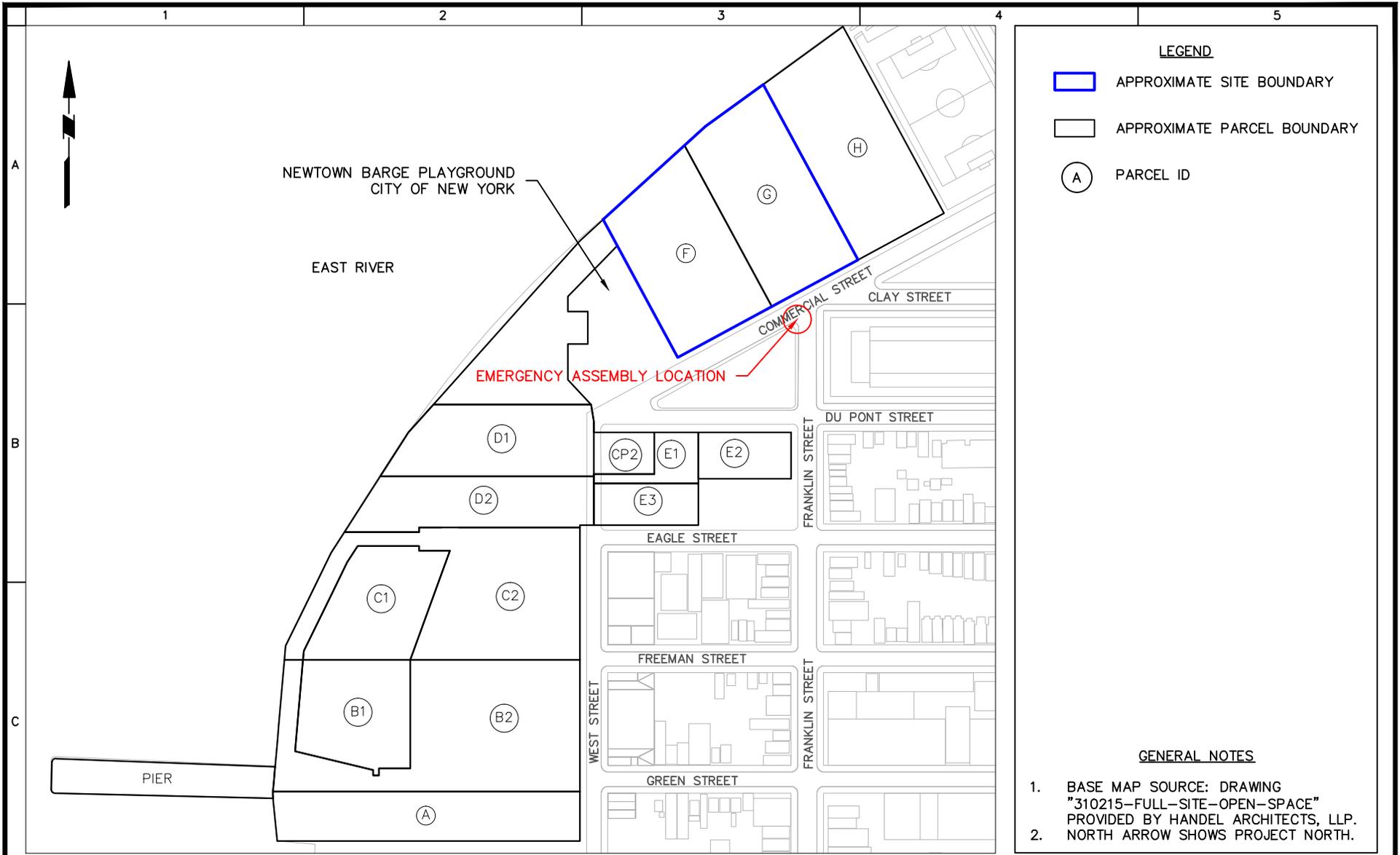
\_\_\_\_\_  
Date

\_\_\_\_\_  
Gregory Wyka, Site Health & Safety Officer (HSO)

\_\_\_\_\_  
Date



## FIGURES



**LEGEND**

APPROXIMATE SITE BOUNDARY

APPROXIMATE PARCEL BOUNDARY

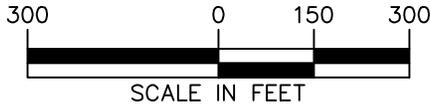
A PARCEL ID

**GENERAL NOTES**

1. BASE MAP SOURCE: DRAWING "310215-FULL-SITE-OPEN-SPACE" PROVIDED BY HANDEL ARCHITECTS, LLP.
2. NORTH ARROW SHOWS PROJECT NORTH.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.



**LANGAN**

21 Penn Plaza, 360 West 31st Street, 8th Floor  
New York, NY 10001

T: 212.479.5400 F: 212.479.5444 www.langan.com

Langan Engineering, Environmental, Surveying and  
Landscape Architecture, D.P.C.  
Langan Engineering and Environmental Services, Inc.  
Langan International LLC  
Collectively known as Langan

Project

GREENPOINT  
LANDING

BROOKLYN  
NEW YORK

KINGS

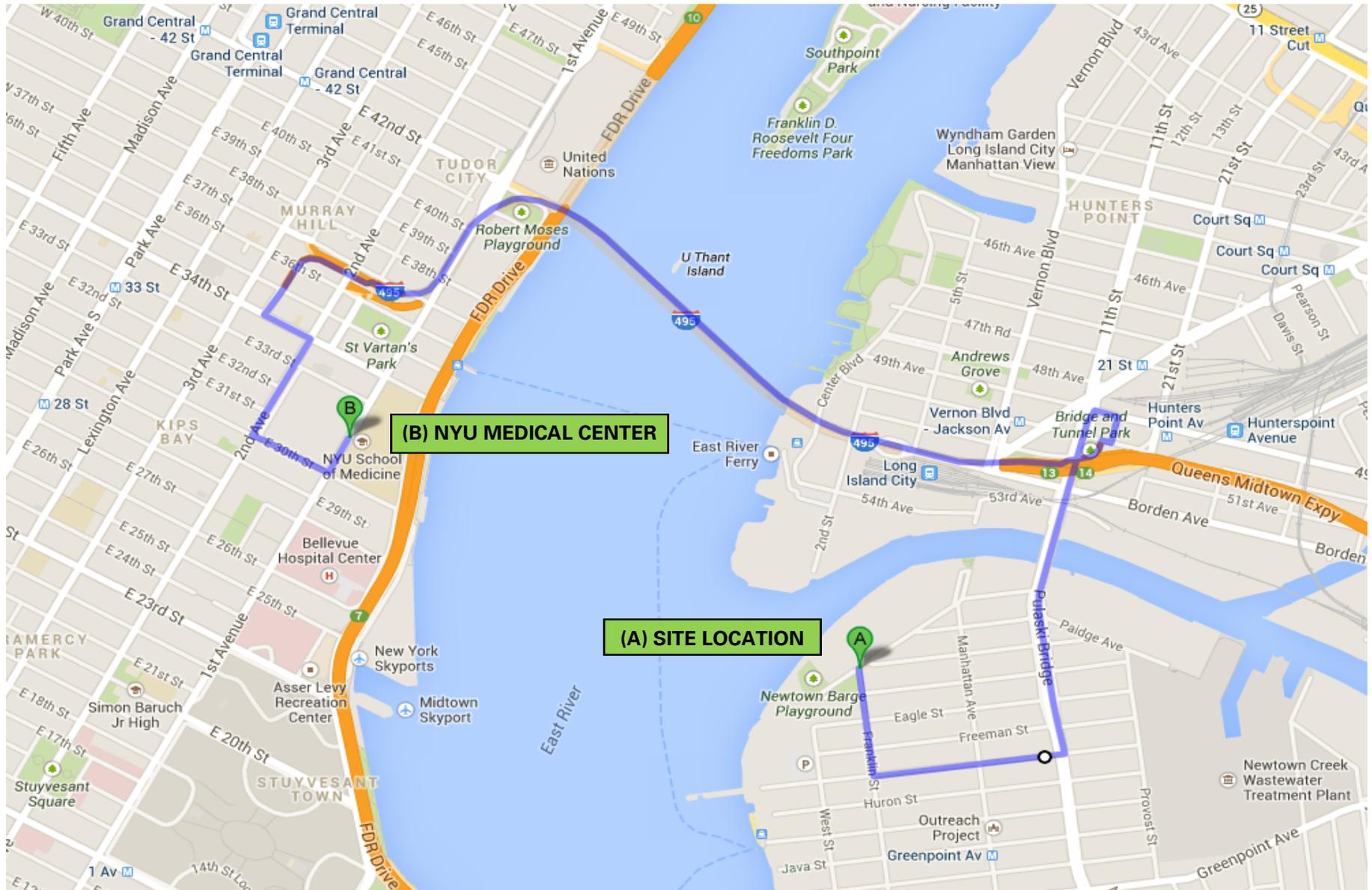
Drawing Title

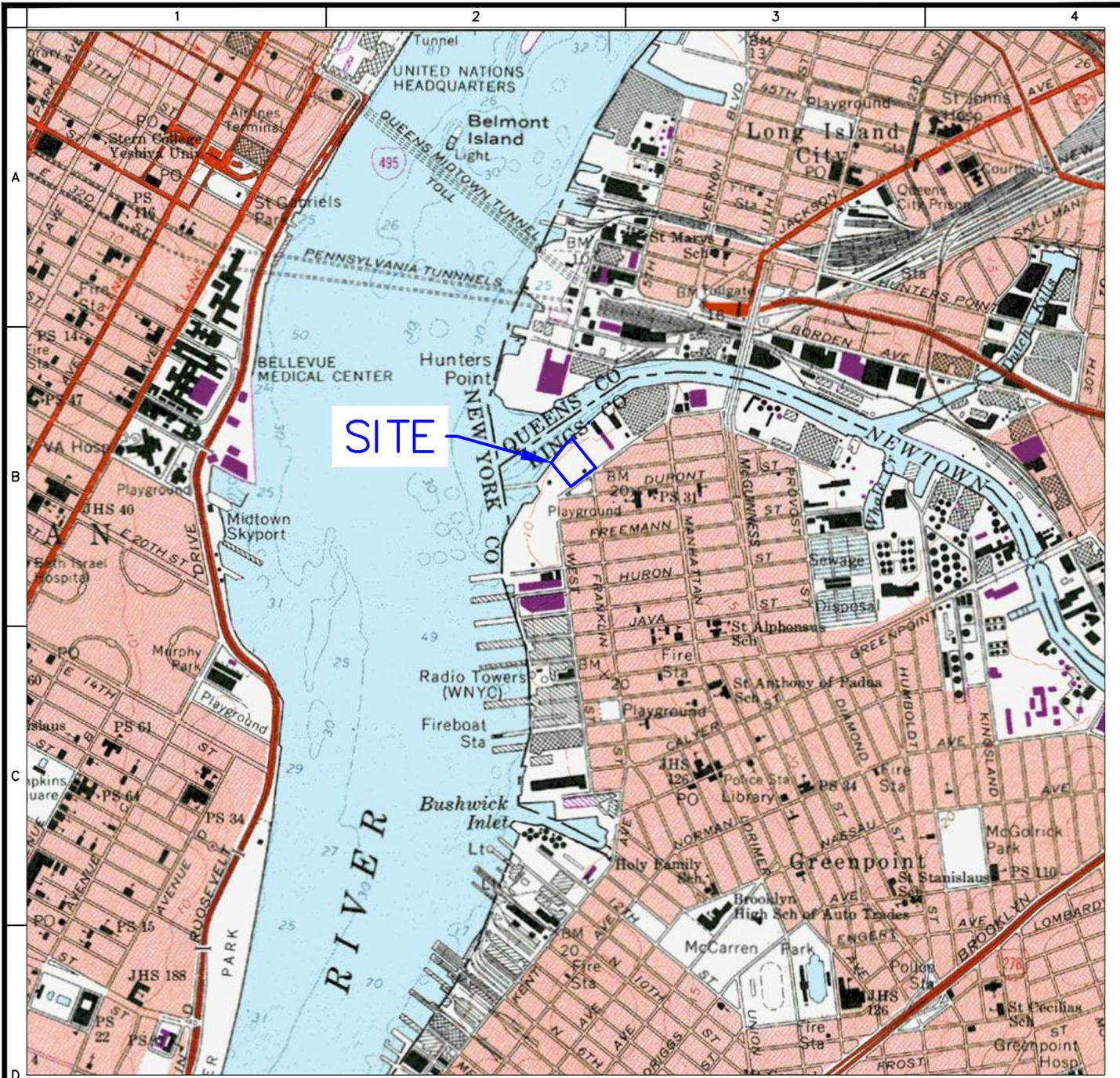
SITE PLAN

Project No.	170229002
Date	3/14/2014
Scale	1" = 300'
Drawn By	GCW
Submission Date	3/14/2014

Drawing No.	1
Sheet	1 of 5

**FIGURE 2**  
**ROUTE MAP TO HOSPITAL (NYU MEDICAL CENTER)**





SITE

LEGEND



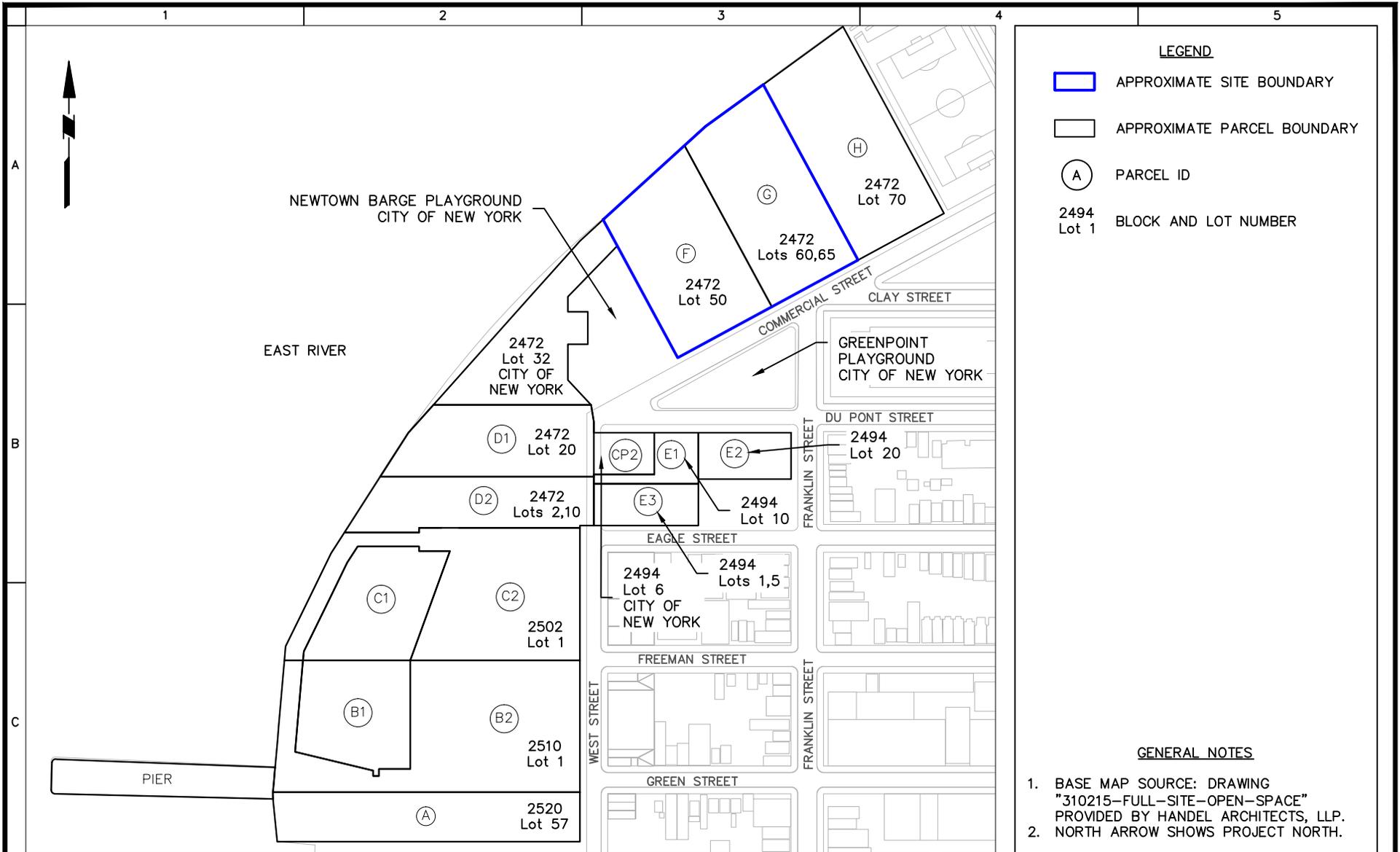
APPROXIMATE SITE BOUNDARY

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

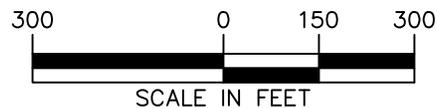
SOURCE: USGS TOPOGRAPHIC QUADRANGLE MAP, BROOKLYN, NY



<p><b>LANGAN</b></p> <p>21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001</p> <p>T: 212.479.5400 F: 212.479.5444 www.langan.com</p> <p>Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. Langan Engineering and Environmental Services, Inc. Langan International LLC</p> <p>Collectively known as Langan</p>	Project	Drawing Title	Project No.	Drawing No.	
	<p><b>GREENPOINT LANDING</b></p> <p>BROOKLYN</p> <p>KINGS NEW YORK</p>	<p><b>SITE LOCATION MAP</b></p>	170229002	<p><b>3</b></p> <p>Sheet 3 of 5</p>	
			Date		3/14/2014
			Scale		NTS
			Drawn By		GCW
	Submission Date	3/14/2014			



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T: 212.479.5400 F: 212.479.5444 www.langan.com

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Project

**GREENPOINT  
LANDING**

BROOKLYN

KINGS

NEW YORK

Drawing Title

**CURRENT  
TAX BLOCKS  
AND LOTS**

Project No.  
170229002

Date  
3/14/2014

Scale  
1" = 300'

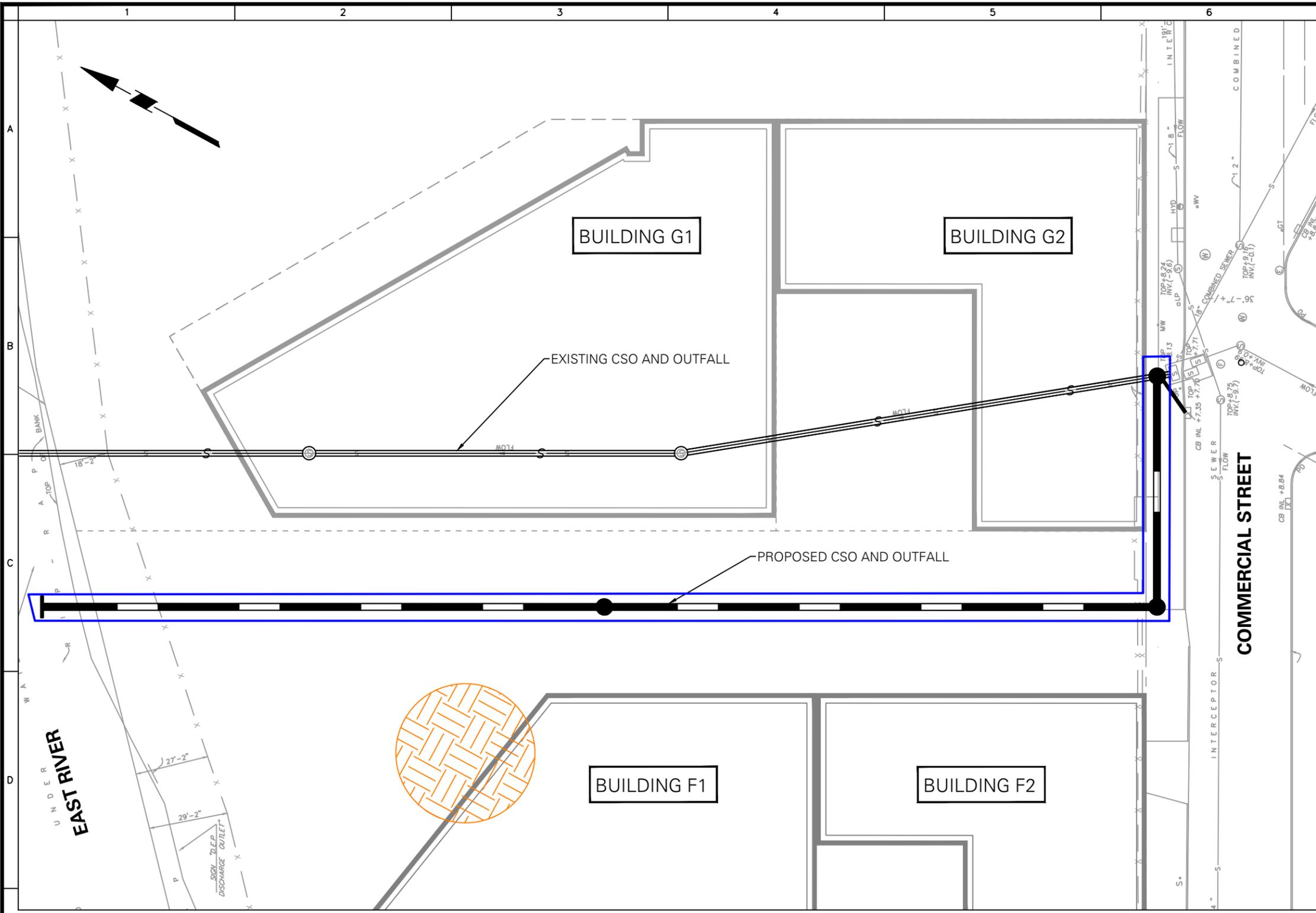
Drawn By  
GCW

Submission Date  
3/14/2014

Drawing No.

**4**

Sheet 4 of 5



**LEGEND**

 APPROXIMATE LOCATION OF POTENTIAL TEMPORARY STOCKPILES OF EXCAVATED SOIL/FILL FOR REUSE AS BACKFILL IN THE CSO TRENCH

 APPROXIMATE EXTENT OF CSO TRENCH EXCAVATION AREA

**GENERAL NOTES**

1. BASE PLANS TAKEN FROM LANGAN DRAWINGS: UTILITY DRAWING "170229001-C-UI0101," SITE SURVEY "170229001-V-EX0101," AND 170229001-C-RSK PLANS - BBSD.
2. NORTH ARROW SHOWS TRUE NORTH.

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

  
 SCALE IN FEET

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21 Penn Plaza, 360 West 31st Street, 8th Floor  
New York, NY 10001  
T: 212.479.5400 F: 212.479.5444 www.langan.com

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Project  
**GREENPOINT LANDING**  
BROOKLYN  
KINGS NEW YORK

Drawing Title  
**PROPOSED CSO AND OUTFALL PLAN**

Project No. 170229002	Drawing No.
Date 3/14/2014	5
Scale 1" = 40'	
Drawn By GCW	Checked By GCW
Submission Date 3/14/2014	Sheet 5 of 5

**APPENDIX A**

**OSHA RIGHT-TO-KNOW FACT SHEET**

# You Have a Right to a Safe and Healthful Workplace. **IT'S THE LAW!**

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.



The *Occupational Safety and Health Act of 1970 (OSH Act)*, P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act*. The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at [www.osha.gov](http://www.osha.gov). If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

## 1-800-321-OSHA [www.osha.gov](http://www.osha.gov)

U.S. Department of Labor  • Occupational Safety and Health Administration • OSHA 3165

**APPENDIX B**

**EMPLOYEE EXPOSURE / INJURY INDICENT REPORT**

### INCIDENT REPORT

#### LANGAN EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT (Submit a Separate Report for Each Employee and/or Incident)

Date: \_\_\_\_\_

Employee Name: \_\_\_\_\_ Employee No: \_\_\_\_\_

Sex: M \_\_\_\_\_ F \_\_\_\_\_ Age: \_\_\_\_\_

Region: \_\_\_\_\_ Location: \_\_\_\_\_

Project: \_\_\_\_\_ Project No: \_\_\_\_\_

Incident: \_\_\_\_\_

Type: Possible Exposure \_\_\_\_\_ Exposure \_\_\_\_\_ Physical Injury \_\_\_\_\_

Location: \_\_\_\_\_

Date of Incident: \_\_\_\_\_ Time of Incident: \_\_\_\_\_

Date of Report Incident: \_\_\_\_\_

Person(s) to Whom Incident was Reported: \_\_\_\_\_

Weather Conditions During Incident: Temperature \_\_\_\_\_ Humidity \_\_\_\_\_

Wind Speed and Direction: \_\_\_\_\_ Cloud Cover: \_\_\_\_\_

Clear: \_\_\_\_\_ Precipitation: \_\_\_\_\_

Materials Potentially Encountered: \_\_\_\_\_

Chemical (give name of description - liquid, solid, gas, vapor, fume, mist):

\_\_\_\_\_  
\_\_\_\_\_

Radiological: \_\_\_\_\_

Other: \_\_\_\_\_

Nature of the Exposure/Injury: (State the nature of the exposure/injury in detail and list the parts of the body affected. Attach extra sheets if necessary).

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---

Did you receive medical care? Yes \_\_\_\_\_ No \_\_\_\_\_ If so, when \_\_\_\_\_

Where? On-Site \_\_\_\_\_ Off-Site \_\_\_\_\_

By Whom: Name of Paramedic: \_\_\_\_\_

Name of Physician: \_\_\_\_\_

Other: \_\_\_\_\_

If Off-Site, name facility (hospital, clinic, etc): \_\_\_\_\_

---

Length of stay at the facility? \_\_\_\_\_

Was the Site Safety Officer contacted? Yes \_\_\_\_\_ No \_\_\_\_\_ When? \_\_\_\_\_

Was the Corporate Health and Safety Officer contacted? Yes \_\_\_\_\_ No \_\_\_\_\_

If so, who was the contact? \_\_\_\_\_

Did the exposure/injury result in permanent disability? Yes \_\_\_\_\_ No \_\_\_\_\_

If so, explain: \_\_\_\_\_

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Has the employee returned to work? Yes \_\_\_\_\_ No \_\_\_\_\_

List the names of other persons affected during this incident:

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---

List the names of persons who witnessed the exposure/injury incident:

---

---

---

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---

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---

Possible cause of the exposure/injury incident: \_\_\_\_\_

---

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---

What was the name and title of the field team leader or immediate supervisor at the site of the incident?

---

Was the operation being conducted under an established Health and Safety Plan?  
Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, attach a copy. If no, explain

---

---

---

---

Describe protective equipment and clothing used by the employee:

---

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---

Did any limitations in safety equipment or protective clothing contribute to or affect exposure? If so, explain:

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What was the employee doing when the exposure/injury occurred? (Describe briefly as Site Reconnaissance, Site Characterization, or Sampling, etc.):

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Where exactly on site or off site did the exposure/injury occur?

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---

How did the exposure/injury occur? (Describe fully what factors led up to and/or contributed to the incident):

---

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---

---

Name of person(s) initiating report, job title, phone number:

---

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---

---

\_\_\_\_\_  
Employee Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Site Safety Officer Signature or Field Team Leader Signature

\_\_\_\_\_  
Date

**APPENDIX C**

**MATERIAL SAFETY DATA SHEETS**

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 4,4'-DDD

Product Number : 35486  
Brand : Fluka

Supplier : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation  
Product Safety - Americas Region  
1-800-521-8956

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Toxic by ingestion, Harmful by skin absorption., Possible carcinogen.

##### GHS Classification

Acute toxicity, Dermal (Category 4)  
Acute toxicity, Oral (Category 3)  
Carcinogenicity (Category 2)  
Acute aquatic toxicity (Category 1)  
Chronic aquatic toxicity (Category 4)

##### GHS Label elements, including precautionary statements

Pictogram



Signal word : Danger

Hazard statement(s)

H301 : Toxic if swallowed.  
H312 : Harmful in contact with skin.  
H351 : Suspected of causing cancer.  
H400 : Very toxic to aquatic life.  
H413 : May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P273 : Avoid release to the environment.  
P280 : Wear protective gloves/ protective clothing.  
P301 + P310 : IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.

##### HMIS Classification

Health hazard: 2  
Chronic Health Hazard: \*  
Flammability: 0  
Physical hazards: 0

**NFPA Rating**

Health hazard: 2  
Fire: 0  
Reactivity Hazard: 0

**Potential Health Effects**

**Inhalation** May be harmful if inhaled. May cause respiratory tract irritation.  
**Skin** May cause skin irritation.  
**Eyes** May cause eye irritation.  
**Ingestion** Toxic if swallowed.

---

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Synonyms : 1,1-Dichloro-2,2-bis(4-chlorophenyl)ethane  
TDE

Formula : C<sub>14</sub>H<sub>10</sub>Cl<sub>4</sub>  
Molecular Weight : 320.04 g/mol

Component	Concentration
<b>2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane</b>	
CAS-No. 72-54-8	-
EC-No. 200-783-0	-

---

**4. FIRST AID MEASURES****General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**If inhaled**

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

**In case of eye contact**

Flush eyes with water as a precaution.

**If swallowed**

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

---

**5. FIREFIGHTING MEASURES****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Special protective equipment for firefighters**

Wear self contained breathing apparatus for fire fighting if necessary.

**Hazardous combustion products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

---

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

**Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

## Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

---

## 7. HANDLING AND STORAGE

### Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

### Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

---

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

### Personal protective equipment

#### Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

#### Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

#### Eye protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

#### Skin and body protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

#### Hygiene measures

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

Form	solid
Colour	no data available

### Safety data

pH	no data available
Melting point/freezing point	94.0 - 96.0 °C (201.2 - 204.8 °F)
Boiling point	193.0 °C (379.4 °F) at 1.3 hPa (1.0 mmHg)
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	< 0.00001 hPa (< 0.00001 mmHg) at 25.0 °C (77.0 °F)

Density	1.38 g/cm <sup>3</sup>
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 6.02
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

---

## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

no data available

### Conditions to avoid

no data available

### Materials to avoid

Strong oxidizing agents

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

Other decomposition products - no data available

---

## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

#### Oral LD50

LD50 Oral - Hamster - > 5,000 mg/kg

TDLo Oral - Human - 428.5 mg/kg

Remarks: Endocrine:Adrenal cortex hypoplasia.

TDLo Oral - rat - 6,000 mg/kg

Remarks: Cardiac:Other changes. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Changes in both tubules and glomeruli.

TDLo Oral - rat - 14 mg/kg

Remarks: Liver:Changes in liver weight. Endocrine:Estrogenic. Musculoskeletal:Other changes.

TDLo Oral - rat - 2,100 mg/kg

Remarks: Behavioral:Altered sleep time (including change in righting reflex).

#### Inhalation LC50

no data available

#### Dermal LD50

LD50 Dermal - rabbit - 1,200 mg/kg

Remarks: Behavioral:Excitement. Behavioral:Convulsions or effect on seizure threshold. Skin irritation

#### Other information on acute toxicity

no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/eye irritation

no data available

### Respiratory or skin sensitization

no data available

### **Germ cell mutagenicity**

no data available

### **Carcinogenicity**

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

### **Reproductive toxicity**

no data available

### **Teratogenicity**

no data available

### **Specific target organ toxicity - single exposure (Globally Harmonized System)**

no data available

### **Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

no data available

### **Aspiration hazard**

no data available

### **Potential health effects**

<b>Inhalation</b>	May be harmful if inhaled. May cause respiratory tract irritation.
<b>Ingestion</b>	Toxic if swallowed.
<b>Skin</b>	May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.

### **Signs and Symptoms of Exposure**

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

### **Synergistic effects**

no data available

### **Additional Information**

RTECS: KI0700000

---

## 12. ECOLOGICAL INFORMATION

### Toxicity

Toxicity to fish	LC50 - other fish - 1.18 - 9 mg/l - 96.0 h LC50 - Lepomis macrochirus (Bluegill) - 0.04 - 0.05 mg/l - 96.0 h LC50 - Oncorhynchus mykiss (rainbow trout) - 0.06 - 0.09 mg/l - 96.0 h LC50 - Pimephales promelas (fathead minnow) - 3.47 - 5.58 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia pulex (Water flea) - 0.01 mg/l - 48 h

### Persistence and degradability

no data available

### Bioaccumulative potential

Indication of bioaccumulation.

### Mobility in soil

no data available

### PBT and vPvB assessment

no data available

### Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

---

## 13. DISPOSAL CONSIDERATIONS

### Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

### Contaminated packaging

Dispose of as unused product.

---

## 14. TRANSPORT INFORMATION

### DOT (US)

UN number: 2811 Class: 6.1 Packing group: III  
Proper shipping name: Toxic solids, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)  
Reportable Quantity (RQ): 1 lbs  
Marine pollutant: No  
Poison Inhalation Hazard: No

### IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A  
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)  
Marine pollutant: No

### IATA

UN number: 2811 Class: 6.1 Packing group: III  
Proper shipping name: Toxic solid, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)

---

## 15. REGULATORY INFORMATION

### OSHA Hazards

Toxic by ingestion, Harmful by skin absorption., Possible carcinogen.

### SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**

Acute Health Hazard

**Massachusetts Right To Know Components**

No components are subject to the Massachusetts Right to Know Act.

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	2009-07-17

**New Jersey Right To Know Components**

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	2009-07-17

**California Prop. 65 Components**

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. 2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	

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**16. OTHER INFORMATION****Further information**

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### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 4,4'-DDE

Product Number : 35487  
Brand : Fluka

Supplier : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation  
Product Safety - Americas Region  
1-800-521-8956

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Carcinogen, Harmful by ingestion.

##### GHS Classification

Acute toxicity, Oral (Category 4)  
Carcinogenicity (Category 2)  
Acute aquatic toxicity (Category 1)  
Chronic aquatic toxicity (Category 4)

##### GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 Harmful if swallowed.  
H351 Suspected of causing cancer.  
H400 Very toxic to aquatic life.  
H413 May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P273 Avoid release to the environment.  
P281 Use personal protective equipment as required.

##### HMIS Classification

Health hazard: 1  
Chronic Health Hazard: \*  
Flammability: 0  
Physical hazards: 0

##### NFPA Rating

Health hazard: 1  
Fire: 0

**Reactivity Hazard:** 0

### Potential Health Effects

**Inhalation** May be harmful if inhaled. May cause respiratory tract irritation.  
**Skin** Harmful if absorbed through skin. May cause skin irritation.  
**Eyes** May cause eye irritation.  
**Ingestion** Harmful if swallowed.

---

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1,1-Dichloro-2,2-bis(4-chlorophenyl)ethene

Formula : C<sub>14</sub>H<sub>8</sub>Cl<sub>4</sub>

Molecular Weight : 318.03 g/mol

Component		Concentration
<b>2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene</b>		
CAS-No.	72-55-9	-
EC-No.	200-784-6	-

---

### 4. FIRST AID MEASURES

#### General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

#### If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

#### In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

#### In case of eye contact

Flush eyes with water as a precaution.

#### If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

---

### 5. FIREFIGHTING MEASURES

#### Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

#### Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

#### Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

---

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

#### Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

#### Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

---

### 7. HANDLING AND STORAGE

#### Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

#### Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

---

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

#### Personal protective equipment

##### Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

##### Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

##### Eye protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

##### Skin and body protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

##### Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

---

### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### Appearance

Form	solid
Colour	no data available

#### Safety data

pH	no data available
Melting point/freezing point	88.0 - 90.0 °C (190.4 - 194.0 °F)
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	< 0.00001 hPa (< 0.00001 mmHg)
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 6.51
Relative vapour	no data available

density	
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

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## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

no data available

### Conditions to avoid

no data available

### Materials to avoid

Strong oxidizing agents, Strong bases

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas  
Other decomposition products - no data available

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## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

#### Oral LD50

LD50 Oral - rat - 880.0 mg/kg

#### Inhalation LC50

no data available

#### Dermal LD50

no data available

#### Other information on acute toxicity

no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/eye irritation

no data available

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

### Reproductive toxicity

no data available

### Teratogenicity

no data available

### Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

### Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

### Aspiration hazard

no data available

### Potential health effects

<b>Inhalation</b>	May be harmful if inhaled. May cause respiratory tract irritation.
<b>Ingestion</b>	Harmful if swallowed.
<b>Skin</b>	Harmful if absorbed through skin. May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.

### Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

### Synergistic effects

no data available

### Additional Information

RTECS: Not available

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## 12. ECOLOGICAL INFORMATION

### Toxicity

Toxicity to fish	LC50 - <i>Lepomis macrochirus</i> (Bluegill) - 0.2 - 0.3 mg/l - 96.0 h
	LC50 - <i>Oncorhynchus mykiss</i> (rainbow trout) - 0.03 - 0.04 mg/l - 96.0 h
	LC50 - <i>Salmo salar</i> (Atlantic salmon) - 0.05 - 0.18 mg/l - 96.0 h

### Persistence and degradability

no data available

### Bioaccumulative potential

Bioaccumulation	<i>Gambusia affinis</i> (Mosquito fish) - 33 d
	Bioconcentration factor (BCF): 12,037

### Mobility in soil

no data available

### PBT and vPvB assessment

no data available

**Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

---

**13. DISPOSAL CONSIDERATIONS**

**Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

**Contaminated packaging**

Dispose of as unused product.

---

**14. TRANSPORT INFORMATION**

**DOT (US)**

UN number: 3077 Class: 9 Packing group: III  
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene)  
Reportable Quantity (RQ): 1 lbs  
Marine pollutant: No  
Poison Inhalation Hazard: No

**IMDG**

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F  
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene)  
Marine pollutant: Marine pollutant

**IATA**

UN number: 3077 Class: 9 Packing group: III  
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene)

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**15. REGULATORY INFORMATION**

**OSHA Hazards**

Carcinogen, Harmful by ingestion.

**SARA 302 Components**

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**

Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

No components are subject to the Massachusetts Right to Know Act.

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene	72-55-9	2009-07-17

**New Jersey Right To Know Components**

	CAS-No.	Revision Date
2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene	72-55-9	2009-07-17

**California Prop. 65 Components**

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. 2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene	72-55-9	2010-06-11

**California Prop. 65 Components**

WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.  
2,2-bis(p-Chlorophenyl)-1,1-dichloroethylene

CAS-No.  
72-55-9

Revision Date  
2010-06-11

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**16. OTHER INFORMATION****Further information**

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### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 4,4'-DDT

Product Number : 386340  
Brand : Aldrich

Supplier : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation  
Product Safety - Americas Region  
1-800-521-8956

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Carcinogen, Toxic by ingestion, Toxic by skin absorption

##### Target Organs

Liver, Pancreas.

##### GHS Classification

Acute toxicity, Dermal (Category 3)  
Acute toxicity, Oral (Category 3)  
Carcinogenicity (Category 2)  
Specific target organ toxicity - repeated exposure, Oral (Category 1)  
Acute aquatic toxicity (Category 1)  
Chronic aquatic toxicity (Category 4)

##### GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301 + H311 Toxic if swallowed or in contact with skin  
H351 Suspected of causing cancer.  
H372 Causes damage to organs through prolonged or repeated exposure if swallowed.  
H400 Very toxic to aquatic life.  
H413 May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P273 Avoid release to the environment.  
P280 Wear protective gloves/ protective clothing.  
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.  
P314 Get medical advice/ attention if you feel unwell.

**HMIS Classification**  
Health hazard: 2  
Chronic Health Hazard: \*  
Flammability: 0  
Physical hazards: 0

**NFPA Rating**  
Health hazard: 2  
Fire: 2  
Reactivity Hazard: 0

**Potential Health Effects**

**Inhalation** May be harmful if inhaled. May cause respiratory tract irritation.  
**Skin** Toxic if absorbed through skin. May cause skin irritation.  
**Eyes** May cause eye irritation.  
**Ingestion** Toxic if swallowed.

---

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Synonyms : 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane  
1,1-Bis(4-chlorophenyl)-2,2,2-trichloroethane

Formula : C<sub>14</sub>H<sub>9</sub>Cl<sub>5</sub>  
Molecular Weight : 354.49 g/mol

Component	Concentration
<b>1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane</b>	
CAS-No. 50-29-3	-
EC-No. 200-024-3	-
Index-No. 602-045-00-7	-

---

**4. FIRST AID MEASURES**

**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**If inhaled**

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

**In case of eye contact**

Flush eyes with water as a precaution.

**If swallowed**

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

---

**5. FIREFIGHTING MEASURES**

**Conditions of flammability**

Not flammable or combustible.

**Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Special protective equipment for firefighters**

Wear self contained breathing apparatus for fire fighting if necessary.

**Hazardous combustion products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

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**6. ACCIDENTAL RELEASE MEASURES**

**Personal precautions**

Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

**Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

**Methods and materials for containment and cleaning up**

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

**7. HANDLING AND STORAGE****Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

**Conditions for safe storage**

Keep container tightly closed in a dry and well-ventilated place.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	TWA	0.5 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
Remarks	Potential Occupational Carcinogen See Appendix A			
		TWA	1 mg/m <sup>3</sup>	USA. ACGIH Threshold Limit Values (TLV)
	Liver damage Confirmed animal carcinogen with unknown relevance to humans			
		TWA	1 mg/m <sup>3</sup>	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	Skin notation			
		TWA	1 mg/m <sup>3</sup>	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Skin designation Substance listed; for more information see OSHA document 1910.1044			

**Personal protective equipment****Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Hand protection**

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Immersion protection**

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: > 480 min

Material tested: Dermatrill® (Aldrich Z677272, Size M)

Splash protection  
Material: Nitrile rubber  
Minimum layer thickness: 0.11 mm  
Break through time: > 30 min  
Material tested: Dermatrill® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

#### **Eye protection**

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

#### **Skin and body protection**

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

#### **Hygiene measures**

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

---

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

### **Appearance**

Form	solid
Colour	no data available

### **Safety data**

pH	no data available
Melting point/freezing point	Melting point/range: 107 - 110 °C (225 - 230 °F) - lit.
Boiling point	260.0 °C (500.0 °F)
Flash point	72.0 - 77.0 °C (161.6 - 170.6 °F)
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	0.0000021 hPa (0.0000016 mmHg) at 20.0 °C (68.0 °F)
Density	0.99 g/cm <sup>3</sup>
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 6.91
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

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## **10. STABILITY AND REACTIVITY**

**Chemical stability**

Stable under recommended storage conditions.

**Possibility of hazardous reactions**

no data available

**Conditions to avoid**

no data available

**Materials to avoid**

Oxidizing agents, Iron and iron salts.

**Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas  
Other decomposition products - no data available

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**11. TOXICOLOGICAL INFORMATION****Acute toxicity****Oral LD50**

LD50 Oral - rat - 87.0 mg/kg

**Inhalation LC50**

no data available

**Dermal LD50**

LD50 Dermal - rabbit - 300.0 mg/kg

Remarks: Behavioral:Tremor. Behavioral:Muscle weakness. Behavioral:Ataxia.

**Other information on acute toxicity**

no data available

**Skin corrosion/irritation**

no data available

**Serious eye damage/eye irritation**

no data available

**Respiratory or skin sensitization**

no data available

**Germ cell mutagenicity**

no data available

**Carcinogenicity**

Limited evidence of carcinogenicity in animal studies

NTP: Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

**Reproductive toxicity**

no data available

**Teratogenicity**

no data available

**Specific target organ toxicity - single exposure (Globally Harmonized System)**

no data available

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

Ingestion - Causes damage to organs through prolonged or repeated exposure.

**Aspiration hazard**

no data available

**Potential health effects**

<b>Inhalation</b>	May be harmful if inhaled. May cause respiratory tract irritation.
<b>Ingestion</b>	Toxic if swallowed.
<b>Skin</b>	Toxic if absorbed through skin. May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.

**Signs and Symptoms of Exposure**

CNS stimulation.

**Synergistic effects**

no data available

**Additional Information**

RTECS: KJ3325000

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**12. ECOLOGICAL INFORMATION****Toxicity**

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0.01 mg/l - 96.0 h
	LC50 - Lepomis macrochirus (Bluegill) - 0.01 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.003400 mg/l - 96.0 h
	LOEC - Oncorhynchus mykiss (rainbow trout) - 150 mg/l - 3.0 d
	NOEC - Oncorhynchus mykiss (rainbow trout) - 113 mg/l - 3.0 d
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0.00108 mg/l - 48 h
Toxicity to algae	LC100 - Scenedesmus quadricauda (Green algae) - > 20 mg/l - 7 d

**Persistence and degradability****Bioaccumulative potential**

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 20 d
	Bioconcentration factor (BCF): 46,670

**Mobility in soil**

no data available

**PBT and vPvB assessment**

no data available

**Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

---

**13. DISPOSAL CONSIDERATIONS****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

**Contaminated packaging**

Dispose of as unused product.

---

**14. TRANSPORT INFORMATION****DOT (US)**

UN number: 2811 Class: 6.1 Packing group: III  
 Proper shipping name: Toxic solids, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)  
 Reportable Quantity (RQ): 1 lbs  
 Marine pollutant: No  
 Poison Inhalation Hazard: No

**IMDG**

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A  
 Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)  
 Marine pollutant: Marine pollutant

**IATA**

UN number: 2811 Class: 6.1 Packing group: III  
 Proper shipping name: Toxic solid, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

---

**15. REGULATORY INFORMATION****OSHA Hazards**

Carcinogen, Toxic by ingestion, Toxic by skin absorption

**SARA 302 Components**

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**

Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2007-03-01

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2007-03-01

**New Jersey Right To Know Components**

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2007-03-01

**California Prop. 65 Components**

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1990-06-15

**California Prop. 65 Components**

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1990-06-15

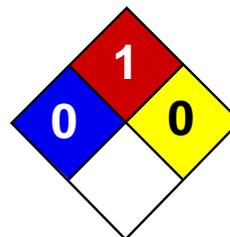
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**16. OTHER INFORMATION****Further information**

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See [www.sigma-aldrich.com](http://www.sigma-aldrich.com) and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Health	0
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet Anthracene MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Anthracene

**Catalog Codes:** SLA3670

**CAS#:** 120-12-7

**RTECS:** CA9350000

**TSCA:** TSCA 8(b) inventory: Anthracene

**CI#:** Not available.

**Synonym:**

**Chemical Formula:** C<sub>14</sub>H<sub>10</sub>

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Anthracene	120-12-7	100

**Toxicological Data on Ingredients:** Anthracene LD50: Not available. LC50: Not available.

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of inhalation. Hazardous in case of skin contact (permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

**Potential Chronic Health Effects:**

Very hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of inhalation. Hazardous in case of skin contact (permeator), of ingestion. **CARCINOGENIC EFFECTS:** Classified A1 (Confirmed for human.) by ACGIH, 1 (Clear evidence.) by NTP, + (Proven.) by OSHA. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** 540°C (1004°F)

**Flash Points:** CLOSED CUP: 121°C (249.8°F).

**Flammable Limits:** LOWER: 0.6%

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

### Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

**Section 8: Exposure Controls/Personal Protection****Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Solid.

**Odor:** Slight.

**Taste:** Not available.

**Molecular Weight:** 178.22 g/mole

**Color:** Colorless.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 342°C (647.6°F)

**Melting Point:** 218°C (424.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.25 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** 6.15 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

**Section 10: Stability and Reactivity Data**

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Dermal contact. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Clear evidence.) by NTP, + (Proven.) by OSHA. Causes damage to the following organs: kidneys, lungs, mucous membranes.

**Other Toxic Effects on Humans:**

Very hazardous in case of skin contact (irritant, sensitizer), of inhalation. Hazardous in case of skin contact (permeator), of ingestion.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

## Section 15: Other Regulatory Information

### **Federal and State Regulations:**

Pennsylvania RTK: Anthracene Massachusetts RTK: Anthracene TSCA 8(b) inventory: Anthracene SARA 313 toxic chemical notification and release reporting: Anthracene CERCLA: Hazardous substances.: Anthracene

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

### **Other Classifications:**

**WHMIS (Canada):** CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

### **DSCL (EEC):**

R38- Irritating to skin. R41- Risk of serious damage to eyes. R43- May cause sensitization by skin contact. R45- May cause cancer.

### **HMIS (U.S.A.):**

**Health Hazard:** 0

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

### **National Fire Protection Association (U.S.A.):**

**Health:** 0

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

### **Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/11/2005 11:19 AM

**Last Updated:** 06/09/2012 12:00 PM

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# Right to Know Hazardous Substance Fact Sheet

Common Name: **ANTIMON**

Synonyms: Antimony Metal; Antimony Powder

Chemical Name: Antimony

Date: June 2004 Revision: February 2012

CAS Number: 7440-36-0

RTK Substance Number: 0141

DOT Number: UN 2871

## Description and Use

Antimony is a naturally occurring, silvery-white, hard, brittle metal. It is also formed as a by-product of smelting Lead and other metals. It is used in alloys with Lead and other metals, electric storage batteries, solder, sheet and pipe metal, castings and pewter.

## Reasons for Citation

Antimony is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IRIS, and EPA.

SEE LOSSAR ON PAGE

## FIRST AID

### Eye Contact

Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### Skin Contact

Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

### Inhalation

Remove the person from exposure. Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped. Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Public Contact

Chemtrec

Norfolk EP

Norfolk Regional Center

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

## Hazard Summary

Health Hazard	Neurotoxicity	Reproductive
Acute	2	-
Chronic	2	-
Reactivity	0	-

COMBUSTIBLE POWDER  
POISONOUS GASES ARE PRODUCED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- Antimony can affect you when inhaled and by passing through the skin.
- Contact can irritate the skin and eyes. Prolonged or repeated contact may cause redness and itchy skin rash (dermatitis).
- Inhaling Antimony can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- Exposure to Antimony can cause headache, dizziness, nausea and vomiting, abdominal pain, and loss of sleep.
- Inhaling Antimony can cause an ulcer or hole in the "bone" (septum) dividing the inner nose.
- Repeated exposure can affect the lungs and cause an abnormal chest x-ray to develop.
- Antimony may damage the liver and kidneys and may affect the heart.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is averaged over an 8-hour workshift.

## Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## Health Hazard Information

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to Antimony:

- ▶ Contact can irritate the skin and eyes. Prolonged or repeated contact may cause redness and itchy skin rash (dermatitis).
- ▶ Inhaling Antimony can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- ▶ Exposure to Antimony can cause headache, dizziness, nausea and vomiting, abdominal pain, and loss of sleep.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to Antimony and can last for months or years:

#### Cancer Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, Antimony has been tested and has not been shown to cause cancer in animals.

#### Reproductive Hazard

- ▶ There is limited evidence that Antimony may affect female fertility.

#### Other Effects

- ▶ Inhaling Antimony can cause an ulcer or a hole in the "bone" (septum) dividing the inner nose, sometimes with bleeding, discharge, and/or formation of a crust.
- ▶ Repeated exposure can affect the lungs, cause an abnormal chest x-ray to develop, and lead to permanent lung damage.
- ▶ Antimony may damage the liver and kidneys and may affect the heart.

## Medical

### Medical Testing

For frequent or potentially high exposure (half the PEL or greater), the following is recommended before beginning work and at regular times after that:

- ▶ Urine test for Antimony

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Chest x-ray and lung function tests
- ▶ Liver and kidney function tests
- ▶ EKG

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

You have a legal right to request copies of your medical testing under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

### Medical Emergencies

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
- ▶ More than light alcohol consumption can cause liver damage. Drinking alcohol can increase the liver damage caused by Antimony.



## Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Antimony** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Moisten *solid* spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **Antimony** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

## Handling and Storage

Prior to working with **Antimony** you should be trained on its proper handling and storage.

- ▶ **Antimony** reacts violently with HALOGENS (such as FLUORINE, CHLORINE and BROMINE) and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) to cause fires and explosions.
- ▶ Contact with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and freshly formed (nascent) HYDROGEN can also form toxic *Antimony Hydride (Stibine) gas*.
- ▶ **Antimony** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, and NITRATES); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); IODINE; and POWDERED METALS.
- ▶ Store in tightly closed containers in a cool, well-ventilated area.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **Antimony powder** is used, handled, or stored.
- ▶ Ground and bond containers when transferring **Antimony powder**.
- ▶ Use only non-sparking tools and equipment, especially when opening and closing containers of **Antimony powder**.

## Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

New Jersey Department of Health & Senior Services  
Right to Know Program  
PO Box 368  
Trenton, NJ 08625-0368  
Phone: 609-984-2202  
Fax: 609-984-7407  
E-mail: rtk@doh.state.nj.us  
Web address: <http://www.nj.gov/health/eoh/rtkweb>

**The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.**

## LOSSAR

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**American Environmental Protection Agency (EPA)** is established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

The **critical temperature** is the temperature above which a gas cannot be liquefied, regardless of the pressure applied.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Environmental Protection Agency (EPA)** values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

**LEL or Lower Explosive Limit** is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSH** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeation** is the movement of chemicals through protective materials.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

**Permissible Action Criteria (PAC)** are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Relative density** is the ratio of the weight of a given volume of one gas to the weight of another (usually Air), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



Common Name: **ANTIMON**

Synonyms: Antimony Metal; Antimony Powder

CAS No: 7440-36-0

Molecular Formula: Sb

RTK Substance No: 0141

Description: Naturally occurring, silvery-white, hard, brittle metal that is also formed from smelting *Lead* and other metals

HAZARD DATA

Table with 3 columns: Hazard Statements (R, S, P), Physical and Chemical Hazards, and Response (R). Contains hazard codes like R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117, R118, R119, R120, R121, R122, R123, R124, R125, R126, R127, R128, R129, R130, R131, R132, R133, R134, R135, R136, R137, R138, R139, R140, R141, R142, R143, R144, R145, R146, R147, R148, R149, R150, R151, R152, R153, R154, R155, R156, R157, R158, R159, R160, R161, R162, R163, R164, R165, R166, R167, R168, R169, R170, R171, R172, R173, R174, R175, R176, R177, R178, R179, R180, R181, R182, R183, R184, R185, R186, R187, 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SPILL/LEAKS
I 25 meters (75 feet)
I 800 meters (1/2 mile)
Moisten solid spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.
Ground and bond containers when transferring Antimony powder.
Use only non-sparking tools and equipment.
DO NOT wash into sewer.

PHYSICAL PROPERTIES
Noncombustible (bulk form)
Combustible (powder and dust)
1 mm Hg at 1,627°F (886°C)
6.69 (water = 1)
Insoluble
2,975°F (1,635°C)
1,166°F (630°C)
121.8

EXPOSURE LIMITS
OS 0.5 mg/m³, 8-hr TWA
NIOS 0.5 mg/m³, 10-hr TWA
AC 0.5 mg/m³, 8-hr TWA
I 50 mg/m³
The Protective Action Criteria values are:
PAC-1 = 1.5 mg/m³ PAC-2 = 20 mg/m³
PAC-3 = 50 mg/m³

PROTECTIVE EQUIPMENT
Nitrile, Neoprene and Natural Rubber
Tyvek
Spill or >0.5 mg/m³: full facepiece APR with P100 filters
Fire or >5 mg/m³: SCBA

HEALTH EFFECTS
Irritation
Irritation, redness and itchy skin rash
Nose, throat and lung irritation, with coughing, wheezing and shortness of breath
Headache, dizziness, nausea, vomiting, and abdominal pain

FIRST AID AND DECONTAMINATION
Remove the person from exposure.
Irrigate eyes with large amounts of water for at least 15 minutes. Remove contact lenses.
Remove contaminated clothing and wash contaminated skin with large amounts of soap and water.
Artificial respiration if breathing has stopped and CPR if necessary.
Transport promptly to a medical facility.



# Right to Know Hazardous Substance Fact Sheet

Common Name: **ARSENIC**

Synonyms: Gray Arsenic; Arsen

Chemical Name: Arsenic

Date: June 1998      Revision: April 2008

CAS Number: 7440-38-2

RTK Substance Number: 0152

DOT Number: UN 1558

## Description and Use

**Arsenic** is a silver-gray or white metallic, odorless, brittle solid. It is used as an alloying agent for heavy metals, and in solders, medicines and herbicides.

## Reasons for Citation

- ▶ **Arsenic** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing. Seek medical attention.

### Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

### Inhalation

- ▶ Remove the person from exposure.
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

**EMERGENCY RESPONDERS >>>> SEE PAGE 6**

## Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	4	-
FLAMMABILITY	0	-
REACTIVITY	0	-
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Arsenic** can affect you when inhaled and may be absorbed through the skin.
- ▶ **Arsenic** is a CARCINOGEN and may cause reproductive damage. HANDLE WITH EXTREME CAUTION.
- ▶ Skin contact can cause irritation, burns, rash and loss of pigment
- ▶ Eye contact can cause irritation and burns.
- ▶ Inhaling **Arsenic** can irritate the nose and throat and can cause an ulcer or hole in the "bone" (septum) dividing the inner nose.
- ▶ Exposure to **Arsenic** can cause weakness, poor appetite, nausea, vomiting, headache, and even death.
- ▶ **Arsenic** may damage the nervous system and the liver.
- ▶ **Arsenic** is a noncombustible solid, but when in *dust* or *fine powder* form it can EXPLODE when exposed to heat, flame or hot surfaces.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **0.01 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.002 mg/m<sup>3</sup>**, which should not be exceeded at any time.

ACGIH: The threshold limit value (TLV) is **0.01 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

- ▶ **Arsenic** is a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

### Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Arsenic**:

- ▶ Skin contact can cause irritation, burns, rash and loss of pigment.
- ▶ Eye contact can cause irritation, burns and red, watery eyes.
- ▶ Inhaling **Arsenic** can irritate the nose and throat causing coughing and wheezing.
- ▶ Exposure to **Arsenic** can cause weakness, poor appetite, nausea, vomiting, headache, muscle cramps and even death.

#### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Arsenic** and can last for months or years:

#### Cancer Hazard

- ▶ **Arsenic** is a CARCINOGEN in humans. It has been shown to cause skin and lung cancer.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen.

#### Reproductive Hazard

- ▶ Chronic **Arsenic** exposure has been associated with spontaneous abortions and still births.
- ▶ There is limited evidence that **Arsenic** is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

#### Other Effects

- ▶ Repeated skin contact can cause thickened skin and/or patchy areas of darkening and loss of pigment. Some persons may develop white lines on the nails.
- ▶ Long-term exposure can cause an ulcer or hole in the "bone" (septum) dividing the inner nose, hoarseness and sore eyes.
- ▶ **Arsenic** may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.
- ▶ **Arsenic** may damage the liver.

### Medical

#### Medical Testing

Before first exposure and every 12 months thereafter, OSHA requires your employer to provide (for persons exposed to greater than **0.005 mg/m<sup>3</sup>** of **Arsenic**) a work and medical history and exam which shall include:

- ▶ Chest x-ray
- ▶ Exam of the nose, skin and nails
- ▶ Test for urine **Arsenic**. This is most accurate at the end of the workday. Eating shellfish or fish may elevate **Arsenic** levels for up to two days. At NIOSH recommended exposure levels, urine **Arsenic** should not be greater than **100 micrograms per liter** of urine.

After suspected overexposure, repeat these tests and consider exam of the nervous system and liver function tests. Also examine your skin periodically for abnormal growth. Skin cancer from **Arsenic** can be easily cured when detected early.

OSHA requires your employer to provide you and your doctor with a copy of the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

#### Mixed Exposures

- ▶ More than light alcohol consumption can cause liver damage. Drinking alcohol may increase the liver damage caused by **Arsenic**.

#### Conditions Made Worse By Exposure

- ▶ May scientists believe that skin changes such as thickening and pigment changes make those skin areas more likely to develop skin cancer.

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).
- ▶ Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.
- ▶ Use a high efficiency particulate air (HEPA) filter when vacuuming. Do not use a standard shop vacuum.

### Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

#### Gloves and Clothing

- ▶ Avoid skin contact with **Arsenic**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.

- ▶ Safety equipment manufacturers recommend *Nitrile*, *Natural Rubber* or *Silver Shield®* for gloves and DuPont *Tyvek®*, or the equivalent, as protective materials for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

#### Eye Protection

- ▶ Wear impact resistant eye protection with side shields.
- ▶ Wear a face shield with goggles when working with corrosive, high irritating or toxic substance.

#### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure not higher than **0.1 mg/m<sup>3</sup>**, use a half-mask air purifying respirator equipped with high efficiency filters.
- ▶ Where the potential exists for exposure not higher than **0.5 mg/m<sup>3</sup>**, use a full facepiece, air purifying respirator with high efficiency filters.
- ▶ Where the potential exists for exposure not higher than **5 mg/m<sup>3</sup>**, use any powered-air purifying respirator with high efficiency filters or a half-mask supplied-air respirator operated in a positive pressure mode.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Arsenic**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Exposure to **5 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **5 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

### Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **Arsenic** is noncombustible, however, **Arsenic dust or fine powder** can explode when exposed to heat, flame or hot surfaces.
- ▶ Use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE, including *Arsenic Oxides*.
- ▶ Use water spray to keep fire-exposed containers cool.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Arsenic** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Collect powdered material in the most convenient and safe manner, or use a HEPA-filter vacuum for clean-up, and deposit in sealed containers.
- ▶ Ventilate area of spill after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **Arsenic** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with **Arsenic** you should be trained on its proper handling and storage.

- ▶ A regulated, marked area should be established where **Arsenic** is handled, used or stored as required by the OSHA *Inorganic Arsenic* Standard (29 CFR 1910.1018).
- ▶ **Arsenic** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) to cause fires and explosions.
- ▶ **Arsenic** reacts with ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and HYDROGEN GAS to produce toxic *Arsine gas*.
- ▶ **Arsenic** is not compatible with powdered METALS (such as ZINC, LITHIUM, RUBIDIUM and PLATINUM); BROMINE AZIDE; LEAD MONOXIDE; and MERCURY OXIDE.
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from COMBUSTIBLES and HEAT.
- ▶ DO NOT store in metal tanks.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

#### For more information, please contact:

New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

***The Right to Know Hazardous Substance Fact Sheets  
 are not intended to be copied and sold  
 for commercial purposes.***

## GLOSSARY

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Acute Exposure Guideline Levels (AEGLs)** are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Emergency Response Planning Guideline (ERPG)** values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization Potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

**LEL or Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeated** is the movement of chemicals through protective materials.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



Common Name: **ARSENIC**

Synonyms: Gray Arsenic; Arsen

CAS No: 7440-38-2

Molecular Formula: As

RTK Substance No: 0152

Description: Silver-gray or white metallic, odorless, brittle solid

## HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<p><b>4 - Health</b></p> <p><b>0 - Fire</b></p> <p><b>0 - Reactivity</b></p> <p><b>DOT#:</b> UN 1558</p> <p><b>ERG Guide #:</b> 152</p> <p><b>Hazard Class:</b> 6.1 (Poison)</p>	<p><b>Arsenic</b> is noncombustible, however, <i>Arsenic dust</i> or <i>fine powder</i> can explode when exposed to heat, flame or hot surfaces.</p> <p>Use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.</p> <p>POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Arsenic Oxides</i>.</p> <p>Use water spray to keep fire-exposed containers cool.</p>	<p><b>Arsenic</b> reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) to cause fires and explosions.</p> <p><b>Arsenic</b> reacts with ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) and HYDROGEN GAS to produce toxic <i>Arsine gas</i>.</p> <p><b>Arsenic</b> is not compatible with <i>powdered</i> METALS (such as ZINC, LITHIUM, RUBIDIUM and PLATINUM); BROMINE AZIDE; LEAD MONOXIDE; and MERCURY OXIDE.</p>

## SPILL/LEAKS

**Isolation Distance:**

Spills: 25 to 50 meters (75 to 150 feet)

Fire: 800 meters (1/2 mile)

Moisten spilled material first or use a HEPA-filter vacuum for clean-up.

DO NOT wash into sewer.

Toxic to aquatic organisms.

## PHYSICAL PROPERTIES

<b>Odor Threshold:</b>	Odorless
<b>Flash Point:</b>	Noncombustible solid
<b>Vapor Pressure:</b>	1 mm Hg at 701°F (372°C)
<b>Specific Gravity:</b>	5.7 (water = 1)
<b>Water Solubility:</b>	Insoluble
<b>Boiling Point:</b>	1,350°F (613°C)
<b>Ionization Potential:</b>	9.87 eV
<b>Molecular Weight:</b>	74.9

## EXPOSURE LIMITS

<b>OSHA:</b>	0.01 mg/m <sup>3</sup> , 8-hr TWA
<b>NIOSH:</b>	0.002 mg/m <sup>3</sup> , 15-min Ceiling
<b>ACGIH:</b>	0.01 mg/m <sup>3</sup> , 8-hr TWA
<b>IDLH:</b>	5 mg/m <sup>3</sup>

## PROTECTIVE EQUIPMENT

<b>Gloves:</b>	Natural Rubber, Nitrile or Silver Shield®
<b>Coveralls:</b>	DuPont Tyvek®
<b>Respirator:</b>	<0.1 mg/m <sup>3</sup> - Full facepiece APR with High efficiency filter <0.5 mg/m <sup>3</sup> -Supplied air

## HEALTH EFFECTS

<b>Eyes:</b>	Irritation, burns, red and watery eyes
<b>Skin:</b>	Irritation, burns, itching, rash and loss of pigment
<b>Inhalation:</b>	Nose and throat irritation with coughing, wheezing and hoarseness Weakness, headache, nausea, vomiting, and muscle cramps
<b>Chronic:</b>	Cancer (skin and lung) in humans

## FIRST AID AND DECONTAMINATION

<b>Remove</b>	the person from exposure.
<b>Flush</b>	eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn. Seek medical attention.
<b>Quickly</b>	remove contaminated clothing and wash contaminated skin with large amounts of soap and water.
<b>Begin</b>	artificial respiration if breathing has stopped and CPR if necessary.
<b>Transfer</b>	to a medical facility.

# International Chemical Safety Cards

**BARIUM**
**ICSC: 1052**

BARIUM Ba Atomic mass: 137.3  CAS # 7440-39-3 RTECS # CQ8370000 ICSC # 1052 UN # 1400			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames.	Special powder, dry sand, NO hydrous agents, NO water.
<b>EXPLOSION</b>	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
<b>EXPOSURE</b>		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• <b>INHALATION</b>	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
• <b>EYES</b>	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from halogenated solvents, strong oxidants, acids. Dry. Keep under inert gas, petroleum or oxygen-free liquid.	UN Hazard Class: 4.3 UN Packing Group: II	
<b>SEE IMPORTANT INFORMATION ON BACK</b>			
<b>ICSC: 1052</b>	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993		

# International Chemical Safety Cards

**BARIUM****ICSC: 1052**

<b>I M P O R T A N T  D A T A</b>	<b>PHYSICAL STATE; APPEARANCE:</b> YELLOWISH TO WHITE LUSTROUS SOLID IN VARIOUS FORMS.		<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by ingestion.	
	<b>PHYSICAL DANGERS:</b>		<b>INHALATION RISK:</b>	
	<b>CHEMICAL DANGERS:</b> The substance may spontaneously ignite on contact with air (if in powder form). The substance is a strong reducing agent and reacts violently with oxidants and acids. Reacts with water, forming combustible gas (hydrogen - see ICSC # 0001) and barium hydroxide. Reacts violently with halogenated solvents causing fire and explosion hazard.		<b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance irritates the eyes, the skin, and the respiratory tract.	
	<b>OCCUPATIONAL EXPOSURE LIMITS          (OELs):</b> TLV: ppm; 0.5 mg/m <sup>3</sup> (as TWA) (ACGIH 1992-1993).		<b>EFFECTS OF LONG-TERM OR          REPEATED EXPOSURE:</b>	
<b>PHYSICAL PROPERTIES</b>	Boiling point: 1640°C Melting point: 725°C Relative density (water = 1): 3.6		Solubility in water: reaction Vapour pressure, kPa at 1049°C: 1.3	
<b>ENVIRONMENTAL DATA</b>				
<b>NOTES</b>				
Reacts violently with fire extinguishing agents such as water, bicarbonate, powder, foam, and carbon dioxide. Rinse contaminated clothes (fire hazard) with plenty of water.				
Transport Emergency Card: TEC (R)-43G14				
<b>ADDITIONAL INFORMATION</b>				
<b>ICSC: 1052</b>		<b>BARIUM</b>		
© IPCS, CEC, 1993				
<b>IMPORTANT LEGAL NOTICE:</b>	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.			

# Material Safety Data Sheet

## Benzene

ACC# 02610

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Benzene

**Catalog Numbers:** AC167660000, AC167660010, AC167660025, AC167660250, AC167665000, AC168650250, AC295330000, AC295330010, AC295330025, AC295330250, AC296880000, AC296880010, AC296880025, AC296880250, AC610230010, AC610231000, AC611001000, B243-4, B245-4, B245-500, B411-1, B411-4, B412-1, S79920ACS

**Synonyms:** Benzol; Cyclohexatriene; Phenyl hydride.**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
71-43-2	Benzene	> 99	200-753-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear colorless liquid. Flash Point: -11 deg C.

**Danger!** Extremely flammable liquid and vapor. Vapor may cause flash fire. Harmful if swallowed, inhaled, or absorbed through the skin. Causes eye, skin, and respiratory tract irritation. Contains benzene. Benzene can cause cancer. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause blood abnormalities. May cause central nervous system effects.

**Target Organs:** Blood, central nervous system, respiratory system, eyes, bone marrow, immune system, skin.

#### Potential Health Effects

**Eye:** Causes eye irritation.

**Skin:** Causes skin irritation. Harmful if absorbed through the skin. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.

**Ingestion:** May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause effects similar to those for inhalation exposure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

**Inhalation:** Causes respiratory tract irritation. May cause drowsiness, unconsciousness, and

central nervous system depression. Exposure may lead to irreversible bone marrow injury. Exposure may lead to aplastic anemia. Potential symptoms of overexposure by inhalation are dizziness, headache, vomiting, visual disturbances, staggering gait, hilarity, fatigue, and other symptoms of CNS depression.

**Chronic:** May cause bone marrow abnormalities with damage to blood forming tissues. May cause anemia and other blood cell abnormalities. Chronic exposure to benzene has been associated with an increased incidence of leukemia and multiple myeloma (tumor composed of cells of the type normally found in the bone marrow). Immunodepressive effects have been reported. This substance has caused adverse reproductive and fetal effects in laboratory animals.

## Section 4 - First Aid Measures

**Eyes:** In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

**Skin:** In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

**Ingestion:** Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

**Inhalation:** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Extremely flammable liquid and vapor. Vapor may cause flash fire. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire. May accumulate static electricity.

**Extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or appropriate foam.

**Flash Point:** -11 deg C ( 12.20 deg F)

**Autoignition Temperature:** 498 deg C ( 928.40 deg F)

**Explosion Limits, Lower:** 1.3 vol %

**Upper:** 7.1 vol %

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Provide ventilation. Approach spill from upwind. Use water spray to cool and disperse vapors, protect personnel, and dilute spills to form nonflammable mixtures.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor.

**Storage:** Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. See 29CFR 1910.1028 for the regulatory requirements for the control of employee exposure to benzene.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzene	0.5 ppm TWA; 2.5 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous route	0.1 ppm TWA 500 ppm IDLH	1 ppm TWA; 10 ppm TWA (applies to industry segments exempt from the benzene standard at 29 CFR 1910.1028); 25 ppm Ceiling (applies to industry segments exempt from the 1 ppm TWA and 5 ppm STEL of the benzene standard); 0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (Cancer hazard, Flammable - see 29 C FR 1910.1028)

**OSHA Vacated PELs:** Benzene: 10 ppm TWA (unless specified in 1910.1028)

### Personal Protective Equipment

**Eyes:** Wear chemical splash goggles.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear colorless  
**Odor:** sweetish odor - aromatic odor  
**pH:** Not applicable.  
**Vapor Pressure:** 75 mm Hg @ 20 deg C  
**Vapor Density:** 2.8 (air=1)  
**Evaporation Rate:**Not available.  
**Viscosity:** 0.647mPa @ 20 deg C  
**Boiling Point:** 80.1 deg C  
**Freezing/Melting Point:**5.5 deg C  
**Decomposition Temperature:**Not available.  
**Solubility:** 0.180 g/100 ml @ 25°C  
**Specific Gravity/Density:**0.8765 @ 20°C  
**Molecular Formula:**C<sub>6</sub>H<sub>6</sub>  
**Molecular Weight:**78.11

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.  
**Conditions to Avoid:** Ignition sources, excess heat, confined spaces.  
**Incompatibilities with Other Materials:** Strong oxidizing agents.  
**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.  
**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 71-43-2: CY1400000

**LD50/LC50:**

CAS# 71-43-2:

Dermal, guinea pig: LD50 = >9400 uL/kg;  
Draize test, rabbit, eye: 88 mg Moderate;  
Draize test, rabbit, eye: 2 mg/24H Severe;  
Draize test, rabbit, skin: 20 mg/24H Moderate;  
Inhalation, mouse: LC50 = 9980 ppm;  
Inhalation, mouse: LC50 = 24 mL/kg/2H;  
Inhalation, rat: LC50 = 10000 ppm/7H;  
Inhalation, rat: LC50 = 34 mL/kg/2H;  
Inhalation, rat: LC50 = 6.5 mL/kg/4H;  
Oral, mouse: LD50 = 4700 mg/kg;  
Oral, rat: LD50 = 930 mg/kg;  
Oral, rat: LD50 = 1 mL/kg;

Oral, rat: LD50 = 1800 Benzene is considered very toxic; probable human oral lethal dose would be 50-500 mg/kg. Human inhalation of approximately 20,000 ppm (2% in air) was fatal in 5-10 minutes. While percutaneous absorption of liquid benzene through intact human skin can be limited (e.g., 0.05% of the applied dose), the absorbed dose via direct dermal contact combined with that received from body surface exposure to benzene in workplace air is such that a substantial fraction (20-40%) of the total exposure is due to skin absorption.

**Carcinogenicity:**

CAS# 71-43-2:

- **ACGIH:** A1 - Confirmed Human Carcinogen
- **California:** carcinogen, initial date 2/27/87
- **NTP:** Known carcinogen
- **IARC:** Group 1 carcinogen

**Epidemiology:** IARC has concluded that epidemiological studies have established the relationship between benzene exposure and the development of acute myelogenous leukemia, and that there is sufficient evidence that benzene is carcinogenic to humans.

**Teratogenicity:** Inhalation, rat: TCLO = 50 ppm/24H (female 7-14 day(s) after conception) Effects on Embryo or Fetus - extra-embryonic structures (e.g., placenta, umbilical cord) and Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).; Inhalation, mouse: TCLO = 5 ppm (female 6-15 day(s) after conception) Effects on Embryo or Fetus - cytological changes (including somatic cell genetic material) and Specific Developmental Abnormalities - blood and lymphatic systems (including spleen and marrow).

**Reproductive Effects:** Inhalation, rat: TCLO = 670 mg/m<sup>3</sup>/24H (female 15 day(s) pre-mating and female 1-22 day(s) after conception) female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated).; Oral, mouse: TDLo = 12 gm/kg (female 6-15 day(s) after conception) Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants).

**Mutagenicity:** DNA Inhibition: Human, Leukocyte = 2200 umol/L.; DNA Inhibition: Human, HeLa cell = 2200 umol/L.; Mutation Test Systems - not otherwise specified: Human, Lymphocyte = 5 umol/L.; Cytogenetic Analysis: Inhalation, Human = 125 ppm/1Y.; Cytogenetic Analysis: Human, Leukocyte = 1 mmol/L/72H.; Cytogenetic Analysis: Human, Lymphocyte = 1 mg/L.

**Neurotoxicity:** See actual entry in RTECS for complete information.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Mosquito Fish: TLm = 395 mg/L; 24 Hr; Unspecified Fish: Goldfish: LC50 = 46 mg/L; 24 Hr; Modified ASTM D 1345 Fish: Fathead Minnow: LC50 = 15.1 mg/L; 96 Hr; Flow-through at 25°C (pH 7.9-8.0) Fish: Rainbow trout: LC50 = 5.3 mg/L; 96 Hr; Flow-through at 25°C (pH 7.9-8.0) Fish: Bluegill/Sunfish: LD50 = 20 mg/L; 24-48 Hr; Unspecified If benzene is 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. If benzene is released to water, it will be subject to rapid volatilization. It will not be expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms or hydrolyze. It may be subject to biodegradation.

**Environmental:** If benzene is released to the atmosphere, it will exist predominantly in the vapor phase. Gas-phase benzene will not be subject to direct photolysis but it will react with photochemically produced hydroxyl radicals with a half-life of 13.4 days. 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. Benzene is fairly soluble in water and is removed from the atmosphere in rain.

**Physical:** Products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid, and peroxyacetyl nitrate.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts

261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 71-43-2: waste number U019 (Ignitable waste, Toxic waste).

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	BENZENE	BENZENE
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1114	UN1114
<b>Packing Group:</b>	II	II
<b>Additional Info:</b>		FLASHPOINT -11 C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 71-43-2 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 71-43-2: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogeni

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 71-43-2: immediate, delayed, fire.

#### Section 313

This material contains Benzene (CAS# 71-43-2, > 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 71-43-2 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

CAS# 71-43-2 is listed as a Hazardous Substance under the CWA. CAS# 71-43-2 is listed as a Priority Pollutant under the Clean Water Act. CAS# 71-43-2 is listed as a Toxic Pollutant under the Clean Water Act.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 71-43-2 can be found on the following state right to know lists: California, New Jersey,

Pennsylvania, Minnesota, Massachusetts.

### California Prop 65

**The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:**

WARNING: This product contains Benzene, a chemical known to the state of California to cause cancer. WARNING: This product contains Benzene, a chemical known to the state of California to cause male reproductive toxicity.

California No Significant Risk Level: CAS# 71-43-2: 6.4 æg/day NSRL (oral); 13 æg/day NSRL (inhalation)

## European/International Regulations

**European Labeling in Accordance with EC Directives**

**Hazard Symbols:**

T F

**Risk Phrases:**

R 11 Highly flammable.

R 36/38 Irritating to eyes and skin.

R 45 May cause cancer.

R 46 May cause heritable genetic damage.

R 48/23/24/25 Toxic : danger of serious damage to health by prolonged exposure through inhalation, contact with skin and if swallowed.

R 65 Harmful: may cause lung damage if swallowed.

**Safety Phrases:**

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

**WGK (Water Danger/Protection)**

CAS# 71-43-2: 3

**Canada - DSL/NDSL**

CAS# 71-43-2 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D2A, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 71-43-2 is listed on the Canadian Ingredient Disclosure List.

## Section 16 - Additional Information

**MSDS Creation Date:** 6/11/1999

**Revision #8 Date:** 9/11/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



# Right to Know Hazardous Substance Fact Sheet

Common Name: **1,2,3,4-BENZO[*a*]ANTHRACENE**

Synonyms: Naphthanthracene; Tetraphene

Chemical Name: Benz[*a*]Anthracene

Date: September 1998      Revision: August 2008

CAS Number: 56-55-3

RTK Substance Number: 0193

DOT Number: UN 3077

## Description and Use

1,2,3,4-Benzo[*a*]anthracene is an odorless, colorless to yellow brown flake, plate or powder. It is not produced commercially, but is used in research laboratories. It is also found in *Coal Tar*, roasted coffee, smoked foods, and automobile exhaust, and is formed as an intermediate during chemical manufacturing.

**EMERGENCY RESPONDERS >>>> SEE PAGE 6**

## Hazard Summary

Physical and Chemical Hazards	Health	Environment
HAZARD	3	-
LAMMABILITY	1	-
REACTIVITY	0	-
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

## Reasons for Citation

- 1,2,3,4-Benzo[*a*]anthracene is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS and EPA.
- This chemical is on the Special Health Hazard Substance List.

- 1,2,3,4-Benzo[*a*]anthracene can affect you when inhaled.
- 1,2,3,4-Benzo[*a*]anthracene should be handled as a CARCINOGEN and MUTAGEN--WITH EXTREME CAUTION.
- For more information, consult the Right to Know Hazardous Substance Fact Sheet on COAL TAR PITCH.

SEE LOSSAR ON PAGE

## FIRST AID

### Eye Contact

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### Skin Contact

- Remove contaminated clothing and wash contaminated skin with soap and water.

### Inhalation

- Remove the person from exposure.
- Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Public Contact: 1-800-455-6113

ChemTREC: 1-800-424-9300

Next EP: 1-800-455-6113

Next ER: 1-800-455-6113

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is 0.1 mg/m<sup>3</sup> (as Coal Tar Pitch Volatiles, Benzene-soluble fraction) averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is 0.05 mg/m<sup>3</sup> (as Coal Tar Pitch Volatiles, Cyclohexane-extractable fraction) averaged over a 10-hour workshift.

ACGIH: Recommends that exposure by all routes be controlled to levels as low as possible.

- 1,2,3,4-Benzo[*a*]anthracene is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

## Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## Health Hazard Information

### Acute (Short-Term) Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to ENANTRACENE:

- ▶ No acute (short-term) health effects are known at this time.

### Chronic (Long-Term) Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to ENANTRACENE and can last for months or years:

#### Cancer Hazard

- ▶ ENANTRACENE is a PROBABLE CARCINOGEN in humans. There is evidence that it causes cancer in humans and it has been shown to cause liver and lung cancer in animals.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen. Such substance may also have the potential for causing reproductive damage in humans.

#### Reproductive Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, ENANTRACENE has not been tested for its ability to affect reproduction.

### Other Effects

- ▶ No chronic (long-term) health effects are known at this time.

## Medical

### Medical Tests

There is no special test for this chemical. However, seek medical attention if illness occurs or overexposure is suspected.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

## Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Use a Class I, Type B, biological safety hood when mixing, handling, or preparing **A**.**r**.
- ▶ Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.
- ▶ Use a high efficiency particulate air (HEPA) filter when vacuuming. Do not use a standard shop vacuum.

## Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Hand Protection

- ▶ Avoid skin contact with **A**.**r**. Wear personal protective equipment made from material that can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Nitrile or Natural Rubber for gloves and DuPont Tyvek®, or the equivalent, as a protective material for clothing.

### Eye Protection

- ▶ Wear eye protection with side shields or goggles.

### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over  $100 \text{ mg/m}^3$  (as *Coal Tar Pitch Volatiles*), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to  $10 \text{ mg/m}^3$  (as *Coal Tar Pitch Volatiles*) is immediately dangerous to life and health. If the possibility of exposure above  $10 \text{ mg/m}^3$  exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

## Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **A**.**r** may burn, but does not readily ignite.
- ▶ Use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE.
- ▶ Use water spray to keep fire-exposed containers cool.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If ENANTRACENE is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Moisten spilled material first or use a HEPA-filter vacuum for clean-up and deposit in sealed containers.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of ENANTRACENE as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with ENANTRACENE you should be trained on its proper handling and storage.

- ▶ A regulated, marked area should be established where ENANTRACENE is handled, used, or stored.
- ▶ ENANTRACENE is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
- ▶ Store in tightly closed containers in a cool, well-ventilated area.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, contact:

New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

***The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.***

LOSSAR

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Airborne Equivalent Level (AELs)** are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Equivalent Concentration Range (ECR) values** are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization Potential (IP)** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

**LEL or Lower Explosive Limit (LEL)** is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSH Act** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**PPE** is the movement of chemicals through protective materials.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit (UEL)** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Relative Vapor Pressure (RVP)** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



Common Name: **ENANTHACENE**

Synonyms: Naphthanthracene; Tetraphene

CAS No: 56-55-3

Molecular Formula: C<sub>18</sub>H<sub>12</sub>

RTK Substance No: 0193

Description: Odorless, colorless to yellow brown flake, plate or powder

**HAZARD DATA**

<b>rd R</b>	<b>r</b>	<b>R</b>
<p><b>rd R</b></p> <p><b>OT</b> UN 3077</p> <p><b>ER</b> 171</p> <p><b>rd C</b>: 9 (Environmentally hazardous substance)</p>	<p><b>A</b> may burn, but does not readily ignite.</p> <p>Use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.</p> <p>POISONOUS GASES ARE PRODUCED IN FIRE.</p> <p>Use water spray to keep fire-exposed containers cool.</p>	<p><b>A</b> is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).</p>

**SPILL/LEAKS**

Small Spill: 50 meters (150 feet)  
 Fire: 800 meters (1/2 mile)  
 Moisten spilled material first or use a HEPA-filter vacuum for clean-up and deposit in sealed containers.  
 Bioaccumulation may occur in seafood

**PHYSICAL PROPERTIES**

**Odor** Odorless  
**P** May burn  
**r Pr** 2 mm Hg at 68°F (20°C)  
**S** 1.3 (water = 1)  
**W** Insoluble  
**P** 820°F (438°C)  
**M** 324°F (162°C)  
**M** 228.3

**EXPOSURE LIMITS**

**OS** 0.2 mg/m<sup>3</sup>, 8-hr TWA (as Coal Tar Pitch Volatiles, Benzene soluble fraction)  
**NIOS** 0.1 mg/m<sup>3</sup>, 10-hr TWA (as Coal Tar Pitch Volatiles, Cyclohexane-extractable fraction)  
**AC** Lowest level possible  
**L** 80 mg/m<sup>3</sup> (as Coal Tar Pitch Volatiles)

**PROTECTIVE EQUIPMENT**

**C** Nitrile and Natural Rubber  
**C** DuPont Tyvek®  
**R** >0.1 mg/m<sup>3</sup> - Supplied Air

**HEALTH EFFECTS**

**E** No information available  
**S** No information available  
**I** No information available  
**C** Cancer (liver and lung) in animals

**FIRST AID AND DECONTAMINATION**

**R** the person from exposure.  
**I** eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.  
**R** contaminated clothing and wash contaminated skin with soap and water.  
**T** to a medical facility.



# Right to Know Hazardous Substance Fact Sheet

Common Name: **BENZO(a)PYRENE**

Synonyms: 3,4-Benzopyrene; B[a]P

Chemical Name: Benzo[a]pyrene

Date: July 1998      Revision: October 2007

CAS Number: 50-32-8

RTK Substance Number: 0207

DOT Number: UN 3077

## Description and Use

**Benzo(a)pyrene** is a pale yellow, crystalline solid or powder with a faint aromatic odor. In its pure form it is used as a laboratory reagent. It also forms as a gaseous by-product when certain carbon substances burn, such as coal tar chemicals, and is found in cigarette smoke.

## Reasons for Citation

- ▶ **Benzo(a)pyrene** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS, and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### Skin Contact

- ▶ Remove contaminated clothing. Wash contaminated skin with soap and water.

### Inhalation

- ▶ Remove the person from exposure.
- ▶ Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

## EMERGENCY RESPONDERS >>>> SEE PAGE 6

### Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	3	-
FLAMMABILITY	1	-
REACTIVITY	0	-
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Benzo(a)pyrene** can affect you when inhaled and by passing through the skin.
- ▶ **Benzo(a)pyrene** is a CARCINOGEN. HANDLE WITH EXTREME CAUTION.
- ▶ **Benzo(a)pyrene** may damage the developing fetus.
- ▶ Contact can irritate and burn the eyes.
- ▶ **Benzo(a)pyrene** can irritate the skin causing a rash or burning feeling on contact.
- ▶ Repeated exposure can cause thickening and darkening of the skin.
- ▶ Except in laboratories, **Benzo(a)pyrene** is usually found mixed with other "coal tar pitch" chemicals.
- ▶ For more information, consult the *Right to Know Hazardous Substance Fact Sheets on COAL TAR PITCH, CREOSOTE, CHRYSENE, and ANTHRACENE.*

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m<sup>3</sup>** (as *Coal Tar Pitch Volatiles*) averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.1 mg/m<sup>3</sup>** (as the *Cyclohexane-extractable fraction*) averaged over a 10-hour workshift.

ACGIH: Recommends that exposure by all routes be controlled to levels as low as possible.

- ▶ **Benzo(a)pyrene** is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

### Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benzo(a)pyrene**:

- ▶ Contact can irritate and burn the eyes.
- ▶ **Benzo(a)pyrene** can irritate the skin causing a rash or burning feeling on contact. Exposure to a combination of sunlight and this chemical can increase these effects.

#### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benzo(a)pyrene** and can last for months or years:

#### Cancer Hazard

- ▶ **Benzo(a)pyrene** is a PROBABLE CARCINOGEN in humans. There is some evidence that it causes stomach, skin, lung, blood, spleen, pancreas, and mammary cancer in animals.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen.

#### Reproductive Hazard

- ▶ **Benzo(a)pyrene** may damage the developing fetus.
- ▶ There is limited evidence that **Benzo(a)pyrene** may damage the male and female reproductive systems.

#### Other Effects

- ▶ Repeated exposure can cause thickening and darkening of the skin and warts.

### Medical

#### Medical Testing

There is no special test for this chemical. However, seek medical attention if illness occurs or overexposure is suspected.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

#### Mixed Exposures

- ▶ Sunlight may cause a rash to develop in people exposed to **Benzo(a)pyrene** and increases the risk of skin cancer.
- ▶ Tobacco smoke also contains **Benzo(a)pyrene**. Smoking may increase the risk of lung cancer with exposure to **Benzo(a)pyrene**.

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.

- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Use a Class I, Type B, biological safety hood when working with **Benzo(a)pyrene** in a laboratory.
- ▶ Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.
- ▶ Use a high efficiency particulate air (HEPA) filter when vacuuming. Do not use a standard shop vacuum.

## Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Gloves and Clothing

- ▶ Avoid skin contact with **Benzo(a)pyrene**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend DuPont Tychem® CPF-2, SL, CPF-4 and Responder® as protective materials for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- ▶ Wear eye protection with side shields or goggles.
- ▶ Do not wear contact lenses when working with this substance.

### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **0.1 mg/m<sup>3</sup>**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

- ▶ Exposure to **80 mg/m<sup>3</sup>** (as *Coal Tar Pitch Volatiles*) is immediately dangerous to life and health. If the possibility of exposure above **80 mg/m<sup>3</sup>** (as *Coal Tar Pitch Volatiles*) exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

## Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **Benzo(a)pyrene** may burn, but does not readily ignite.
- ▶ Use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE.

## Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Benzo(a)pyrene** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Moisten spilled material first to reduce dust or use a HEPA-filter vacuum for clean-up.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ It may be necessary to contain and dispose of **Benzo(a)pyrene** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP), Nuclear Regulatory Commission (NRC) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

## Handling and Storage

Prior to working with **Benzo(a)pyrene** you should be trained on its proper handling and storage.

- ▶ A regulated, marked area should be established where **Benzo(a)pyrene** is handled, used, or stored.
- ▶ **Benzo(a)pyrene** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
- ▶ Store in tightly closed containers in a cool, well-ventilated area.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **Benzo(a)pyrene** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

**Occupational Health Information  
Resources**

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

**For more information, please contact:**

New Jersey Department of Health & Senior Services  
Right to Know Program  
PO Box 368  
Trenton, NJ 08625-0368  
Phone: 609-984-2202  
Fax: 609-984-7407  
E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
Web address: <http://www.nj.gov/health/eoh/rtkweb>

***The Right to Know Hazardous Substance Fact Sheets  
are not intended to be copied and sold  
for commercial purposes.***

## GLOSSARY

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Acute Exposure Guideline Levels (AEGLs)** are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Emergency Response Planning Guideline (ERPG)** values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization Potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

**LEL or Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeated** is the movement of chemicals through protective materials.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



Common Name: **BENZO(a)PYRENE**

Synonyms: 3,4-Benzopyrene; B[a]P

CAS No: 50-32-8

Molecular Formula: C<sub>20</sub>H<sub>12</sub>

RTK Substance No: 0207

Description: Pale yellow, crystalline solid or powder

## HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<b>3 - Health</b> <b>1 - Fire</b> <b>0 - Reactivity</b>  DOT#: UN 3077 ERG Guide #: 171 Hazard Class: 9 (Miscellaneous Hazardous Materials)	<b>Benzo(a)pyrene</b> may burn, but does not readily ignite.  Use dry chemical, CO <sub>2</sub> , water spray or foam as extinguishing agents.  POISONOUS GASES ARE PRODUCED IN FIRE.	<b>Benzo(a)pyrene</b> reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) to cause fires and explosions.

## SPILL/LEAKS

**Isolation Distance:** 50 meters (150 feet)

Moisten spilled material first or use a HEPA-filter vacuum for clean-up.

Toxic to aquatic organisms.

## PHYSICAL PROPERTIES

**Odor Threshold:** Faint aromatic odor

**Flash Point:** No information

**Specific Gravity:** 1.35

**Vapor Density:** 8.7 (air = 1)

**Vapor Pressure:** 5.49 X 10<sup>9</sup> mm Hg at 77°F (25°C)

**Water Solubility:** Insoluble

**Boiling Point:** 590° - 594°F (310° - 312°C)

**Melting Point:** 347° - 354 F (175° - 179°C)

## EXPOSURE LIMITS

**OSHA:** 0.2 mg/m<sup>3</sup>, 8-hr TWA

**NIOSH:** 0.1 mg/m<sup>3</sup>, 10-hr TWA

**ACGIH:** lowest level possible

**IDLH LEVEL:** 80 mg/m<sup>3</sup> (as *Coal Tar Pitch Volatiles*)

## PROTECTIVE EQUIPMENT

**Gloves:** No information

**Coveralls:** DuPont Tychem®, CPF-2, SL, CPF-4, Responder® (all >8-hr permeation time)

**Boots:** No information

**Respirator:** >0.1 mg/m<sup>3</sup> - Supplied air

## HEALTH EFFECTS

**Eyes:** Irritation and burns

**Skin:** Irritation, rash and burning feeling

**Chronic:** Cancer (stomach, skin, lung, blood, spleen, pancreas, and mammary) in animals.  
May affect the developing fetus  
Thickening and darkening of the skin and warts

## FIRST AID AND DECONTAMINATION

**Remove** the person from exposure.

**Flush** eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.

**Remove** contaminated clothing and wash contaminated skin with soap and water.

**Transfer** to a medical facility.



New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BENZO(b)FLUORANTHENE**

CAS Number: 205-99-2

DOT Number: None

RTK Substance number: 0208

Date: September 1995 Revision: July 2001

## HAZARD SUMMARY

- \* **Benzo(b)fluoranthene** can affect you when breathed in and may be absorbed through the skin.
- \* **Benzo(b)fluoranthene** is a CARCINOGEN--HANDLE WITH EXTREME CAUTION.
- \* Contact with **Benzo(b)fluoranthene** can cause skin and eye irritation.
- \* Because the major hazards associated with **Benzo(b)fluoranthene** come from exposure to *Coal Tar Pitch*, CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEET ON COAL TAR PITCH.

## IDENTIFICATION

**Benzo(b)fluoranthene** is a colorless, needle-shaped solid. It is used as a research chemical and is present in coal, and coke oven emissions, and petroleum products.

## REASON FOR CITATION

- \* **Benzo(b)fluoranthene** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, NIOSH, NTP, IARC, HHAG and EPA.
- \* This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN**.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

## WORKPLACE EXPOSURE LIMITS

The following exposure limits are for **Benzo(b)fluoranthene** (measured as *Coal Tar Pitch volatiles*):

OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **0.1 mg/m<sup>3</sup>** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **0.2 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

- \* **Benzo(b)fluoranthene** is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- \* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

## WAYS OF REDUCING EXPOSURE

- \* Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* A regulated, marked area should be established where **Benzo(b)fluoranthene** is handled, used, or stored.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Benzo(b)fluoranthene** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Benzo(b)fluoranthene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benzo(b)fluoranthene**:

- \* Contact with **Benzo(b)fluoranthene** can cause skin and eye irritation.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benzo(b)fluoranthene** and can last for months or years:

### Cancer Hazard

- \* **Benzo(b)fluoranthene** is a PROBABLE CARCINOGEN in humans. It has been shown to cause lung, liver and skin cancer in animals.
- \* Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

### Reproductive Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Benzo(b)fluoranthene** has not been tested for its ability to affect reproduction.

### Other Long-Term Effects

- \* **Benzo(b)fluoranthene** has not been tested for other chronic (long-term) health effects.

## MEDICAL

### Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Examine your skin periodically for growths or changes in warts or moles. Skin cancers are usually easily curable when removed early.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- \* Where possible, automatically transfer **Benzo(b)fluoranthene** from drums or other storage containers to process containers.
- \* A Class I, Type B, biological safety hood should be used when mixing, handling, or preparing **Benzo(b)fluoranthene**.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Benzo(b)fluoranthene** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Benzo(b)fluoranthene**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Benzo(b)fluoranthene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Benzo(b)fluoranthene**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Benzo(b)fluoranthene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP**.
- \* When vacuuming, a high efficiency particulate air (HEPA) filter should be used, not a standard shop vacuum.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Benzo(b)fluoranthene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear impact resistant eye protection with side shields or goggles.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

### Respiratory Protection

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* Where the potential exists for exposure over **0.1 mg/m<sup>3</sup>** (as *Coal Tar Pitch volatiles*), use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- \* Exposure to **80 mg/m<sup>3</sup>** (as *Coal Tar Pitch volatiles*) is immediately dangerous to life and health. If the possibility of exposure above **80 mg/m<sup>3</sup>** (as *Coal Tar Pitch volatiles*) exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Don't all chemicals cause cancer?
- A: No. Most chemicals tested by scientists are not cancer-causing.
- Q: Should I be concerned if a chemical causes cancer in animals?
- A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**HHAG** is the Human Health Assessment Group of the federal EPA.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

**MSHA** is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NCI** is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Benzo[ghi]perylene

Product Number : B9009  
Brand : Aldrich

Supplier : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation  
Product Safety - Americas Region  
1-800-521-8956

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Carcinogen

##### GHS Classification

Acute aquatic toxicity (Category 1)

Chronic aquatic toxicity (Category 1)

##### GHS Label elements, including precautionary statements

Pictogram



Signal word : Warning

Hazard statement(s)

H410 : Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273 : Avoid release to the environment.

P501 : Dispose of contents/ container to an approved waste disposal plant.

#### HMIS Classification

Health hazard: 0

Chronic Health Hazard: \*

Flammability: 0

Physical hazards: 0

#### NFPA Rating

Health hazard: 0

Fire: 0

Reactivity Hazard: 0

#### Potential Health Effects

**Inhalation** : May be harmful if inhaled. May cause respiratory tract irritation.

**Skin** : May be harmful if absorbed through skin. May cause skin irritation.

**Eyes** May cause eye irritation.  
**Ingestion** May be harmful if swallowed.

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### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1,12-Benzoperylene  
Formula : C<sub>22</sub>H<sub>12</sub>  
Molecular Weight : 276.33 g/mol

Component		Concentration
<b>Benzo[ghi]perylene</b>		
CAS-No.	191-24-2	-
EC-No.	205-883-8	-

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### 4. FIRST AID MEASURES

#### General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

#### If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

#### In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

#### In case of eye contact

Flush eyes with water as a precaution.

#### If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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### 5. FIREFIGHTING MEASURES

#### Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

#### Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

#### Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

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### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions

Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.

#### Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

#### Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

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### 7. HANDLING AND STORAGE

#### Precautions for safe handling

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

#### Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

### Personal protective equipment

#### Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

#### Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

#### Eye protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

#### Skin and body protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

#### Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

### Appearance

Form	solid
Colour	no data available

### Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 277 - 279 °C (531 - 534 °F) - lit.
Boiling point	> 500 °C (> 932 °F) - lit.
Flash point	no data available
Ignition temperature	no data available
Auto-ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	insoluble
Partition coefficient: n-octanol/water	log Pow: 6.63
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available

Evaporation rate no data available

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## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

no data available

### Conditions to avoid

no data available

### Materials to avoid

Strong oxidizing agents

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - no data available

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## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

#### Oral LD50

no data available

#### Inhalation LC50

no data available

#### Dermal LD50

no data available

#### Other information on acute toxicity

no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/eye irritation

no data available

### Respiratory or skin sensitisation

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Benzo[ghi]perylene)

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Benzo[ghi]perylene)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: Reasonably anticipated to be a human carcinogen (Benzo[ghi]perylene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

### Reproductive toxicity

no data available

### **Teratogenicity**

no data available

### **Specific target organ toxicity - single exposure (Globally Harmonized System)**

no data available

### **Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

no data available

### **Aspiration hazard**

no data available

### **Potential health effects**

<b>Inhalation</b>	May be harmful if inhaled. May cause respiratory tract irritation.
<b>Ingestion</b>	May be harmful if swallowed.
<b>Skin</b>	May be harmful if absorbed through skin. May cause skin irritation.
<b>Eyes</b>	May cause eye irritation.

### **Signs and Symptoms of Exposure**

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

### **Synergistic effects**

no data available

### **Additional Information**

RTECS: Not available

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## **12. ECOLOGICAL INFORMATION**

### **Toxicity**

no data available

### **Persistence and degradability**

no data available

### **Bioaccumulative potential**

no data available

### **Mobility in soil**

no data available

### **PBT and vPvB assessment**

no data available

### **Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

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## **13. DISPOSAL CONSIDERATIONS**

### **Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

### **Contaminated packaging**

Dispose of as unused product.

## 14. TRANSPORT INFORMATION

### DOT (US)

Not dangerous goods

### IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F  
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[ghi]perylene)  
Marine pollutant: Marine pollutant

### IATA

UN number: 3077 Class: 9 Packing group: III  
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[ghi]perylene)

### Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

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## 15. REGULATORY INFORMATION

### OSHA Hazards

Carcinogen

### SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

### SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

### SARA 311/312 Hazards

Chronic Health Hazard

### Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzo[ghi]perylene	191-24-2	2007-03-01

### Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzo[ghi]perylene	191-24-2	2007-03-01

### New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzo[ghi]perylene	191-24-2	2007-03-01

### California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Benzo[ghi]perylene	191-24-2	1990-01-01

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## 16. OTHER INFORMATION

### Further information

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# New Jersey Department of Health and Senior Services

## HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BENZO(k)FLUORANTHENE**

CAS Number: 207-08-9

DOT Number: None

RTK Substance number: 2969

Date: October 2002

### HAZARD SUMMARY

- \* **Benzo(k)Fluoranthene** can affect you when breathed in and may be absorbed through the skin.
- \* **Benzo(k)Fluoranthene** should be handled as a **CARCINOGEN--WITH EXTREME CAUTION**.
- \* Contact can irritate the skin and eyes.

### IDENTIFICATION

**Benzo(k)Fluoranthene** is a pale yellow, needle-like solid. It is primarily found in smoke from tobacco and polluted air.

### REASON FOR CITATION

- \* **Benzo(k)Fluoranthene** is on the Hazardous Substance List because it is cited by NTP, IARC, HHAG and EPA.
- \* This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN**.
- \* Definitions are provided on page 5.

### HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

### WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Benzo(k)Fluoranthene**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

- \* **Benzo(k)Fluoranthene** may be a **CARCINOGEN** in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- \* It should be recognized that **Benzo(k)Fluoranthene** can be absorbed through your skin, thereby increasing your exposure.

### WAYS OF REDUCING EXPOSURE

- \* Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Benzo(k)Fluoranthene** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Benzo(k)Fluoranthene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benzo(k)Fluoranthene**:

- \* Contact can irritate the skin and eyes.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benzo(k)Fluoranthene** and can last for months or years:

### Cancer Hazard

- \* **Benzo(k)Fluoranthene** may be a CARCINOGEN in humans since it has been shown to cause skin cancer in animals.
- \* Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

### Reproductive Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Benzo(k)Fluoranthene** has not been tested for its ability to affect reproduction.

### Other Long-Term Effects

- \* **Benzo(k)Fluoranthene** has not been adequately tested for other chronic (long-term) health effects.

## MEDICAL

### Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- \* Where possible, automatically transfer **Benzo(k)Fluoranthene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Benzo(k)Fluoranthene** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Benzo(k)Fluoranthene**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Benzo(k)Fluoranthene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Benzo(k)Fluoranthene**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Benzo(k)Fluoranthene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

**Clothing**

- \* Avoid skin contact with **Benzo(k)Fluoranthene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

**Eye Protection**

- \* Eye protection is included in the recommended respiratory protection.

**Respiratory Protection**

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* At any exposure level, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

**QUESTIONS AND ANSWERS**

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Don't all chemicals cause cancer?
- A: No. Most chemicals tested by scientists are not cancer-causing.
- Q: Should I be concerned if a chemical causes cancer in animals?
- A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**HHAG** is the Human Health Assessment Group of the federal EPA.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NCI** is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



# Material Safety Data Sheet

## Cadmium metal, granular

ACC# 03720

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Cadmium metal, granular**Catalog Numbers:** 61213-5000, C3-500**Synonyms:** None.**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-43-9	Cadmium	100	231-152-8

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: silver white granules.

**Danger!** Flammable solid. May be fatal if inhaled. Harmful if swallowed. Causes eye, skin, and respiratory tract irritation. Contains cadmium. Cancer hazard. Avoid creating dust. Can cause lung and kidney disease. Inhalation of fumes may cause metal-fume fever. Air sensitive. May cause reproductive and fetal effects.

**Target Organs:** Blood, kidneys, liver, lungs, skeletal structures, prostate.

#### Potential Health Effects

**Eye:** Causes eye irritation.**Skin:** Causes skin irritation.**Ingestion:** Harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion may produce fluid loss, acute renal failure, and cardiopulmonary depression.**Inhalation:** May be fatal if inhaled. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. Damage may be delayed. May cause nausea, vomiting, abdominal pain, diarrhea, chest tightness, weakness, and delayed pulmonary edema. In humans inhalation causes proteinuria, an excess of protein in the urine.**Chronic:** May cause respiratory tract cancer. Repeated inhalation may cause chronic bronchitis. Chronic inhalation may cause nasal septum ulceration and perforation. Cadmium and compounds may cause lung, liver and kidney damage and lung and prostate cancer in humans. May cause loss of smell, emphysema, anemia, bone demineralization, and lung fibrosis. The primary target organ

for chronic cadmium disease is clearly the kidney.

## Section 4 - First Aid Measures

**Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Attempt rescue only after notifying at least one other person of the emergency and putting into effect established emergency procedures. Do not become a casualty yourself.

**Notes to Physician:** Administration of calcium disodium EDTA may be useful in acute poisoning with its use at the discretion of qualified medical personnel. Persons with kidney disease, chronic respiratory disease, liver disease, or skin disease may be at increased risk from exposure to this substance.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Material can spontaneously ignite (pyrophoric) when exposed to air at normal or slightly elevated temperatures. Dust can be an explosion hazard when exposed to heat or flame. Flammable solid. May burn rapidly with flare burning effect. May re-ignite after fire is extinguished. Dangerous fire hazard in the form of dust when exposed to heat or flame.

**Extinguishing Media:** Use dry sand, graphite powder, dry sodium chloride-based extinguishers.

**Flash Point:** Not available.

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 4; Flammability: 2; Instability: 1

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. Place under an inert atmosphere.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Use spark-proof tools

and explosion proof equipment. Avoid contact with skin and eyes. Do not breathe dust, mist, or vapor. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep away from heat, sparks and flame. Do not ingest or inhale. Handle under an inert atmosphere. Store protected from air. Use only in a chemical fume hood. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air. Store under an inert atmosphere.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood. See 29CFR 1910.1027 for regulations applying to all occupational exposures to cadmium and cadmium compounds, in all forms.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cadmium	0.01 mg/m <sup>3</sup> TWA; 0.002 mg/m <sup>3</sup> TWA (respirable fraction)	9 mg/m <sup>3</sup> IDLH (dust)	5 æg/m <sup>3</sup> TWA; 0.1 mg/m <sup>3</sup> TWA (fume, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 0.2 mg/m <sup>3</sup> TWA (dust, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 0.3 mg/m <sup>3</sup> Ceiling (fume, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 0.6 mg/m <sup>3</sup> Ceiling (dust, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 2.5 æg/m <sup>3</sup> Action Level; 5 æg/m <sup>3</sup> TWA (Do not eat, drink or chew tobacco or gum or apply cosmetics in regulated areas. Carcinogen - dust can cause lung and kidney disease. See 29 CFR 1910.1027)

**OSHA Vacated PELs:** Cadmium: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

## Section 9 - Physical and Chemical Properties

**Physical State:** Granules

**Appearance:** silver white

**Odor:** odorless

**pH:** Not available.

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Evaporation Rate:** Not applicable.

**Viscosity:** Not applicable.

**Boiling Point:** 765 deg C @ 760 mmHg

**Freezing/Melting Point:** 321 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 8.64 @ 25°C

**Molecular Formula:** Cd

**Molecular Weight:** 112.40

## Section 10 - Stability and Reactivity

**Chemical Stability:** Oxidizes when exposed to air. Easily tarnishes in moist air. Powder or liquid is pyrophoric. Contact with acid liberates gas.

**Conditions to Avoid:** Ignition sources, dust generation, excess heat, prolonged exposure to air.

**Incompatibilities with Other Materials:** Strong oxidizing agents, acids, sulfur, zinc, selenium, tellurium.

**Hazardous Decomposition Products:** Toxic cadmium oxide fumes.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 7440-43-9: EU9800000

**LD50/LC50:**

CAS# 7440-43-9:

Inhalation, rat: LC50 = 25 mg/m<sup>3</sup>/30M;

Oral, mouse: LD50 = 890 mg/kg;

Oral, rat: LD50 = 2330 mg/kg;

**Carcinogenicity:**

CAS# 7440-43-9:

- **ACGIH:** A2 - Suspected Human Carcinogen

- **California:** carcinogen, initial date 10/1/87
- **NTP:** Known carcinogen
- **IARC:** Group 1 carcinogen

**Epidemiology:** Occupational exposure to cadmium has been implicated in a significant increase in prostate and respiratory tract cancer. There is evidence of a significant excess of respiratory cancer deaths among a cohort of cadmium production workers, and concluded that cadmium and its compounds are potential carcinogens.

**Teratogenicity:** Oral, rat: TDLo = 155 mg/kg (male 13 week(s) pre-mating and female 13 week (s) pre-mating - 3 week(s) after conception) Effects on Newborn - growth statistics (e.g.%, reduced weight gain) and Effects on Newborn - behavioral.; Oral, rat: TDLo = 23 mg/kg (female 1-22 day(s) after conception) Specific Developmental Abnormalities - blood and lymphatic systems (including spleen and marrow).; Oral, mouse: TDLo = 1700 mg/kg (female 8-12 day(s) after conception) Effects on Newborn - viability index (e.g., # alive at day 4 per # born alive) and Effects on Newborn - growth statis

**Reproductive Effects:** Oral, rat: TDLo = 21500 ug/kg (multigenerations) Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea).; Intraperitoneal, rat: TDLo = 1124 ug/kg (male 1 day(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).

**Mutagenicity:** Micronucleus Test: Mouse, Embryo = 6 umol/L.; Cytogenetic Analysis: Hamster, Ovary = 1 umol/L.

**Neurotoxicity:** No information found

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Rainbow trout: TLm = 30 ppm; 24 Hr; Hard waterFish: Striped bass: LC50 = 0.001 ppm; 24-48 Hr; Static bioassayFish: Fathead Minnow: TL50 = 7.2 ppm; 96 Hr; UnspecifiedFish: Bluegill/Sunfish: LCO = 0.08 ppm; 96 Hr; Static bioassay (Hard water) No data available.

**Environmental:** Cadmium can enter the air from natural sources.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	TOXIC SOLIDS, FLAMMABLE, ORGANIC, N.O.S.	Toxic Solid, Flammable, Organic, N.O.S. (CADMIUM METAL)

<b>Hazard Class:</b>	6.1	6.1
<b>UN Number:</b>	UN2930	UN2930
<b>Packing Group:</b>	I	I

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 7440-43-9 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 7440-43-9: 10 lb final RQ (no reporting of releases of this hazardous substance is required)

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 7440-43-9: immediate, delayed, fire.

#### Section 313

This material contains Cadmium (CAS# 7440-43-9, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 7440-43-9 (listed as Cadmium compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7440-43-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-43-9 is listed as a Toxic Pollutant under the Clean Water Act.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 7440-43-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

#### California Prop 65

#### The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Cadmium, a chemical known to the state of California to cause cancer. WARNING: This product contains Cadmium, a chemical known to the state of California to cause male reproductive toxicity.

California No Significant Risk Level: CAS# 7440-43-9: 0.05 æg/day NSRL (inhalation)

### European/International Regulations

#### European Labeling in Accordance with EC Directives

**Hazard Symbols:**

T+ F

**Risk Phrases:**

R 11 Highly flammable.  
R 25 Toxic if swallowed.  
R 26 Very toxic by inhalation.  
R 45 May cause cancer.

**Safety Phrases:**

S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.  
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).  
S 53 Avoid exposure - obtain special instructions before use.

**WGK (Water Danger/Protection)**

CAS# 7440-43-9: No information available.

**Canada - DSL/NDSL**

CAS# 7440-43-9 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D1A, B4.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 7440-43-9 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 6/28/1999**Revision #7 Date:** 2/13/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



# New Jersey Department of Health and Senior Services

## HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **CHLORDANE**

CAS Number: 57-74-9  
DOT Number: UN 2762  
DOT Hazard Class: 6.1 (Toxic)

RTK Substance number: 0361  
Date: April 1998 Revision: June 2005

### HAZARD SUMMARY

- \* **Chlordane** can affect you when breathed in and by passing through your skin.
- \* **Chlordane** should be handled as a CARCINOGEN-- WITH EXTREME CAUTION.
- \* It may damage the developing fetus.
- \* **Chlordane** can irritate the eyes and skin and can cause burns and rash on contact.
- \* Exposure to the vapor can irritate the nose, mouth and throat.
- \* **Chlordane** can cause nausea, vomiting, diarrhea, headache and abdominal pain.
- \* Exposure to **Chlordane** can cause fatigue, confusion, dizziness, loss of muscle coordination, convulsions, unconsciousness and death.
- \* Repeated exposure may cause personality changes of depression, anxiety or irritability.
- \* **Chlordane** may damage the liver and kidneys.

### IDENTIFICATION

Pure **Chlordane** is a colorless to amber, odorless, thick liquid. The commercial product has a *Chlorine*-like odor. It is used as an insecticide.

### REASON FOR CITATION

- \* **Chlordane** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP, IARC, IRIS and EPA.
- \* This chemical is on the Special Health Hazard Substance List because it is a CARCINOGEN.
- \* Definitions are provided on page 5.

### HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

### WORKPLACE EXPOSURE LIMITS

- OSHA: The legal airborne permissible exposure limit (PEL) is **0.5 mg/m<sup>3</sup>** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **0.5 mg/m<sup>3</sup>** averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **0.5 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

- \* **Chlordane** may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- \* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

### WAYS OF REDUCING EXPOSURE

- \* Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Chlordane** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Chlordane** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chlordane**:

- \* **Chlordane** can irritate the eyes and skin and can cause burns and rash on contact.
- \* Exposure to the vapor can irritate the nose, mouth and throat.
- \* **Chlordane** can cause nausea, vomiting, diarrhea, headache and abdominal pain.
- \* Exposure to **Chlordane** can cause fatigue, confusion, dizziness, loss of muscle coordination, convulsions, unconsciousness and death.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Chlordane** and can last for months or years:

### Cancer Hazard

- \* **Chlordane** may be a CARCINOGEN in humans since it has been shown to cause liver cancer in animals.
- \* Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

### Reproductive Hazard

- \* **Chlordane** may damage the developing fetus.

### Other Long-Term Effects

- \* Repeated exposure may cause personality changes of depression, anxiety or irritability.
- \* **Chlordane** may damage the liver and kidneys.

## MEDICAL

### Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

- \* Liver and kidney function tests.
- \* Exam of the nervous system.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

### Mixed Exposures

- \* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by **Chlordane**.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- \* Where possible, automatically pump liquid **Chlordane** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Chlordane** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Chlordane**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Chlordane**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Chlordane**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Chlordane** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Chlordane**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* Safety equipment manufacturers recommend Tychem ® BR/LV, Tychem ® 10,000, and Tychem ® TK as protective materials.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

### Respiratory Protection

#### IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* For field applications check with your supervisor and your safety equipment supplier regarding the appropriate respiratory equipment.
- \* Where the potential exists for exposure over **0.5 mg/m<sup>3</sup>**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- \* Exposure to **100 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **100 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

## HANDLING AND STORAGE

- \* Prior to working with **Chlordane** you should be trained on its proper handling and storage.
- \* **Chlordane** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE).
- \* Store in tightly closed containers in a cool, well-ventilated area away from HEAT; COMBUSTIBLES; IRON; ZINC; PLASTIC; RUBBER and COATINGS.
- \* Sources of ignition, such as smoking and open flames, are prohibited where **Chlordane** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Don't all chemicals cause cancer?
- A: No. Most chemicals tested by scientists are not cancer-causing.

- Q: Should I be concerned if a chemical causes cancer in animals?
- A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.
- Q: Who is at the greatest risk from reproductive hazards?
- A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

**CFR** is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

**IRIS** is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.





# Right to Know Hazardous Substance Fact Sheet

Common Name: **CHROMIUM**

Synonyms: Chrome; Metallic Chromium

Chemical Name: Chromium

Date: January 2000      Revision: March 2009

CAS Number: 7440-47-3

RTK Substance Number: 0432

DOT Number: UN 3089

## Description and Use

**Chromium** is a hard, gray, odorless solid with a metallic luster. It is used in stainless and alloy steels, in making alloys, and as an isotope in medicine and research.

## Reasons for Citation

- ▶ **Chromium** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IARC and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention.

### Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

### Inhalation

- ▶ Remove the person from exposure
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

## EMERGENCY RESPONDERS >>>> SEE LAST PAGE

### Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	2	-
FLAMMABILITY	3	-
REACTIVITY	0	-

FLAMMABLE POWDER  
POISONOUS GASES ARE PRODUCED IN FIRE  
CONTAINERS MAY EXPLODE IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Chromium** can affect you when inhaled.
- ▶ Contact can irritate and burn the skin and eyes with possible eye damage.
- ▶ Inhaling **Chromium** can irritate the nose and throat.
- ▶ Exposure to **Chromium fumes** can cause a flu-like illness called *metal fume fever*.
- ▶ **Chromium** may cause a skin allergy and an asthma-like allergy
- ▶ Inhaling **Chromium** can cause a sore and/or a hole in the "bone" (septum) dividing the inner nose.
- ▶ **Chromium** may affect the liver and kidneys.
- ▶ **Chromium** in *powder* form is FLAMMABLE and a DANGEROUS FIRE HAZARD. It may also spontaneously explode in air.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **1 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.5 mg/m<sup>3</sup>** averaged over a 8-hour workshift.

ACGIH: The threshold limit value (TLV) is **0.5 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

### Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chromium**:

- ▶ Contact can irritate and burn the skin and eyes with possible eye damage.
- ▶ Inhaling **Chromium** can irritate the nose and throat causing coughing and wheezing.
- ▶ Exposure to **Chromium fumes** can cause "metal fume fever." This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.

#### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Chromium** and can last for months or years:

#### Cancer Hazard

- ▶ While **Chromium** has been tested, it is not classifiable as to its potential to cause cancer.

#### Reproductive Hazard

- ▶ There is no evidence that **Chromium** affects reproduction. This is based on test results presently available to the NJDHSS from published studies.

#### Other Effects

- ▶ Inhaling **Chromium** can cause a sore and/or a hole in the "bone" (septum) dividing the inner nose, sometimes with bleeding, discharge, and/or formation of a crust.
- ▶ **Chromium** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- ▶ **Chromium** may cause an asthma-like allergy. Future exposure can cause asthma attacks with shortness of breath, wheezing, coughing, and/or chest tightness.
- ▶ Prolonged skin contact can cause burns, blisters and deep ulcers
- ▶ **Chromium** may affect the liver and kidneys.

### Medical

#### Medical Testing

For frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- ▶ Lung function tests. The results may be normal if the person is not having an attack at the time of the test.

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Examine your skin periodically for little bumps or blisters, the first sign of "chrome ulcers." If not treated early, these can last for years after exposure.
- ▶ Evaluation by a qualified allergist can help diagnose skin allergy.
- ▶ Liver and kidney function tests

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

#### Mixed Exposures

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
- ▶ More than light alcohol consumption can cause liver damage. Drinking alcohol can increase the liver damage caused by **Chromium**.

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Before entering a confined space where **Chromium powder** may be present, check to make sure that an explosive concentration does not exist.
- ▶ Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**

### Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

#### Gloves and Clothing

- ▶ Avoid skin contact with **Chromium**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Nitrile and Natural Rubber for gloves, and Tyvek®, or the equivalent, as a protective material for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

#### Eye Protection

- ▶ Wear eye protection with side shields or goggles.
- ▶ If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.

#### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **0.5 mg/m<sup>3</sup>**, use a NIOSH approved negative pressure, air-purifying, particulate filter respirator with an N, R or P95 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Chromium**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential exists for exposure over **5 mg/m<sup>3</sup>**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to **250 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **250 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

#### Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ Extinguish fire using an agent suitable for type of surrounding fire. **Chromium** itself does not burn.
- ▶ **Chromium** in *powder* form is **FLAMMABLE** and a **DANGEROUS FIRE HAZARD**. It may also spontaneously explode in air.
- ▶ Use dry sand or dry chemical extinguishing agents to fight **Chromium powder** fires.
- ▶ **POISONOUS GASES ARE PRODUCED IN FIRE.**
- ▶ **CONTAINERS MAY EXPLODE IN FIRE.**
- ▶ **DO NOT** get water inside container.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Chromium powder** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Moisten spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.
- ▶ Keep **Chromium powder** out of confined spaces, such as sewers, because of the possibility of an explosion.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **Chromium** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with **Chromium** you should be trained on its proper handling and storage.

- ▶ **Chromium** may react violently or explosively with AMMONIUM NITRATE; CARBON DIOXIDE ATMOSPHERES; BROMINE PENTAFLUORIDE; LITHIUM; NITROGEN OXIDES; and SULFUR DIOXIDE.
- ▶ **Chromium** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); STRONG ACIDS (such as HYDROCHLORIC and SULFURIC); and ALKALI METALS (such as SODIUM and POTASSIUM).
- ▶ Store in tightly closed containers in a cool, well-ventilated area.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **Chromium powder** is used, handled, or stored.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

#### For more information, please contact:

New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

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## GLOSSARY

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Acute Exposure Guideline Levels (AEGs)** are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Emergency Response Planning Guideline (ERPG)** values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization Potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

**LEL or Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

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**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeated** is the movement of chemicals through protective materials.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

**Protective Action Criteria (PAC)** are values established by the Department of Energy and are based on AEGs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



# Right to Know Hazardous Substance Fact Sheet

Emergency  
Responders  
Quick Reference

Common Name: **CHROMIUM**

Synonyms: Chrome; Metallic Chromium

CAS No: 7440-47-3

Molecular Formula: Cr

RTK Substance No: 0432

Description: Hard, gray, odorless solid with a metallic luster

## HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<b>2 - Health</b> <b>3 - Fire</b> <b>0 - Reactivity</b>  DOT#: UN 3089 ERG Guide #: 170 Hazard Class: 4.1 (Flammable Solid)	Extinguish fire using an agent suitable for type of surrounding fire. <b>Chromium</b> itself does not burn. <b>Chromium</b> in powder form is FLAMMABLE and a DANGEROUS FIRE HAZARD. It may also spontaneously explode in air. Use dry sand or dry chemical extinguishing agents to fight <b>Chromium</b> powder fires. POISONOUS GASES ARE PRODUCED IN FIRE. CONTAINERS MAY EXPLODE IN FIRE. DO NOT get water inside container.	<b>Chromium</b> may react violently or explosively with AMMONIUM NITRATE; CARBON DIOXIDE ATMOSPHERES; BROMINE PENTAFLUORIDE; LITHIUM; NITROGEN OXIDES; and SULFUR DIOXIDE. <b>Chromium</b> is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); STRONG ACIDS (such as HYDROCHLORIC and SULFURIC); and ALKALI METALS (such as SODIUM and POTASSIUM).

## SPILL/LEAKS

### Isolation Distance:

Spill: 25 meters (75 feet)

Fire: 800 meters (1/2 mile)

Moisten spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.

Keep **Chromium** powder out of confined spaces, such as sewers, because of the possibility of an explosion.

DO NOT wash into sewer.

## PHYSICAL PROPERTIES

**Odor Threshold:** Odorless

**Flash Point:** Noncombustible solid, Flammable powder

**Vapor Pressure:** <0 mm Hg at 68°F (20°C) (approximate)

**Specific Gravity:** 7.2 (water = 1)

**Water Solubility:** Insoluble

**Boiling Point:** 4,788°F (2,642°C)

**Melting Point:** 3,452°F (1,900°C)

**Molecular Weight:** 52

## EXPOSURE LIMITS

**OSHA:** 1 mg/m<sup>3</sup>, 8-hr TWA

**NIOSH:** 0.5 mg/m<sup>3</sup>, 8-hr TWA

**ACGIH:** 0.5 mg/m<sup>3</sup>, 8-hr TWA

**IDLH:** 250 mg/m<sup>3</sup>

The Protective Action Criteria values are:

PAC-1 = 1.5 mg/m<sup>3</sup>    PAC-3 = 250 mg/m<sup>3</sup>

PAC-2 = 2.5 mg/m<sup>3</sup>

## PROTECTIVE EQUIPMENT

**Gloves:** Nitrile or Natural Rubber

**Coveralls:** Tyvek®

**Respirator:** >0.5 mg/m<sup>3</sup> - full facepiece APR with High efficiency filters  
>1.5 mg/m<sup>3</sup> - SCBA

## HEALTH EFFECTS

**Eyes:** Irritation, burns and possible eye damage

**Skin:** Irritation, burns, itching, rash and skin ulcers

**Inhalation:** Nose and throat irritation with coughing and wheezing  
Headache, fever and chills

## FIRST AID AND DECONTAMINATION

**Remove** the person from exposure.

**Flush** eyes with large amounts of water for at least 30 minutes. Remove contact lenses if worn. Seek medical attention.

**Quickly** remove contaminated clothing and wash contaminated skin with large amounts of soap and water.

**Begin** artificial respiration if breathing has stopped and CPR if necessary.

**Transfer** promptly to a medical facility.



# Right to Know Hazardous Substance Fact Sheet

Common Name: **CHRYSENE**

Synonyms: Benzo(a)phenanthrene

Chemical Name: Chrysene

Date: December 1999 Revision: June 2008

CAS Number: 218-01-9

RTK Substance Number: 0441

DOT Number: UN 3077

## Description and Use

**Chrysene** is a colorless to white, crystalline solid which is used in research laboratories. It is most often found as the gaseous by-product from the incomplete combustion of fossil fuel, wood, *Coal Tar* and *Creosote*.

## Reasons for Citation

- ▶ **Chrysene** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IARC, IRIS and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### Skin Contact

- ▶ Remove contaminated clothing and wash contaminated skin with soap and water.

### Inhalation

- ▶ Remove the person from exposure.
- ▶ Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

## EMERGENCY RESPONDERS >>>> SEE PAGE 6

### Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	3	-
FLAMMABILITY	0	-
REACTIVITY	1	-
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE DOES NOT BURN		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Chrysene** can affect you when inhaled and by passing through the skin.
- ▶ **Chrysene** should be handled as a CARCINOGEN--WITH EXTREME CAUTION.
- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling **Chrysene** may irritate the nose and throat.
- ▶ If skin contaminated with **Chrysene** is exposed to sunlight, a rash or sunburn effect and permanent changes in skin pigment can occur
- ▶ **Chrysene** is almost always found in *Coal Tar Pitch*, *Creosote*, or other *Coal Tar Products*. If you work with *Coal, Tar, Soot, Pitch, Asphalt*, etc., you may be exposed to **Chrysene**.
- ▶ For more information, consult the *Right to Know Hazardous Substance Fact Sheets on COAL TAR PITCH, CREOSOTE and ANTHRACENE*.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m<sup>3</sup>** (as *Coal Tar Pitch Volatiles, Benzene-soluble fraction*) averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.1 mg/m<sup>3</sup>** (as *Coal Tar Pitch Volatiles, Cyclohexane-extractable fraction*) averaged over a 10-hour workshift.

ACGIH: Recommends that exposure by all routes be controlled to levels as low as possible.

- ▶ **Chrysene** may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible.
- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

### Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chrysene**:

- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling **Chrysene** may irritate the nose and throat causing coughing and wheezing.
- ▶ If skin contaminated with **Chrysene** is exposed to sunlight, a rash or sunburn effect can occur, sometimes with blisters.

#### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Chrysene** and can last for months or years:

#### Cancer Hazard

- ▶ **Chrysene** may be a CARCINOGEN in humans since it has been shown to cause skin, liver, and lung cancer in animals.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen. Such substance may also have the potential for causing reproductive damage in humans.

#### Reproductive Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, **Chrysene** has not been tested for its ability to affect reproduction.

#### Other Effects

- ▶ Permanent changes in skin pigment can occur if contaminated skin is exposed to sunlight

### Medical

#### Medical Testing

- ▶ There is no special test for this chemical. However, an exposed person should examine their skin periodically for growths, changes in warts or moles, and sores that do not heal. Skin cancer is easily cured when detected and treated early.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

#### Mixed Exposures

- ▶ Persons who smoke cigarettes and are exposed to **Chrysene** may be at increased risk for lung cancer. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Use a Class I, Type B, biological safety hood when mixing, handling, or preparing **Chrysene**.
- ▶ Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**
- ▶ Use a high efficiency particulate air (HEPA) filter when vacuuming. Do not use a standard shop vacuum.

### Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

#### Gloves and Clothing

- ▶ Avoid skin contact with **Chrysene**. Wear personal protective equipment made from material that can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Nitrile or Natural Rubber for gloves and DuPont Tyvek®, or the equivalent, as protective material for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

#### Eye Protection

- ▶ Wear eye protection with side shields or goggles.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

#### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **0.1 mg/m<sup>3</sup>** (as *Coal Tar Pitch Volatiles*), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Where the potential for high exposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to **80 mg/m<sup>3</sup>** (as *Coal Tar Pitch Volatiles*) is immediately dangerous to life and health. If the possibility of exposure above **80 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

### Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **DOES NOT BURN**
- ▶ Use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.
- ▶ **POISONOUS GASES ARE PRODUCED IN FIRE.**
- ▶ Use water spray to keep fire-exposed containers cool.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Chrysene** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Moisten spilled material first or use a HEPA-filter vacuum for clean-up.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
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Prior to working with **Chrysene** you should be trained on its proper handling and storage.

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- ▶ Store in tightly closed containers in a cool, well-ventilated area.

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Right to Know Program  
PO Box 368  
Trenton, NJ 08625-0368  
Phone: 609-984-2202  
Fax: 609-984-7407  
E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
Web address: <http://www.nj.gov/health/eoh/rtkweb>

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**PEOSHA** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeated** is the movement of chemicals through protective materials.

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**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



Common Name: **CHRYSENE**

Synonyms: Benzo(a)phenanthrene

CAS No: 218-01-9

Molecular Formula: C<sub>18</sub>H<sub>12</sub>

RTK Substance No: 0441

Description: Colorless to white, crystalline solid

## HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<b>3 - Health</b> <b>0 - Fire</b> <b>1 - Reactivity</b> DOT#: UN 3077 ERG Guide #: 171 Hazard Class: 9 (Miscellaneous Hazardous Materials)	DOES NOT BURN Use dry chemical, CO <sub>2</sub> , water spray or foam as extinguishing agents. POISONOUS GASES ARE PRODUCED IN FIRE. Use water spray to keep fire-exposed containers cool.	<b>Chrysene</b> is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).

## SPILL/LEAKS

**Isolation Distance:**  
 Spill: 25 meters (75 feet)  
 Fire: 800 meters (1/2 mile)  
 Moisten spilled material first or use a HEPA-filter vacuum for clean-up.  
 DO NOT wash into sewer.  
 May biodegrade in water.

## PHYSICAL PROPERTIES

**Odor Threshold:** Unknown  
**Flash Point:** Noncombustible  
**Vapor Pressure:** 6.3 x 10.9 mm Hg at 68°F (20°C)  
**Specific Gravity:** 1.27 (water = 1)  
**Water Solubility:** Insoluble  
**Boiling Point:** 838°F (448°C)  
**Melting Point:** 491° to 493°F (255° to 256°C)  
**Ionization Potential:** 7.59±0.2 eV  
**Molecular Weight:** 228.3

## EXPOSURE LIMITS

**OSHA:** 0.2 mg/m<sup>3</sup>, 8-hr TWA  
**NIOSH:** 0.1 mg/m<sup>3</sup>, 10-hr TWA  
**ACGIH:** Lowest level possible  
**IDLH:** 80 mg/m<sup>3</sup>  
 (All of the above as *Coal Tar Pitch Volatile*)

## PROTECTIVE EQUIPMENT

**Gloves:** Nitrile or Natural Rubber  
**Coveralls:** DuPont Tyvek®  
**Respirator:** >0.1 mg/m<sup>3</sup> - Supplied air  
 >80 mg/m<sup>3</sup> - SCBA

## HEALTH EFFECTS

**Eyes:** Irritation  
**Skin:** Irritation, rash or sunburn with blisters can occur if contaminated skin is exposed to sunlight  
**Inhalation:** Nose and throat irritation with coughing and wheezing  
**Chronic:** Cancer (skin, liver, lungs) in animals

## FIRST AID AND DECONTAMINATION

**Remove** the person from exposure.  
**Flush** eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.  
**Remove** contaminated clothing and wash contaminated skin with soap and water.  
**Transfer** to a medical facility.

# International Chemical Safety Cards

**COPPER**
**ICSC: 0240**

<b>COPPER</b> (powder) Cu Atomic mass: 63.5  CAS # 7440-50-8 RTECS # GL5325000 ICSC # 0240			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		PREVENT DISPERSION OF DUST!	
• <b>INHALATION</b>	Cough. Headache. Shortness of breath. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into containers. Carefully collect remainder. Then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).	Separated from: see Chemical Dangers.		
<b>SEE IMPORTANT INFORMATION ON BACK</b>			
<b>ICSC: 0240</b>		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

# International Chemical Safety Cards

**COPPER**
**ICSC: 0240**

	<b>PHYSICAL STATE; APPEARANCE:</b>		<b>ROUTES OF EXPOSURE:</b>
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<b>I M P O R T A N T D A T A</b>	<p>RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS (OELs):</b> TLV: ppm; 0.2 mg/m<sup>3</sup> fume (ACGIH 1992-1993). TLV (as Cu, dusts &amp; mists): ppm; 1 mg/m<sup>3</sup> (ACGIH 1992-1993).</p>	<p>The substance can be absorbed into the body by inhalation and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> Inhalation of fume may cause metal fever (see Notes).</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact may cause skin sensitization.</p>
<b>PHYSICAL PROPERTIES</b>	Boiling point: 2595°C Melting point: 1083°C	Relative density (water = 1): 8.9 Solubility in water: none
<b>ENVIRONMENTAL DATA</b>		
<b>NOTES</b>		
The symptoms of metal fume fever do not become manifest until several hours.		
<b>ADDITIONAL INFORMATION</b>		
<b>ICSC: 0240</b>	© IPCS, CEC, 1993	<b>COPPER</b>
<b>IMPORTANT LEGAL NOTICE:</b>	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	



# Right to Know Hazardous Substance Fact Sheet

Common Name: **1,2,5,6-DIBENZANTHACENE**

Synonyms: 1,2,5,6-DBA; 1,2,5,6-Dibenzanthracene

Chemical Name: Dibenz[a,h]Anthracene

Date: August 2010

CAS Number: 53-70-3

RTK Substance Number: 0622

DOT Number: UN 3077

## Description and Use

Dibenz[a,h]anthracene is a colorless, white or light yellow, crystalline (sand-like) solid. It is used as a research chemical and is found bound to particulate matter in urban air, industrial emissions and cigarette smoke. Dibenz[a,h]anthracene has not been produced in the United States since 1978.

## Reasons for Citation

- Dibenz[a,h]anthracene is on the Right to Know Hazardous Substance List because it is cited by DOT, NTP, DEP, IARC, IRIS and EPA.
- This chemical is on the Special Health Hazard Substance List.

[SEE GLOSSARY ON PAGE 5.](#)

## FIRST AID

### EYES

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### SKIN

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

### INHALED

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

POISON CENTER: 1-800-455-7253

Chemical Emergency: 1-800-455-7253

NEPA: 1-800-455-7253

Neurotoxicology Center: 1-800-455-7253

**EMERGENCY RESPONDERS >>>> SEE LAST PAGE**

## Hazard Summary

Health Hazard	Neurotoxicity	Reproductive
Acute	3	-
Chronic	1	-
Reactivity	0	-

CARCINOGEN  
POISONOUS GASES ARE PRODUCED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- Dibenz[a,h]anthracene can affect you when inhaled.
- Dibenz[a,h]anthracene should be handled as a CARCINOGEN and MUTAGEN--WITH EXTREME CAUTION.
- Contact can irritate the skin and eyes. Prolonged or repeated contact can cause a skin rash, dryness and redness. Exposure to sunlight can greatly aggravate these effects.
- Exposure can irritate the nose and throat.
- Exposure to Dibenz[a,h]anthracene can cause headache, dizziness, nausea and vomiting.
- Dibenz[a,h]anthracene may affect the liver and kidneys.

## Workplace Exposure Limits

No occupational exposure limits have been established for Dibenz[a,h]anthracene. However, it may pose a health risk. Always follow safe work practices.

- Dibenz[a,h]anthracene is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

## Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## Health Hazard Information

### Acute (Short-Term) Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to 1,1-DIETHYL-4-ANTHRACENE:

- ▶ Contact can irritate the skin and eyes.
- ▶ Prolonged or repeated contact can cause a skin rash, dryness and redness. Exposure to sunlight can greatly aggravate these effects.
- ▶ Inhaling 1,1-DIETHYL-4-ANTHRACENE can irritate the nose and throat causing coughing and wheezing.
- ▶ Exposure to 1,1-DIETHYL-4-ANTHRACENE can cause headache, dizziness, nausea and vomiting.

### Chronic (Long-Term) Effects

The following chronic (long-term) health effects can occur at some time after exposure to 1,1-DIETHYL-4-ANTHRACENE and can last for months or years:

#### Cancer Hazard

- ▶ 1,1-DIETHYL-4-ANTHRACENE is a PROBABLE CARCINOGEN in humans. There is evidence that it causes lung, skin, mammary, and other types of cancers.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen.

#### Reproductive Hazard

- ▶ There is limited evidence that 1,1-DIETHYL-4-ANTHRACENE may damage the developing fetus in animals.

#### Other Effects

- ▶ 1,1-DIETHYL-4-ANTHRACENE may affect the liver and kidneys.

## Medical

### Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Liver and kidney function tests

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

### Medical Evaluation

- ▶ More than light alcohol consumption can cause liver damage. Drinking alcohol may increase the liver damage caused by 1,1-DIETHYL-4-ANTHRACENE.

## Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Use a Class I, Type B, biological safety hood when mixing, handling, or preparing **A**.
- ▶ Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**
- ▶ Use a high efficiency particulate air (HEPA) filter when vacuuming. Do not use a standard shop vacuum.

## Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Hand C

- ▶ Avoid skin contact with **A**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Nitrile and Natural Rubber for gloves, and Tyvek®, or the equivalent, as a protective clothing material.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- ▶ Wear eye protection with side shields or goggles.
- ▶ If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.

### Respirator Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ At any detectable concentration, use a NIOSH approved negative pressure, air-purifying, particulate filter respirator with an N, R or P100 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **A**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential for high exposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus or an emergency escape air cylinder.

## Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **A** may burn, but does not readily ignite.
- ▶ Use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.
- ▶ **POISONOUS GASES ARE PRODUCED IN FIRE.**
- ▶ Use water spray to keep fire-exposed containers cool.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If 1,1-DICHLOROETHANE is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Moisten spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of 1,1-DICHLOROETHANE as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with 1,1-DICHLOROETHANE you should be trained on its proper handling and storage.

- ▶ A regulated, marked area should be established where 1,1-DICHLOROETHANE is handled, used, or stored.
- ▶ 1,1-DICHLOROETHANE is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from SUNLIGHT.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where 1,1-DICHLOROETHANE is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

New Jersey Department of Health & Senior Services

Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

***The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.***

LOSSAR

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Airborne Exposure Guideline Levels (AEGs)** are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

The **critical temperature** is the temperature above which a gas cannot be liquefied, regardless of the pressure applied.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Exposure Response Prediction Guidelines (ERPG)** values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

**LEL** or **Lower Explosive Limit** is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSH** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeation** is the movement of chemicals through protective materials.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

**Permissible Action Criteria (PAC)** are values established by the Department of Energy and are based on AEGs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL** or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Relative density** is the ratio of the weight of a given volume of one gas to the weight of another (usually Air), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



# Right to Know Hazardous Substance Fact Sheet

**Emergency  
Responders  
Quick Reference**

Common Name: **1,2,5,6-DIBENZANTHRAcene**

Synonyms: 1,2,5,6-DBA; 1,2,5,6-Dibenzanthracene

CAS No: 53-70-3

Molecular Formula: C<sub>22</sub>H<sub>14</sub>

RTK Substance No: 0622

Description: Colorless, white or light yellow, crystalline solid

## HAZARD DATA

<b>Signal Word</b> DANGER	<b>Physical</b> Hazard H228 Flammable solid.	<b>Health</b> Hazard H350 May cause cancer.
<b>Prevention</b> P201 Read the label and labels on containers. P202 Do not handle until you have read the label and labels on containers. P273 Avoid release to the environment. <b>Other</b> UN 3077 <b>ER</b> 171 <b>Environmental</b> C9 (Environmentally Hazardous Substance)	<b>Response</b> R601 Do not breathe dust. R602 Do not breathe gas, vapor, mist, or smoke. R603 Do not breathe skin contact residue. R604 Do not breathe liquid spray. R605 Do not breathe dust, fumes, or mists. R606 Do not breathe gas, vapor, mist, or smoke from fire or heated material in fire. R607 Do not breathe gas, vapor, mist, or smoke from dry cleaning process. R608 Do not breathe gas, vapor, mist, or smoke from a dry cleaning process using perchloroethylene. R610 May be fatal if inhaled. R611 May be fatal if swallowed and enters airways. R612 May be fatal if inhaled and enters airways. R613 May be fatal if inhaled and enters airways. R614 May be fatal if inhaled and enters airways. 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R675 May be fatal if inhaled and enters airways. R676 May be fatal if inhaled and enters airways. R677 May be fatal if inhaled and enters airways. R678 May be fatal if inhaled and enters airways. R679 May be fatal if inhaled and enters airways. R680 May be fatal if inhaled and enters airways. R681 May be fatal if inhaled and enters airways. R682 May be fatal if inhaled and enters airways. R683 May be fatal if inhaled and enters airways. R684 May be fatal if inhaled and enters airways. R685 May be fatal if inhaled and enters airways. R686 May be fatal if inhaled and enters airways. R687 May be fatal if inhaled and enters airways. R688 May be fatal if inhaled and enters airways. R689 May be fatal if inhaled and enters airways. R690 May be fatal if inhaled and enters airways. R691 May be fatal if inhaled and enters airways. R692 May be fatal if inhaled and enters airways. R693 May be fatal if inhaled and enters airways. R694 May be fatal if inhaled and enters airways. R695 May be fatal if inhaled and enters airways. R696 May be fatal if inhaled and enters airways. R697 May be fatal if inhaled and enters airways. R698 May be fatal if inhaled and enters airways. R699 May be fatal if inhaled and enters airways. R700 May be fatal if inhaled and enters airways.	<b>Response</b> R22 Harmful if swallowed. R23 Irritating to eyes. R24 Irritating to skin. R25 Irritating to the respiratory system. R26 Causes serious eye irritation. R27 Causes skin irritation. R28 Causes respiratory irritation. R302 Harmful if swallowed. R312 Irritating to eyes. R314 Causes serious eye irritation. R315 Causes skin irritation. R317 Causes respiratory irritation. R373 Irritating to the aquatic environment. R501 Toxic to aquatic life.

## SPILL/LEAKS

**Isolation**  
Spill: 25 meters (75 feet)  
Fire: 800 meters (1/2 mile)  
Moisten spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.  
DO NOT wash into sewer.  
Hazardous substance may bioaccumulate in sea food.

## PHYSICAL PROPERTIES

**Boiling Point** 1 x 10<sup>-10</sup> mm Hg at 68°F (20°C)  
**Specific Gravity** 1.28 (water = 1)  
**Water Solubility** Insoluble  
**Freezing Point** 975°F (524°C)  
**Melting Point** 511° to 513°F (266° to 267°C)  
**Molecular Weight** 278.36

## EXPOSURE LIMITS

No occupational exposure limits have been established for this substance.  
The Protective Action Criteria values are:  
PAC-1 = 0.0025 mg/m<sup>3</sup>  
PAC-2 = 0.015 mg/m<sup>3</sup>  
PAC-3 = 15 mg/m<sup>3</sup>

## PROTECTIVE EQUIPMENT

**Respiratory** Nitrile and Natural Rubber  
**Chemical** Tyvek®  
**Respiratory** Full facepiece APR with P100 filters  
>15 mg/m<sup>3</sup> - SCBA

## HEALTH EFFECTS

**Effects** Irritation  
**Signs** Irritation, skin rash, dryness and redness  
**Impairment** Nose and throat irritation with coughing and wheezing  
Headache, dizziness, nausea and vomiting  
**Carcinogenicity** Cancer (lung, skin, mammary) in animals

## FIRST AID AND DECONTAMINATION

**Remove** the person from exposure.  
**Wash** eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.  
**Remove** contaminated clothing and wash contaminated skin with large amounts of soap and water.  
**Begin** artificial respiration if breathing has stopped and CPR if necessary.  
**Transport** promptly to a medical facility.



New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **ENDRIN**

CAS Number: 72-20-8  
DOT Number: NA 2761

RTK Substance number: 0825  
Date: August 1987 Revision: December 1998

## HAZARD SUMMARY

- \* **Endrin** can affect you when breathed in and by passing through your skin.
- \* Contact can irritate the skin and eyes and may affect vision.
- \* Breathing **Endrin** can irritate the nose and throat.
- \* Exposure to **Endrin** can cause nausea, vomiting, diarrhea, loss of appetite, sweating and weakness.
- \* Exposure can cause headache, lightheadedness, dizziness, convulsions (fits) and passing out. Lower exposure can affect concentration, memory and muscle coordination.
- \* **Endrin** may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.
- \* Repeated exposure may cause personality changes of depression, anxiety or irritability.
- \* High or repeated exposure may damage the liver.

## IDENTIFICATION

**Endrin** is a white, crystalline (sugar or sand-like), odorless solid. It is used as an insecticide and to kill rodents.

## REASON FOR CITATION

- \* **Endrin** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, HHAG and EPA.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

## WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **0.1 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **0.1 mg/m<sup>3</sup>** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **0.1 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

- \* **Endrin** may be a teratogen in humans. All contact with this chemical should be reduced to the lowest possible level.
- \* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

## WAYS OF REDUCING EXPOSURE

- \* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Endrin** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Endrin** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Endrin**:

- \* Contact can irritate the skin and eyes and may affect vision.
- \* Breathing **Endrin** can irritate the nose and throat.
- \* Exposure to **Endrin** can cause nausea, vomiting, diarrhea, loss of appetite, sweating and weakness.
- \* Exposure can cause headache, lightheadedness, dizziness, convulsions (fits) and passing out. Lower exposure can affect concentration, memory and muscle coordination.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Endrin** and can last for months or years:

### Cancer Hazard

- \* There is no evidence that **Endrin** causes cancer in animals. This is based on test results presently available to the New Jersey Department of Health and Senior Services from published studies.

### Reproductive Hazard

- \* **Endrin** may damage the developing fetus.

### Other Long-Term Effects

- \* **Endrin** may damage the nervous system causing numbness, "pins and needles," and/or weakness in the hands and feet.
- \* Repeated exposure may cause personality changes of depression, anxiety or irritability.
- \* High or repeated exposure may damage the liver.

## MEDICAL

### Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

- \* Exam of the nervous system.
- \* Electroencephalogram (a test for abnormal seizure activity).
- \* Blood **Endrin** level.
- \* Liver function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- \* Where possible, automatically transfer **Endrin** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Endrin** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Endrin**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Endrin**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Endrin**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Endrin** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Endrin**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear impact resistant eye protection with side shields or goggles.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

### Respiratory Protection

#### IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* For field applications check with your supervisor and your safety equipment supplier regarding the appropriate respiratory equipment.
- \* Where the potential exists for exposure over **0.1 mg/m<sup>3</sup>**, use a MSHA/NIOSH approved full facepiece respirator with an organic vapor cartridge and particulate prefilters. Increased protection is obtained from full facepiece powered-air purifying respirators.
- \* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Endrin**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.

- \* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- \* Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- \* Exposure to **2 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **2 mg/m<sup>3</sup>** exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

- Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
- A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.
- Q: Who is at the greatest risk from reproductive hazards?
- A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Disease and Injury Services  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Disease and Injury Services, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**HHAG** is the Human Health Assessment Group of the federal EPA.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

**MSHA** is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NCI** is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



# Material Safety Data Sheet

## Ethyl Benzene

ACC# 08780

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Ethyl Benzene**Catalog Numbers:** O2751 1, O2751-1, O27511**Synonyms:** Ethylbenzol; Phenylethane**Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
100-41-4	Ethylbenzene	100	202-849-4

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 21 deg C.

**Warning!** Causes eye irritation. **Flammable liquid and vapor.** Causes skin irritation. May be absorbed through intact skin. Aspiration hazard if swallowed. Can enter lungs and cause damage. Causes digestive and respiratory tract irritation. May cause central nervous system depression.

**Target Organs:** Central nervous system.

#### Potential Health Effects

**Eye:** Causes moderate eye irritation. Vapors may cause eye irritation.

**Skin:** Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May be absorbed through the skin. Contact with the liquid may cause erythema (redness), exfoliation and vesiculation (blistering).

**Ingestion:** May cause irritation of the digestive tract. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. Vapors may cause dizziness or suffocation.

**Chronic:** Chronic inhalation may cause effects similar to those of acute inhalation.

## Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. For large fires, use water spray, fog or alcohol-resistant foam. Contact professional fire-fighters immediately. Cool containers with flooding quantities of water until well after fire is out.

**Flash Point:** 21 deg C ( 69.80 deg F)

**Autoignition Temperature:** 810 deg F ( 432.22 deg C)

**Explosion Limits, Lower:**0.8

**Upper:** 6.7

**NFPA Rating:** (estimated) Health: 3; Flammability: 4; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a

tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ethylbenzene	100 ppm TWA; 125 ppm STEL	100 ppm TWA; 435 mg/m <sup>3</sup> TWA 800 ppm IDLH	100 ppm TWA; 435 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** Ethylbenzene: 100 ppm TWA; 435 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves and clothing to prevent skin exposure.

**Clothing:** Wear appropriate protective gloves and clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** aromatic odor

**pH:** Not available.

**Vapor Pressure:** 7.1 mm Hg @ 20 C

**Vapor Density:** 3.7

**Evaporation Rate:** <1 (butyl acetate=1)

**Viscosity:** 0.63 mPa s 20 C

**Boiling Point:** 277 deg F

**Freezing/Melting Point:** -139 deg F

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:** 0.9

**Molecular Formula:** C<sub>8</sub>H<sub>10</sub>

**Molecular Weight:** 106.07

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:****CAS#** 100-41-4: DA0700000**LD50/LC50:**

CAS# 100-41-4:

Draize test, rabbit, eye: 500 mg Severe;

Inhalation, mouse: LC50 = 35500 mg/m<sup>3</sup>/2H;Inhalation, rat: LC50 = 55000 mg/m<sup>3</sup>/2H;

Oral, rat: LD50 = 3500 mg/kg;

Oral, rat: LD50 = 3500 mg/kg;

Skin, rabbit: LD50 = 17800 uL/kg;

Oral, rat: LD50 = 5.46

**Carcinogenicity:**

CAS# 100-41-4:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 6/11/04
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

**Epidemiology:** No information found**Teratogenicity:** No information found**Reproductive Effects:** No information found**Mutagenicity:** Mutation in mammalian somatic cells(Rodent,mouse) Lymphocyte = 80 mg/L.**Neurotoxicity:** No information found**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** Fish: Rainbow trout: 14.0 mg/L; 96 Hr.; StaticFish: Fathead Minnow: 12.1 mg/L; 96 Hr.; Flow-throughFish: Bluegill/Sunfish: LC50 =150.0 mg/L; 96 Hr.; Flow-throughWater flea EC50 =2.1 mg/L; 48 Hr.; StaticBacteria: EC50 =9.8 mg/L; 30 minutes; Micotox TestWater flea EC50 =75.0 mg/L; 48 minutes; Static, pH6.7-8.1, 72.0 mg/L CaCO<sub>3</sub> Shrimp (mysidoposis bahia), LC50=87.6 mg/L/96hr. Sheepshead minnow LC50=275 mg/L/96hr. Fathead minnow LC50=42.3 mg/L/96hr in hard water &48.5 mg/L/96hr in softwater.

**Environmental:** Experimental data on the bioconcentration of ethylbenzene include a log BCF of 1.9 in goldfish and the log BCF of 0.67 for clams exposed to the water-soluble fraction of crude oil. Using its octanol/water partition coefficient (log Kow= 3.15) and using a recommended regression equation, one can calculate a log BCF in fish of 2.16 indicating that ethylbenzene should not significantly bioconcentrate in aquatic organisms. Ethylbenzene has a moderate adsorption for soil. The measured Koc for silt loam was 164

**Physical:** The predominant photochemical reaction of ethylbenzene in the atmosphere is with hydroxyl radicals; the tropospheric half-life for this reaction is 5.5 and 24 hr in the summer and winter, actively. Degradation is somewhat faster under photochemical smog situations. Photooxidation products which have been identified include ethylphenol, benzaldehyde, acetophenone and m- and p-ethylnitrobenzene. Ethylbenzene is resistant to hydrolysis. Ethylbenzene does not significantly absorb light above 290 nm in methanol solution.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	ETHYLBENZENE	ETHYL BENZENE
<b>Hazard Class:</b>	3	3
<b>UN Number:</b>	UN1175	UN1175
<b>Packing Group:</b>	II	II
<b>Additional Info:</b>		FLASHPOINT 15C

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 100-41-4 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 100-41-4: Effective 6/19/87, Sunset 6/19/97

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 100-41-4: 1000 lb final RQ; 454 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 100-41-4: immediate, delayed, fire.

#### Section 313

This material contains Ethylbenzene (CAS# 100-41-4, 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 100-41-4 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

CAS# 100-41-4 is listed as a Hazardous Substance under the CWA. CAS# 100-41-4 is listed as a Priority Pollutant under the Clean Water Act. CAS# 100-41-4 is listed as a Toxic Pollutant

under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 100-41-4 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

**California Prop 65**

**The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:**

WARNING: This product contains Ethylbenzene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations**

**European Labeling in Accordance with EC Directives**

**Hazard Symbols:**

XN F

**Risk Phrases:**

R 11 Highly flammable.

R 20 Harmful by inhalation.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 24/25 Avoid contact with skin and eyes.

S 29 Do not empty into drains.

**WGK (Water Danger/Protection)**

CAS# 100-41-4: 1

**Canada - DSL/NDSL**

CAS# 100-41-4 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B2, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 100-41-4 is listed on the Canadian Ingredient Disclosure List.

**Section 16 - Additional Information**

**MSDS Creation Date:** 4/28/1999

**Revision #4 Date:** 10/03/2005

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*

# Material Safety Data Sheet

## Fluoranthene, 93%

ACC# 01667

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Fluoranthene, 93%**Catalog Numbers:** AC345980000, AC345980010, AC345982500**Synonyms:****Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
206-44-0	Fluoranthene	93%	205-912-4

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Not available.

**Target Organs:** None known.

#### Potential Health Effects

**Eye:** May cause eye irritation.**Skin:** May cause skin irritation.**Ingestion:** Harmful if swallowed. May cause irritation of the digestive tract.**Inhalation:** May cause respiratory tract irritation.**Chronic:** Not available.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.**Skin:** Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.**Ingestion:** Get medical aid. Wash mouth out with water.**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

**Extinguishing Media:** In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

**Flash Point:** > 100 deg C (> 212.00 deg F)

**Autoignition Temperature:** Not available.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** Not published.

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Vacuum or sweep up material and place into a suitable disposal container.

## Section 7 - Handling and Storage

**Handling:** Avoid breathing dust, mist, or vapor. Avoid contact with skin and eyes.

**Storage:** Store in a cool, dry place. Store in a tightly closed container.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Fluoranthene	none listed	none listed	none listed

**OSHA Vacated PELs:** Fluoranthene: No OSHA Vacated PELs are listed for this chemical.

### Personal Protective Equipment

**Eyes:** Not available.

**Skin:** Wear appropriate protective gloves and clothing to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to minimize contact with skin.

**Respirators:** Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

## Section 9 - Physical and Chemical Properties

**Physical State:** Crystalline powder

**Appearance:** yellow

**Odor:** odorless

**pH:** Not available.  
**Vapor Pressure:** Not available.  
**Vapor Density:** Not available.  
**Evaporation Rate:** Not available.  
**Viscosity:** Not available.  
**Boiling Point:** 380 - 34.0 deg C @  
**Freezing/Melting Point:** 109.00 - 111  
**Decomposition Temperature:** Not available.  
**Solubility:** insoluble  
**Specific Gravity/Density:** Not available.  
**Molecular Formula:** C<sub>16</sub>H<sub>10</sub>  
**Molecular Weight:** 202.07

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.  
**Conditions to Avoid:** Incompatible materials.  
**Incompatibilities with Other Materials:** Strong oxidizing agents.  
**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.  
**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 206-44-0: LL4025000

**LD50/LC50:**

CAS# 206-44-0:

Oral, rat: LD50 = 2 gm/kg;

Skin, rabbit: LD50 = 3180 mg/kg;

**Carcinogenicity:**

CAS# 206-44-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No data available.

**Teratogenicity:** No data available.

**Reproductive Effects:** No data available.

**Mutagenicity:** No data available.

**Neurotoxicity:** No data available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.

**Environmental:** No information available.

**Physical:** No information available.

**Other:** Biodegradable.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:**

CAS# 206-44-0: waste number U120.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	NOT REGULATED FOR DOMESTIC TRANSPORT	No information available.
<b>Hazard Class:</b>	XCP	
<b>UN Number:</b>		
<b>Packing Group:</b>		

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 206-44-0 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 206-44-0: 100 lb final RQ; 45.4 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 206-44-0: immediate.

#### Section 313

This material contains Fluoranthene (CAS# 206-44-0, 93%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 206-44-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XN

**Risk Phrases:**

R 22 Harmful if swallowed.

**Safety Phrases:****WGK (Water Danger/Protection)**

CAS# 206-44-0: No information available.

**Canada - DSL/NDSL**

CAS# 206-44-0 is listed on Canada's NDSL List.

**Canada - WHMIS**

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 206-44-0 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 10/27/1999

**Revision #4 Date:** 3/28/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **FLUORENE**

CAS Number: 86-73-7  
DOT Number: None

RTK Substance number: 2993  
Date: May 1999

## HAZARD SUMMARY

- \* **Fluorene** can affect you when breathed in.
- \* **Fluorene** can irritate and burn the eyes and skin.

## IDENTIFICATION

**Fluorene** is white crystalline plates. It is used in resinous products, dyestuffs, and as a chemical intermediate.

## REASON FOR CITATION

- \* **Fluorene** is on the Hazardous Substance List because it is cited by HHAG and EPA.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

## WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Fluorene**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

## WAYS OF REDUCING EXPOSURE

- \* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Fluorene** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Fluorene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

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**HEALTH HAZARD INFORMATION**

**Acute Health Effects**

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Fluorene**:

- \* **Fluorene** can irritate and burn the eyes and skin.

**Chronic Health Effects**

The following chronic (long-term) health effects can occur at some time after exposure to **Fluorene** and can last for months or years:

**Cancer Hazard**

- \* **Fluorene** has been tested but further studies are required to determine its ability to cause cancer.

**Reproductive Hazard**

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Fluorene** has not been tested for its ability to affect reproduction.

**Other Long-Term Effects**

- \* No chronic (long-term) health effects are known at this time.

**MEDICAL**

**Medical Testing**

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

**WORKPLACE CONTROLS AND PRACTICES**

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- \* Where possible, automatically transfer **Fluorene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Fluorene** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Fluorene**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Fluorene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Fluorene**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Fluorene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**

**PERSONAL PROTECTIVE EQUIPMENT**

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

**Clothing**

- \* Avoid skin contact with **Fluorene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

**Eye Protection**

- \* Wear impact resistant eye protection with side shields or goggles.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

**Respiratory Protection**

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.**

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
- \* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Fluorene**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.

- \* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- \* Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

**QUESTIONS AND ANSWERS**

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/coh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**HHAG** is the Human Health Assessment Group of the federal EPA.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

**MSHA** is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NCI** is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.





New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **HEXACHLOROBENZENE**

CAS Number: 118-74-1  
DOT Number: UN 2729

RTK Substance number: 0978  
Date: November 1988 Revision: July 2001

## HAZARD SUMMARY

- \* **Hexachlorobenzene** can affect you when breathed in and may be absorbed through the skin.
- \* **Hexachlorobenzene** should be handled as a **CARCINOGEN--WITH EXTREME CAUTION**.
- \* Contact can irritate the skin and eyes.
- \* Breathing **Hexachlorobenzene** can irritate the nose and throat.
- \* **Hexachlorobenzene** may damage the liver and kidneys and affect the thyroid.
- \* High or repeated exposure may damage the nervous system and can cause irritability, muscle weakness, tremors, seizures and/or a feeling of "pins and needles" on the skin.
- \* Repeated exposure can cause permanent skin changes, such as changes in pigment and skin thickening.

## IDENTIFICATION

**Hexachlorobenzene** is a white, needle-like solid. It is used as a wood preservative and a fungicide for treating seeds.

## REASON FOR CITATION

- \* **Hexachlorobenzene** is on the Hazardous Substance List because it is cited by ACGIH, DOT, NTP, DEP, IARC, HHAG and EPA.
- \* This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN**.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

## WORKPLACE EXPOSURE LIMITS

ACGIH: The recommended airborne exposure limit is **0.002 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

- \* **Hexachlorobenzene** may be a **CARCINOGEN** in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- \* The above exposure limit is for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limit listed above.

## WAYS OF REDUCING EXPOSURE

- \* Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Hexachlorobenzene** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Hexachlorobenzene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

**HEALTH HAZARD INFORMATION**

**Acute Health Effects**

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Hexachlorobenzene**:

- \* Contact can irritate the skin and eyes.
- \* Breathing **Hexachlorobenzene** can irritate the nose and throat.

**Chronic Health Effects**

The following chronic (long-term) health effects can occur at some time after exposure to **Hexachlorobenzene** and can last for months or years:

**Cancer Hazard**

- \* **Hexachlorobenzene** may be a CARCINOGEN in humans since it has been shown to cause liver and thyroid gland cancers in animals.
- \* Many scientists believe there is no safe level of exposure to a carcinogen.

**Reproductive Hazard**

- \* **Hexachlorobenzene** may damage the developing fetus.

**Other Long-Term Effects**

- \* **Hexachlorobenzene** may damage the liver and kidneys and affect the thyroid.
- \* High or repeated exposure may damage the nervous system and can cause irritability, difficulty with walking and coordination, muscle weakness, tremors, seizures and/or a feeling of "pins and needles" on the skin.
- \* Repeated exposure can cause permanent skin changes, such as changes in pigment, skin thickening, easy wrinkling, skin scarring, fragile skin, and increased hair growth.

**MEDICAL**

**Medical Testing**

If symptoms develop or overexposure is suspected, the following are recommended:

- \* Liver and kidney function tests.
- \* Thyroid function tests.
- \* Exam of the nervous system.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

**Mixed Exposures**

- \* *Iron* as a dietary supplement could increase liver damage caused by **Hexachlorobenzene**. Consult your physician before taking *Iron* supplements.

**Conditions Made Worse By Exposure**

- \* Sunlight will worsen the effects of **Hexachlorobenzene** on your skin.

**WORKPLACE CONTROLS AND PRACTICES**

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- \* Where possible, automatically transfer **Hexachlorobenzene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Hexachlorobenzene** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Hexachlorobenzene**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Hexachlorobenzene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Hexachlorobenzene**, whether or not known skin contact has occurred.

- \* Do not eat, smoke, or drink where **Hexachlorobenzene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**

**PERSONAL PROTECTIVE EQUIPMENT**

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

**Clothing**

- \* Avoid skin contact with **Hexachlorobenzene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

**Eye Protection**

- \* Wear impact resistant eye protection with side shields or goggles.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

**Respiratory Protection**

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* For field applications check with your supervisor and your safety equipment supplier regarding the appropriate respiratory equipment.
- \* Where the potential exists for exposure over **0.002 mg/m<sup>3</sup>**, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

**QUESTIONS AND ANSWERS**

- Q: If I have acute health effects, will I later get chronic health effects?  
 A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?  
 A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?  
 A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?  
 A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?  
 A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Don't all chemicals cause cancer?  
 A: No. Most chemicals tested by scientists are not cancer-causing.
- Q: Should I be concerned if a chemical causes cancer in animals?  
 A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?  
 A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

- Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
- A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.
- Q: Who is at the greatest risk from reproductive hazards?
- A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**HHAG** is the Human Health Assessment Group of the federal EPA.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

**MSHA** is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NCI** is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.





New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **INDENO (1,2,3-cd) PYRENE**

CAS Number: 193-39-5

DOT Number: UN 3077

DOT Hazard Class: 9 (Environmentally Hazardous  
Substance)

RTK Substance number: 3052

Date: May 2000 Revision: March 2007

## HAZARD SUMMARY

- \* **Indeno (1,2,3-cd) Pyrene** can affect you when breathed in and may be absorbed through the skin.
- \* **Indeno (1,2,3-cd) Pyrene** is a **CARCINOGEN--HANDLE WITH EXTREME CAUTION.**
- \* No acute (short-term) health effects are known at this time.

## IDENTIFICATION

**Indeno (1,2,3-cd) Pyrene** is a yellow plate or needle-shaped solid. It is a research chemical and a component of gasoline engine exhaust and tobacco smoke. There is no commercial production or known use of this compound.

## REASON FOR CITATION

- \* **Indeno (1,2,3-cd) Pyrene** is on the Hazardous Substance List because it is cited by DOT, NTP, DEP, IARC, IRIS and EPA.
- \* This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN**.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

## WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Indeno (1,2,3-cd) Pyrene**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

- \* **Indeno (1,2,3-cd) Pyrene** may be a **CARCINOGEN** in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- \* It should be recognized that **Indeno (1,2,3-cd) Pyrene** can be absorbed through your skin, thereby increasing your exposure.

## WAYS OF REDUCING EXPOSURE

- \* Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Indeno (1,2,3-cd) Pyrene** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Indeno (1,2,3-cd) Pyrene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

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## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Indeno (1,2,3-cd) Pyrene**:

- \* No acute (short-term) health effects are known at this time.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Indeno (1,2,3-cd) Pyrene** and can last for months or years:

### Cancer Hazard

- \* **Indeno (1,2,3-cd) Pyrene** may be a CARCINOGEN in humans since it has been shown to cause skin and lung cancer in animals.
- \* Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

### Reproductive Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Indeno (1,2,3-cd) Pyrene** has not been tested for its ability to affect reproduction.

### Other Long-Term Effects

- \* **Indeno (1,2,3-cd) Pyrene** has not been tested for other chronic (long-term) health effects.

## MEDICAL

### Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- \* Where possible, automatically transfer **Indeno (1,2,3-cd) Pyrene** from drums or other storage containers to process containers.
- \* A Class I, Type B, biological safety hood should be used when mixing, handling, or preparing **Indeno (1,2,3-cd) Pyrene**.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Indeno (1,2,3-cd) Pyrene** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Indeno (1,2,3-cd) Pyrene**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Indeno (1,2,3-cd) Pyrene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Indeno (1,2,3-cd) Pyrene**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Indeno (1,2,3-cd) Pyrene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP**.
- \* When vacuuming, a high efficiency particulate air (HEPA) filter should be used, not a standard shop vacuum.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Indeno (1,2,3-cd) Pyrene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Eye protection is included in the recommended respiratory protection.

### Respiratory Protection

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- \* At any exposure level, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Should I be concerned if a chemical causes cancer in animals?
- A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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## DEFINITIONS

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

**CFR** is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

**IRIS** is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.





New Jersey Department of Health and Senior Services  
**HAZARDOUS SUBSTANCE  
FACT SHEET**

Common Name: **IRON OXIDE**

CAS Number: 1309-37-1

DOT Number: None

DOT Hazard Class: None

RTK Substance number: 1036

Date: August 1998 Revision: May 2007

### HAZARD SUMMARY

- \* **Iron Oxide** can affect you when breathed in.
- \* Exposure to **Iron Oxide fumes** can cause metal fume fever. This is a flu-like illness with symptoms of metallic taste, fever and chills, aches, chest tightness and cough.
- \* Prolonged or repeated contact can discolor the eyes causing permanent *Iron* staining.
- \* Repeated exposure to **Iron Oxide fume** or *dust* can cause pneumoconiosis (*Siderosis*) with cough, shortness of breath and changes on chest x-ray.
- \* **Iron Oxide** as *Ferric Oxide* ( $Fe_2O_3$ ) is not combustible, unless finely powdered. However, *Ferrous Oxide* ( $FeO$ ) is extremely flammable and reactive, and may ignite spontaneously in air.

### IDENTIFICATION

**Iron Oxide** is a black crystal or a reddish-brown powder. It is used in polishing compounds, pigments, and metallurgy. **Iron Oxide fume** is produced when materials containing *Iron* are heated, as in arc welding. DOT number UN 1376 refers to *Ferrous Oxide* ( $FeO$ ), *Iron Oxide (Spent)* or *Iron Sponge*. *Ferrous Oxide* ( $FeO$ ) may be formed in *Oxygen*-limited atmospheres, in flue gas, and from coal gas purification. *Iron Oxide (Spent)* or *Iron Sponge* is produced when *Iron Ore* is heated below the melting point of *Iron*. With further processing, they become *Wrought Iron*.

### REASON FOR CITATION

- \* **Iron Oxide** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, NIOSH and IARC.
- \* Definitions are provided on page 5.

### HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).
- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

### WORKPLACE EXPOSURE LIMITS

The following exposure limits are for **Iron Oxide** (measured as *Iron*):

- OSHA: The legal airborne permissible exposure limit (PEL) is **10 mg/m<sup>3</sup>** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **5 mg/m<sup>3</sup>** averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **5 mg/m<sup>3</sup>** (as the *respirable fraction*) averaged over an 8-hour workshift.

### WAYS OF REDUCING EXPOSURE

- \* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Iron Oxide** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in "hot" operations in the workplace. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated. Consult the appropriate New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheets.

## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Iron Oxide**:

- \* Exposure to **Iron Oxide fumes** can cause metal fume fever. This is a flu-like illness with symptoms of metallic taste, fever and chills, aches, chest tightness and cough.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Iron Oxide** and can last for months or years:

### Cancer Hazard

- \* While **Iron Oxide** has been tested, it is not classifiable as to its potential to cause cancer.

### Reproductive Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Iron Oxide** has not been tested for its ability to affect reproduction.

### Other Long-Term Effects

- \* Prolonged or repeated contact can discolor the eyes, causing permanent *Iron* staining.
- \* Repeated exposure to **Iron Oxide fume or dust** can cause pneumoconiosis (*Siderosis*) with cough, shortness of breath and changes on chest x-ray.

## MEDICAL

### Medical Testing

For those with frequent or potentially high exposure (half the PEL or greater), the following are recommended before beginning work and at regular times after that:

- \* Lung function tests

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

### Mixed Exposures

- \* Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- \* Where possible, automatically transfer **Iron Oxide** from drums or other storage containers to process containers.
- \* Before entering a confined space where *Ferrous Oxide* (FeO) may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Iron Oxide** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Iron Oxide**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Iron Oxide**, immediately wash or shower to remove the chemical.

- \* Do not eat, smoke, or drink where **Iron Oxide** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Iron Oxide**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear impact resistant eye protection with side shields or goggles.

### Respiratory Protection

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- \* Where the potential exists for exposure over **5 mg/m<sup>3</sup>** (as *Iron*), use a NIOSH approved air-purifying particulate filter respirator with a N95 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.
- \* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Iron Oxide**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.

- \* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- \* Where the potential exists for exposure over **50 mg/m<sup>3</sup>** (as *Iron*), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- \* Exposure to **2,500 mg/m<sup>3</sup>** (as *Iron*) is immediately dangerous to life and health. If the possibility of exposure above **2,500 mg/m<sup>3</sup>** (as *Iron*) exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

**CFR** is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

**IRIS** is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



# Material Safety Data Sheet

## p-Cymene, 98%

ACC# 95901

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** p-Cymene, 98%**Catalog Numbers:** AC111760000, AC111760010, AC111760025, AC111762500**Synonyms:** Dolcymene; p-isopropyltoluene; isopropyl methylbenzene**Company Identification:**

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
99-87-6	P-CYMENE	98	202-796-7

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 47 deg C.

**Warning! Flammable liquid and vapor.** Causes eye, skin, and respiratory tract irritation. May be absorbed through intact skin. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause central nervous system effects.

**Target Organs:** Central nervous system.

#### Potential Health Effects

**Eye:** May cause eye irritation.**Skin:** Causes skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. May be absorbed through the skin.**Ingestion:** May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.**Inhalation:** Causes respiratory tract irritation. May cause narcotic effects in high concentration. May cause drowsiness, unconsciousness, and central nervous system depression.**Chronic:** Chronic inhalation may cause effects similar to those of acute inhalation. Prolonged or repeated skin contact may cause defatting and dermatitis.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

**Skin:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

**Ingestion:** Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

**Notes to Physician:** Treat symptomatically and supportively.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Containers may explode in the heat of a fire. Flammable liquid and vapor.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Water may be ineffective. Use water spray, dry chemical, carbon dioxide, or chemical foam.

**Flash Point:** 47 deg C ( 116.60 deg F)

**Autoignition Temperature:** 435 deg C ( 815.00 deg F)

**Explosion Limits, Lower:** .70 vol %

**Upper:** 5.60 vol %

**NFPA Rating:** 1 - health, 2 - flammability, 0 - instability

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate ventilation to keep airborne concentrations low.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
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P-CYMENE

none listed

none listed

none listed

**OSHA Vacated PELs:** P-CYMENE: No OSHA Vacated PELs are listed for this chemical.

**Personal Protective Equipment**

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** clear, colorless

**Odor:** Lemon-type

**pH:** Not available.

**Vapor Pressure:** 1 mm Hg @17.3C

**Vapor Density:** 4.62 (air=1)

**Evaporation Rate:**Not available.

**Viscosity:** Not available.

**Boiling Point:** 176 - 178 deg C @ 760.00mm Hg

**Freezing/Melting Point:**-68 deg C

**Decomposition Temperature:**Not available.

**Solubility:** practically insoluble in water

**Specific Gravity/Density:**.8600g/cm<sup>3</sup>

**Molecular Formula:**C<sub>10</sub>H<sub>14</sub>

**Molecular Weight:**134.22

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Strong oxidizing agents

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Will not occur.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS# 99-87-6:** GZ5950000

**LD50/LC50:**

CAS# 99-87-6:

Draize test, rabbit, skin: 500 mg/24H Moderate;

Inhalation, mouse: LC50 = 19500 mg/m<sup>3</sup>;

Oral, mouse: LD50 = 1695 mg/kg;

Oral, rat: LD50 = 4750 mg/kg;

Oral, rat: LD50 = 3669 mg/kg;

**Carcinogenicity:**

CAS# 99-87-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** Genotoxicity: see The Dictionary of Substances and their Effects, 1992

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. Bioaccumulation: Readily biodegradable Abiotic removal: Evaporation rate relative to n-butyl-acetate which has been assigned a value of 1 at 25°C is 0.14 (The Dictionary of Substances and their Effects, 1992)

**Environmental:** No information available.

**Physical:** No information available.

**Other:** No information available.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	CYMENES	No information available.
<b>Hazard Class:</b>	3	
<b>UN Number:</b>	UN2046	
<b>Packing Group:</b>	III	

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 99-87-6 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

**Section 12b**

None of the chemicals are listed under TSCA Section 12b.

**TSCA Significant New Use Rule**

None of the chemicals in this material have a SNUR under TSCA.

**CERCLA Hazardous Substances and corresponding RQs**

None of the chemicals in this material have an RQ.

**SARA Section 302 Extremely Hazardous Substances**

None of the chemicals in this product have a TPQ.

**SARA Codes**

CAS # 99-87-6: immediate, fire.

**Section 313** No chemicals are reportable under Section 313.**Clean Air Act:**

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depleters.

This material does not contain any Class 2 Ozone depleters.

**Clean Water Act:**

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 99-87-6 can be found on the following state right to know lists: Pennsylvania, Massachusetts.

**California Prop 65**

California No Significant Risk Level: None of the chemicals in this product are listed.

**European/International Regulations****European Labeling in Accordance with EC Directives****Hazard Symbols:**

XI F

**Risk Phrases:**

R 10 Flammable.

R 37/38 Irritating to respiratory system and skin.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

**WGK (Water Danger/Protection)**

CAS# 99-87-6: No information available.

**Canada - DSL/NDSL**

CAS# 99-87-6 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of B3, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

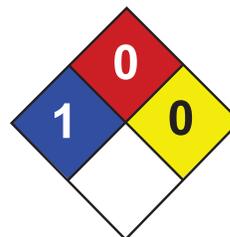
CAS# 99-87-6 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information
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**MSDS Creation Date:** 9/02/1997

**Revision #4 Date:** 11/20/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



Health	1
Fire	0
Reactivity	0
Personal Protection	E

# Material Safety Data Sheet

## Lead MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Lead

**Catalog Codes:** SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

**CAS#:** 7439-92-1

**RTECS:** OF7525000

**TSCA:** TSCA 8(b) inventory: Lead

**CI#:** Not available.

**Synonym:** Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

**Chemical Name:** Lead

**Chemical Formula:** Pb

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Lead	7439-92-1	100

**Toxicological Data on Ingredients:** Lead LD50: Not available. LC50: Not available.

### Section 3: Hazards Identification

**Potential Acute Health Effects:** Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

**Potential Chronic Health Effects:**

Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Non-flammable in presence of open flames and sparks, of shocks, of heat.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** When heated to decomposition it emits highly toxic fumes of lead.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

### Section 7: Handling and Storage

**Precautions:**

Keep locked up. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.05 (mg/m<sup>3</sup>) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m<sup>3</sup>) from OSHA (PEL) [United States] TWA: 0.03 (mg/m<sup>3</sup>) from NIOSH [United States] TWA: 0.05 (mg/m<sup>3</sup>) [Canada] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Metal solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 207.21 g/mole

**Color:** Bluish-white. Silvery. Gray

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 1740°C (3164°F)

**Melting Point:** 327.43°C (621.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 11.3 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, excess heat

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Inhalation. Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

**Other Toxic Effects on Humans:** Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations****Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Section 14: Transport Information**

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

**Section 15: Other Regulatory Information****Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:21 PM

**Last Updated:** 06/09/2012 12:00 PM

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# Right to Know Hazardous Substance Fact Sheet

Common Name: **MAGNESIUM**

Synonyms: None

Chemical Name: Magnesium

Date: September 1999 Revision: June 2008

CAS Number: 7439-95-4

RTK Substance Number: 1136

DOT Number: UN 1869  
UN 1418 (Powder)

## Description and Use

**Magnesium** is a light, silvery-white metal which can be in the form of a gray powder, thin sheet or chip. It is used in making structural metals, die-cast auto parts, missiles, precision instruments and optical mirrors, flashbulbs, flares, pyrotechnics, and batteries.

## Reasons for Citation

- ▶ **Magnesium** is on the Right to Know Hazardous Substance List because it is cited by DOT and NFPA.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### Skin Contact

- ▶ Remove contaminated clothing and wash contaminated skin with soap and water.

### Inhalation

- ▶ Remove the person from exposure.
- ▶ Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

## EMERGENCY RESPONDERS >>>> SEE PAGE 6

### Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	1	0
FLAMMABILITY	-	1
REACTIVITY	-	1

MAY SPONTANEOUSLY IGNITE  
POISONOUS GASES ARE PRODUCED IN FIRE  
DO NOT USE WATER, CO<sub>2</sub>, FOAM OR HALOGENATED AGENTS

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Magnesium dust or fume** can affect you when inhaled.
- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling **Magnesium** can irritate the nose, throat and lungs.
- ▶ Exposure to **Magnesium** may cause a flu-like illness called "metal fume fever."
- ▶ Repeated exposure to the *dust* can cause **Magnesium** to accumulate in the body. This will cause an upset stomach.
- ▶ **Magnesium POWDER, SHEETS and CHIPS** may SPONTANEOUSLY IGNITE on contact with AIR or MOISTURE.

## Workplace Exposure Limits

The following exposure limits are for *Magnesium Oxide*:

OSHA: The legal airborne permissible exposure limit (PEL) is **15 mg/m<sup>3</sup>** (as *total particulate*) averaged over an 8-hour workshift.

ACGIH: The threshold limit value (TLV) is **10 mg/m<sup>3</sup>** (as the *inhalable fraction*) averaged over an 8-hour workshift.

### Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Magnesium**:

- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling **Magnesium** can irritate the nose, throat and lungs causing tightness in the chest and/or difficulty in breathing.
- ▶ Exposure to **Magnesium** may cause "metal fume fever." This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.

#### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Magnesium** and can last for months or years:

#### Cancer Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, **Magnesium** has not been tested for its ability to cause cancer in animals.

#### Reproductive Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, **Magnesium** has not been tested for its ability to affect reproduction.

#### Other Effects

- ▶ Repeated exposure to the *dust* can cause **Magnesium** to accumulate in the body. This will cause an upset stomach.

### Medical

#### Medical Testing

There is no special test for this chemical. However, seek medical attention if illness occurs or overexposure is suspected.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Before entering a confined space where **Magnesium powder** may be present, check to make sure that an explosive concentration does not exist.
- ▶ Use a vacuum for **Magnesium powder** to reduce dust during clean-up. DO NOT DRY SWEEP.

### Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

#### Gloves and Clothing

- ▶ Avoid skin contact with **Magnesium**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Nitrile and Natural Rubber for gloves and DuPont Tyvek®, or the equivalent, as a protective material for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

#### Eye Protection

- ▶ Wear eye protection with side shields or goggles.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

#### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **10 mg/m<sup>3</sup>** (as *Magnesium Oxide*), use a NIOSH approved air-purifying, particulate filter respirator with an N95 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Magnesium**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential exists for exposure over **100 mg/m<sup>3</sup>** (as *Magnesium Oxide*), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to **750 mg/m<sup>3</sup>** (as *Magnesium Oxide*) is immediately dangerous to life and health. If the possibility of exposure above **750 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

### Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **Magnesium POWDER, SHEETS and CHIPS** may SPONTANEOUSLY IGNITE on contact with AIR or MOISTURE.
- ▶ Use Class D fire extinguishers or dry sand, clay, graphite, or limestone to fight fires.
- ▶ DO NOT USE WATER, CO<sub>2</sub>, foam or halogenated extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE.
- ▶ FIRE MAY RESTART AFTER IT HAS BEEN EXTINGUISHED.
- ▶ CONTAINERS MAY EXPLODE IN FIRE.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Magnesium** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Collect powdered material in the most convenient and safe manner, or use a HEPA-filter vacuum, and deposit in sealed containers.
- ▶ DO NOT USE WATER OR WET METHOD.
- ▶ Ventilate area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **Magnesium** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with **Magnesium** you should be trained on its proper handling and storage.

- ▶ *Finely divided Magnesium* reacts with WATER, MOISTURE, STEAM and ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) to release flammable and explosive *Hydrogen gas*.
- ▶ *Finely divided Magnesium* ignites on contact with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and AMMONIA; and reacts vigorously or explosively (and may form explosive compounds) with ACETYLENIC COMPOUNDS (such as ACETYLENE and ETHYLENE OXIDE); HALOCARBONS (such as CHLOROFORM and CHLOROMETHANE); AMMONIA NITRATE; CARBONATES; ARSENIC; METAL OXIDES; METAL SULFATES; OXYGEN; METAL CYANIDES; PHOSPHATES, and many other substances.
- ▶ **Magnesium** is AIR and MOISTURE sensitive.
- ▶ Store in tightly closed containers in a cool, well-ventilated area and protect from SHOCK and FRICTION.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **Magnesium** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.
- ▶ Use explosion-proof electrical equipment and fittings wherever **Magnesium** is used, handled, manufactured, or stored.
- ▶ Use only non-sparking tools and equipment, especially when opening and closing containers of **Magnesium**.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

#### For more information, please contact:

New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

*The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.*

## GLOSSARY

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Acute Exposure Guideline Levels (AEGLs)** are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Emergency Response Planning Guideline (ERPG)** values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization Potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

**LEL or Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeated** is the movement of chemicals through protective materials.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



Common Name: **MAGNESIUM**

Synonyms: None  
 CAS No: 7439-95-4  
 Molecular Formula: Mg  
 RTK Substance No: 1136

Description: Light, silvery-white metal which can be in the form of a gray powder, thin sheet or chip

## HAZARD DATA

Hazard Rating	Firefighting	Reactivity
1 - Health 1 - Fire 1 - Reactivity  DOT#: UN 1869 UN 1418 (powder) ERG Guide #: 138 Hazard Class: 4.1 and 4.3 UN 1869 (Flammable) UN 1418 (Water Reactive)	<p><b>Magnesium</b> POWDER, SHEETS and CHIPS MAY SPONTANEOUSLY IGNITE on contact with AIR or MOISTURE.</p> <p>Use Class D fire extinguishers or dry sand, clay, graphite, or limestone to fight fires.</p> <p>DO NOT USE WATER, CO<sub>2</sub>, foam or halogenated extinguishing agents.</p> <p>POISONOUS GASES ARE PRODUCED IN FIRE.</p> <p>FIRE MAY RESTART AFTER IT HAS BEEN EXTINGUISHED.</p>	<p><i>Finely divided Magnesium</i> reacts with WATER, MOISTURE, STEAM and ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) to release flammable and explosive <i>Hydrogen gas</i>.</p> <p><i>Finely divided Magnesium</i> ignites on contact with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and AMMONIA; and reacts vigorously or explosively (and may form explosive compounds) with ACETYLENIC COMPOUNDS (such as ACETYLENE and ETHYLENE OXIDE); HALOCARBONS (such as CHLOROFORM and CHLOROMETHANE); AMMONIA NITRATE; CARBONATES; ARSENIC; METAL OXIDES; METAL SULFATES; OXYGEN; METAL CYANIDES; PHOSPHATES, and many other substances.</p> <p><b>Magnesium</b> is AIR and MOISTURE sensitive.</p>

## SPILL/LEAKS

**Isolation Distance:**  
 Spills: 25 meters (75 feet)  
 Fires: 800 meters (1/2 mile)  
 Collect powdered material in the most convenient and safe manner, or use a HEPA-filter vacuum, and deposit in sealed containers.  
 DO NOT wash into sewer.

## PHYSICAL PROPERTIES

**Odor Threshold:** Odorless  
**Flash Point:** Flammable powder  
**Auto Ignition Temp:** 883°F (473°C)  
**Vapor Density:** 1.7 (air = 1)  
**Vapor Pressure:** 1 mm Hg at 1,149°F (621°C)  
**Specific Gravity:** 1.74 (water = 1)  
**Water Solubility:** Insoluble, Reactive  
**Boiling Point:** 2,012°F (1,100°C)  
**Molecular Weight:** 24.3

## EXPOSURE LIMITS

**OSHA:** 15 mg/m<sup>3</sup>, 8-hr TWA  
**NIOSH:** None  
**ACGIH:** 10 mg/m<sup>3</sup>, 8-hr TWA  
**IDLH:** 750 mg/m<sup>3</sup>  
 All of the above are for *Magnesium Oxide*

## PROTECTIVE EQUIPMENT

**Gloves:** Nitrile and Natural Rubber  
**Coveralls:** DuPont Tyvek®  
**Respirator:** >10 mg/m<sup>3</sup> - APR with High efficiency filter  
 >100 mg/m<sup>3</sup> - Supplied air

## HEALTH EFFECTS

**Eyes:** Irritation  
**Skin:** Irritation  
**Inhalation:** Nose, throat and lung irritation with coughing and difficulty in breathing  
 Headache, fever and chills, chest tightness

## FIRST AID AND DECONTAMINATION

**Remove** the person from exposure.  
**Flush** eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.  
**Remove** contaminated clothing and wash contaminated skin with soap and water.  
**Transfer** to a medical facility.



# Right to Know Hazardous Substance Fact Sheet

Common Name: **MANANESE**

Synonyms: Colloidal Manganese

Chemical Name: Manganese

Date: January 2007 Revision: January 2012

CAS Number: 7439-96-5

RTK Substance Number: 1155

DOT Number: UN 3089

## Description and Use

Manganese is a naturally occurring metal found in rocks. Pure Manganese is a silver or grey-white, brittle solid. It is used in making steel and alloying metals, and as a catalyst, gasoline additive, animal feed supplement and component of some fertilizers.

## Reasons for Citation

- Manganese is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IRIS and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE LOSSAR ON PAGE

## FIRST AID

### EYES

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### SKIN

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

### INHALATION

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

POISON CENTER

CEMTEC

NEP

NR

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

## Hazard Summary

Physical and Chemical Hazards	Health	Environment
HAZARD	2	-
LAMMABILITY	3 (powder)	-
REACTIVITY	1	-
FLAMMABLE POWDER OR DUST POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- Manganese can affect you when inhaled.
- Contact can irritate the skin and eyes.
- Inhaling Manganese can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- Exposure to Manganese can cause a flu-like illness called "metal fume fever."
- Repeated exposure can cause permanent brain damage. Early symptoms include poor appetite, weakness and sleepiness. Later effects include changes in speech, balance, mood and personality, loss of facial expressions, poor muscle coordination, muscle cramps, twitching and tremors. The later symptoms are identical to Parkinson's disease.
- Prolonged or repeated exposure can lead to permanent lung damage.
- Manganese may affect the liver and may cause anemia.
- Manganese powder and dust are FLAMMABLE and DANGEROUS FIRE HAZARDS.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is 0.05 mg/m<sup>3</sup>, not to be exceeded at any time.

NIOSH: The recommended airborne exposure limit (REL) is 0.05 mg/m<sup>3</sup> averaged over a 10-hour workshift and 0.05 mg/m<sup>3</sup>, not to be exceeded during any 5-minute work period.

ACGIH: The threshold limit value (TLV) is 0.05 mg/m<sup>3</sup> (as the inhalable fraction) and 0.05 mg/m<sup>3</sup> (as the respirable fraction) averaged over an 8-hour workshift.

## Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## Health Hazard Information

### Acute (short-term) Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to M:

- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling M can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- ▶ Exposure to M can cause "metal fume fever." This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.

### Chronic (long-term) Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to M and can last for months or years:

#### Cancer Hazard

- ▶ While M has been tested, it is not classifiable as to its potential to cause cancer.

### Reproductive Hazard

- ▶ M may damage the testes (male reproductive glands) and may decrease fertility in males.

### Other Effects

- ▶ Repeated exposure can cause permanent brain damage. Early symptoms include poor appetite, weakness and sleepiness. Later effects include changes in speech, balance, mood and personality, loss of facial expressions, poor muscle coordination, muscle cramps, twitching and tremors. The later symptoms are identical to Parkinson's disease.
- ▶ Prolonged or repeated exposure can lead to permanent lung damage.
- ▶ M may affect the liver and may cause anemia.

## Medical

### Medical Testing

For frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- ▶ Exam of the nervous system
- ▶ Chest x-ray and lung function tests

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Liver function tests
- ▶ Complete blood count
- ▶ Evaluate for brain effects such as changes in memory, concentration, sleeping patterns and mood (especially irritability and social withdrawal), as well as for headaches and fatigue. Consider evaluations of the cerebellar, autonomic and peripheral nervous systems. Positive and borderline individuals should be referred for neuropsychological testing.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

You have a legal right to request copies of your medical testing under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

### Medical Examinations

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
- ▶ More than light alcohol consumption can cause liver damage. Drinking alcohol may increase the liver damage caused by M.



## Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **M** is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Collect powdered material in the most convenient and safe manner and place into sealed containers for disposal.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **M** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

## Handling and Storage

Prior to working with **M** you should be trained on its proper handling and storage.

- ▶ *Finely divided M dust* can ignite spontaneously in AIR.
- ▶ **M** reacts with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC), and slowly with WATER or STEAM, to produce flammable and explosive *Hydrogen gas*.
- ▶ **M** may react with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); NITROGEN DIOXIDE; PHOSPHORUS; and SULFUR DIOXIDE to cause ignition and/or violent decomposition.
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from WATER and MOISTURE.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **M powder** is used, handled, or stored.
- ▶ Ground and bond containers when transferring **M powder**.
- ▶ Use only non-sparking tools and equipment, especially when opening and closing containers of **M powder**.

## Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

**New Jersey Department of Health & Senior Services**

Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

***The Right to Know Hazardous Substance Fact Sheets  
 are not intended to be copied and sold  
 for commercial purposes.***

## LOSSAR

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**American Environmental Protection Agency (EPA)** is established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

The **critical temperature** is the temperature above which a gas cannot be liquefied, regardless of the pressure applied.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Environmental Protection Agency (EPA) values** provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

**LEL or Lower Explosive Limit** is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSH** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeation** is the movement of chemicals through protective materials.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

**Permissible Action Criteria (PAC)** are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Relative density** is the ratio of the weight of a given volume of one gas to the weight of another (usually Air), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



Common Name: **MANANESE**

Synonyms: Colloidal Manganese

CAS No: 7439-96-5

Molecular Formula: Mn

RTK Substance No: 1155

Description: Pure **M** is a silver or grey-white, brittle solid

HAZARD DATA

Table with 3 columns: Hazard Statements, Precautionary Statements, and Response Statements. Includes details on flammability, reactivity, and health hazards.

SPILL/LEAKS

Evacuation distance: 25 meters (75 feet) for small spills, 800 meters (1/2 mile) for large spills. Instructions on containment and disposal.

PHYSICAL PROPERTIES

Flammable powder and dust. Melting point: 842°F (450°C). Boiling point: 2,271°F (1,244°C). Density: 5.49 g/cm³.

EXPOSURE LIMITS

OSHA: 5 mg/m³, Ceiling. NIOSH: 1 mg/m³, 8-hr TWA; 3 mg/m³, STEL. ACGIH: 0.2 mg/m³ (inhalable); 0.02 mg/m³ (respirable), 8-hr TWA.

PROTECTIVE EQUIPMENT

Nitrile and Neoprene gloves. Tyvek® clothing. Spill - full facepiece APR with P100 filters. Fire - SCBA.

HEALTH EFFECTS

Irritation to eyes, nose, throat, and lungs. Symptoms include coughing, wheezing, and shortness of breath. Headache, fever, and chills are also noted.

FIRST AID AND DECONTAMINATION

Remove person from exposure. Flush eyes with water for 15 minutes. Remove contaminated clothing. Wash skin with soap and water. Artificial respiration if breathing has stopped.



# Right to Know Hazardous Substance Fact Sheet

Common Name: **MERCURY, ELEMENTAL AND INORGANIC COMPOUNDS**

Synonyms: Colloidal Mercury; Quicksilver

Chemical Name: Mercury

Date: May 2009

Revision: November 2009

CAS Number: 7439-97-6

RTK Substance Number: 1183

DOT Number: UN 2809

## Description and Use

**Mercury** is a heavy, silvery, liquid metal. It is used for gold recovery and in dental amalgams, thermometers, barometers and other gauges, and in dry cell batteries.

## Reasons for Citation

- ▶ **Mercury** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IARC, IRIS and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.

### Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water. Seek medical attention immediately.

### Inhalation

- ▶ Remove the person from exposure.
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

## EMERGENCY RESPONDERS >>>> SEE LAST PAGE

### Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	3	-
FLAMMABILITY	0	-
REACTIVITY	0	-
CORROSIVE POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Mercury** can affect you when inhaled and may be absorbed through the skin.
- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling **Mercury** can irritate the nose, throat and lungs.
- ▶ Exposure can cause metallic taste in the mouth, nausea and vomiting, and abdominal pain.
- ▶ **Mercury** may cause a skin allergy and make the skin turn gray.
- ▶ Repeated exposure can cause *Mercury poisoning* with tremors, personality changes, trouble remembering and concentrating, and gum problems.
- ▶ **Mercury** may damage the kidneys.
- ▶ **Mercury** is a DOT CORROSIVE material.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **0.1 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.05 mg/m<sup>3</sup>** (as **Mercury vapor**) averaged over a 10-hour workshift and **0.1 mg/m<sup>3</sup>** (as **Mercury**), not to be exceeded at any time.

ACGIH: The threshold limit value (TLV) is **0.025 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

### Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Mercury**:

- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling **Mercury** can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- ▶ Exposure can cause metallic taste in the mouth, nausea and vomiting, and abdominal pain.

#### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Mercury** and can last for months or years:

#### Cancer Hazard

- ▶ While **Mercury** has been tested, it is not classifiable as to its potential to cause cancer.

#### Reproductive Hazard

- ▶ There is limited evidence that **Mercury** may cause an increase in spontaneous abortions and menstrual disorders in exposed women.
- ▶ There is limited evidence that **Mercury** may affect male fertility.

- ▶ **Mercury** may also damage the developing fetus in animals.

#### Other Effects

- ▶ **Mercury** can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath.
- ▶ **Mercury** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- ▶ Long-term contact can cause the skin to turn gray, brown staining in the eyes, and may affect peripheral vision (ability to see to the sides).
- ▶ Repeated exposure or a very high single exposure can cause *Mercury poisoning*. Symptoms include tremors (shaking), trouble remembering and concentrating, gum problems, increased salivation, loss of appetite and weight, and changes in mood and personality. These can be severe and cause hallucinating and psychosis.
- ▶ **Mercury** may damage the kidneys.

### Medical

#### Medical Testing

For frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- ▶ Exam of the nervous system (including handwriting test to detect early hand tremor)
- ▶ Urine *Mercury* level (usually less than **0.02 mg/liter**)
- ▶ Kidney function tests

If symptoms develop or overexposure is suspected, the following is recommended:

- ▶ Lung function tests
- ▶ Exam of the eyes and vision
- ▶ Evaluation by a qualified allergist can help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

#### Mixed Exposures

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
- ▶ Creams to whiten or bleach skin may contain *Mercury*. If you use them, you may be at increased risk of *Mercury* poisoning. A high fish diet, especially of marine predatory fish (fish-eating fish), also may increase your blood *Mercury* levels.

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ For clean-up, use a specialized charcoal-filtered vacuum or suction pump to avoid generating *Mercury vapor*. Do not disturb spilled material.

### Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

#### Gloves and Clothing

- ▶ Avoid skin contact with **Mercury**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Butyl, Nitrile, Neoprene, Polyvinyl Chloride, Silver Shield®/4H® and Viton for gloves, and Tychem® fabrics, or the equivalent, as protective materials for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

#### Eye Protection

- ▶ Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- ▶ If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.

#### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **0.05 mg/m<sup>3</sup>** (as **Mercury vapor**), or over **0.1 mg/m<sup>3</sup>** but less than **1 mg/m<sup>3</sup>** (as **Mercury**), use a NIOSH approved half-mask respirator with cartridges specific for **Mercury vapor**. These cartridges have end of service life indicators (ESLI) which visually indicate when filters must be changed.
- ▶ If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Mercury**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential exists for exposure over **0.5 mg/m<sup>3</sup>** (as **Mercury vapor**) or over **1 mg/m<sup>3</sup>** (as **Mercury**), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to **10 mg/m<sup>3</sup>** (as **Mercury**) is immediately dangerous to life and health. If the possibility of exposure above **10 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

### Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ Extinguish fire using an agent suitable for type of surrounding fire. **Mercury** itself does not burn.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE.
- ▶ Use water spray to keep fire-exposed containers cool.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Mercury** is spilled or leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Cover with a *Sulfur compound* to keep from vaporizing and collect with a charcoal filter vacuum. Kits specific for the clean-up of *Mercury* spills are available. DO NOT USE a regular or shop vacuum.
- ▶ Use *Zinc* or *Copper flakes* and a flashlight to check for remaining **Mercury** after clean-up.
- ▶ Ventilate and wash area of spill or leak.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **Mercury** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with **Mercury** you should be trained on its proper handling and storage.

- ▶ **Mercury** reacts with ACETYLENE to form explosive *Acetylide*.
- ▶ **Mercury** can form explosive compounds with AMMONIA and will explode when mixed with CHLORINE DIOXIDE; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and METHYL AZIDE.
- ▶ **Mercury** is not compatible with COMBUSTIBLE MATERIALS; METALS (such as ALUMINUM and COPPER); CALCIUM; SODIUM CARBIDE; AMINES; LITHIUM; and RUBIDIUM.
- ▶ Store in tightly closed containers in a cool, well-ventilated area.

### Occupational Health Information Resources

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#### For more information, please contact:

New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

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**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeated** is the movement of chemicals through protective materials.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

**Protective Action Criteria (PAC)** are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



# Right to Know Hazardous Substance Fact Sheet

Emergency  
Responders  
Quick Reference

Common Name: **MERCURY, ELEMENTAL AND INORGANIC COMPOUNDS**

Synonyms: Colloidal Mercury; Quicksilver

CAS No: 7439-97-6

Molecular Formula: Hg

RTK Substance No: 1183

Description: Heavy, silvery, liquid metal

## HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<b>3 - Health</b> <b>0 - Fire</b> <b>0 - Reactivity</b> DOT#: UN 2809 ERG Guide #: 172 Hazard Class: 8 (Corrosive)	Extinguish fire using an agent suitable for type of surrounding fire. <b>Mercury</b> itself does not burn. POISONOUS GASES ARE PRODUCED IN FIRE. Use water spray to keep fire-exposed containers cool.	<b>Mercury</b> reacts with ACETYLENE to form explosive <i>Acetylides</i> . <b>Mercury</b> can form explosive compounds with AMMONIA and will explode when mixed with CHLORINE DIOXIDE; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and METHYL AZIDE. <b>Mercury</b> is not compatible with COMBUSTIBLE MATERIALS; METALS (such as ALUMINUM and COPPER); CALCIUM; SODIUM CARBIDE; AMINES; LITHIUM; and RUBIDIUM.

## SPILL/LEAKS

### Isolation Distance:

Spill: 50 meters (150 feet)

Fire: 500 meters (1/3 mile)

Cover spill with a *Sulfur compound* to prevent vaporization and collect with a charcoal filter vacuum.

Use *Zinc* or *Copper flakes* and a flashlight to check for remaining **Mercury** after clean-up.

**Mercury** is very toxic to aquatic life and bioaccumulates.

## PHYSICAL PROPERTIES

<b>Odor Threshold:</b>	Odorless
<b>Flash Point:</b>	Nonflammable
<b>Vapor Density:</b>	6.9 (air = 1)
<b>Vapor Pressure:</b>	0.002 mm Hg at 77°F (25°C)
<b>Specific Gravity:</b>	13.6 (water = 1)
<b>Water Solubility:</b>	Insoluble
<b>Boiling Point:</b>	674°F (357°C)
<b>Melting Point:</b>	-38°F (-39°C)
<b>Ionization Potential:</b>	10.4 eV
<b>Molecular Weight:</b>	200.6

## EXPOSURE LIMITS

**NIOSH:** 0.05 mg/m<sup>3</sup>, 10-hr TWA (as **Mercury vapor**)  
0.1 mg/m<sup>3</sup>, Ceiling (as **Mercury**)

**ACGIH:** 0.025 mg/m<sup>3</sup>, 8-hr TWA (as **Mercury**)

**IDLH:** 10 mg/m<sup>3</sup> (as **Mercury**)

The Protective Action Criteria values are:

PAC-1 = 0.3 mg/m<sup>3</sup>

PAC-2 = 2.05 mg/m<sup>3</sup>

PAC-3 = 4.1 mg/m<sup>3</sup>

## PROTECTIVE EQUIPMENT

<b>Gloves:</b>	Butyl, Nitrile, Neoprene, Polyvinyl Chloride, Silver Shield®/4H® and Viton (>8-hr breakthrough)
<b>Coveralls:</b>	Tychem® fabrics (>8-hr breakthrough)
<b>Respirator:</b>	>0.025 mg/m <sup>3</sup> - full facepiece APR with cartridges specific for <b>Mercury</b> >0.3 mg/m <sup>3</sup> - SCBA

## HEALTH EFFECTS

<b>Eyes:</b>	Irritation
<b>Skin:</b>	Irritation
<b>Inhalation:</b>	Nose, throat and lung irritation with coughing, wheezing and/or shortness of breath Nausea, vomiting and abdominal pain

## FIRST AID AND DECONTAMINATION

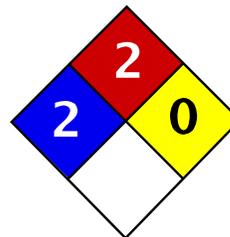
**Remove** the person from exposure.

**Flush** eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn. Seek medical attention immediately.

**Quickly** remove contaminated clothing and wash contaminated skin with large amounts of soap and water. Seek medical attention immediately.

**Begin** artificial respiration if breathing has stopped and CPR if necessary.

**Transfer** promptly to a medical facility.



Health	2
Fire	2
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet Naphthalene MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Naphthalene

**Catalog Codes:** SLN1789, SLN2401

**CAS#:** 91-20-3

**RTECS:** QJ0525000

**TSCA:** TSCA 8(b) inventory: Naphthalene

**CI#:** Not available.

**Synonym:**

**Chemical Name:** Not available.

**Chemical Formula:** C<sub>10</sub>H<sub>8</sub>

**Contact Information:**

**Sciencelab.com, Inc.**  
14025 Smith Rd.  
Houston, Texas 77396

US Sales: **1-800-901-7247**  
International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Naphthalene	91-20-3	100

**Toxicological Data on Ingredients:** Naphthalene: ORAL (LD50): Acute: 490 mg/kg [Rat]. 533 mg/kg [Mouse]. 1200 mg/kg [Guinea pig]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit]. VAPOR (LC50): Acute: 170 ppm 4 hour(s) [Rat].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant, permeator). Severe over-exposure can result in death.

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE].

The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

## Section 4: First Aid Measures

### Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

### Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

### Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

### Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 567°C (1052.6°F)

**Flash Points:** CLOSED CUP: 88°C (190.4°F). OPEN CUP: 79°C (174.2°F).

**Flammable Limits:** LOWER: 0.9% UPPER: 5.9%

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:** Not available.

### Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

### Fire Fighting Media and Instructions:

Flammable solid.

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**

Flammable solid.

Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

**Storage:**

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:**

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

Israel: TWA: 10 (ppm)  
TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) [1995]  
TWA: 52 STEL: 79 (mg/m<sup>3</sup>) from ACGIH [1995]  
Australia: STEL: 15 (ppm)  
Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Crystalline solid.)

**Odor:** Aromatic.

**Taste:** Not available.

**Molecular Weight:** 128.19 g/mole

**Color:** White.

**pH (1% soln/water):** Not available.

**Boiling Point:** 218°C (424.4°F)

**Melting Point:** 80.2°C (176.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.162 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** 4.4 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 0.038 ppm

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:**

Partially dispersed in hot water, methanol, n-octanol.

Very slightly dispersed in cold water.

See solubility in methanol, n-octanol.

**Solubility:**

Partially soluble in methanol, n-octanol.

Very slightly soluble in cold water, hot water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Highly reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** May attack some forms of rubber and plastic

**Polymerization:** No.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 490 mg/kg [Rat].

Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit].

Acute toxicity of the vapor (LC50): 170 ppm 4 hour(s) [Rat].

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

**DEVELOPMENTAL TOXICITY:** Classified Development toxin [POSSIBLE].

The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS).

**Other Toxic Effects on Humans:**

Very hazardous in case of ingestion.

Hazardous in case of inhalation.

Slightly hazardous in case of skin contact (irritant, permeator).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

### Section 12: Ecological Information

**Ecotoxicity:** Ecotoxicity in water (LC50): 305.2 ppm 96 hour(s) [Trout].

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

### Section 14: Transport Information

**DOT Classification:** CLASS 4.1: Flammable solid.

**Identification:** : Naphthalene, refined : UN1334 PG: III

**Special Provisions for Transport:** Marine Pollutant

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

Rhode Island RTK hazardous substances: Naphthalene

Pennsylvania RTK: Naphthalene

Florida: Naphthalene

Minnesota: Naphthalene

Massachusetts RTK: Naphthalene

TSCA 8(b) inventory: Naphthalene

TSCA 8(a) PAIR: Naphthalene

TSCA 8(d) H and S data reporting: Naphthalene: 06/01/87

SARA 313 toxic chemical notification and release reporting: Naphthalene: 1%

CERCLA: Hazardous substances.: Naphthalene: 100 lbs. (45.36 kg)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**

CLASS B-4: Flammable solid.

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

CLASS D-2B: Material causing other toxic effects (TOXIC).

**DSCL (EEC):**

R36- Irritating to eyes.

R40- Possible risks of irreversible effects.

R48/22- Harmful: danger of serious damage to health by prolonged exposure if swallowed.

R48/23- Toxic: danger of serious damage to health by prolonged exposure through inhalation.

R63- Possible risk of harm to the unborn child.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 2

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 2

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/11/2005 01:30 PM

**Last Updated:** 10/11/2005 01:30 PM

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# Material Safety Data Sheet

## Nickel Metal

ACC# 16240

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Nickel Metal**Catalog Numbers:** N40-500**Synonyms:****Company Identification:**

Fisher Scientific  
1 Reagent Lane  
Fair Lawn, NJ 07410

**For information, call:** 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7440-02-0	NICKEL	100.0	231-111-4

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: white to gray white solid.

**Caution!** May cause allergic skin reaction. May cause eye irritation. May cause respiratory tract irritation. May cause cancer in humans. May cause liver and kidney damage.

**Target Organs:** Kidneys, liver, respiratory system.

#### Potential Health Effects

**Eye:** May cause eye irritation.

**Skin:** May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May cause severe irritation and possible burns. May cause dermatitis.

**Ingestion:** Causes gastrointestinal irritation with nausea, vomiting and diarrhea.

**Inhalation:** Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. Inhalation of a mist of this material may cause respiratory tract irritation. Breathing Nickel (Dust and Fume) can cause a sore or hole in the "bone" (septum) dividing the inner nose.

**Chronic:** Prolonged or repeated skin contact may cause sensitization dermatitis and possible destruction and/or ulceration. May cause respiratory tract cancer.

### Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Get medical aid if irritation develops or persists. Wash clothing before reuse. Flush skin with plenty of soap and water.

**Ingestion:** If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

**Notes to Physician:** Treat symptomatically and supportively.

**Antidote:** There exists several chelation agents. The determination of their use should be made only by qualified medical personnel.

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Dusts at sufficient concentrations can form explosive mixtures with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Dust can be an explosion hazard when exposed to heat or flame.

**Extinguishing Media:** Confining and smothering is preferable to applying water. DO NOT USE WATER, CO<sub>2</sub>, OR FOAM DIRECTLY ON FIRE ITSELF. Use DRY sand, sodium chloride powder, graphite powder, copper powder or Lith-X powder. Dousing metallic fires with water may generate hydrogen gas, an extremely dangerous explosion hazard, particularly if fire is in a confined environment.

**Flash Point:** Not applicable.

**Autoignition Temperature:** Not applicable.

**Explosion Limits, Lower:** Not available.

**Upper:** Not available.

**NFPA Rating:** (estimated) Health: 3; Flammability: 1; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Very fine particles can cause a fire or explosion. Eliminate all ignition sources. Reduce airborne dust and prevent scattering by moistening with water. Sweep up, then place into a suitable container for disposal. Carefully scoop up and place into appropriate disposal container. Provide ventilation.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Avoid ingestion and inhalation.

**Storage:** Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
NICKEL	1.5 mg/m <sup>3</sup> TWA (inhalable fraction)	0.015 mg/m <sup>3</sup> TWA 10 mg/m <sup>3</sup> IDLH	1 mg/m <sup>3</sup> TWA

**OSHA Vacated PELs:** NICKEL: 1 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to minimize contact with skin.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

## Section 9 - Physical and Chemical Properties

**Physical State:** Solid

**Appearance:** white to gray white

**Odor:** none reported

**pH:** Not available.

**Vapor Pressure:** 1 mm Hg @ 1810 C

**Vapor Density:** Not available.

**Evaporation Rate:** Not available.

**Viscosity:** Not applicable.

**Boiling Point:** 2730 deg C

**Freezing/Melting Point:** 1455 deg C

**Decomposition Temperature:** Not available.

**Solubility:** Insoluble in water.

**Specific Gravity/Density:** 8.90

**Molecular Formula:** Ni

**Molecular Weight:** 58.69

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, dust generation.

**Incompatibilities with Other Materials:** Acids, aluminum, ammonia, ammonium nitrate, bromine pentafluoride, ethylene + aluminum, dioxane, fluorine, hydrazine, hydrazoic acid, hydrogen, methanol, nitric acid, nitryl fluoride, organic solvents, oxidants, phosphorus, potassium perchlorate, selenium, sulfur and compounds.

**Hazardous Decomposition Products:** Toxic and highly flammable nickel carbonyl.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 7440-02-0: QR5950000; QR6126100; QR6555000; QR7120000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

CAS# 7440-02-0:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 10/1/89
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Nickel compounds).

**Epidemiology:** Epidemiological studies have shown an increased incidence of cancers among nickel refinery workers.

**Teratogenicity:** No information available.

**Reproductive Effects:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

**Other Studies:**

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. No information available.

**Environmental:** No information reported.

**Physical:** No information available.

**Other:** None.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** None listed.

## Section 14 - Transport Information

	US DOT	Canada TDG
<b>Shipping Name:</b>	Not regulated as a hazardous material	No information available.
<b>Hazard Class:</b>		
<b>UN Number:</b>		

Packing Group:
----------------

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 7440-02-0 is listed on the TSCA inventory.

#### Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 7440-02-0: 100 lb final RQ (no reporting of releases of this hazardous substance is require

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 7440-02-0: immediate, delayed, fire.

#### Section 313

This material contains NICKEL (CAS# 7440-02-0, 100.0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 7440-02-0 (listed as Nickel compounds) is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

#### Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

CAS# 7440-02-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 7440-02-0 is listed as a Toxic Pollutant under the Clean Water Act.

#### OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

#### STATE

CAS# 7440-02-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

#### California Prop 65

#### The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains NICKEL, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: None of the chemicals in this product are listed.

### European/International Regulations

#### European Labeling in Accordance with EC Directives

#### Hazard Symbols:

XN

#### Risk Phrases:

R 40 Limited evidence of a carcinogenic effect.

R 43 May cause sensitization by skin contact.

**Safety Phrases:**

S 22 Do not breathe dust.

S 36 Wear suitable protective clothing.

**WGK (Water Danger/Protection)**

CAS# 7440-02-0: No information available.

**Canada - DSL/NDSL**

CAS# 7440-02-0 is listed on Canada's DSL List.

**Canada - WHMIS**

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

**Canadian Ingredient Disclosure List**

CAS# 7440-02-0 is listed on the Canadian Ingredient Disclosure List.

<b>Section 16 - Additional Information</b>
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**MSDS Creation Date:** 3/19/1998

**Revision #5 Date:** 10/28/2008

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



# Right to Know Hazardous Substance Fact Sheet

Common Name: **PHENANTHRENE**

Synonyms: Phenantrin; Coal Tar Pitch Volatiles

Chemical Name: Phenanthrene

Date: August 1999      Revision: November 2010

CAS Number: 85-01-8

RTK Substance Number: 3004

DOT Number: UN 3077

## Description and Use

Phenanthrene is a colorless to white, crystalline (sand-like) solid with a faint odor. It is used in dyestuffs, explosives, research, and in making drugs. It is also a product of the incomplete combustion of wood and fossil fuels, and is found in polluted air and water.

**EMERGENCY RESPONDERS >>>> SEE LAST PAGE**

## Hazard Summary

Health Hazard	Flammability	Reactivity
HEALTH HAZARD	2	-
FLAMMABILITY	1	-
REACTIVITY	0	-
POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

## Reasons for Citation

Phenanthrene is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS, NFPA and EPA.

- Phenanthrene can affect you when inhaled.
- Contact can irritate the skin and eyes. If skin contaminated with Phenanthrene is exposed to sunlight a rash or skin burn may occur, sometimes with blisters.
- Inhaling Phenanthrene can irritate the nose and throat.
- Phenanthrene may cause a skin allergy.
- For more information, consult the Right to Know Hazardous Substance Fact Sheet on COAL TAR PITCH.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### EYES

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### SKIN

- Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water. Seek medical attention.

### INHALATION

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Phenanthrene Chemical Emergency Response

Chemical Emergency Response (CEMREC)

National Emergency (NEP)

National Response Center (NRC)

## Workplace Exposure Limits

The following exposure limits are for Coal Tar Pitch Volatiles:

OSHA: The legal airborne permissible exposure limit (PEL) is 0.1 mg/m<sup>3</sup> (as the Benzene soluble fraction) averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is 0.1 mg/m<sup>3</sup> (as the Cyclohexane extractable fraction) averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is 0.1 mg/m<sup>3</sup> (as the Benzene soluble aerosol) averaged over an 8-hour workshift.

## Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## Health Hazard Information

### Acute (Short-Term) Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to PENTANE:

- ▶ Contact can irritate the skin and eyes. If skin contaminated with PENTANE is exposed to sunlight a rash or skin burn may occur, sometimes with blisters.
- ▶ Inhaling PENTANE can irritate the nose and throat.

### Chronic (Long-Term) Effects

The following chronic (long-term) health effects can occur at some time after exposure to PENTANE and can last for months or years:

#### Cancer Hazard

- ▶ While PENTANE has been tested, it is not classifiable as to its potential to cause cancer.

#### Reproductive Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, PENTANE has not been tested for its ability to affect reproduction.

### Other Effects

- ▶ PENTANE may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.

## Medical

### Medical Treatment

If symptoms develop or overexposure is suspected, the following is recommended:

- ▶ Evaluation by a qualified allergist can help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

## Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

## Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### 0 0000 00d C 000000

- ▶ Avoid skin contact with P 000000r 0000. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ The recommended glove materials are Nitrile, Neoprene and Barrier® for *Coal Tar Extract*.
- ▶ The recommended protective clothing material for *solid* P 000000r 0000 is Tyvek®, or the equivalent.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### E 00 Pr 00000000

- ▶ Wear eye protection with side shields or goggles.
- ▶ If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.

### R 0000r 0000 Pr 00000000

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over 000 0 000<sup>□</sup>, use a NIOSH approved respirator with an organic vapor cartridge and particulate N, R or P100 prefilters. Increased protection is obtained from full facepiece powered-air purifying respirators.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect P 000000r 0000, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential exists for exposure over 0 0 000<sup>□</sup>, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus or an emergency escape air cylinder.

## Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ P 000000r 0000 may burn, but does not readily ignite.
- ▶ Use dry chemical, CO<sub>2</sub> or water as extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE.
- ▶ Use water spray to keep fire-exposed containers cool.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If PENANTRENE is spilled, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Moisten spilled material first or use a HEPA-filter vacuum for clean-up and place into sealed containers for disposal.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of PENANTRENE as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with PENANTRENE you should be trained on its proper handling and storage.

- ▶ PENANTRENE is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from HEAT and LIGHT.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where PENANTRENE is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, contact:

New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: rtk@doh.state.nj.us  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

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LOSSAR

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**American Environmental Health and Safety Agency (AEGLs)** are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **Carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **Combustible** substance is a solid, liquid or gas that will burn.

A **Corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

The **Critical Temperature** is the temperature above which a gas cannot be liquefied, regardless of the pressure applied.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Environmental Risk Protection Agency (ERPG)** values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **Fetus** is an unborn human or animal.

A **Flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **Flash Point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization Potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

**LEL or Lower Explosive Limit** is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **Mutagen** is a substance that causes mutations. A **Mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSH Act** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**PPE** is the movement of chemicals through protective materials.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

**Permissible Action Criteria (PAC)** are values established by the Department of Energy and are based on AEGLs and ERPGs. They are used for emergency planning of chemical release events.

A **Reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **Teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Relative Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually Air), at the same temperature and pressure.

The **Vapor Pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.





# Right to Know Hazardous Substance Fact Sheet

Common Name: **PHENOL**

Synonyms: Carboic Acid; Hydroxybenzene

Chemical Name: Phenol

Date: June 2001 Revision: January 2010

CAS Number: 108-95-2

RTK Substance Number: 1487

DOT Number: UN 1671

## Description and Use

**Phenol** is a colorless or white, crystalline (sand-like) solid that is usually sold or used in solution. It is used to produce phenolic resins for the construction, automotive and appliance industries, as a disinfectant, and in medicines.

- ▶ **ODOR THRESHOLD = 0.4 ppm**
- ▶ Odor thresholds vary greatly. Do not rely on odor alone to determine potentially hazardous exposures.

## Reasons for Citation

- ▶ **Phenol** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, DEP, IARC, IRIS, NFPA and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention.

### Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of water. Seek medical attention.

### Inhalation

- ▶ Remove the person from exposure.
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.
- ▶ Medical observation is recommended for 24 to 48 hours after overexposure, as pulmonary edema may be delayed.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

## EMERGENCY RESPONDERS >>>> SEE LAST PAGE

### Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	-	4
FLAMMABILITY	-	2
REACTIVITY	-	0
MUTAGEN COMBUSTIBLE POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Phenol** can affect you when inhaled and may be absorbed through the skin.
- ▶ Because this is a **MUTAGEN**, handle it as a possible carcinogen--**WITH EXTREME CAUTION**.
- ▶ Contact can severely irritate and burn the skin and eyes leading to eye damage.
- ▶ Inhaling **Phenol** can irritate the nose and throat.
- ▶ Inhaling **Phenol** can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- ▶ High levels of this substance may reduce the blood's ability to transport *Oxygen*, causing headache, fatigue, dizziness, and a blue color to the skin and lips (*methemoglobinemia*).
- ▶ Exposure can cause headache, dizziness, lightheadedness, and passing out.
- ▶ High or repeated exposure can damage the liver, kidneys and nervous system.
- ▶ **Phenol** can cause irregular heartbeat (arrhythmia).

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **5 ppm** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **5 ppm** averaged over a 10-hour workshift and **15.6 ppm**, not to be exceeded during any 15-minute work period.

ACGIH: The threshold limit value (TLV) is **5 ppm** averaged over an 8-hour workshift.

- ▶ **Phenol** is a **MUTAGEN**. Mutagens may have a cancer risk. All contact with this chemical should be reduced to the lowest possible level.
- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

### Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Phenol**:

- ▶ Contact can severely irritate and burn the skin and eyes leading to eye damage.
- ▶ Inhaling **Phenol** can irritate the nose and throat.
- ▶ Inhaling **Phenol** can irritate the lungs causing coughing and/or shortness of breath. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- ▶ High levels of this substance may reduce the blood's ability to transport *Oxygen*, causing headache, fatigue, dizziness, and a blue color to the skin and lips (*methemoglobinemia*). Exposure to very high levels may cause trouble breathing, collapse and even death.
- ▶ Exposure can cause headache, fatigue, weakness, nausea and vomiting, dizziness, lightheadedness and passing out.

#### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Phenol** and can last for months or years:

#### Cancer Hazard

- ▶ While **Phenol** has been tested, it is not classifiable as to its potential to cause cancer.
- ▶ **Phenol** is a MUTAGEN. It may cause genetic changes.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen.

#### Reproductive Hazard

- ▶ There is limited evidence that **Phenol** may damage the developing fetus in animals.

#### Other Effects

- ▶ **Phenol** can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath.
- ▶ High or repeated exposure can damage the liver, kidneys and nervous system.
- ▶ **Phenol** can cause irregular heartbeat (arrhythmia).

### Medical

#### Medical Testing

For frequent or potentially high exposure (half the PEL or greater), the following are recommended before beginning work and at regular times after that:

- ▶ Lung function tests

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Consider chest x-ray after acute overexposure
- ▶ Blood methemoglobin level
- ▶ Liver and kidney function tests
- ▶ Special 24-48 hours EKG (Holter monitor) to observe and record abnormal heart rhythms
- ▶ Exam of the nervous system

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

#### Mixed Exposures

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
- ▶ More than light alcohol consumption can cause liver damage. Drinking alcohol can increase the liver damage caused by **Phenol**.

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ For *solid Phenol*, use a vacuum to reduce dust during clean-up. DO NOT DRY SWEEP.

### Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

#### Gloves and Clothing

- ▶ Avoid skin contact with **Phenol**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Butyl, Silver Shield®/4H®, Viton and Barrier® for gloves, and Tychem® SL, BR, Responder®, and TK; and Trelchem® HPS and VPS, or the equivalent, as protective clothing materials.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

#### Eye Protection

- ▶ Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- ▶ For *solid Phenol* wear eye protection with side shields or goggles.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

#### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **5 ppm**, use a NIOSH approved full facepiece respirator with an organic vapor cartridge and particulate prefilters. Increased protection is obtained from full facepiece powered-air purifying respirators.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Phenol**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential exists for exposure over **50 ppm**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus or an emergency escape air cylinder.
- ▶ Exposure to **250 ppm** is immediately dangerous to life and health. If the possibility of exposure above **250 ppm** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

### Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **Phenol** is a COMBUSTIBLE SOLID.
- ▶ Use dry chemical, CO<sub>2</sub>, water spray or alcohol-resistant foam as extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE.
- ▶ Use water spray to keep fire-exposed containers cool.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Phenol** is spilled or leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ For **Phenol** in *solution*, cover with sand and place into sealed containers for disposal.
- ▶ Collect *solid* material in the most convenient and safe manner and place into sealed containers for disposal.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **Phenol** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with **Phenol** you should be trained on its proper handling and storage.

- ▶ **Phenol** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ALUMINUM CHLORIDE; CALCIUM HYPOCHLORITE; STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); FORMALDEHYDE; ISOCYANATES; BUTADIENE; SODIUM NITRITE; and many other materials.
- ▶ **Phenol** is corrosive to COPPER, BRASS and STAINLESS STEELS.
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from LIGHT and AIR.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **Phenol** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

#### For more information, please contact:

New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

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## GLOSSARY

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**Acute Exposure Guideline Levels (AEGLs)** are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

The **critical temperature** is the temperature above which a gas cannot be liquefied, regardless of the pressure applied.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

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**Emergency Response Planning Guideline (ERPG)** values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

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**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

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**Permeated** is the movement of chemicals through protective materials.

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A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Air*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



# Right to Know Hazardous Substance Fact Sheet

Emergency  
Responders  
Quick Reference

Common Name: **PHENOL**

Synonyms: Carboic Acid; Hydroxybenzene

CAS No: 108-95-2

Molecular Formula: C<sub>6</sub>H<sub>5</sub>OH

RTK Substance No: 1487

Description: Colorless or white, crystalline solid that is usually sold or used in solution

## HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<b>4 - Health</b> <b>2 - Fire</b> <b>0 - Reactivity</b> DOT#: UN 1671 ERG Guide #: 153 Hazard Class: 6.1 (Poison)	<b>Phenol</b> is a COMBUSTIBLE SOLID. Use dry chemical, CO <sub>2</sub> , water spray or alcohol-resistant foam as extinguishing agents. POISONOUS GASES ARE PRODUCED IN FIRE. Use water spray to keep fire-exposed containers cool.	<b>Phenol</b> is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ALUMINUM CHLORIDE; CALCIUM HYPOCHLORITE; STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); FORMALDEHYDE; ISOCYANATES; BUTADIENE; SODIUM NITRITE; and many other materials. <b>Phenol</b> is corrosive to COPPER, BRASS and STAINLESS STEELS.

## SPILL/LEAKS

### Isolation Distance:

Spill: 25 meters (75 feet) (Solid)  
50 meters (150 feet) (Liquid)

Fire: 800 meters (1/2 mile)

For **Phenol** in *solution*, cover with sand and place into sealed containers for disposal.

Collect *solid* material in the most convenient and safe manner and place into sealed containers for disposal.

DO NOT wash into sewer.

Neutralize water spills with dry lime or soda ash.

**Phenol** is harmful to aquatic life at very low concentrations.

## PHYSICAL PROPERTIES

<b>Odor Threshold:</b>	0.4 ppm
<b>Flash Point:</b>	175°F (79.4°C)
<b>LEL:</b>	1.3%
<b>UEL:</b>	8.6%
<b>Auto Ignition Temp:</b>	1,319°F (715°C)
<b>Vapor Density:</b>	3.2 (air = 1)
<b>Vapor Pressure:</b>	0.4 mm Hg at 68°F (20°C)
<b>Specific Gravity:</b>	1.1 (water = 1)
<b>Water Solubility:</b>	Soluble
<b>Boiling Point:</b>	358°F (181°C)
<b>Melting Point:</b>	106°F (41°C)
<b>Ionization Potential:</b>	8.5 eV
<b>Molecular Weight:</b>	94.1
<b>pH:</b>	6 (aqueous solution)

## EXPOSURE LIMITS

**OSHA:** 5 ppm, 8-hr TWA

**NIOSH:** 5 ppm, 10-hr TWA; 15.6 ppm, 15-min Ceiling

**ACGIH:** 5 ppm, 8-hr TWA

**IDLH:** 250 ppm

The Protective Action Criteria values are:

PAC-1 = 15 ppm PAC-2 = 23 ppm PAC-3 = 200 ppm

## PROTECTIVE EQUIPMENT

<b>Gloves:</b>	Butyl, Silver Shield®/4H®, Viton and Barrier® (>8-hr breakthrough)
<b>Coveralls:</b>	Tychem® BR, Responder®, and TK; Trelchem® HPS and VPS (>8-hr breakthrough)
<b>Respirator:</b>	>5 ppm - full facepiece APR with <i>Organic vapor cartridges</i> and <i>High efficiency prefilters</i> >50 ppm - SCBA

## HEALTH EFFECTS

**Eyes:** Irritation and burns

**Skin:** Irritation and burns

**Inhalation:** Nose, throat and lung irritation with coughing and severe shortness of breath (pulmonary edema)

Methemoglobinemia with headache, dizziness, lightheadedness and passing out

## FIRST AID AND DECONTAMINATION

**Remove** the person from exposure.

**Flush** eyes with large amounts of water for at least 30 minutes. Remove contact lenses if worn. Seek medical attention.

**Quickly** remove contaminated clothing and wash contaminated skin with large amounts of water. Seek medical attention.

**Begin** artificial respiration if breathing has stopped and CPR if necessary.

**Transfer** promptly to a medical facility.

**Medical** observation is recommended as symptoms may be delayed.



# Right to Know Hazardous Substance Fact Sheet

Common Name: **POLYCHLORINATED BIPHENYLS**

Synonyms: Aroclor; Chlorodiphenyls; PCBs

Chemical Name: 1,1'-Biphenyl, Chloro Derivs.

Date: April 2002

Revision: November 2008

CAS Number: 1336-36-3

RTK Substance Number: 1554

DOT Number: UN 2315

## Description and Use

**Polychlorinated Biphenyls** are light yellow or colorless, thick, oily liquids. They are used in hydraulic and heat transfer liquids. They were formally used in electrical capacitors and transformers.

## Reasons for Citation

- ▶ **Polychlorinated Biphenyls** are on the Right to Know Hazardous Substance List because they are cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS, NFPA and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### Eye Contact

- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

### Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

### Inhalation

- ▶ Remove the person from exposure
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

## EMERGENCY RESPONDERS >>>> SEE PAGE 6

### Hazard Summary

Hazard Rating	NJDHSS	NFPA
HEALTH	3	2
FLAMMABILITY	-	1
REACTIVITY	-	0
CARCINOGEN TERATOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Polychlorinated Biphenyls** can affect you when inhaled and by passing through the skin.
- ▶ **Polychlorinated Biphenyls** should be handled as CARCINOGENS and may be TERATOGENS. HANDLE WITH EXTREME CAUTION.
- ▶ Contact can irritate the skin and eyes.
- ▶ **Polychlorinated Biphenyls** may cause brownish pigmentation of the skin, eyes and fingernails.
- ▶ Skin contact may cause an acne-like rash (chloracne).
- ▶ Inhaling the vapors can irritate the nose, throat and lungs.
- ▶ Exposure to **Polychlorinated Biphenyls** can cause headache, nausea, vomiting, loss of weight and abdominal pain.
- ▶ High exposure can damage the nervous system causing headache, numbness, weakness, and tingling ("pins and needles) in the arms and legs.
- ▶ **Polychlorinated Biphenyls** may damage the liver.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **1 mg/m<sup>3</sup>** (42% Chlorine) and **0.5 mg/m<sup>3</sup>** (54% Chlorine) averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.001 mg/m<sup>3</sup>** averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is **1 mg/m<sup>3</sup>** (42% Chlorine) and **0.5 mg/m<sup>3</sup>** (54% Chlorine) averaged over an 8-hour workshift.

- ▶ **Polychlorinated Biphenyls** are PROBABLE CARCINOGENS and TERATOGENS in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

### Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

### Health Hazard Information

#### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Polychlorinated Biphenyls**:

- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling the vapors can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- ▶ Exposure to **Polychlorinated Biphenyls** can cause headache, nausea, vomiting, loss of weight and abdominal pain.

#### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Polychlorinated Biphenyls** and can last for months or years:

#### Cancer Hazard

- ▶ **Polychlorinated Biphenyls** are PROBABLE CARCINOGENS in humans. There is evidence that they cause cancer of the skin, brain, and pancreas in humans and have been shown to cause liver and pituitary cancer, and leukemia, in animals.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen.

#### Reproductive Hazard

- ▶ **Polychlorinated Biphenyls** may be TERATOGENS in humans since they are teratogens in animals.
- ▶ There is limited evidence that **Polychlorinated Biphenyls** may affect male and female fertility.

#### Other Effects

- ▶ **Polychlorinated Biphenyls** may cause brownish pigmentation of the skin, eyes and fingernails.
- ▶ Skin contact may cause an acne-like rash (chloracne).
- ▶ High exposure can damage the nervous system causing headache, numbness, weakness, and tingling ("pins and needles") in the arms and legs.
- ▶ **Polychlorinated Biphenyls** may damage the liver.

### Medical

#### Medical Testing

Before beginning employment and at regular times after that, for frequent or potentially high exposures, the following are recommended:

- ▶ Liver function tests
- ▶ Exam of the skin and fingernails

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Blood PCB levels
- ▶ Exam of the nervous system

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

#### Mixed Exposures

- ▶ More than light alcohol consumption can cause liver damage. Drinking alcohol can increase the liver damage caused by **Polychlorinated Biphenyls**.

### Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Where possible, transfer **Polychlorinated Biphenyls** from drums or other containers to process containers in an enclosed system.

### Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

#### Gloves and Clothing

- ▶ Avoid skin contact with **Polychlorinated Biphenyls**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Butyl, Neoprene, Polyvinyl Chloride, Silver Shield®/4H® and Viton for gloves, and Tychem® CPF 2, SL, CPF 4 and Responder®, or the equivalent, as protective materials for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

#### Eye Protection

- ▶ Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

#### Respiratory Protection

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **0.001 mg/m<sup>3</sup>**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to **5 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **5 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

### Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **Polychlorinated Biphenyls** may burn, but do not readily ignite.
- ▶ Use dry chemical, CO<sub>2</sub>, water spray or alcohol-resistant foam as extinguishing agents.
- ▶ **POISONOUS GASES ARE PRODUCED IN FIRE**, including *Polychlorinated Dibenzofurans* and *Chlorinated Dibenzo-p-dioxins*.
- ▶ Use water spray to keep fire-exposed containers cool.

## Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Polychlorinated Biphenyls** are spilled or leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Absorb liquids in vermiculite, dry sand, earth, or a similar material and place into sealed containers for disposal.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **Polychlorinated Biphenyls** as HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

## Handling and Storage

Prior to working with **Polychlorinated Biphenyls** you should be trained on its proper handling and storage.

- ▶ **Polychlorinated Biphenyls** are not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC).
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from STRONG ULTRAVIOLET LIGHT and SUNLIGHT.

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### For more information, please contact:

New Jersey Department of Health & Senior Services  
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PO Box 368  
Trenton, NJ 08625-0368  
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E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
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**Vapor Density** is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



Common Name: **POLYCHLORINATED BIPHENYLS**

Synonyms: Aroclor; Chlorodiphenyls; PCBs

CAS No: 1336-36-3

Molecular Formula:  $C_{12}H_{10-n}Cl_n$

RTK Substance No: 1554

Description: Light yellow or colorless, thick, oily liquids

## HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<b>3 - Health</b> <b>1 - Fire</b> <b>0 - Reactivity</b> DOT#: UN 2315 ERG Guide #: 171 Hazard Class: 9 (Miscellaneous Hazardous Materials)	<b>Polychlorinated Biphenyls</b> may burn, but do not readily ignite. Use dry chemical, CO <sub>2</sub> , water spray or alcohol-resistant foam as extinguishing agents. POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Polychlorinated Dibenzofurans</i> and <i>Chlorinated Dibenzo-p-dioxins</i> . Use water spray to keep fire-exposed containers cool.	<b>Polychlorinated Biphenyls</b> are not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC).

## SPILL/LEAKS

**Isolation Distance:**

Spills: 50 meters (150 feet)

Fire: 800 meters (1/2 mile)

Absorb liquids in vermiculite, dry sand, earth, or a similar material and place into sealed containers for disposal.

DO NOT wash into sewer.

**Polychlorinated Biphenyls** bioaccumulate and are hazardous to the environment.

## PHYSICAL PROPERTIES

**Flash Point:** 286° to 385°F (141° to 196°C)

**Auto Ignition Temp:** 464°F (240°C)

**Vapor Pressure:** 0.001 mm Hg at 68°F (20°C)

**Specific Gravity:** 1.3 (water = 1)

**Water Solubility:** Insoluble

**Boiling Point:** 617° to 734°F (325° to 390°C)

**Melting Point:** -2° to 50°F (-19° to 10°C)

**Molecular Weight:** 258 to 326

## EXPOSURE LIMITS

**OSHA:** 1 mg/m<sup>3</sup>, 8-hr TWA (42% Chlorine) and 0.5 mg/m<sup>3</sup>, 8-hr TWA (54% Chlorine)

**NIOSH:** 0.001 mg/m<sup>3</sup>, 10-hr TWA

**ACGIH:** 1 mg/m<sup>3</sup>, 8-hr TWA (42% Chlorine) and 0.5 mg/m<sup>3</sup>, 8-hr TWA (54% Chlorine)

**IDLH:** 5 mg/m<sup>3</sup>

## PROTECTIVE EQUIPMENT

**Gloves:** Butyl, Neoprene, Polyvinyl Chloride, Silver Shield®/4H® and Viton (>4-hr breakthrough)

**Coveralls:** Tychem® CPF 2, SL, CPF 4 and Responder® (>8-hr breakthrough)

**Respirator:** >0.001 mg/m<sup>3</sup> - Supplied air or SCBA

## HEALTH EFFECTS

**Eyes:** Irritation

**Skin:** Irritation

**Inhalation:** Nose, throat and lung irritation with coughing, wheezing and shortness of breath

Headache, nausea, vomiting, and abdominal pain

**Chronic:** Cancer (skin, brain, pancreas) in humans

## FIRST AID AND DECONTAMINATION

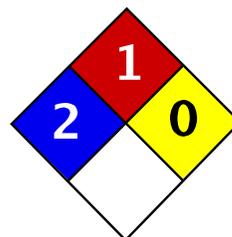
**Remove** the person from exposure.

**Flush** eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.

**Quickly** remove contaminated clothing and wash contaminated skin with large amounts of soap and water.

**Begin** artificial respiration if breathing has stopped and CPR if necessary.

**Transfer** promptly to a medical facility



Health	2
Fire	1
Reactivity	0
Personal Protection	C

## Material Safety Data Sheet Pyrene MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Pyrene

**Catalog Codes:** SLP3868

**CAS#:** 129-00-00

**RTECS:** UR2450000

**TSCA:** TSCA 8(b) inventory: Pyrene

**CI#:** Not available.

**Synonym:** Benzo(D,E,F)phenanthrene

**Chemical Name:** Pyrene

**Chemical Formula:** C16-H10

**Contact Information:**

**Sciencelab.com, Inc.**  
14025 Smith Rd.  
Houston, Texas 77396

US Sales: **1-800-901-7247**  
International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Pyrene	129-00-00	100

**Toxicological Data on Ingredients:** Pyrene: ORAL (LD50): Acute: 2700 mg/kg [Rat]. 800 mg/kg [Mouse].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

Repeated or prolonged exposure is not known to aggravate medical condition.

### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

### Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:**

Slightly flammable to flammable in presence of heat, of combustible materials.  
Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available.  
Slightly explosive in presence of heat.  
Non-explosive in presence of open flames and sparks.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder.  
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

### Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

## Section 7: Handling and Storage

### Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

### Storage:

Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F). Preferably refrigerate.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Synthetic apron. Gloves (impervious).

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:** Not available.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Crystalline solid. Powdered solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 202.26 g/mole

**Color:** Yellow.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 404°C (759.2°F)

**Melting Point:** 151.2°C (304.2°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 1.271 @ 23 C (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** The product is more soluble in oil;  $\log(\text{oil/water}) = 4.9$

**Ionicity (in Water):** Not available.

**Dispersion Properties:**

Is not dispersed in cold water, hot water.  
See solubility in diethyl ether.

**Solubility:**

Soluble in diethyl ether.  
Insoluble in cold water, hot water.  
Pyrene is fairly soluble in organic solvents.  
It is soluble in alcohol, benzene, carbon disulfide, ether, petroleum ether, and toluene

### Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Excess heat, incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

### Section 11: Toxicological Information

**Routes of Entry:** Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 800 mg/kg [Mouse].

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.

**Other Toxic Effects on Humans:**

Hazardous in case of ingestion, of inhalation.

Slightly hazardous in case of skin contact (irritant, permeator).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

May affect genetic material (mutagenic).

May cause cancer (tumorigenic) according to animal data.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects:

Skin: May cause skin irritation. May be absorbed through skin.

Eyes: May cause eye irritation. Conjunctival irritation may be noted.

Inhalation: May cause respiratory tract irritation.

Ingestion: May cause gastrointestinal tract irritation. May affect behavior/Central Nervous System (excitation and muscel spasicity), liver and urinary system, and immune system, and blood.

### Section 12: Ecological Information

**Ecotoxicity:** Ecotoxicity in water (LC50): 1.8 mg/l 48 hours [Water flea].

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

### Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

### Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

### Section 15: Other Regulatory Information

**Federal and State Regulations:**

Connecticut carcinogen reporting list.: Pyrene  
Illinois chemical safety act: Pyrene  
New York release reporting list: Pyrene  
Pennsylvania RTK: Pyrene  
Massachusetts RTK: Pyrene  
Massachusetts spill list: Pyrene  
New Jersey: Pyrene  
New Jersey spill list: Pyrene  
Louisiana RTK reporting list: Pyrene  
Louisiana spill reporting: Pyrene  
California Director's list of Hazardous Substances: Pyrene  
TSCA 8(b) inventory: Pyrene  
TSCA 8(a) CAIR: Pyrene  
TSCA 8(d) H and S data reporting: Pyrene: June 1, 1987-June1, 1997  
SARA 302/304/311/312 extremely hazardous substances: Pyrene  
CERCLA: Hazardous substances.: Pyrene: 5000 lbs. (2268 kg)

**Other Regulations:** EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):**

R20/21/22- Harmful by inhalation, in contact with skin and if swallowed.

S2- Keep out of the reach of children.

S36/37- Wear suitable protective clothing and gloves.

S46- If swallowed, seek medical advice immediately and show this container or label.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** C

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves (impervious).

Synthetic apron.

Not applicable.

Safety glasses.

**Section 16: Other Information**

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 06:14 PM

**Last Updated:** 11/06/2008 12:00 PM

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New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **SILVER**

CAS Number: 7440-22-4  
DOT Number: None

RTK Substance number: 1669  
Date: January 1986 Revision: October 2002

## HAZARD SUMMARY

- \* **Silver dust** can affect you when breathed in.
- \* Contact can irritate the skin and eyes.
- \* Breathing **Silver dust** can irritate the nose and throat.
- \* Repeated exposures to **Silver dust** can cause blue-gray discoloration (argyria) of the eyes, skin, nose, mouth, throat and internal body organs. This may take years to develop but is permanent.
- \* **Silver** may affect the kidneys.

## IDENTIFICATION

**Silver** is a brilliant white metal. It is used in making jewelry, silverware and mirrors, and in photography, solders and electroplating.

## REASON FOR CITATION

- \* **Silver** is on the Hazardous Substance List because it is regulated by OSHA cited by ACGIH, NIOSH, DEP, HHAG and EPA.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

## WORKPLACE EXPOSURE LIMITS

- OSHA: The legal airborne permissible exposure limit (PEL) is **0.01 mg/m<sup>3</sup>** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **0.01 mg/m<sup>3</sup>** averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **0.1 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

## WAYS OF REDUCING EXPOSURE

- \* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Silver dust** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Silver** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

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## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Silver dust**:

- \* Contact can irritate the skin and eyes.
- \* Breathing **Silver dust** can irritate the nose and throat.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Silver dust** and can last for months or years:

### Cancer Hazard

- \* There is no evidence that **Silver dust** causes cancer in animals. This is based on test results presently available to the New Jersey Department of Health and Senior Services from published studies.

### Reproductive Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Silver dust** has not been tested for its ability to affect reproduction.

### Other Long-Term Effects

- \* Repeated exposures to **Silver dust** can cause blue-gray discoloration (argyria) of the eyes, skin, nose, mouth, throat and internal body organs. This may take years to develop but is permanent.
- \* **Silver dust** may affect the kidneys.

## MEDICAL

### Medical Testing

Before beginning employment and at regular times after that, the following are recommended:

- \* Careful, periodic exams of the eyes, inner nose, throat and skin are useful.
- \* Kidney function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

## Mixed Exposures

- \* A few medications contain **Silver**. Caution is advised in the use of these medications for persons exposed to **Silver**.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- \* Where possible, automatically transfer **Silver dust** or **powder** from drums or other storage containers to process containers.
- \* Before entering a confined space where **Silver dust** or **powder** may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Silver dust** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Silver dust**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Silver dust**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Silver dust**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Silver dust** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP**.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Silver dust**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear impact resistant eye protection with side shields or goggles.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- \* Contact lenses should not be worn when working with this substance.

### Respiratory Protection

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
- \* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Silver dust**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.

- \* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- \* Where the potential exists for exposure over **0.25 mg/m<sup>3</sup>**, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- \* Exposure to **10 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **10 mg/m<sup>3</sup>** exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

## HANDLING AND STORAGE

- \* Prior to working with **Silver** you should be trained on its proper handling and storage.
- \* **Silver dust** or *powder* is not compatible with OXYGEN; OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ACETYLENE; AMMONIA; HYDROGEN PEROXIDE; ETHYLENEIMINE; STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE) BROMOAZIDE; CHLORINE TRIFLUORIDE; OXALIC; ACID; and TARTARIC ACID.
- \* Store in tightly closed containers in a cool, well-ventilated area away from LIGHT and AIR.
- \* Sources of ignition, such as smoking and open flames, are prohibited where **Silver dust** or *powder* is used, handled, or stored.
- \* Metal containers involving the transfer of **Silver dust** or *powder* should be grounded and bonded.
- \* Use only non-sparking tools and equipment, especially when opening and closing containers of **Silver dust** or *powder*.
- \* Wherever **Silver dust** or *powder* is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

#### **Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

#### **Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

#### **Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

#### **Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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## DEFINITIONS

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**HHAG** is the Human Health Assessment Group of the federal EPA.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NCI** is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.





# Right to Know Hazardous Substance Fact Sheet

Common Name: **SO<sub>2</sub>DIUM**

Synonyms: Natrium

Chemical Name: Sodium

Date: April 2001

Revision: April 2010

CAS Number: 7440-23-5

RTK Substance Number: 1674

DOT Number: UN 1428

## Description and Use

**S<sub>2</sub>d<sub>2</sub>** is an odorless, soft, silvery-white metal. It is used as a laboratory reagent, to make other chemicals and *Sodium compounds*, in non-glare lighting on highways, and as a heat transfer agent.

## Reasons for Citation

- ▶ **S<sub>2</sub>d<sub>2</sub>** is on the Right to Know Hazardous Substance List because it is cited by DOT, NFPA, and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

## FIRST AID

### E<sub>2</sub>C<sub>2</sub>

- ▶ Quickly brush off excess chemical from the face. Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.

### S<sub>2</sub>C<sub>2</sub>

- ▶ Quickly remove contaminated clothing. Immediately blot or brush off excess chemical and wash gently with large amounts of water for at least 30 minutes. Seek medical attention immediately.

### I<sub>2</sub>

- ▶ Remove the person from exposure.
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.
- ▶ Medical observation is recommended for 24 to 48 hours after overexposure, as pulmonary edema may be delayed.

## EMERGENCY NUMBERS

P<sub>2</sub>C<sub>2</sub>r<sub>2</sub>

C<sub>2</sub>EMTREC<sub>2</sub>

N<sub>2</sub>EP

N<sub>2</sub>R<sub>2</sub>C<sub>2</sub>r<sub>2</sub>

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

## Hazard Summary

<input type="checkbox"/> rd R <sub>2</sub>	N <sub>2</sub> SS	N <sub>2</sub> PA
<input type="checkbox"/> EALT <sub>2</sub>	-	3
<input type="checkbox"/> LAMMA <sub>2</sub> ILIT <sub>2</sub>	-	3
REACT <sub>2</sub> IT <sub>2</sub>	-	2
FLAMMABLE WATER AND AIR REACTIVE POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **S<sub>2</sub>d<sub>2</sub>** can affect you when inhaled.
- ▶ Contact can severely irritate and burn the skin and eyes with possible eye damage.
- ▶ Exposure can irritate the nose and throat.
- ▶ Inhaling **S<sub>2</sub>d<sub>2</sub>** can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- ▶ **S<sub>2</sub>d<sub>2</sub>** can cause headache, nausea, vomiting, diarrhea and abdominal pain.
- ▶ When **S<sub>2</sub>d<sub>2</sub>** combines with moisture from the air or skin it becomes corrosive *Sodium Hydroxide*. For more information, consult the Right to Know Hazardous Substance Fact Sheet on SODIUM HYDROXIDE.
- ▶ **S<sub>2</sub>d<sub>2</sub>** is FLAMMABLE and REACTIVE and a DANGEROUS FIRE and EXPLOSION HAZARD when exposed to WATER, STEAM, AIR or MOIST AIR.

## Workplace Exposure Limits

No occupational exposure limits have been established for **S<sub>2</sub>d<sub>2</sub>**. However, it may pose a health risk. Always follow safe work practices.

## Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## Health Hazard Information

### Acute (short-term) Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to SO<sub>2</sub>:

- ▶ Contact can severely irritate and burn the skin and eyes with possible eye damage.
- ▶ Exposure can irritate the nose and throat.
- ▶ Inhaling SO<sub>2</sub> can irritate the lungs causing coughing and/or shortness of breath. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- ▶ SO<sub>2</sub> can cause headache, nausea, vomiting, diarrhea and abdominal pain.
- ▶ When SO<sub>2</sub> combines with moisture from the air or skin, it becomes corrosive *Sodium Hydroxide*.

### Chronic (long-term) Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to SO<sub>2</sub> and can last for months or years:

#### Cancer Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, SO<sub>2</sub> has not been tested for its ability to cause cancer in animals.

#### Reproductive Hazard

- ▶ According to the information presently available to the New Jersey Department of Health and Senior Services, SO<sub>2</sub> has not been tested for its ability to affect reproduction.

#### Other Effects

- ▶ SO<sub>2</sub> can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath.

## Medical

### Medical Treatment

If symptoms develop or overexposure is suspected, the following is recommended:

- ▶ Consider chest x-ray after acute overexposure

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

### Medical Emergencies

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

## Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Before entering a confined space where **S<sub>2</sub>O<sub>2</sub>** may be present, check to make sure that an explosive concentration does not exist.
- ▶ Always keep **S<sub>2</sub>O<sub>2</sub>** dry and store under a liquid such as *Kerosene*.

## Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### 00000 00d C000000

- ▶ Avoid skin contact with **S<sub>2</sub>O<sub>2</sub>**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Nitrile gloves, and flame-retardant protective clothing for **S<sub>2</sub>O<sub>2</sub>**.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### E00 Pr00000000

- ▶ Wear eye protection with side shields or goggles.
- ▶ If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.

### R000r000r0 Pr00000000

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for overexposure to **S<sub>2</sub>O<sub>2</sub>**, use a NIOSH approved full facepiece negative pressure, air-purifying, particulate filter respirator with an N, R or P95 filter. More protection is provided by a full facepiece respirator than by a half-mask respirator.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **S<sub>2</sub>O<sub>2</sub>**, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential for high exposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus or an emergency escape air cylinder.

## Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **S<sub>2</sub>O<sub>2</sub>** is a FLAMMABLE SOLID which will ignite spontaneously in AIR or MOIST AIR and reacts violently with WATER or STEAM to produce flammable and explosive *Hydrogen gas*.
- ▶ Use dry chemicals appropriate for extinguishing metal fires such as graphite, soda ash or powdered sodium chloride.
- ▶ DO NOT USE WATER, CO<sub>2</sub> or halogenated extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE, including *Sodium Oxides*.



## LOSSAR

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Airborne Exposure Limit Values (AELVs)** are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

The **critical temperature** is the temperature above which a gas cannot be liquefied, regardless of the pressure applied.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Emergency Response Planning (ERP)** values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

**LEL or Lower Explosive Limit** is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSH** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeation** is the movement of chemicals through protective materials.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

**Permissible Action Criteria (PAC)** are values established by the Department of Energy and are based on AELVs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Relative density** is the ratio of the weight of a given volume of one gas to the weight of another (usually Air), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



Common Name: **SO<sub>2</sub>IUM**

Synonyms: Natrium

CAS No: 7440-23-5

Molecular Formula: Na

RTK Substance No: 1674

Description: Odorless, soft, silvery-white metal

HAZARD DATA

Table with hazard data including R-phrases (R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99), S-phrases (S11, S12, S13, S14, S15, S16, S17, S18, S19, S20, S21, S22, S23, S24, S25, S26, S27, S28, S29, S30, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45, S46, S47, S48, S49, S50, S51, S52, S53, S54, S55, S56, S57, S58, S59, S60, S61, S62, S63, S64, S65, S66, S67, S68, S69, S70, S71, S72, S73, S74, S75, S76, S77, S78, S79, S80, S81, S82, S83, S84, S85, S86, S87, S88, S89, S90, S91, S92, S93, S94, S95, S96, S97, S98, S99), and hazard statements (H228, H252, H253, H254, H255, H256, H257, H258, H259, H260, H261, H272, H273, H282, H283, H284, H285, H286, H287, H288, H290, H302, H303, H304, H305, H306, H307, H308, H309, H311, H312, H314, H315, H316, H317, H318, H319, H320, H321, H322, H323, H324, H325, H326, H327, H328, H329, H330, H331, H332, H333, H334, H335, H336, H337, H338, H339, H340, H341, H342, H343, H344, H345, H346, H347, H348, H349, H350, H351, H352, H353, H354, H355, H356, H357, H358, H359, H360, H361, H362, H363, H364, H365, H366, H367, H368, H369, H370, H371, H372, H373, H374, H375, H376, H377, H378, H379, H380, H381, H382, H383, H384, H385, H386, H387, H388, H389, H390, H400, H410, H411, H412, H413, H414, H415, H416, H417, H418, H419, H420, H421, H422, H423, H424, H425, H426, H427, H428, H429, H430, H431, H432, H433, H434, H435, H436, H437, H438, H439, H440, H441, H442, H443, H444, H445, H446, H447, H448, H449, H450, H451, H452, H453, H454, H455, H456, H457, H458, H459, H460, H461, H462, H463, H464, H465, H466, H467, H468, H469, H470, H471, H472, H473, H474, H475, H476, H477, H478, H479, H480, H481, H482, H483, H484, H485, H486, H487, H488, H489, H490, H491, H492, H493, H494, H495, H496, H497, H498, H499).

SPILL/LEAKS

Spill: 25 meters (75 feet)
Fire: 800 meters (1/2 mile)
DO NOT sweep up dry material, keep dry, cover with dry sand, limestone or clay, and place quickly into a container of Kerosene, Naphtha, Light Oil or similar material.
Use only non-sparking tools and equipment, especially when opening and closing containers of Sodium.
DO NOT wash into sewer.
Keep Sodium out of confined spaces, such as sewers, because of the possibility of an explosion.
Sodium is dangerous to aquatic life at high concentrations.

PHYSICAL PROPERTIES

Odorless
Flammable solid
>239°F (115°C)
0.003 (air = 1)
1.2 mm Hg at 752°F (400°C)
0.97 (water = 1)
Decomposes (violently)
1,619°F (882°C)
208°F (98°C)
22.49

EXPOSURE LIMITS

No occupational exposure limits have been established for Sodium.
The Protective Action Criteria values are:
PAC-1 = 0.5 mg/m³ PAC-2 = 5 mg/m³
PAC-3 = 50 mg/m³

PROTECTIVE EQUIPMENT

Nitrile (>8-hr breakthrough for Kerosene and Naphtha)
Turn out gear or flash protection
>0.5 mg/m³ -full facepiece APR with High efficiency filters
>5 mg/m³ - SCBA

HEALTH EFFECTS

Irritation and burns
Irritation and burns
Nose, throat and lung irritation, with coughing, and severe shortness of breath (pulmonary edema)
Headache, dizziness, nausea and vomiting

FIRST AID AND DECONTAMINATION

Remove the person from exposure.
brush off excess chemical from the face. Flush with large amounts of water for at least 30 minutes. Remove contact lenses, if worn. Seek medical attention immediately.
remove contaminated clothing. Immediately blot or brush off excess chemical and wash with large amounts of water for at least 30 minutes. Seek medical attention immediately.
artificial respiration if breathing has stopped and CPR if necessary.
Transport promptly to a medical facility.
Observation is recommended as symptoms may be delayed.



# Right to Know Hazardous Substance Fact Sheet

Common Name: **TETRACHLOROETHYLENE**

Synonyms: Ethylene Tetrachloride; Perchloroethylene

Chemical Name: Ethene, Tetrachloro-

Date: March 2002 Revision: October 2011

CAS Number: 127-18-4

RTK Substance Number: 1810

DOT Number: UN 1897

## Description and Use

Tetrachloroethylene is a clear, colorless liquid with a sweet Ether-like odor. It is used as a dry cleaning solvent, heat transfer medium, degreaser, solvent, and drying agent for metals.

- ▶ Odor thresholds vary greatly. Do not rely on odor alone to determine potentially hazardous exposures.

## Reasons for Citation

- ▶ Tetrachloroethylene is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, IRIS, NFPA and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE LOSSAR ON PAGE

## FIRST AID

- EYES:**
- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.
- SKIN:**
- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.
- INHALATION:**
- ▶ Remove the person from exposure.
  - ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
  - ▶ Transfer promptly to a medical facility.
  - ▶ Medical observation is recommended for 24 to 48 hours after overexposure, as pulmonary edema may be delayed.

## EMERGENCY NUMBERS

PEPCON CHEMICAL SERVICE

CEMTREC

NFPA

NATIONAL RESPONSE CENTER

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

## Hazard Summary

Physical & Chemical	Health	Environment
HAZARD	3	2
LAMMABILITY	-	0
REACTIVITY	-	0

CARCINOGEN  
POISONOUS GASES ARE PRODUCED IN FIRE  
DOES NOT BURN

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ Tetrachloroethylene can affect you when inhaled and by passing through the skin.
- ▶ Tetrachloroethylene should be handled as a CARCINOGEN--WITH EXTREME CAUTION.
- ▶ Tetrachloroethylene can cause reproductive damage.
- ▶ Contact can irritate and burn the skin and eyes. Prolonged or repeated exposure can cause drying and cracking of the skin with rash, redness and blisters.
- ▶ Exposure can irritate the eyes, nose and throat.
- ▶ Inhaling Tetrachloroethylene can irritate the lungs. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency.
- ▶ Exposure can cause headache, dizziness, lightheadedness, nausea, vomiting, and passing out.
- ▶ Tetrachloroethylene may damage the liver and kidneys and affect the nervous system and heart.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is 100 ppm averaged over an 8-hour workshift, 500 ppm, not to be exceeded during any 15-minute work period, and 1000 ppm as a maximum peak for 5-minutes during any 3-hour period.

NIOSH: Recommends that exposure to occupational carcinogens be limited to the lowest feasible concentration.

ACGIH: The threshold limit value (TLV) is 100 ppm averaged over an 8-hour workshift and 500 ppm as a STEL (short-term exposure limit).

- ▶ Tetrachloroethylene is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.





## Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If TetraChloroethene is spilled or leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Absorb liquids in dry sand, earth, or a similar material and place into sealed containers for disposal.
- ▶ Ventilate area of spill or leak.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of TetraChloroethene as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

## Handling and Storage

Prior to working with TetraChloroethene you should be trained on its proper handling and storage.

- ▶ TetraChloroethene reacts violently with *finely dispersed or finely divided* METALS (such as ALUMINUM, BARIUM, LITHIUM, BERYLLIUM and ZINC).
- ▶ TetraChloroethene is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); SULFURIC ACID; NITRIC ACID; SODIUM HYDROXIDE; and POTASSIUM HYDROXIDE.
- ▶ TetraChloroethene slowly decomposes in WATER to form acids such as *Hydrogen Chloride*.
- ▶ TetraChloroethene decomposes slowly with heating, and with exposure to ultraviolet light or on contact with hot surfaces, to form toxic *Hydrogen Chloride* and *Phosgene* gases.
- ▶ Store in tightly closed containers in a cool, well-ventilated area.

## Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

TetraChloroethene

New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: [rtk@doh.state.nj.us](mailto:rtk@doh.state.nj.us)  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

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# New Jersey Department of Health and Senior Services

## HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **THALLIUM**

CAS Number: 7440-28-0  
DOT Number: UN 1707

RTK Substance number: 1840  
Date: March 1998 Revision: November 2004

### HAZARD SUMMARY

- \* **Thallium** can affect you when breathed in and by passing through your skin.
- \* **Thallium** can irritate and burn the skin and eyes.
- \* Prolonged contact can cause blurred vision and/or loss of vision, nail changes, skin rash and dryness, and hair loss.
- \* Exposure can cause fatigue, poor appetite, nausea, vomiting, metallic taste, insomnia, confusion and mood changes.
- \* **Thallium** can damage the nervous system causing headache, weakness, irritability, pain, and "pins and needles" in the arms and legs.
- \* Repeated exposures can cause tremor, convulsions, hallucinations, coma and death.
- \* **Thallium** may damage the liver and kidneys.

### IDENTIFICATION

**Thallium** is a solid, bluish-white metal. It is used in rodenticides for the control of vermin, and in the production of semi-conductors, photoelectric equipment, lenses and thermometers. **Thallium** is contained in flue dusts from *Lead* and *Zinc* smelters.

### REASON FOR CITATION

- \* **Thallium** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP and EPA.
- \* Definitions are provided on page 5.

### HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

### WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **0.1 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **0.1 mg/m<sup>3</sup>** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **0.1 mg/m<sup>3</sup>** averaged over an 8-hour workshift.

- \* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

### WAYS OF REDUCING EXPOSURE

- \* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Thallium** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Thallium** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

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## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Thallium**:

- \* **Thallium** can irritate and burn the skin and eyes.
- \* Exposure can cause fatigue, poor appetite, nausea, vomiting, metallic taste, insomnia, confusion and mood changes.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Thallium** and can last for months or years:

### Cancer Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Thallium** has not been tested for its ability to cause cancer in animals.

### Reproductive Hazard

- \* While **Thallium** has not been identified as a reproductive hazard, it should be HANDLED WITH CAUTION since several related *Thallium compounds* are teratogens in animals.

### Other Long-Term Effects

- \* Prolonged contact can cause blurred vision and/or loss of vision, nail changes, skin rash and dryness, and hair loss.
- \* **Thallium** can damage the nervous system causing headache, weakness, irritability, pain, and "pins and needles" in the arms and legs.
- \* Repeated exposures can cause tremor, convulsions, hallucinations, coma and death.
- \* **Thallium** may damage the liver and kidneys.

## MEDICAL

### Medical Testing

For those with frequent or potentially high exposure (half the PEL or greater), the following is recommended before beginning work and at regular times after that:

- \* Complete exam of the nervous system.

If symptoms develop or overexposure is suspected, the following are recommended:

- \* Complete visual exam.
- \* Liver and kidney function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

### Mixed Exposures

- \* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by **Thallium**.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- \* Where possible, automatically transfer **Thallium** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Thallium** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Thallium**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Thallium**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Thallium**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Thallium** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Thallium**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear impact resistant eye protection with side shields or goggles.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

### Respiratory Protection

#### IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
- \* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Thallium**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.

- \* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- \* Where the potential exists for exposure over **1 mg/m<sup>3</sup>**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- \* Exposure to **15 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **15 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

- Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
- A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.
- Q: Who is at the greatest risk from reproductive hazards?
- A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.
- Q: Should I be concerned if a chemical is a teratogen in animals?
- A: Yes. Although some chemicals may affect humans differently than they affect animals, damage to animals suggests that similar damage can occur in humans.

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 The following information is available from:

New Jersey Department of Health and Senior Services  
 Occupational Health Service  
 PO Box 360  
 Trenton, NJ 08625-0360  
 (609) 984-1863  
 (609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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## DEFINITIONS

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

**CFR** is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

**IRIS** is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



# Material Safety Data Sheet

## Toluene, 99%

ACC# 96584

### Section 1 - Chemical Product and Company Identification

**MSDS Name:** Toluene, 99%**Catalog Numbers:** AC177160000, AC177160010, AC177160025, AC177160200, AC177160250**Synonyms:** Methacide; Methylbenzene; Methylbenzol; Phenylmethane; Toluol.**Company Identification:**

Acros Organics N.V.  
One Reagent Lane  
Fair Lawn, NJ 07410

**For information in North America, call:** 800-ACROS-01**For emergencies in the US, call CHEMTREC:** 800-424-9300

### Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
108-88-3	Benzene, methyl-	>99.0	203-625-9

**Hazard Symbols:** XN F**Risk Phrases:** 11 20

### Section 3 - Hazards Identification

#### EMERGENCY OVERVIEW

Appearance: colorless liquid. Flash Point: 40 deg F. **Flammable liquid and vapor.** May cause central nervous system depression. May cause liver and kidney damage. This substance has caused adverse reproductive and fetal effects in animals. Causes digestive and respiratory tract irritation. May cause skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage.

**Danger!** Harmful or fatal if swallowed. Causes eye irritation and possible transient injury. Poison! May be absorbed through intact skin. Vapor harmful. Call physician immediately.

**Target Organs:** Kidneys, central nervous system, liver.

#### Potential Health Effects

**Eye:** Causes eye irritation. May result in corneal injury. Vapors may cause eye irritation.

**Skin:** May cause skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May be absorbed through the skin.

**Ingestion:** Aspiration hazard. May cause irritation of the digestive tract. May cause effects similar to those for inhalation exposure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

**Inhalation:** Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Inhalation of vapor may cause respiratory tract irritation. May cause liver and kidney damage. Vapors may cause dizziness or suffocation. Overexposure may cause dizziness, tremors, restlessness, rapid heart beat, increased blood pressure, hallucinations, acidosis, kidney failure.

**Chronic:** Prolonged or repeated skin contact may cause dermatitis. May cause cardiac sensitization and severe heart abnormalities. May cause liver and kidney damage.

## Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

**Skin:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

**Ingestion:** Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

**Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Notes to Physician:** Causes cardiac sensitization to endogenous catecholamines which may lead to cardiac arrhythmias. Do NOT use adrenergic agents such as epinephrine or pseudoepinephrine.

## Section 5 - Fire Fighting Measures

**General Information:** Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water. For small fires, use dry chemical, carbon dioxide, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out. For large fires, use water spray, fog or regular foam.

**Flash Point:** 40e deg F ( 4.44 deg C)

**Autoignition Temperature:** 896 deg F ( 480.00 deg C)

**Explosion Limits, Lower:** 1.1

**Upper:** 7.1

**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Instability: 0

## Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as saw dust. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

**Storage:** Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzene, methyl-	50 ppm TWA; skin - potential for cutaneous absorption	100 ppm TWA; 375 mg/m <sup>3</sup> TWA 500 ppm IDLH	200 ppm TWA; 300 ppm Ceiling

**OSHA Vacated PELs:** Benzene, methyl-: 100 ppm TWA; 375 mg/m<sup>3</sup> TWA

### Personal Protective Equipment

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to prevent skin exposure.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

## Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Appearance:** colorless

**Odor:** sweetish odor - pleasant odor

**pH:** Not available.

**Vapor Pressure:** 36.7 mm Hg @ 30C

**Vapor Density:** 3.1 (Air=1)

**Evaporation Rate:**2.4 (Butyl acetate=1)

**Viscosity:** 0.59 cP @ 20C

**Boiling Point:** 232 deg F

**Freezing/Melting Point:**-139 deg F

**Decomposition Temperature:**Not available.

**Solubility:** Insoluble.

**Specific Gravity/Density:**0.9 (Water=1)

**Molecular Formula:**C6H5CH3

**Molecular Weight:**92.056

## Section 10 - Stability and Reactivity

**Chemical Stability:** Stable under normal temperatures and pressures.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.

**Incompatibilities with Other Materials:** Nitrogen tetroxide, nitric acid + sulfuric acid, silver perchlorate, strong oxidizers, sodium difluoride, .

**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 108-88-3: XS5250000

**LD50/LC50:**

CAS# 108-88-3:

Draize test, rabbit, eye: 870 ug Mild;

Draize test, rabbit, eye: 2 mg/24H Severe;

Draize test, rabbit, skin: 435 mg Mild;

Draize test, rabbit, skin: 500 mg Moderate;

Draize test, rabbit, skin: 20 mg/24H Moderate;

Inhalation, mouse: LC50 = 400 ppm/24H;

Inhalation, rat: LC50 = 49 gm/m<sup>3</sup>/4H;

Oral, rat: LD50 = 636 mg/kg;

Skin, rabbit: LD50 = 14100 uL/kg;

**Carcinogenicity:**

CAS# 108-88-3:

**ACGIH:** A4 - Not Classifiable as a Human Carcinogen

**IARC:** IARC Group 3 - not classifiable

**Epidemiology:** No information available.

**Teratogenicity:** Specific developmental abnormalities included craniofacial effects involving the nose and tongue, musculoskeletal effects, urogenital and metabolic effects in studies on mice and rats by the inhalation and oral routes of exposure. Some evidence of fetotoxicity with reduced fetal weight and retarded skeletal development has been reported in mice and rats.

**Reproductive Effects:** Effects on fertility such as abortion were reported in rabbits by inhalation. Paternal effects were noted in rats by inhalation. These effects involved the testes, sperm duct and epididymis.

**Neurotoxicity:** No information available.

**Mutagenicity:** No information available.

**Other Studies:** See actual entry in RTECS for complete information.

## Section 12 - Ecological Information

**Ecotoxicity:** No data available. Bluegill LC50=17 mg/L/24H Shrimp LC50=4.3 ppm/96H Fathead minnow LC50=36.2 mg/L/96H Sunfish (fresh water) TLm=1180 mg/L/96H

**Environmental:** From soil, substance evaporates and is microbially biodegraded. In water,

substance volatilizes and biodegrades.

**Physical:** Photochemically produced hydroxyl radicals degrade substance.

**Other:** None.

## Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

**RCRA P-Series:** None listed.

**RCRA U-Series:** CAS# 108-88-3: waste number U220.

## Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
<b>Shipping Name:</b>	TOLUENE				No information available.
<b>Hazard Class:</b>	3				
<b>UN Number:</b>	UN1294				
<b>Packing Group:</b>	II				

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 108-88-3 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 108-88-3: Effective Date: 10/4/82; Sunset Date: 10/4/92

#### Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

#### Section 12b

None of the chemicals are listed under TSCA Section 12b.

#### TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

#### SARA

#### CERCLA Hazardous Substances and corresponding RQs

CAS# 108-88-3: 1000 lb final RQ; 454 kg final RQ

#### SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPO.

#### SARA Codes

CAS # 108-88-3: acute, flammable.

#### Section 313

This material contains Benzene, methyl- (CAS# 108-88-3, 99.0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

#### Clean Air Act:

CAS# 108-88-3 is listed as a hazardous air pollutant (HAP). This material does not contain any

Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

**Clean Water Act:**

CAS# 108-88-3 is listed as a Hazardous Substance under the CWA. CAS# 108-88-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 108-88-3 is listed as a Toxic Pollutant under the Clean Water Act.

**OSHA:**

None of the chemicals in this product are considered highly hazardous by OSHA.

**STATE**

CAS# 108-88-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

WARNING: This product contains Benzene, methyl-, a chemical known to the state of California to cause birth defects or other reproductive harm. California No Significant Risk Level: None of the chemicals in this product are listed.

## European/International Regulations

### European Labeling in Accordance with EC Directives

**Hazard Symbols:**

XN F

**Risk Phrases:**

R 11 Highly flammable.

R 20 Harmful by inhalation.

**Safety Phrases:**

S 16 Keep away from sources of ignition - No smoking.

S 25 Avoid contact with eyes.

S 29 Do not empty into drains.

S 33 Take precautionary measures against static discharges.

**WGK (Water Danger/Protection)**

CAS# 108-88-3: 2

**Canada - DSL/NDSL**

CAS# 108-88-3 is listed on Canada's DSL List.

**Canada - WHMIS**

This product does not have a WHMIS classification.

**Canadian Ingredient Disclosure List**

CAS# 108-88-3 is listed on the Canadian Ingredient Disclosure List.

**Exposure Limits**

CAS# 108-88-3: OEL-AUSTRALIA: TWA 100 ppm (375 mg/m<sup>3</sup>); STEL 150 ppm (560 mg/m<sup>3</sup>) OEL-BELGIUM: TWA 100 ppm (377 mg/m<sup>3</sup>); STEL 150 ppm (565 mg/m<sup>3</sup>) OEL-CZECHOSLOVAKIA: TWA 200 mg/m<sup>3</sup>; STEL 1000 mg/m<sup>3</sup> OEL-DENMARK: TWA 50 ppm (190 mg/m<sup>3</sup>); Skin OEL-FINLAND: TWA 100 ppm (375 mg/m<sup>3</sup>); STEL 150 ppm; Skin OEL-FRANCE: TWA 100 ppm (375 mg/m<sup>3</sup>); STEL 150 ppm (560 mg/m<sup>3</sup>) OEL-GERMANY: TWA 100 ppm (380 mg/m<sup>3</sup>) OEL-HUNGARY: TWA 100 mg/m<sup>3</sup>; STEL 300 mg/m<sup>3</sup>; Skin OEL-JAPAN: TWA 100 ppm (380 mg/m<sup>3</sup>) OEL-THE NETHERLANDS: TWA 100 ppm (375 mg/m<sup>3</sup>); Skin OEL-THE PHILIPPINES: TWA 100 ppm (375 mg/m<sup>3</sup>) OEL-POLAND: TWA 100 mg/m<sup>3</sup> OEL-RUSSIA: TWA 100 ppm; STEL 50 mg/m<sup>3</sup> OEL-SWEDEN: TWA 50 ppm (200 mg/m<sup>3</sup>); STEL 100 ppm (400 mg/m<sup>3</sup>); Skin OEL-SWITZERLAND: TWA 100 ppm (380 mg/m<sup>3</sup>); STEL 500 ppm OEL-THAILAND: TWA 200 ppm; STEL 300 ppm OEL-TURKEY: TWA 200 ppm (750 mg/m<sup>3</sup>) OEL-UNITED KINGDOM: TWA 100 ppm (375 mg/m<sup>3</sup>); STEL 150 ppm; Skin OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

## Section 16 - Additional Information

**MSDS Creation Date:** 6/01/1999

**Revision #5 Date:** 3/18/2003

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.*



New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **TRIMETHYL BENZENE**  
(mixed isomers)

CAS Number: 25551-13-7  
DOT Number: UN 2325

RTK Substance number: 1929  
Date: January 1997 Revision: May 2003

## HAZARD SUMMARY

- \* **Trimethyl Benzene** can affect you when breathed in.
- \* Contact can irritate the skin and eyes.
- \* Exposure can cause you to feel dizzy, lightheaded, and to pass out.
- \* Repeated exposure can cause headaches, and cause you to feel nervous, tense, tired and sleepy.
- \* **Trimethyl Benzene** may cause changes in the blood cells and affect the blood's clotting ability.
- \* **Trimethyl Benzene** can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
- \* *CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEET ON PSEUDOCUMENE.*

## IDENTIFICATION

**Trimethyl Benzene** is a colorless liquid with a distinct odor. It is used in making dyes, pharmaceuticals and antioxidants, and as a solvent.

## REASON FOR CITATION

- \* **Trimethyl Benzene** is on the Hazardous Substance List because it is cited by ACGIH, DOT, NIOSH, DEP and NFPA.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
- \* **ODOR THRESHOLD = 2.4 ppm.**
- \* The range of accepted odor threshold values is quite broad. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

## WORKPLACE EXPOSURE LIMITS

- NIOSH: The recommended airborne exposure limit is **25 ppm** averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **25 ppm** averaged over an 8-hour workshift.

## WAYS OF REDUCING EXPOSURE

- \* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Trimethyl Benzene** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Trimethyl Benzene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

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## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Trimethyl Benzene**:

- \* Contact can irritate the skin and eyes.
- \* Exposure can cause you to feel dizzy, lightheaded, and to pass out.
- \* Repeated exposure can cause headaches, and cause you to feel nervous, tense, tired and sleepy.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Trimethyl Benzene** and can last for months or years:

### Cancer Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Trimethyl Benzene** has not been tested for its ability to cause cancer in animals.

### Reproductive Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Trimethyl Benzene** has not been tested for its ability to affect reproduction.

### Other Long-Term Effects

- \* **Trimethyl Benzene** may cause changes in the blood cells and affect the blood's clotting ability.
- \* **Trimethyl Benzene** can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.

## MEDICAL

### Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

- \* Lung function tests.
- \* Complete blood count and platelet count.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

## Mixed Exposures

- \* Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- \* Where possible, automatically pump liquid **Trimethyl Benzene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Trimethyl Benzene** should change into clean clothing promptly.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Trimethyl Benzene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Trimethyl Benzene**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Trimethyl Benzene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.

## PERSONAL PROTECTIVE EQUIPMENT

**WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT.** However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and

to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Trimethyl Benzene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

### Respiratory Protection

#### IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* Where the potential exists for exposure over **25 ppm**, use a NIOSH approved full facepiece respirator with an organic vapor cartridge. Increased protection is obtained from full facepiece powered-air purifying respirators.
- \* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Trimethyl Benzene**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- \* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- \* Where the potential for high exposure exists, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

### QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**HHAG** is the Human Health Assessment Group of the federal EPA.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NCI** is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.





# Right to Know Hazardous Substance Fact Sheet

Common Name: **LENES**

Synonyms: Methyl Toluene (mixed isomers); Xylol

Chemical Name: Benzene, Dimethyl-

Date: August 2006 Revision: October 2011

CAS Number: 1330-20-7

RTK Substance Number: 2014

DOT Number: UN 1307

## Description and Use

LENES are colorless liquids with a faint, sweet odor. They are used as solvents and in making paints, adhesives and other chemicals.

- ▶ **ODOR THRESHOLDS** vary greatly. Do not rely on odor alone to determine potentially hazardous exposures.

This fact sheet can be used for:

- m*-Xylene CAS#: 108-38-3
- o*-Xylene CAS#: 95-47-6
- p*-Xylene CAS#: 106-42-3

## Reasons for Citation

- ▶ LENES are on the Right to Know Hazardous Substance List because they are cited by OSHA, ACGIH, DOT, NIOSH, DEP, IARC, IRIS, NFPA and EPA.

SEE LOSSAR ON PAGE 10

## FIRST AID

- EYES**
- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention.

- SKIN**
- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

- INHALED**
- ▶ Remove the person from exposure.
  - ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
  - ▶ Transfer promptly to a medical facility.

## EMERGENCY NUMBERS

- POISON CONTROL CENTER** 1-800-FIGHT-FIRE
- CHEM TREC** 1-800-424-9293
- NJ EP** 1-800-452-7000
- NJ RR** 1-800-452-7000

EMERGENCY RESPONDERS >>>> SEE LAST PAGE

## Hazard Summary

Physical and Chemical Hazards	Health	Environment
HAZARD	-	2
FLAMMABLE LIQUID	-	3
REACTIVITY	-	0
FLAMMABLE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ LENES can affect you when inhaled and by passing through the skin.
- ▶ Contact can irritate the skin and eyes. Prolonged or repeated contact can cause a skin rash, dryness and redness.
- ▶ Inhaling LENES can irritate the nose and throat causing coughing and wheezing.
- ▶ Exposure can cause headache, dizziness, lightheadedness and passing out. Repeated exposure can affect concentration, memory, vision, and muscle coordination. Higher levels can cause coma and death.
- ▶ LENES may damage the liver and kidneys.
- ▶ LENES are FLAMMABLE LIQUIDS and DANGEROUS FIRE HAZARDS.

## Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is 100 ppm averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is 100 ppm averaged over a 10-hour workshift and 100 ppm, not to be exceeded during any 15-minute work period.

ACGIH: The threshold limit value (TLV) is 100 ppm averaged over an 8-hour workshift and 100 ppm as a STEL (short-term exposure limit).

- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

## Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet, available on the RTK Program website ([www.nj.gov/health/eoh/rtkweb](http://www.nj.gov/health/eoh/rtkweb)) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act and the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

## Health Hazard Information

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to:

- ▶ Contact can irritate the skin and eyes.
- ▶ Inhaling can irritate the nose and throat causing coughing and wheezing.
- ▶ Exposure can cause headache, nausea and vomiting, dizziness, lightheadedness and passing out.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to and can last for months or years:

#### Cancer Hazard

- ▶ While have been tested, they are not classifiable as to their potential to cause cancer.

#### Reproductive Hazard

- ▶ may damage the developing fetus.

### Other Effects

- ▶ Repeated exposure can affect concentration, memory, vision, and muscle coordination. Higher levels can cause coma and death.
- ▶ Prolonged or repeated contact can cause a skin rash, dryness and redness.
- ▶ may damage the liver and kidneys.

## Medical

### Medical Testing

For frequent or potentially high exposure (half the PEL or greater), the following are recommended before beginning work and at regular times after that:

- ▶ Liver and kidney function tests

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Exam of the eyes and vision
- ▶ Exam of the nervous system

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

You have a legal right to request copies of your medical testing under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

### Medical Examinations

- ▶ More than light alcohol consumption can cause liver damage. Drinking alcohol can increase the liver damage caused by.

## Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at [www.cdc.gov/niosh/topics/ctrlbanding/](http://www.cdc.gov/niosh/topics/ctrlbanding/).

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Before entering a confined space where □□□□□□ may be present, check to make sure that an explosive concentration does not exist.

## Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### □ □□□□ □□□ C□□□□□□

- ▶ Avoid skin contact with □□□□□□. Wear personal protective equipment made from material that can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ The recommended glove materials for □□□□□□ are Viton/Butyl, Polyvinyl Alcohol, Silver Shield®/4H®, Viton and Barrier®.
- ▶ The recommended protective clothing materials for □□□□□□ are Tychem® BR, CSM and TK, or the equivalent.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### E□□ Pr□□□□□□□□

- ▶ Wear indirect vent goggles when working with liquids that may splash, spray or mist. A face shield is also required if the liquid is severely irritating or corrosive to the skin and eyes.

### R□□□□□□□□ Pr□□□□□□□□

**Improper use of respirators is dangerous.** Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134). O□□□ NIOS□

### □□□□□□□□ d r□□□□□□□□□□ □□□□□□□□ d □□□□□□□□

- ▶ Where the potential exists for exposure over □□□ □□□, use a full facepiece respirator with an organic vapor cartridge. Increased protection is obtained from full facepiece powered-air purifying respirators.
- ▶ Leave the area immediately if (1) while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect □□□□□□, (2) while wearing particulate filters abnormal resistance to breathing is experienced, or (3) eye irritation occurs while wearing a full facepiece respirator. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- ▶ Consider all potential sources of exposure in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- ▶ Where the potential for high exposure exists, use a supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus or an emergency escape air cylinder.
- ▶ Exposure to □□□ □□□ is immediately dangerous to life and health. If the possibility of exposure above □□□ □□□ exists, use a self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

## Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ □□□□□□ are FLAMMABLE LIQUIDS.
- ▶ Use dry chemical, CO<sub>2</sub>, water spray or foam as extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE.
- ▶ CONTAINERS MAY EXPLODE IN FIRE.
- ▶ Use water spray to keep fire-exposed containers cool.
- ▶ Vapors are heavier than air and may travel a distance to cause a fire or explosion far from the source and flash back.
- ▶ Flow or agitation may generate electrostatic charges.
- ▶ □□□□□□ may form an ignitable vapor/air mixture in closed tanks or containers.

### Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If □□□□□□ are spilled or leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Absorb *liquids* in dry sand, earth, or a similar material and place into sealed containers for disposal.
- ▶ Keep □□□□□□ out of confined spaces, such as sewers, because of the possibility of an explosion.
- ▶ Ventilate area of spill or leak.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of □□□□□□ as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

### Handling and Storage

Prior to working with □□□□□□ you should be trained on its proper handling and storage.

- ▶ □□□□□□ react with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC).
- ▶ Store in tightly closed containers in a cool, well-ventilated area.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where □□□□□□ are used, handled, or stored.
- ▶ Metal containers involving the transfer of □□□□□□ should be grounded and bonded.
- ▶ Use explosion-proof electrical equipment and fittings wherever □□□□□□ are used, handled, manufactured, or stored.
- ▶ Use only non-sparking tools and equipment, especially when opening and closing containers of □□□□□□.

### Occupational Health Information Resources

The New Jersey Department of Health and Senior Services, Occupational Health Service, offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

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New Jersey Department of Health & Senior Services  
 Right to Know Program  
 PO Box 368  
 Trenton, NJ 08625-0368  
 Phone: 609-984-2202  
 Fax: 609-984-7407  
 E-mail: rtk@doh.state.nj.us  
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

***The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.***

□□LOSSAR□

**ACGIH** is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

**Airborne Exposure Reference Level (AERLs)** are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

**Boiling point** is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

**CFR** is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

The **critical temperature** is the temperature above which a gas cannot be liquefied, regardless of the pressure applied.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

**ERG** is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

**Exposure Reference Point (ERP)** values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group.

**Ionization potential** is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

**IRIS** is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

**LEL or Lower Explosive Limit** is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSH Act** is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

**Permeation** is the movement of chemicals through protective materials.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

**Permissible Action Criteria (PAC)** are values established by the Department of Energy and are based on AERLs and ERPGs. They are used for emergency planning of chemical release events.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**UEL or Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

**Relative density** is the ratio of the weight of a given volume of one gas to the weight of another (usually Air), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.



Common Name: LENES

Synonyms: Dimethylbenzene; Methyl Toluene (mixed isomers); Xylol

CAS No: 1330-20-7

Molecular Formula: C<sub>6</sub>H<sub>4</sub>(CH<sub>3</sub>)<sub>2</sub>

RTK Substance No: 2014

Description: Colorless liquids with a faint, sweet odor

HAZARD DATA

Table with 3 columns: Hazard Codes, Physical and Chemical Hazards, and Health Hazards. Includes text like 'FLAMMABLE LIQUIDS', 'POISONOUS GASES ARE PRODUCED IN FIRE', and 'react with OXIDIZING AGENTS'.

SPILL/LEAKS

Spill: 50 meters (150 feet)
Fire: 800 meters (1/2 mile)
Absorb liquids in dry sand, earth, or a similar material and place into sealed containers for disposal.

PHYSICAL PROPERTIES

Odor Threshold 0.07 to 40 ppm
Boiling Point 63° to 77°F (17° to 25°C)
LEL 0.9 to 1.1%
UEL 6.7 to 7%
Autoignition Temperature 867° to 984°F (464° to 529°C)

EXPOSURE LIMITS

OSHA 100 ppm, 8-hr TWA
NIOSH 100 ppm, 10-hr TWA; 150 ppm, STEL
ACGIH 100 ppm, 8-hr TWA; 150 ppm, STEL
LC50 900 ppm
The Protective Action Criteria values are:
PAC-1 = 130 ppm PAC-2 = 920 ppm PAC-3 = 2,500 ppm

PROTECTIVE EQUIPMENT

Viton/Butyl, Polyvinyl Alcohol, Silver Shield®/4H®, Viton and Barrier® (>8-hr breakthrough)
Tychem® BR, CSM and TK (>8-hr breakthrough)
>100 ppm - full facepiece APR with Organic vapor cartridge
>900 ppm - SCBA

HEALTH EFFECTS

Irritation
Irritation (skin absorbable)
Nose and throat irritation with coughing and wheezing
Headache, dizziness, lightheadedness, and passing out

FIRST AID AND DECONTAMINATION

Remove the person from exposure.
Irrigate eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.
Remove contaminated clothing and wash contaminated skin with large amounts of soap and water.
Artificial respiration if breathing has stopped and CPR if necessary.
Transport promptly to a medical facility.



New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **ZINC OXIDE**

CAS Number: 1314-13-2  
DOT Number: UN 3077  
DOT Hazard Class: 9 (Miscellaneous Hazardous Material)

RTK Substance number: 2037  
Date: February 2000 Revision: January 2007

## HAZARD SUMMARY

- \* **Zinc Oxide** can affect you when breathed in.
- \* Exposure to **Zinc Oxide** can cause "metal fume fever." This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.
- \* **Zinc Oxide** may be released when welding galvanized metal.

## IDENTIFICATION

**Zinc Oxide** is a white or yellowish-white, odorless powder which is used in pigments, rubber, paints, ceramics, plastics, cosmetics and pharmaceuticals. **Zinc Oxide fumes** are fine, white, odorless particles which are formed when **Zinc** or **Zinc alloys** are heated to high temperatures (such as in welding, galvanizing and smelting).

## REASON FOR CITATION

- \* **Zinc Oxide** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP and EPA.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

## WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **5 mg/m<sup>3</sup>** (for **Zinc Oxide fume**), **15 mg/m<sup>3</sup>** (for **total dust**), and **5 mg/m<sup>3</sup>** (for **respirable dust**) averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **5 mg/m<sup>3</sup>** (for **Zinc Oxide fume and dust**) averaged over a 10-hour workshift, **10 mg/m<sup>3</sup>** as a short-term exposure limit (for **Zinc Oxide fume**), and **15 mg/m<sup>3</sup>** (for **Zinc Oxide dust**), not to be exceeded at any time.

ACGIH: The recommended airborne exposure limit is **2 mg/m<sup>3</sup>** averaged over an 8-hour workshift and **10 mg/m<sup>3</sup>** as a STEL (short-term exposure limit) for the *respirable fraction*.

## WAYS OF REDUCING EXPOSURE

- \* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Zinc Oxide** and at the end of the workshift.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Zinc Oxide** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in "hot" operations in the workplace. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated. Consult the appropriate New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheet.

## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Zinc Oxide**:

- \* Exposure to **Zinc Oxide** can cause "metal fume fever." This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Zinc Oxide** and can last for months or years:

### Cancer Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Zinc Oxide** has not been tested for its ability to cause cancer in animals.

### Reproductive Hazard

- \* **Zinc Oxide** may damage the developing fetus.

### Other Long-Term Effects

- \* **Zinc Oxide** has not been tested for other chronic (long-term) health effects.

## MEDICAL

### Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- \* Where possible, automatically transfer **Zinc Oxide** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Zinc Oxide** should change into clean clothing promptly.
- \* Do not take contaminated work clothes home. Family members could be exposed.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Zinc Oxide**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Zinc Oxide**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Zinc Oxide**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Zinc Oxide** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, applying cosmetics, smoking, or using the toilet.
- \* Use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Zinc Oxide**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear eye protection with side shields or goggles.

### Respiratory Protection

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- \* NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
- \* If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Zinc Oxide**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.

- \* Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- \* Where the potential exists for exposure over **20 mg/m<sup>3</sup>**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- \* Exposure to **500 mg/m<sup>3</sup>** is immediately dangerous to life and health. If the possibility of exposure above **500 mg/m<sup>3</sup>** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

- Q: Who is at the greatest risk from reproductive hazards?
- A: Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.
- Q: Can men as well as women be affected by chemicals that cause reproductive system damage?
- A: Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Health Service  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 984-7407 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

**Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

**Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

**Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

**Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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**DEFINITIONS**

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

**CFR** is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

**IRIS** is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEL** is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

**PIH** is a DOT designation for chemicals which are Poison Inhalation Hazards.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

**STEL** is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



**APPENDIX D**

**HEAT AND COLD STRESS FACT SHEETS**

# Fast Facts

## Protecting Yourself from Cold Stress

Workers who are exposed to extreme cold or work in cold environments may be at risk of cold stress. Extremely cold or wet weather is a dangerous situation that can cause occupational illness and injuries such as hypothermia, frostbite, trench foot, and chilblains.

### Hypothermia

A condition in which the body uses up its stored energy and can no longer produce heat. Often occurs after prolonged exposure to cold temperature.

#### Early symptoms

- Shivering
- Fatigue
- Loss of coordination
- Confusion and disorientation

#### Late symptoms

- No shivering
- Blue skin
- Dilated pupils
- Slowed pulse and breathing
- Loss of consciousness

#### First Aid

- Request immediate medical assistance.
- Move the victim into a warm room or shelter.
- Remove wet clothing.
- Warm the center of their body first—chest, neck, head, and groin—using an electric blanket; or use skin-to-skin contact under loose, dry layers of blankets, clothing, or towels.
- If conscious, warm beverages may help increase the body temperature. Do not give alcohol.
- Once temperature has increased keep them dry and wrapped in a warm blanket, including the head and neck.
- If no pulse, begin CPR.

### Frostbite

An injury to the body that is caused by freezing, which most often affects the nose, ears, cheeks, chin, fingers, or toes.

#### Symptoms

- Reduced blood flow to hands and feet
- Numbness
- Aching
- Tingling or stinging
- Bluish or pale, waxy skin

#### First Aid

- Get into a warm room as soon as possible.
- Unless necessary, do not walk on frostbitten feet or toes.
- Immerse the affected area in warm (not hot) water, or warm the affected area using body heat. Do not use a heating pad, fireplace, or radiator for warming.
- Do not massage the frostbitten area; doing so may cause more damage.

## Trench Foot

An injury of the feet resulting from prolonged exposure to wet and cold conditions that can occur at temperatures as high as 60 °F if the feet are constantly wet.

### Symptoms

- Reddening of the skin
- Numbness
- Leg cramps
- Swelling
- Tingling pain
- Blisters or ulcers
- Bleeding under the skin
- Gangrene (foot may turn dark purple, blue, or gray)

### First Aid

- Remove shoes/boots and wet socks.
- Dry feet.
- Avoid walking on feet, as this may cause tissue damage.

## Chilblains

Ulcers formed by damaged small blood vessels in the skin, caused by the repeated exposure of skin to temperatures just above freezing to as high as 60 °F.

### Symptoms

- Redness
- Itching
- Possible blistering
- Inflammation
- Possible ulceration in severe cases

### First Aid

- Avoid scratching.
- Slowly warm the skin.
- Use corticosteroid creams to relieve itching and swelling
- Keep blisters and ulcers clean and covered.

## Protect Yourself

- Monitor your physical condition and that of your coworkers.
- Wear appropriate clothing.
  - Wear several layers of loose clothing for insulation.
  - Tight clothing reduces blood circulation to the extremities.
- Be aware that some clothing may restrict movement resulting in a hazardous situation.
- Protect the ears, face, hands and feet in extremely cold or wet weather.
  - Boots should be waterproof and insulated.
  - Wear a hat to reduce the loss of body heat from your head.
- Move into warm locations during breaks; limit the amount of time outside.
- Carry extra socks, gloves, hats, jacket, blankets, a change of clothes and a thermos of hot liquid.
- Include chemical hot packs in your first aid kit.
- Avoid touching cold metal surfaces with bare skin.

### DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health

[www.cdc.gov/niosh/topics/outdoor/](http://www.cdc.gov/niosh/topics/outdoor/)

DHHS (NIOSH) Publication No. 2010-115

Telephone: 1-800-CDC-INFO

TTY: 1-888-232-6348

E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)



# Fast Facts

## Protecting Yourself from Heat Stress

Heat stress, from exertion or hot environments, places workers at risk for illnesses such as heat stroke, heat exhaustion, or heat cramps.

### Heat Stroke

A condition that occurs when the body becomes unable to control its temperature, and can cause death or permanent disability.

#### Symptoms

- High body temperature
- Confusion
- Loss of coordination
- Hot, dry skin or profuse sweating
- Throbbing headache
- Seizures, coma

#### First Aid

- Request immediate medical assistance.
- Move the worker to a cool, shaded area.
- Remove excess clothing and apply cool water to their body.

### Heat Exhaustion

The body's response to an excessive loss of water and salt, usually through sweating.

#### Symptoms

- Rapid heart beat
- Heavy sweating
- Extreme weakness or fatigue
- Dizziness
- Nausea, vomiting
- Irritability
- Fast, shallow breathing
- Slightly elevated body temperature

#### First Aid

- Rest in a cool area.
- Drink plenty of water or other cool beverages.
- Take a cool shower, bath, or sponge bath.

## Heat Cramps

Affect workers who sweat a lot during strenuous activity. Sweating depletes the body's salt and moisture levels.

### Symptoms

- Muscle cramps, pain, or spasms in the abdomen, arms or legs

### First Aid

- Stop all activity, and sit in a cool place.
- Drink clear juice or a sports beverage, or drink water with food.
  - Avoid salt tablets.
- Do not return to strenuous work for a few hours after the cramps subside.
- Seek medical attention if you have the following: heart problems, are on a low-sodium diet, or if the cramps do not subside within one hour.

## Protect Yourself

Avoid heavy exertion, extreme heat, sun exposure, and high humidity when possible. When these cannot be avoided, take the following preventative steps:

- Monitor your physical condition and that of your coworkers for signs or symptoms of heat illnesses.
- Wear light-colored, loose-fitting, breathable clothing such as cotton.
  - Avoid non-breathable synthetic clothing.
- Gradually build up to heavy work.
- Schedule heavy work during the coolest parts of day.
- Take more breaks when doing heavier work, and in high heat and humidity.
  - Take breaks in the shade or a cool area.
- Drink water frequently. Drink enough water that you never become thirsty.
- Be aware that protective clothing or personal protective equipment may increase the risk of heat-related illnesses.

### DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health

[www.cdc.gov/niosh/topics/outdoor/](http://www.cdc.gov/niosh/topics/outdoor/)

DHHS (NIOSH) Publication No. 2010-114

Telephone: 1-800-CDC-INFO

TTY: 1-888-232-6348

E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)



**APPENDIX E**

**JOBSITE SAFETY INSPECTION FORM**



Client: \_\_\_\_\_ Inspection Date: \_\_\_\_\_

Site: \_\_\_\_\_ Inspector: \_\_\_\_\_

Project Number: \_\_\_\_\_

Check one of the following: **A:** Acceptable **NA:** Not Applicable **D:** Deficiency

	A	NA	D	Remarks
1. HASP available on site for inspection?				
2. Health & Safety Compliance agreement (in HASP) appropriately signed by Langan employees and subcontractors?				
3. Hospital route map with directions posted on site?				
4. Emergency Notification List posted on site?				
5. First Aid kit available and properly stocked?				
6. Personnel trained in CPR/First Aid on site?				
7. MSDSs readily available, and all workers knowledgeable about the specific chemicals and compounds to which they may be exposed?				
8. Appropriate PPE being worn by Langan employees and subcontractors?				
9. Project site safe practices ("Standing Orders") posted?				
10. Project staff have 40-hr./8-hr./Supervisor HAZWOPER training?				
11. Project staff medically cleared to work in hazardous waste sites and fit-tested to wear respirators, if needed?				
12. Respiratory protection readily available?				
13. Health & Safety Incident Report forms available?				
14. Air monitoring instruments calibrated daily and results recorded on the Daily Instrument Calibration check sheet?				
15. Air monitoring readings recorded on the air monitoring data sheet/field log book?				
16. Subcontract workers have received 40-hr./8-hr./Spvsr. HAZWOPER training, as appropriate?				
17. Subcontract workers medically cleared to work on site, and fit-tested for respirator wear?				
18. Subcontract workers have respirators readily available?				
19. Markouts of underground utilities done prior to initiating any subsurface activities?				
20. Decontamination procedures being followed as outlined in HASP?				
21. Are tools in good condition and properly used?				
22. Drilling performed in areas free from underground objects including utilities?				
23. Adequate size/type fire extinguisher supplied?				
24. Equipment at least 20 feet from overhead powerlines?				
25. Evidence that drilling operator is responsible for the safety of his rig.				
26. Trench sides shored, layed back, or boxed?				
27. Underground utilities located and authorities contacted before digging?				

28. Ladders in trench (25-foot spacing)?				
29. Excavated material placed more than 2 feet away from excavation edge?				
30. Public protected from exposure to open excavation?				
31. People entering the excavation regarding it as a permit-required confined space and following appropriate procedures?				
32. Confined space entry permit is completed and posted?				
33. All persons knowledgeable about the conditions and characteristics of the confined space?				
34. All persons engaged in confined space operations have been trained in safe entry and rescue (non-entry)?				
35. Full body harnesses, lifelines, and hoisting apparatus available for rescue needs?				
36. Attendant and/or supervisor certified in basic first aid and CPR?				
37. Confined space atmosphere checked before entry and continuously while the work is going on?				
38. Results of confined space atmosphere testing recorded?				
39. Evidence of coordination with off-site rescue services to perform entry rescue, if needed?				
40. Are extension cords rated for this work being used and are they properly maintained?				
41. Are GFCIs provided and being used?				

**Unsafe acts observed?** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Additional remarks** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Distribution:** Project Manager (for information and follow-up) Name: \_\_\_\_\_  
 Health & Safety Officer (for corrective action) Name: \_\_\_\_\_  
 Health & Safety Coordinator (resource for corrective action and follow-up)

**APPENDIX F**

**SITE SAFETY MEETING FORM**

# **SAFETY BRIEFING**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Leader: \_\_\_\_\_ Location: \_\_\_\_\_

Work Task: \_\_\_\_\_

## **SAFETY TOPICS** *(provide some detail of discussion points)*

Chemical Exposure Hazards and Control \_\_\_\_\_

Physical Hazards and Control \_\_\_\_\_

Air Monitoring \_\_\_\_\_

PPE \_\_\_\_\_

Communications \_\_\_\_\_

Safe Work Practices \_\_\_\_\_

Emergency Response \_\_\_\_\_

Hospital/Medical Center Location \_\_\_\_\_

Phone Nos. \_\_\_\_\_

Other \_\_\_\_\_

## **FOR FOLLOW-UP** (the issues, responsibilities, due dates, etc.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **ATTENDEES**

PRINT NAME	COMPANY	SIGNATURE

Briefing Conducted By: \_\_\_\_\_

**APPENDIX G**

**DECONTAMINATION PROCEDURES**

# PERSONNEL DECONTAMINATION

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## LEVEL A DECONTAMINATION

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Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and fully-encapsulating suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Tank Change	4. If worker leaves Exclusion Zone to change air tank, this is the last step in the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, fully-encapsulating suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	SCBA Removal	6. SCBA backpack and facepiece is removed (avoid touching face with fingers). SCBA deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

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## LEVEL B DECONTAMINATION

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Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Tank Change	4. If worker leaves Exclusion Zone to change air tank, this is the last step in the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	SCBA Removal	6. SCBA backpack and facepiece is removed (avoid touching face with fingers). SCBA deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

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## LEVEL C DECONTAMINATION

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Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	4. If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Facepiece Removal	6. Facepiece is removed (avoid touching face with fingers). Facepiece deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

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## LEVEL D DECONTAMINATION

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Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boot, Gloves and Outer Garment Removal	4. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5:	Field Wash	5. Hands and face are thoroughly washed. Shower as soon as possible.

## **EQUIPMENT DECONTAMINATION**

### **GENERAL:**

Equipment to be decontaminated during the project may include tools, monitoring equipment, respirators, sampling containers, laboratory equipment and drilling equipment.

All decontamination will be done by personnel in protective gear, appropriate for the level of decontamination, as determined by the site HSO. The decontamination work tasks will be split or rotated among support and work crews.

Depending on site conditions, backhoe and pumps may be decontaminated over a portable decontamination pad to contain wash water; or, wash water may be allowed to run off into a storm sewer system. Equipment needed may include a steam generator with high-pressure water, empty drums, screens, screen support structures, and shovels. Drums will be used to hold contaminated wash water pumped from the lined pit. These drums will be labeled as such.

Miscellaneous tools and equipment will be dropped into a plastic pail, tub, or other container. They will be brushed off and rinsed with a detergent solution, and finally rinsed with clean water.

### **MONITORING EQUIPMENT:**

Monitoring equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as much of the instruments as possible with plastic without hindering the operation of the unit. The HNu or OVA meter, for example, can be placed in a clear plastic bag, which allows reading of the scale and operation of knobs. The probes can be partially wrapped keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

### **RESPIRATORS:**

Respirators will be cleaned and disinfected after every use. Taken from the drop area, the masks (with the cartridges removed and disposed of with other used disposable gear) will be immersed in a cleaning solution and scrubbed gently with a soft brush, followed by a rinse in plain warm water, and then allowed to air dry. In the morning, new cartridges will be installed. Personnel will inspect their own masks for serviceability prior to donning them. And, once the mask is on, the wearer will check the respirator for leakage using the negative and positive pressure fit check techniques.