

# **TOMAT SERVICE STATION**

**1815-1825 OCEAN AVENUE**

**BROOKLYN, NEW YORK**

**Block 7656 Lot 55 & 58**

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## **INTERM REMEDIAL MEASURE WORK PLAN**

JULY 2016

*Prepared for:*

Ocean Units LLC  
1274 49<sup>th</sup> Street; Suite 443  
Brooklyn, NY 11219



**AMC Engineering, PLLC**  
38-20 32<sup>nd</sup> Street, Suite 102  
Long Island City, NY 11101

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Attachment A	Community Air Monitoring Plan
Attachment B	Quality Assurance Project Plan
Attachment C	Health and Safety Plan

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## CERTIFICATION PAGE

I, Ariel Czemerinski, certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measure Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



7/8/16

## 1.0 INTRODUCTION

This Work Plan was prepared on behalf of Ocean Units LLC for the property known as the Tomat Service Station Site, located at 1815-1825 Ocean Avenue, Brooklyn, New York (**Figure 1**). An application for acceptance into the New York State Brownfield Cleanup Program (BCP) was submitted to the New York State Department of Environmental Conservation (NYSDEC) on May 5, 2015. The application was determined to be complete on May 15, 2015. On June 29, 2015, the DEC notified Ocean Units LLC that the Site had been accepted to the BCP (Site No. C203052) with the applicant defined as a Volunteer. The Brownfield Cleanup Agreement was executed by DEC on July 13, 2015.

This Interim Remedial Measure (IRM) Work Plan addresses the following:

1. Removal of all USTs, any associated petroleum impacted soil, hydraulic lifts and oil water separators, which will be performed to remediate the site.
2. Excavation of the west side of the site to 12 feet below grade and excavation of the east side of the site to 1 foot below grade, which will be performed for redevelopment purposes.

Removal of the USTs and shallow impacted soil will reduce the threat of potential exposure while development of a comprehensive remedial plan for the Site proceeds. Removing the shallow impacted soil will also facilitate the installation of remedial system components for deeper soils and groundwater which are to be installed beneath the new building.

### 1.1 SITE LOCATION AND DESCRIPTION

The address of the Site is 1815-1825 Ocean Avenue (Figure 1) Brooklyn, New York. The Site to be remediated and redeveloped is located in the Midwood section of Brooklyn (Kings County) and is comprised of two tax parcels (Block 7656, Lots 55 & 58) totaling 16,555 square feet (0.38 acres). The subject property is located in the City of New York and Borough of Brooklyn (Kings County). The Site is 150.5 feet wide and 110 feet deep.

The lot is currently developed with a one-story gasoline service station building and a parking lot (**Figure 2**). The building has a footprint of approximately 2,190 s.f. which, according to the NYC Department of Buildings, was constructed in 1931.

The elevation of the Site is approximately 25 feet above the National Geodetic Vertical Datum (NGVD). The area topography gradually slopes to the southwest. The depth to groundwater beneath the Site, as determined from field measurements, is approximately 20-23 feet below grade. Groundwater flow is expected to be to the south based on survey data from the RIR.

The surrounding land use is primarily residential or a mix of multifamily residential buildings to the north, east, west and south.

### 1.2 SITE GEOLOGY / HYDROGEOLOGY

The geologic setting of Long Island is well documented and consists of crystalline bedrock overlain by layers of unconsolidated deposits. According to geologic maps of the area created by

the United States Geologic Survey (USGS), the bedrock in this area of Brooklyn is an igneous intrusive classified as the Ravenswood grano-diorite of middle Ordovician to middle Cambrian age. Unconsolidated sediments overlie the bedrock and consist of Pleistocene aged sand, gravel and silty clays, deposited by glacial-fluvial activity. Non-native fill materials consisting of dredge spoils, rubble and / or other materials have historically been used to reinforce and extend shoreline areas and to raise and improve the drainage of low lying areas.

Subsurface soils at the Site consist of historic fill materials to a depth of approximately 1 foot below grade. Brown sand, brown clay, brown silty sand, brown silt is present immediately below this layer. According to the USGS topographic map for the area (Brooklyn Quadrangle), the elevation of the property is approximately 25 feet above mean sea level. The topography within the immediate area slopes gradually to the southwest.

Groundwater occurs beneath the Site at a depth of 22.15 to 23.49 feet below grade under water table conditions. Based upon on-site measurements, groundwater flow is generally to the south.

## **2.0 UST REMOVAL AND EXCAVATION**

The IRM proposed for the Site consists of the removal of all underground storage tanks and piping and the excavation, hydraulic lits, oil water separators and disposal of soil from the western half of the Site to a depth of 12 ft below grade (**Figure 4**). After USTs removal excavation will continue as needed for redevelopment. The IRM will be performed in accordance with the methods and specifications as described under the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (May, 2010).

### **2.1 GOVERNING DOCUMENTS**

Governing documents and procedures included in the Work Plan include a Site-specific HASP, a CAMP and a Soil Management Plan (SMP). Highlights of these documents and procedures are provided in the following sections.

#### **2.1.1 Health & Safety Plan (HASP)**

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by the remediation contractor, excavation subcontractor, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. A HASP has been prepared for the IRM activity at the site and is provided in **Attachment C**.

Contractors and subcontractors will have the option of adopting this HASP or developing their own site-specific document. If a contractor or subcontractor chooses to prepare their own HASP, the Project Remedial Engineer will ensure that it meets the minimum requirements as detailed in the site HASP prepared by EBC and must be submitted to and approved by the NYSDEC.

#### **2.1.2 Quality Assurance Project Plan (QAPP)**

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-pak(s) to maintain a temperature of 4°C.

Dedicated disposable sampling materials will be used for both soil and groundwater samples (if collected), eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected.

Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil;
- Rinse with tap water;
- Wash withalconox® detergent solution and scrub ;
- Rinse with tap water;
- Rinse with distilled or deionized water.

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will accompany samples each time they are transported to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory. Laboratory reports will be upgradeable to ASP category B deliverables for use in the preparation of a data usability report (DUSR). The DUSR will be applicable to all confirmation samples and final round samples. Performance monitoring samples will be in a results-only format. The QAPP prepared for the Site is provided in **Attachment B**.

### **2.1.3 Soil Management Plan (SMP)**

An SMP was prepared for excavation, handling, storage, transport and disposal of all soils/materials that are disturbed/excavated at the Site. The SMP includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations. The SMP developed for this site is presented in **Section 2.7** of this IRM.

### **2.1.4 Storm-Water Pollution Prevention Plan (SWPPP)**

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control.

The erosion and sediment controls for all remedial activity will be performed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Typical measures that will be utilized at various stages of the project to limit the potential for erosion and migration of soil include the use of hay bales, temporary stabilized construction entrances/exits, placement of silt fencing and/or hay bales around soil stockpiles, and dust control measures.

Since this IRM will consist of the removal of underground storage tanks and related tank system components, oil water separators, hydraulic lifts and the remediation of contaminants in shallow soil (to 12 ft below grade) at the Site through excavation, erosion and sediment control measures will be utilized if necessary.

### **2.1.5 Community Air Monitoring Plan (CAMP)**

The CAMP provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities.



The action levels specified require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air. The primary concerns for this site are vapors, nuisance odors and dust particulates. A CAMP was prepared for implementation of the IRM and is provided in **Attachment A**.

## **2.2 GENERAL INFORMATION**

### **2.2.1 Project Organization**

The Remedial Engineer for the excavation activity is Mr. Ariel Czemerinski, P.E. The Owner's representative in charge of the redevelopment project is NY Developers. Mr. Ramez Kabbani of NY Developers will serve as the project's Construction Manager for site preparation and redevelopment.

### **2.2.2 Remedial Engineer**

The Remedial Engineer for this project will be Mr. Ariel Czemerinski, P.E.. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the overall remedial program for the Site. The Remedial Engineer will certify that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in conformance with that Plan.

The Remedial Engineer will oversee all aspects of the Work Plan, including tank removal, soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal.

### **2.2.3 Work Plan Schedule**

The duration of the excavation and dewatering activities is eight weeks. Endpoint sampling will follow in stages as the final excavation depth is reached.

### **2.2.4 Work Hours**

The hours for operation of excavation activity will conform to the NYCDOB construction code requirements or according to specific variances issued by that agency. DEC will be notified by the Volunteer of any variances issued by the NYCDOB.

### **2.2.5 Site Security**

The lot on which the work will be performed, currently has an 8 ft high brick wall located along the north and south lot lines and a 6 ft high chain link fence along the rear of the property (east side). A 6 ft high chain link fence and gate is present along Ocean Avenue (west property line). The fences and gate will be maintained during the UST removal and associated soil excavation activity and properly secured at the end of the day.

### **2.2.6 Traffic Control**

All traffic will enter and leave the Site via a construction entrance to be located on Eckford Street. The IRM contractor will direct the arrival or departure of construction vehicles, and provide flag services as needed to maintain safe travel exiting and entering the Site. Traffic related to the IRM activity may require the staging of 10-wheel dump trucks along Eckford Street on a daily basis during soil loading activity. The local soil disposal transport route will be as follows: Exit the Site by turning left heading north on Eckford Street for 1 block to Driggs Avenue. Turn right heading west on Driggs Avenue 2 blocks to McGuinness Boulevard. Turn right on McGuinness Boulevard heading south for 5 blocks continuing under the Brooklyn Queens Expressway overpass to Meeker Avenue. Turn Left on Meeker Avenue heading north following the signs and merging left onto I-278 Brooklyn Queens Expressway East.

This route was designed to minimize or eliminate the time trucks will be on local streets. See **Figure 3** for a map of the planned truck route. Clean, empty trucks waiting to be loaded will be parked in front of the Site along Eckford Street and not on residential Streets. Site personnel will be required to park on Site or in legal all-day on-street parking spaces, near the Site or in an off-street parking lot/garage.

### **2.2.7 Pre-Construction Meeting with NYSDEC**

A pre-construction meeting with the Project Manager, Remedial Engineer, Construction Manager and Owner's Representative will take place prior to the start of major construction activities. The NYSDEC will be permitted an opportunity to participate in this meeting and will be given advance notice to enable attendance.

### **2.2.8 Emergency Contact Information**

An emergency contact sheet with names and phone numbers is included in **Table 1**. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

## **2.3 REPORTING**

### **2.3.1 Daily Reports**

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day in which remedial activity takes place. Daily reports will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP readings;
- An explanation of notable Site conditions.

Emergency conditions and changes to the Work Plan will be addressed directly to the NYSDEC Project Manager via personal communication. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

### **2.3.2 Monthly Reports**

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within 10 days following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

### **2.3.3 Construction Completion Report (CCR)**

Following completion of all IRM activity, a Construction Completion Report (CCR) will be prepared to document all aspects of the underground storage tank and contaminated soil removal. This report will be summarized in the Remedial Action Work Plan (RAWP), and included in the Final Engineering Report (FER). The CCR will be prepared in accordance with DER-10 guidelines and will include:

- A summary of the removal action including a detailed description of the extent and volume of soil excavated.
- All fully executed manifests documenting any off-site transport of waste material.
- Scaled site plan showing the location of all confirmation samples
- Results of all analyses, including summary tables, laboratory data sheets and the required laboratory data deliverables.
- Photographic documentation of the excavation and the overall removal process.
- Information on backfill imported onto the Site including amount, type and origin and copies of transport tickets from the supplier.
- Certification of the Report by a QEP or P.E. as required.

### **2.3.4 Complaint Management Plan**

Complaints from the public regarding nuisance or other Site conditions including noise, odor, truck traffic etc., will be recorded in the Site field book and reported to the NYSDEC in the daily status report.

### **2.3.5 Deviations from the IRM Work Plan**

All deviations from the IRM will require department approval prior to implementation, unless immediate action is needed to protect health and or safety.

Minor deviations from the IRMWP will be identified in the daily update report and will be noted in the Final Engineering Report. When deviations are reported, a brief discussion will be provided which will state the following:

- Reasons for deviating from the approved IRMWP;
- Effect of the deviations on overall remedy.

Major changes to the scope of work must be discussed with the NYSDEC and the NYSDOH prior to implementation. If the changes are considered to be significant enough, an addendum to the IRMWP Work Plan will be prepared and submitted to NYSDEC/NYSDOH for review.

## **2.4 MOBILIZATION**

Mobilization will include the delivery of excavation equipment and materials to the site. All on-site personnel engaged in the tank removal and excavation will receive site orientation and training in accordance with the site specific HASP, CAMP and established policies and procedures to be followed during the implementation of the Work Plan. The tank removal contractor and construction manager will each receive a copy of the Work Plan and the site specific HASP and will be briefed on their contents.

## **2.5 SITE PREPARATION**

### **2.5.1 Erosion and Sedimentation Controls**

During mobilization, a continuous line of silt fence or hay bales will be established around the perimeter of the work area as necessary to minimize off-site sediment transport during storm events. Silt fences and hay bales will also be used as needed to protect any storm drains outside the excavation areas. The silt fences will be inspected by the Contractor at the start and end of each workday and repaired immediately as needed.

### **2.5.2 Stabilized Construction Entrance(s)**

The construction entrance is stabilized with existing asphalt paving and will be maintained as necessary to provide a safe egress and ingress to the Site.

### **2.5.3 Utility Mark-outs, Easements and Permits**

The tank removal contractor and excavation contractor and its sub-contractors are solely responsible for the identification of utilities that might be affected by work under the Work Plan

and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this Work Plan. The tank removal contractor and excavation contractor and its sub-contractors are solely responsible for safe execution of all invasive and other work performed under this Work Plan. The tank removal contractor and excavation contractor and its sub-contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this Work Plan including but not limited to NYC Department of Buildings work permits. Approval of this Work Plan by NYSDEC does not constitute satisfaction of these requirements. The presence of utilities and easements on the Site will be investigated by the Contractor and it must be determined that no risk or impediment to the planned work under this Work Plan is posed by utilities or easements on the Site. The Contractor will provide copies of all permits and documentation of the utility investigation to the Remedial Engineer prior to the start of work.

#### **2.5.4 Sheeting and Shoring**

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities including excavation is the sole responsibility of the tank removal contractor and excavation contractor and its sub-contractors. The tank removal contractor and excavation contractor and its sub-contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The tank removal contractor and excavation contractor and its sub-contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the Excavation Contractor and its sub-contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

#### **2.5.5 Equipment and Material Staging**

Equipment and materials used for excavation work and tank removal will be staged on Site within the fenced perimeter. Trucks arriving for the transport of soil and other materials will be staged along Ocean Avenue in front of the Site. It is anticipated that no more than 5 trucks will be staged at a time.

#### **2.5.6 Decontamination Area**

All materials and equipment (except disposable items) will be decontaminated on specially constructed “pads” located at the exit point from the Site. At a minimum, the pads will consist of a layer of crushed stone underlain by an impervious plastic liner that has been graded to drain to the interior of the Site. The pad will be sized to accommodate the largest piece of equipment used on the project. Where effective, the equipment will be “dry” decontaminated using a broom and/or brushes. If significant amounts of soil or other contaminants remain after the dry decontamination, the equipment will also be washed down before leaving the Site. Disposable items will be containerized within the site and transported for appropriate off-site disposal.

### **2.6 REMOVAL OF UNDERGROUND STORAGE TANKS (USTs)**

Historic records and field observations indicate that two 4,000-gallon gasoline USTs, a 250-gallon waste oil UST and a 550 gallon fuel oil tank are present on-site (**Figure 2**). These tanks will be removed by a qualified tank contractor and fully trained personnel (40HR OSHA

HAZWOPER). The tank removal contractor must include or provide an individual who is a Certificate of License Holder from the NYC Fire Department.

The tank(s) will also be permanently closed/removed in accordance with 6 NYCRR Part 612.2 and 613.9 by submitting a modified Application for Petroleum Bulk Storage Registration identifying the tanks and the date of permanent closure/removal.

### **2.6.1 UST Removal**

USTs will be removed in accordance with the procedures described under the NYSDEC Memorandum for the Permanent Closure of Petroleum Storage Tanks and Section 5.5 of DER-10 as follows:

- Remove all product to its lowest draw-off point
- Drain and flush piping into the tank
- Vacuum out the tank bottom consisting of water product and sludge
- Any recovered petroleum or rinse water will be collected with a vacuum truck or within drums by a licensed waste hauler and will be disposed of as waste petroleum
- Dig down to the top of the tank and expose the upper half of the tank
- Remove the fill tube and disconnect the fill, gauge, product and vent lines and pumps. Cap and plug open ends of lines
- Temporarily plug all tank openings, complete the excavation, remove the tank and place it in a secure location
- Render the tank safe and check the tank atmosphere to ensure that petroleum vapors have been satisfactorily purged from the tank
- Clean tank or remove to a storage yard for cleaning
- If the tank is to be moved it must be transported by a licensed waste transporter. Plug and cap all holes prior to transport leaving a 1/8 inch vent hole located at the top of the tank during transport
- After cleaning the tank must be made acceptable for disposal at a scrap yard cleaning the tank interior with a high pressure rinse and cutting the tank in several pieces.

During the tank and pipe line removal the following field observations should be made and recorded:

- A description and photographic documentation of the tank and pipe line condition (pitting, holes, staining, leak points, evidence of repairs, etc.)
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.)
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation with a calibrated photoionization detector (PID).
- Following removal the Petroleum Bulk Storage (PBS) listing for the Site will be modified to show the tanks as closed-removed. An affidavit stating that the tanks were removed will also be filed with the NYCFD by the tank removal contractor.

All soil in the vicinity of the UST excavations will be field screened with a PID and visually inspected. Soil which has visible staining and PID readings above background levels will be excavated and sent to the appropriate disposal facility.

### **2.6.2 Documentation**

The Volunteer and its contractors will be responsible for filing an Affidavit of tank Removal with the NYC Fire Department and a modified NYSDEC PBS form to change the status of the tanks to Closed – Removed. The signed tank removal affidavit and the completed PBS forms will be included in the Construction Completion Report.

## **2.7 SOIL / MATERIAL MANAGEMENT PLAN**

### **2.7.1 Excavation of Petroleum Contaminated and Historic Fill Soil**

Petroleum impacted soil has been documented throughout the western half of the Site at a depth of approximately 23-25 feet below slab. Historic fill material has been identified across the Site from surface to a depth ranging from a few inches to 1 foot below grade. The historic fill material contains metals above unrestricted and restricted use SCOs including barium, copper, lead, chromium, manganese, mercury, nickel, and zinc. Petroleum contaminated soil and historic fill material will be segregated from non-contaminated native soils and disposed of off-Site at a permitted disposal facility. Petroleum contaminated soil and historic fill soil with lead levels above 1,500 mg/kg will require further segregation for disposal at alternate facilities. Excavated petroleum contaminated soil and historic fill materials will be pre-characterized via collection of waste characterization samples for "live loading" into the transport trucks during excavation.

Waste characterization will be conducted during the comment period and will consist of sample collection from five test pits or five borings. 5-point composite samples will be generated from the five test pits or five borings and grab samples will be collected as well. Frequency and amount of samples will be conducted as per the disposal facility requirements. Documentation from this sampling will be submitted to DEC.

It is anticipated that the petroleum contaminated soil and historic fill material will be performed by 40 hr HAZWOPER trained personnel. The excavation of historic fill, if classified as non-hazardous, will be performed by the excavation contractor for the construction project using trained personnel (24 hr HAZWOPER). If this material is classified as hazardous, then 40 hr HAZWOPER trained personnel will be needed to perform the excavation of this material.

Final excavation depth, length, and width will be determined in the field, and will depend on the horizontal and vertical extent of contaminated soils as identified through physical examination (PID response, odor, staining, etc.) and confirmatory sampling though it will not exceed 13 feet.

The following procedure will be used for the excavation of impacted soil (as necessary and appropriate):

- Wear appropriate health and safety equipment as outlined in the HASP;



- Prior to excavation, ensure that the area is clear of utility lines or other obstructions. Lay plastic sheeting on the ground next to the area to be excavated;
- Using a rubber-tired backhoe or track mounted excavator, remove overburden soils and stockpile or dispose of separate from the impacted soil;
- Maintain a written description and photographic documentation of the excavation.
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation with a calibrated photoionization detector (PID).
- If physically contaminated soil is present (e.g., staining, odors, sheen, PID response, etc), an attempt will be made to remove it to the extent not limited by the site boundaries. If possible, physically impacted soil will be removed using the backhoe or excavator, segregated from clean soils and overburden, and staged on separate dedicated plastic sheeting or live loaded into trucks from the disposal facility. Removal of the impacted soils will continue as practical, until visibly clean material is encountered and monitoring instruments indicate that no contaminants are present;
- Excavated soils which are temporarily stockpiled on-site will be covered with 6-mil polyethylene sheeting while disposal options are determined. Sheeting will be checked on a daily basis and replaced, repaired or adjusted as needed to provide full coverage. The sheeting will be shaped and secured in such a manner as to drain runoff and direct it toward the interior of the property;
- Once the soil excavation effort has been complete, verification or confirmatory samples will be collected from the excavation as described in **Section 2.7.4** of this document.

The excavation of impacted soil will be performed by a qualified remedial contractor and fully trained personnel (40HR OSHA HAZWOPER).

### **2.7.2 Excavation of Native Soils**

Native soils are present directly below the fill materials and may require excavation for foundation components during construction of the new building. It is expected that native soils below the fill and outside the area of petroleum affected soil, will not be contaminated. However, if evidence of contamination is discovered during excavation then this soil will be stockpiled separately from the non-contaminated native soil and disposed of accordingly. Clean native soils will be stockpiled on-site and characterized for reuse on-site in areas over excavated to remove petroleum contaminated soil. Any excess soil will be disposed of off-site as a beneficial re-use material. Clean native soils utilized on-site will be subject to a testing program to verify that they meet unrestricted SCOs prior to use.

It is anticipated that the excavation of native soil materials will be performed by the excavation contractor for the construction project.



### 2.7.3 Soil Screening Methods

Visual, olfactory, soil screening and assessment will be performed by a qualified environmental professional (QEP) during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC. Soil screening will include physical observation for odors and staining of soils and bedrock materials and scanning with a photoionization detector.

Resumes will be provided for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

### 2.7.4 Post Excavation Confirmation Sampling

Endpoint soil samples will be collected from across the Site to verify that remedial goals have been achieved. Endpoint soil samples will be collected from the Site as follows:

- (1) Following removal of the fuel oil UST, bottom and sidewall endpoint soil samples will be collected to verify that petroleum contamination does not remain. The endpoint soil samples collected from both the base and sidewalls of the fuel oil UST area will be analyzed for VOCs and SVOCs.
- (2) Following removal of the hydraulic lifts, bottom endpoint soil samples will be collected to verify that contamination does not remain. The endpoint soil samples collected from the base of the hydraulic lift area will be analyzed for VOCs, SVOCs and PCBs.
- (3) Following removal of the oil water separators, bottom endpoint soil samples will be collected to verify that contamination does not remain. The endpoint soil samples collected from the base of the oil water separator areas will be analyzed for VOCs, SVOCs and metals.
- (4) Site-wide endpoint soil samples will be collected from the base of the excavation; following removal of two 4,000-gallon gasoline USTs, removal of waste oil UST and removal of all soil needed for construction of the buildings foundation (1 foot on the east side of the site and 12 feet on the west side of the site). Side wall samples (EP28, EP29, EP30, EP31 and EP32) will be collected at the point where the east (1 foot depth) and west excavations (12 foot depth) meet. This will verify that remedial goals have been achieved. The Site-wide endpoint soil samples will be analyzed for VOCs, SVOCs, pesticides, PCBs and metals.

The approximate locations of post excavation endpoint samples are shown in **Figure 5**.

#### 2.7.4.1 Confirmation Sampling Frequency

Confirmation samples for petroleum impacted areas will be collected at a frequency as outlined in DER-10 as follows:

If impacted soil is encountered and removed to the extent practical, a minimum of five samples will be collected consisting of 4 sidewall samples (minimum of 1 per 30 linear feet of sidewall) and one bottom sample (minimum of 1 sample per 900 square feet). Samples will be biased upon field screening to the suspected location of greatest contamination.

Sitewide endpoint samples will be collected from the base of the excavation at a rate of one sample per 900 sf and from the sidewalls at the rate 1 sample per 30 linear ft. Sidewall samples will be collected unless an abutting building foundation occupies the entire side wall of an excavation. Since the planned building excavation will extend to the property line, sitewide sidewall samples when collected will be off-site. Off-site information is needed to identify the presence of contamination and support the qualitative off-site exposure assessment.

#### *2.7.4.2 Methodology*

Collected samples be placed in glass jars supplied by the analytical laboratory and stored in a cooler with ice to maintain a temperature of 4 degrees C. Samples will either be picked up at the Site by a laboratory dispatched courier at the end of the day or transported back to the EBC office where they will be picked up the following day by the laboratory courier. All samples will be analyzed by a NYSDOH ELAP certified environmental laboratory

Endpoint samples from waste oil UST area will be analyzed for VOCs by EPA Method 8260B and SVOCs by EPA method 8270. Endpoint samples from oil water separator area will be analyzed for VOCs by EPA Method 8260B), SVOCs by EPA method 8270 and TAL metals. Endpoint samples from hydraulic lift areas will be analyzed for VOCs by EPA Method 8260B, SVOCs by EPA method 8270 and PCBs by EPA method 8082.

All remaining post excavation (endpoint) soil samples will be analyzed for VOCs by EPA Method 8260B, SVOCs by EPA method 8270, pesticides/PCBs by EPA method 8081/8082 and TAL metals.

#### *2.7.4.3 Reporting of Results*

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR).

#### *2.7.4.4 QA/QC*

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be

containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-paks to maintain a temperature of 4°C.

Dedicated disposable sampling materials will be used for sample collection, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected.

Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil;
- Rinse with tap water;
- Wash withalconox® detergent solution and scrub ;
- Rinse with tap water;
- Rinse with distilled or deionized water;

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

#### 2.7.4.5 DUSR

The DUSR provides a thorough evaluation of analytical data with third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use. Verification and/or performance monitoring samples collected under this IRMWP will be reviewed and evaluated in accordance with the Guidance for the Development of Data Usability Summary Reports as presented in Appendix 2B of DER-10. The completed DUSR for verification/performance samples collected during implementation of this IRMWP will be included in the final Engineering Report.

### 2.7.5 Estimated Removal Quantities

The total quantity of soils expected for off-site disposal is approximately 4,666 cubic yards including 603 cubic yards of urban fill, 566 cubic yards of petroleum impacted soil and 4,015 cubic yards of non-contaminated native soil. The estimated quantity of soil/fill expected to be reused/relocated on Site is 550 cubic yards.

Removal of all USTs, any associated petroleum impacted soil, hydraulic lifts and oil water separators will be performed to remediate the site. Excavation of the west side of the Site to 12 feet below grade and excavation of the east side of the Site to 1 foot below grade will be performed for redevelopment purposes.

### 2.7.6 Stockpile Methods

Excavated materials which not immediately loaded and are stockpiled overnight or for longer periods of time prior to loading will be securely covered with commercial grade tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

### **2.7.7 Materials Excavation and Load Out**

The Remediation Engineer or an Environmental Professional under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material. Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

The EP will be responsible for ensuring that all outbound trucks and/ or roll-off containers are inspected and dry-brushed to remove loose soil before leaving the Site. Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking. The EP will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site derived materials.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

### **2.7.8 Materials Transport Off-Site**

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded. A truck transport route has been prepared to limit truck traffic along local roads. All trucks loaded with Site materials will exit the vicinity of the Site using only this approved truck route.

Proposed in-bound and out-bound truck routes to the Site are shown in **Figure 3**, and take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development. Material transported by trucks exiting the site will be secured with covers.

Wet loads are not anticipated since the entire site will be dewatered prior to excavating soils. However, if wet soils are excavated they will be stockpiled within the excavation to dry or blended with dry soils. If loads contain wet material capable of producing free liquid, truck liners will be used. All trucks and / or roll-off containers will be inspected and dry-brushed, as needed, before leaving the site.

### **2.7.9 Materials Disposal Off-Site**

Multiple disposal facility designations will be employed for the materials removed from the Site. Once final arrangements have been made the disposal location(s) will be reported to the NYSDEC Project Manager.

It is anticipated that the soil will be disposed of at up to 2 different facilities, based on the following classification:

- Non Hazardous - Contaminated Low Lead (petroleum and/or historic fill with lead < 1,000 mg/kg)
- Uncontaminated Native Soil - meets NJDSC Criteria for beneficial Reuse

Final classification of excavated materials will be dependant upon the results of waste characterization sampling and the NYSDEC. Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the CCR. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

#### *Hazardous Soil Disposal and Transport*

Soil classified as hazardous will be shipped under a hazardous waste manifest system. All hazardous waste transported and disposed of must have a USEPA ID Number and waste code and must be distributed in accordance with the regulatory requirements.

The multi-part manifest will be filled out for each load of soil shipped off of the Site. At a minimum, the following information will be recorded on each manifest:

- 1) Generator's Name, Address, and Phone Number
- 2) Destination Facility Name, Address and Phone Number
- 3) EPA ID Number
- 4) Waste classification code
- 5) Transporter Name, Address, Phone Number, License Plate Number, Driver Name, and SW Haulers Permit #
- 6) Signatures – Generator or an authorized agent for the generator shall print, sign, and date each non-hazardous material manifest after each truck is loaded. The transporter shall then sign and date noting time material was picked up at the site. Both the transporter and a representative of the disposal facility will sign the non-hazardous material manifest when the material has been delivered to disposal facility.

#### *Non-Hazardous Soil Disposal and Transport*

Non-hazardous historic fill material and petroleum contaminated soil taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Historical fill material and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be Construction

and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DMM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

Soil classified as non-hazardous fill will be transported under a non-hazardous waste manifest obtained from the selected disposal facility. The multi-part manifest will be filled out for each load of soil shipped off of the Site. At a minimum, the following information will be recorded on each manifest:

- 1) Generator's Name, Address, and Phone Number
- 2) Destination Facility Name, Address and Phone Number
- 3) Transporter Name, Address, Phone Number, License Plate Number, Driver Name, and SW Haulers Permit #
- 4) Signatures – Generator or an authorized agent for the generator shall print, sign, and date each non-hazardous material manifest after each truck is loaded. The transporter shall then sign and date noting time material was picked up at the site. Both the transporter and a representative of the disposal facility will sign the non-hazardous material manifest when the material has been delivered to disposal facility.

A copy of the manifest will be retained by on-Site personnel for each shipment. Final signed manifests will be forwarded by the disposal facility to the generator. Copies of the final manifests will be presented in the CCR.

#### *Clean Soil Disposal*

Clean native soil removed from the Site for development purposes (i.e. basement levels) will be handled as unregulated or beneficial use disposal. This soil will undergo a testing program to confirm that it meets Unrestricted Use SCOs or Residential / Groundwater Protection SCOs prior to unregulated disposal or meets Unrestricted Use SCOs prior to reuse on-Site. Confirmation testing of clean soils will be in accordance with DER-10 Section 5.4(e)(10) as follows:

Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	Each composite sample for analysis is created from 3-5 discrete samples from representative locations in the fill.
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	



800-1000	7	2	
1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Uncontaminated native soil confirmed by the above testing program and removed from the site, will be disposed of as unregulated C&D material or sent to a beneficial re-use facility. The final destination of soils whether classified as contaminated or uncontaminated must be approved by the NYSDEC.

#### *C&D and Scrap Metal Disposal*

Concrete demolition material generated on the Site from building slabs, parking areas and other structures will be segregated, sized and shipped to a concrete recycling facility upon approval by the NYSDEC's Division of Materials Management for Region 2. Concrete crushing or processing on-Site is prohibited. Asphalt removed from the parking areas will be sent to a separate recycling facility.

Additionally, it is common to encounter scrap metals and large boulders (greater than one foot in diameter) during excavation which may not be accepted by either the licensed disposal facility or the C&D facility. These materials will be segregated and subsequently recycled at local facilities. Uncontaminated metal objects will be taken to a local scrap metal facility.

Bricks and other C&D material are also not accepted by most soil disposal facilities if present at greater than 5% by volume. This material, if encountered, will be sent to a C&D landfill or other C&D processing facility if approved by the DEC. C&D material of this type is most often encountered on sites in which former basement structures have been filled in with material from demolishing a former building. There was no evidence of former basement areas identified during previous investigations performed at the Site.

#### *Scale Tickets*

All trucks to be utilized for transport of hazardous or non-hazardous contaminated soil shall be weighed before and after unloading at the disposal facility. Disposal facilities must provide truck scales capable of generating load tickets measured in tons. The tonnage transported and disposed will be determined by the disposal facility and reported on a certified scale ticket which will be attached to each returned manifest. Weights will be reported on the certified scale ticket as Tare and Gross weights.

#### *C&D Transport Tickets / Bills of Lading*

Bill of Lading system or equivalent will be used for the disposal of C&D and related materials. Documentation for materials disposed of at recycling facilities (such as metal, concrete, asphalt) and as non-regulated C&D will include transport tickets for each load stating the origin of the material, the destination of the material and the quantity transported. This information will be reported in the CCR and Final Engineering Report.

#### *Disposal Facility Documentation*

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial

Engineer or BCP Applicant to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the CCR and FER.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the CCR and FER.

#### **2.7.10 Materials Reuse On-Site**

It is estimated that approximately 555 cy of clean native soil will be reused behind the foundation wall along Ocean Avenue and along the rear (east side) of the building foundation wall. Re-use of on-Site clean native soil will only be allowed if the material is found to meet Unrestricted Use SCOs (for Track 1) or Restricted Residential Use SCOs (for Track 2 or 4) through the verification testing program detailed above. The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.

Acceptable demolition material proposed for reuse on-Site, if any, will be sampled for asbestos. Concrete crushing or processing on-Site is prohibited. Contaminated on-Site material, including historic fill material and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

#### **2.7.11 Backfill from Off-Site Sources**

Off-site fill material will be needed to backfill the source area excavation. All soil brought to the site for use as backfill will meet the requirements of 6NYCRR Part 375 6.7(d).

Recycled Concrete Aggregate (RCA) derived from recognizable and uncontaminated concrete and supplied by facilities permitted by, and in full compliance with Part 360-16 and DSNY regulations, is an acceptable form of backfill material. The Remedial Engineer is responsible for ensuring that the facility is compliant with the registration and permitting requirements of 6 NYCRR Part 360 and DSNY regulations at the time the RCA is acquired. RCA imported from compliant facilities does not require additional testing unless required by NYS DEC and DSNY under its terms of operations for the facility. Documentation of part 360-16 and DSNY compliance must be reviewed and approved by the Remedial Engineer before the RCA is transported to the Site.



Fill material may also consist of virgin mined sand, gravel or stone products. Materials from a virgin mined source may be imported to the Site without testing provided that the material meets the specifications of the geotechnical engineer, Remedial Engineer, and Redevelopment Construction Documents and that the source of the material is approved by the Remedial Engineer and the NYSDEC Project Manager.

The source approval process will require a review of the following information:

- The origin of the material;
- The address of the facility which mines/processes the material;
- A letter from the facility stating that the material to be delivered to the site is a virgin mined material and that it has not been co-mingled with other materials during processing or stockpiling.

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this IRM prior to receipt at the Site. Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

Under no circumstances will fill materials be imported to the site without prior approval from the NYSDEC Project Manager. If sufficient documentation is not obtained, fill materials will be tested at a frequency consistent with that as specified in Table 4 of NYSDEC CP-51 Soil Cleanup Guidance Policy. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

#### **2.7.12 Community Air Monitoring Plan**

The CAMP provides measures for protection for the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at construction sites.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air. The primary concerns for this site are nuisance odors and dust particulates. These are expected to be minimal since the work will be performed within a building structure.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report. The complete CAMP developed for this site is included in **Attachment A** of this IRM.

#### **2.7.13 Odor, Dust and Nuisance Control Plan**

#### *2.7.13.1 Odor Control Plan*

This odor control plan is capable of controlling emissions of nuisance odors off-Site. 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. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils; . If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

#### *2.7.13.2 Dust Control Plan*

A dust suppression plan that addresses dust management during invasive on-Site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of wetting.

#### *2.7.13.3 Other Nuisances*

A plan for rodent control will be developed and utilized by the contractor prior to and during Site demolition and clearing, and during all remedial work. A plan will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

### 3.0 SCHEDULE

The Work is anticipated to begin 1 week following NYSDEC approval of the Work Plan. The duration of the removal of all on-site USTs and soil excavation / soil handling activity is eight weeks.

The schedule of events is as follows:

Schedule Task	Date
NYSDEC Approval of IRM Work Plan	Week of July 4, 2016 or week of July 11, 2016
Conduct Pre-construction meeting	Within 1 week following DEC approval of IRM Work Plan
Post Construction Notice to the List Serv	Prior to beginning site work
Mobilize equipment to the Site (begin)	Within 2 weeks following DEC approval of IRM Work Plan
Invasive activity - begin excavation of USTs and UST components	Immediately following mobilization
Complete removal of all on site USTs and excavation of soil for the new building's cellar	8 Weeks Following Mobilization
Receive Laboratory Results of Endpoint Samples	7 to 10 days following delivery to laboratory
Receive Laboratory Deliverable Package	3 weeks from receipt of laboratory results
Receive DUSR	4 weeks from receipt of laboratory deliverable package
Submit Documentation Report; Construction Completion Report	30 days from receipt of DUSR

Changes in the schedule will require DEC approval.

# **TABLES**

## **FIGURES**

**ATTACHMENT A**  
***Community Air Monitoring Plan***

**ATTACHMENT B**  
***Quality Assurance Project Plan***

# **ATTACHMENT C CHASP**

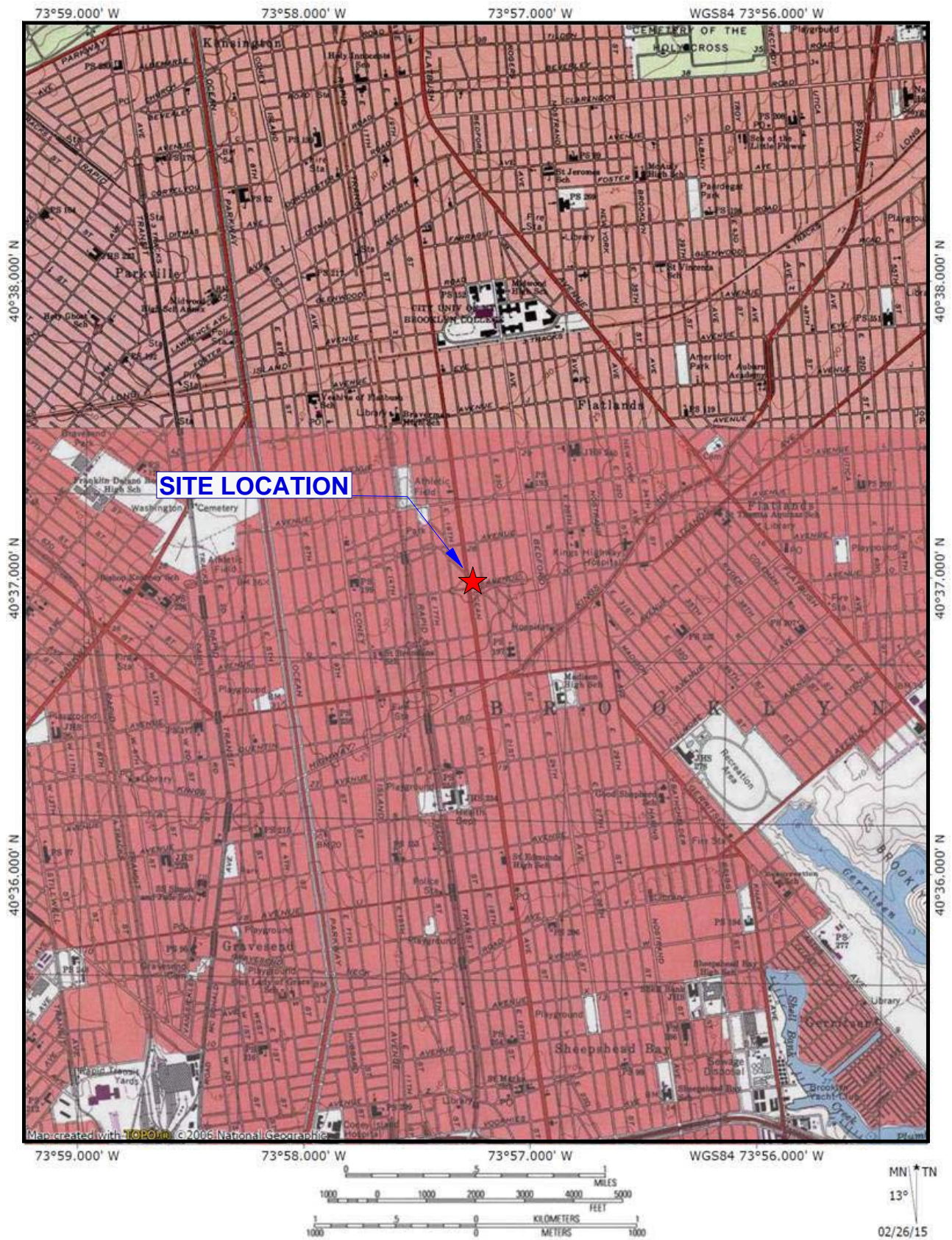


# **TABLES**

**Table 1**  
**Emergency Contact List**

General Emergencies		911
NYC Police		911
NYC Fire Department		911
New York Community Hospital		(718)-692-5300
NYSDEC Spills Hotline		1-800-457-7362
NYSDEC Project Manager		(518) 402 - 9621
NYSDOH Project Manager		(518) 402-7860
NYC Department of Health		(212) 676-2400
National Response Center		1-800-424-8802
Poison Control		1-800-222-1222
EBC Project Manager	Chawinie Reilly	(631) 504-6000
EBC BCP Program Manager	Charles Sosik	(631) 504-6000
EBC Site Safety Officer	Kevin Waters	(631) 504-6000
Remedial Engineer	Ariel Czemerinski	(516) 987-1662
Construction Manager	Ramez Kabbani	(516) 260-8940

# **FIGURES**



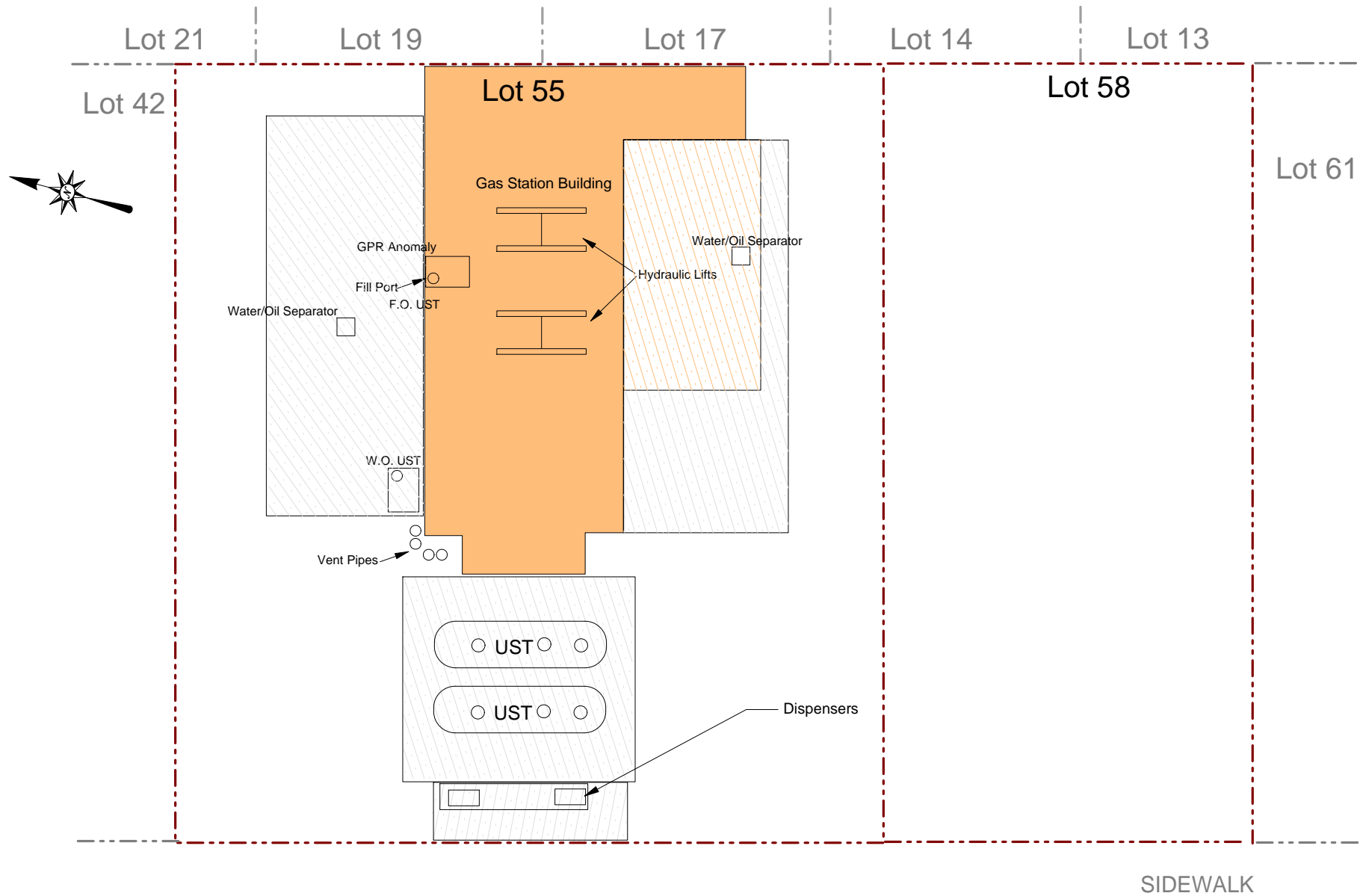
USGS Central Park, NY Quadrangle 1995, Contour Interval = 10 feet



**ENVIRONMENTAL BUSINESS CONSULTANTS**

Phone 631.504.6000  
Fax 631.924.2870

**TOMAT SERVICE STATION**  
**1815-1825 OCEAN AVENUE, BROOKLYN, NY**  
**FIGURE 1** **SITE LOCATION MAP**



KEY: Property Boundary  
 Concrete  
 Concrete Covered by Overhang

SCALE:   
 Scale: 1 inch = 20 feet



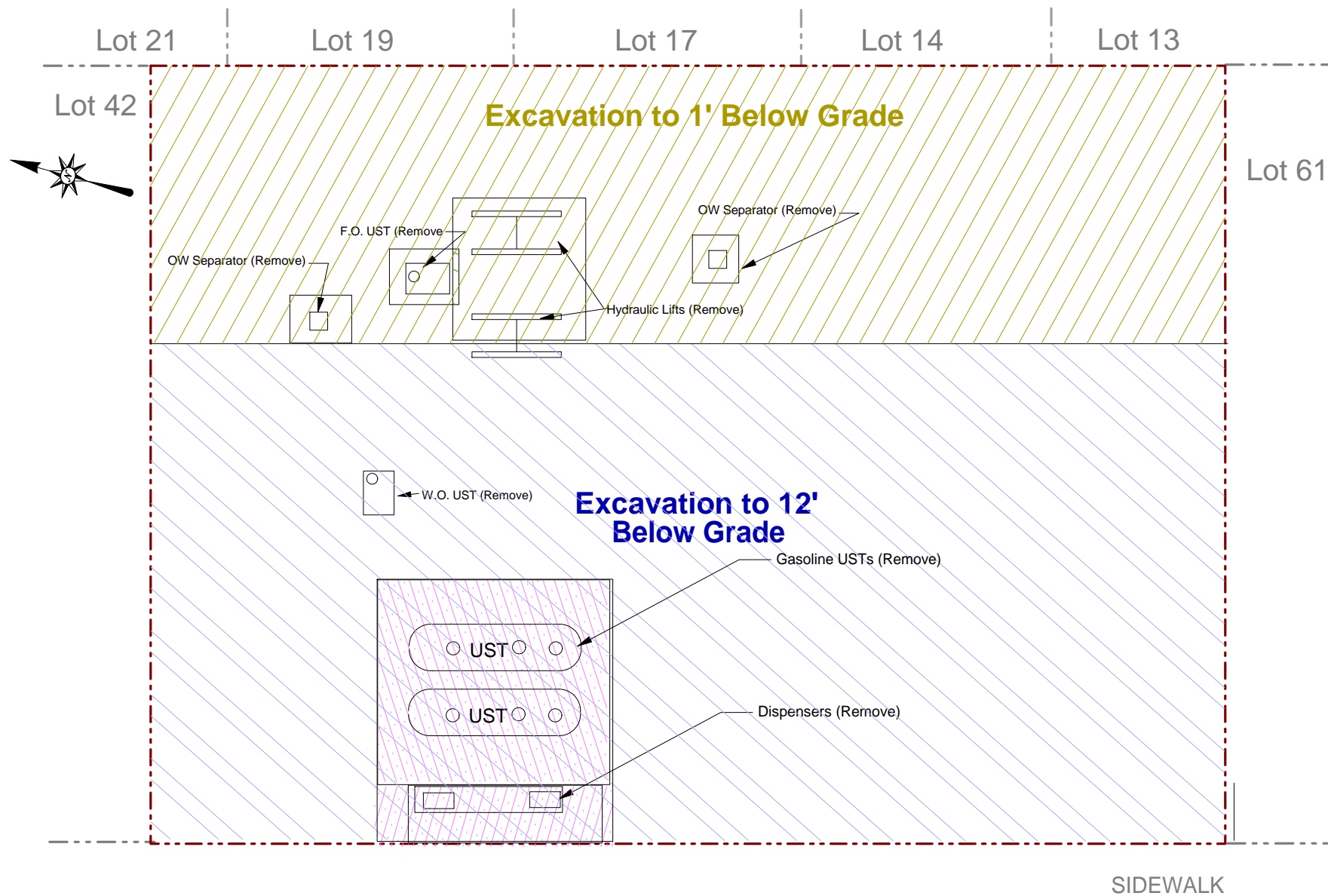


**ENVIRONMENTAL BUSINESS CONSULTANTS**  
1808 MIDDLE COUNTRY ROAD, RIDGE, NY 11961

**Phone** 631.504.6000  
**Fax** 631.924.2780

**TOMAT SERVICE STATION**  
1815-1825 OCEAN AVENUE, BROOKLYN, NY

**FIGURE 3** TRUCK ROUTE



OCEAN AVENUE

KEY:



Property Boundary



Cellar Excavation

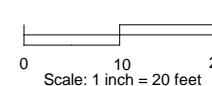


Rear Yard Excavation



Anticipated extent of shallow petroleum impacted soil

SCALE:



**IBC**

ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000  
Fax 631.924.2870

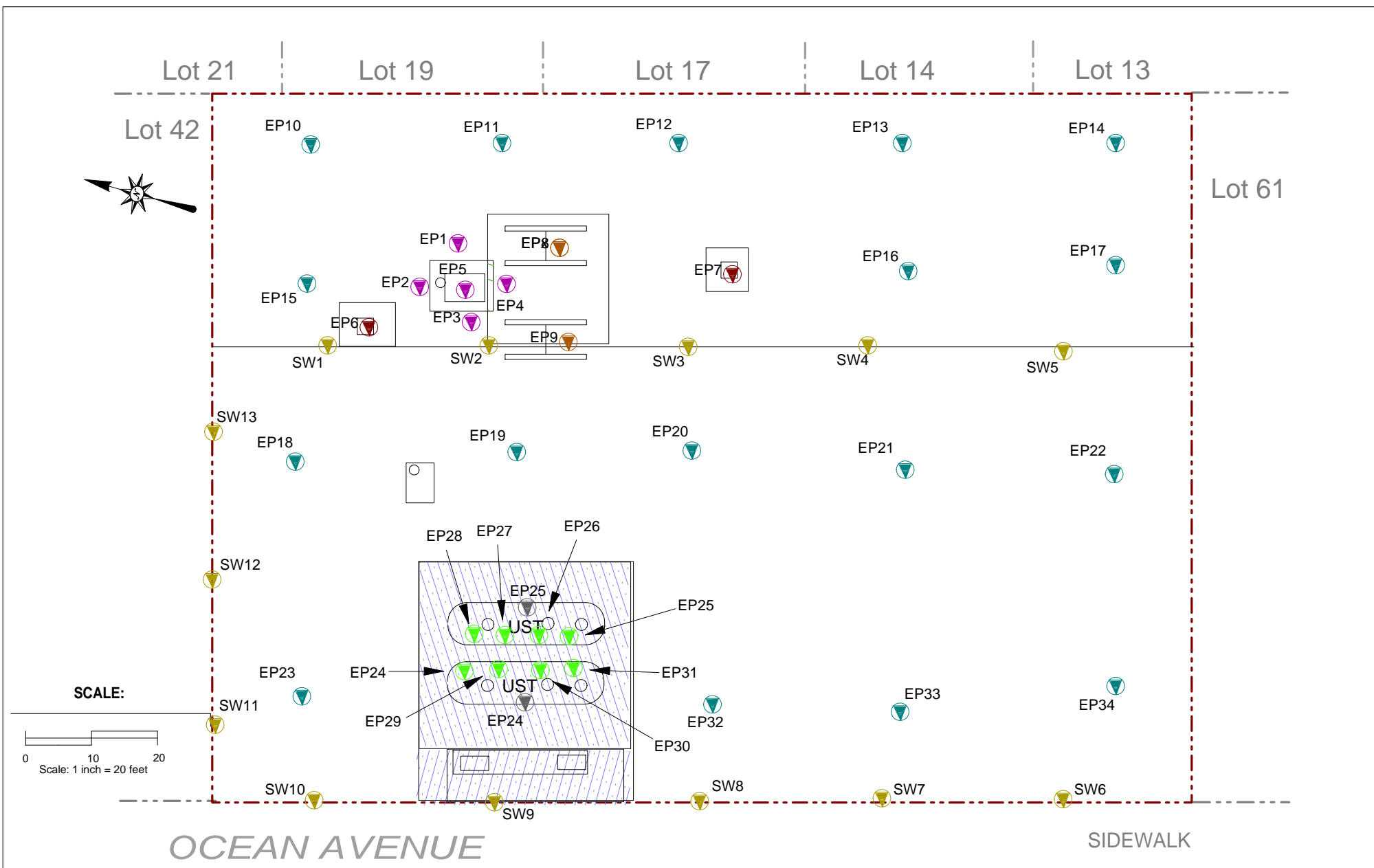
Figure No.

4

Site Name: TOMAT SERVICE STATION

Site Address: 1815-1825 OCEAN AVENUE, BROOKLYN, NY

Drawing Title: EXCAVATION PLAN



**KEY:**   Property Boundary     Anticipated extent of shallow petroleum impacted soil

EPx ▼ Endpoint Sampling Locations (VOCs, SVOCs, Pesticides, PCBs, Metals)

SWx ▼ Side Wall Endpoint Sampling Locations (VOCs, SVOCs, Pesticides, PCBs, Metals)

EPx ▼ UST Sampling Locations (VOCs and SVOCs only)   EPx ▼ UST Sampling Locations If Contaminated Soil is Present (VOCs and SVOCs only)

EPx ▼ Hydraulic Lifts Sampling Locations (VOCs, SVOCs and PCBs only)   EPx ▼ UST Sampling Locations If Clean Soil is Present (VOCs and SVOCs only)

EPx ▼ Oil Water Separators Sampling Locations (VOCs, SVOCs and Metals only)



**ATTACHMENT A**  
***Community Air Monitoring Plan***

COMMUNITY AIR MONITORING PLAN

TOMAT SERVICE STATION  
1815-1825 OCEAN AVENUE  
BROOKLYN, NY

JULY - 2016

**COMMUNITY AIR MONITORING PLAN  
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1815-1825 Ocean Avenue, Brooklyn, NY**

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***APPENDICES***

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Appendix A    Action Limit Report

## 1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been prepared for the excavation and construction activities to be performed under a Interim Remedial Measure at the Tomat Service Station located at 18165-1825 Ocean Avenue, Brooklyn, NY. The CAMP provides measures for protection for the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the investigation activities) from potential airborne contaminant releases resulting from excavation activities at the site.

Compliance with this CAMP is required during all activities associated with soil disturbance activities that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). These activities include excavation and loading of affected soil. This CAMP has been prepared to ensure that remedial activities do not adversely affect passersby, residents, or workers in the area immediately surrounding the Site and to preclude or minimize airborne migration of site-related contaminants to off-site areas.

### 1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan as presented in DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC May 3, 2010). This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air.

## 2.0 AIR MONITORING

Petroleum volatile organic compounds (VOCs) are the constituents of concern at the Site. The appropriate method to monitor air for these constituents during remediation activities is through real-time VOC and air particulate (dust) monitoring.

### 2.1 Meteorological Data

At a minimum, wind direction will be evaluated at the start of each workday, noon of each workday, and the end of each workday. These readings will be utilized to position the monitoring equipment in appropriate upwind and downwind locations.

### 2.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before activities begin. These points will be monitored periodically in series during the site work. When the excavation area is within 20 feet of potentially exposed populations or occupied structures, the perimeter monitoring points will be located to represent the nearest potentially exposed individuals at the downwind location and will take into account the locations of ventilation system intakes of nearby structures.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor (or equivalent). Air will be monitored for VOCs with a portable Ionscience 3000 photoionization detector (PID), or equivalent. All air monitoring data will be documented in a site log book by the designated site safety officer. The site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan

When work area are within in 20 feet of the potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such base vapor / dust barriers, temporary negative pressure enclosures, or special ventilation devices should be considered to prevent exposures related to work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during the weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to the intake vents exceed 1 ppm, monitoring should occur within the occupied structures (if access is granted by occupants). Background readings in the occupied spaces must be take prior to the commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to the commencement of work.
- If total particulate concentrations opposite the walls of the occupied structures or next to the intake vents exceed  $150 \mu\text{g}/\text{m}^3$ , work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to  $150 \mu\text{g}/\text{m}^3$  or less at the monitoring point.

### 3.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present.

The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report, as shown in Appendix A, will be completed.

#### 3.1 Potential Corrective Measures and VOC Suppression Techniques

If the 15-minute integrated VOC level at the downwind location persists at a concentration that exceeds the upwind level by more than 5 ppm but less than 25 ppm during remediation activities, then vapor suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive organic vapors:

- Collection of purge water in covered containers;
- storage of excess sample and drill cuttings in drums or covering with plastic

## 4.0 PARTICULATE MONITORING

Air monitoring for particulates (i.e., dust) will be performed continuously during excavation and loading activities using both air monitoring equipment and visual observation at upwind and downwind locations. Monitoring equipment capable of measuring particulate matter smaller than 10 microns (PM<sub>10</sub>) and capable of integrating (averaging) over periods of 15 minutes or less will be set up at upwind (i.e., background) and downwind locations, at heights approximately four to five feet above land surface (i.e., the breathing zone). Monitoring equipment will be MIE Data Ram monitors, or equivalent. The audible alarm on the particulate monitoring device will be set at 90 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100  $\mu\text{g}/\text{m}^3$  above background. The monitors will be calibrated at least once per day prior to work activities and recalibrated as needed thereafter. In addition, fugitive dust migration will be visually assessed during all intrusive work activities.

The following summarizes particulate action levels and the appropriate responses:

- If the downwind PM-10 particulate level is 100  $\mu\text{g}/\text{m}^3$  greater than background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150  $\mu\text{g}/\text{m}^3$  above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150  $\mu\text{g}/\text{m}^3$  above the upwind level, work must be stopped and an evaluation of activities initiated. Work can resume provided that dust suppression measures (as described in Section 2.3.1 below) and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150  $\mu\text{g}/\text{m}^3$  of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report as shown in **Appendix A** will be completed.

### 4.1 Potential Particulate Suppression Techniques

If the integrated particulate level at the downwind location exceeds the upwind level by more than 100  $\mu\text{g}/\text{m}^3$  at any time during remediation activities, then dust suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive dusts:

- limiting the excavation size;
- backfilling the excavation;
- spraying water onto the excavation faces and equipment;
- covering soil stockpiles with 8-mil plastic sheeting;

- hauling waste materials in properly tarped containers; and/or
- limiting vehicle speeds onsite.

Work may continue with dust suppression techniques provided that downwind PM<sub>10</sub> levels are not more than 150 µg/m<sup>3</sup> greater than the upwind levels.

There may also be situations where the dust is generated by remediation activities and migrates to downwind locations, but is not detected by the monitoring equipment at or above the action level. Therefore, if dust is observed leaving the working area, dust suppression techniques such as those listed above will be employed.

If dust suppression techniques do not lower particulates to below 150 µg/m<sup>3</sup>, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review.



## **5.0 DATA QUALITY ASSURANCE**

### **5.1 Calibration**

Instrument calibration shall be documented on instrument calibration and maintenance sheets or in the designated field logbook. All instruments shall be calibrated as required by the manufacturer. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

### **5.2 Operations**

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the SSO for reference.

### **5.3 Data Review**

The SSO will interpret all monitoring data based the established criteria and his/her professional judgment. The SSO shall review the data with the PM to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the PM.

## **6.0 RECORDS AND REPORTING**

All air readings must be recorded on daily air monitoring log sheets and made available for review by personnel from NYSDEC and NYSDOH.

**APPENDIX A**  
**ACTION LIMIT REPORT**

**CAMP  
ACTION LIMIT REPORT**

Project Location: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Name: \_\_\_\_\_

Contaminant: \_\_\_\_\_ PM-10: \_\_\_\_\_ VOC: \_\_\_\_\_

Wind Speed: \_\_\_\_\_

Wind Direction: \_\_\_\_\_

Temperature: \_\_\_\_\_

Barometric Pressure: \_\_\_\_\_

**DOWNWIND DATA**

Monitor ID #: \_\_\_\_\_ Location: \_\_\_\_\_ Level Reported: \_\_\_\_\_

Monitor ID#: \_\_\_\_\_ Location: \_\_\_\_\_ Level Reported: \_\_\_\_\_

**UPWIND DATA**

Monitor ID #: \_\_\_\_\_ Location: \_\_\_\_\_ Level Reported: \_\_\_\_\_

Monitor ID#: \_\_\_\_\_ Location: \_\_\_\_\_ Level Reported: \_\_\_\_\_

**BACKGROUND CORRECTED LEVELS**

Monitor ID #: Location: \_\_\_\_\_ Level Reported: Level Reported: \_\_\_\_\_

**ACTIONS TAKEN**

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**ATTACHMENT B**  
***Quality Assurance Project Plan***

**QUALITY ASSURANCE PROJECT PLAN**  
**Tomat Service Station**  
**1815-1825 Ocean Avenue, Brooklyn, NY**

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**Prepared on behalf of:**

**Ocean Units LLC**  
**1274 49<sup>th</sup> Street Suite 443**  
**Brooklyn, NY 11219**

**Prepared by:**

***EBC***  
***ENVIRONMENTAL BUSINESS CONSULTANTS***  
**RIDGE, NY 11961**

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Tomat Service Station  
1815-1825 Ocean Avenue, Brooklyn, NY

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Table 2	Containers Preservatives and Holding Times

## 1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared in accordance with DER-10 to detail procedures to be followed during the course of the sampling and analytical portion of the project, as required by the approved work plan.

To ensure the successful completion of the project each individual responsible for a given component of the project must be aware of the quality assurance objectives of his / her particular work and of the overall project. The EBC Project Director, Charles Sosik will be directly responsible to the client for the overall project conduct and quality assurance/quality control (QA/QC) for the project. The Project Director will be responsible for overseeing all technical and administrative aspects of the project and for directing QA/QC activities. Mr. Kevin Brussee will serve as the Quality Assurance Officer (QAO) and in this role may conduct:

- conduct periodic field and sampling audits;
- interface with the analytical laboratory to resolve problems; and
- interface with the data validator and/or the preparer of the DUSR to resolve problems.

Chawinie Reilly will serve as the Project Manager and will be responsible for implementation of the Remedial Investigation and coordination with field sampling crews and subcontractors. Reporting directly to the Project Manager will be the Field Operations Officer, Kevin Waters; who will serve as the on-Site qualified environmental professional who will record observations, direct the drilling crew and be responsible for the collection and handling of all samples.

### 1.1 Organization

Project QA will be maintained under the direction of the Project Manager, in accordance with this QAPP. QC for specific tasks will be the responsibility of the individuals and organizations listed below, under the direction and coordination of the Project Manager

GENERAL RESPONSIBILITY	SCOPE OF WORK	RESPONSIBILITY OF QUALITY CONTROL
Field Operations	Supervision of Field Crew, sample collection and handling	K. Waters, EBC
Project Manager	Implementation of the RI according to the RIWP.	Chawinie Reilly, EBC
Laboratory Analysis	Analysis of soil samples by NYSDEC ASP methods Laboratory	NYSDOH-Certified Laboratory
Data review	Review for completeness and compliance	3 <sup>rd</sup> party validation



## **2.0 QUALITY ASSURANCE PROJECT PLAN OBJECTIVES**

### **2.1 Overview**

Overall project goals are defined through the development of Data Quality Objectives (DQOs), which are qualitative and quantitative Statements that specify the quality of the data required to support decisions; DQOs, as described in this section, are based on the end uses of the data as described in the work plan.

In this plan, Quality Assurance and Quality Control are defined as follows:

- Quality Assurance - The overall integrated program for assuring reliability of monitoring and measurement data.
- Quality Control - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

### **2.2 QA / QC Requirements for Analytical Laboratory**

Samples will be analyzed by a New York State Department of Health (NYSDOH) certified laboratory. Data generated from the laboratory will be used to evaluate contaminants such as metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total cyanide, mercury, TPH and pesticides / PCBs in both historic fills and native soils and in groundwater and other volatile organic compounds (VOCs) in soil, soil gas. The QA requirements for all subcontracted analytical laboratory work performed on this project are described below. QA elements to be evaluated include accuracy, precision, sensitivity, representativeness, and completeness. The data generated by the analytical laboratory for this project are required to be sensitive enough to achieve detection levels low enough to meet required quantification limits as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP, 07/2005). The analytical results meeting the required quantification limits will provide data sensitive enough to meet the data quality objectives of this remedial program as described in the work plan. Reporting of the data must be clear, concise, and comprehensive. The QC elements that are important to this project are completeness of field data, sample custody, sample holding times, sample preservation, sample storage, instrument calibration and blank contamination.

#### *2.2.1 Instrument Calibration*

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of NYSDEC ASP 07/2005).

#### *2.2.2 Continuing Instrument Calibration*

The initial calibration curve will be verified every 12 hrs by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then corrective action must be taken as provided in the specific methodology.

### 2.2.3 Method Blanks

Method blank or preparation blank is prepared from an analyte-free matrix which includes the same reagents, internal standards and surrogate standards as the related samples. This is carried through the entire sample preparation and analytical procedure. A method blank analysis will be performed once for each 12 hr period during the analysis of samples for volatiles. An acceptable method blank will contain less than two (2) times the CRQL of methylene chloride, acetone and 2-butanone. For all other target compounds, the method blank must contain less than or equal to the CRQL of any single target compound. For non-target peaks in the method blank, the peak area must be less than 10 percent of the nearest internal standard. The method blank will be used to demonstrate the level of laboratory background and reagent contamination that might result from the analytical process itself.

### 2.2.4 Trip Blanks.

Trip blanks consist of a single set of sample containers filled at the laboratory with deionized. laboratory-grade water. The water used will be from the same source as that used for the laboratory method blank. The containers will be carried into the field and handled and transported in the same way as the samples collected that day. Analysis of the trip blank for VOCs is used to identify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the trip blanks will be not opened during this procedure.) A complete set of trip blanks will be provided with each shipment of samples to the certified laboratory.

### 2.2.5 Surrogate Spike Analysis

For organic analyses, all samples and blanks will be spiked with surrogate compounds before purging or extraction in order to monitor preparation and analyses of samples. Surrogate spike recoveries shall fall within the advisory limits in accordance with the NY5DEC ASP protocols for samples falling within the quantification limits without dilution.

### 2.2.6 Matrix Spike / Matrix Spike Duplicate / Matrix Spike Blank (MS/MSDIMSB) Analysis

MS, MSD and MSB analyses will be performed to evaluate the matrix effect of the sample upon the analytical methodology along with the precision of the instrument by measuring recoveries. The MS / MSD / MSB samples will be analyzed for each group of samples of a similar matrix at a rate of 5% (one for every 20 field samples). The RPD will be calculated from the difference between the MS and MSD. Matrix spike blank analysis will be performed to indicate the appropriateness of the spiking solution(s) used for the MS/MSD.

## 2.3 Accuracy

Accuracy is defined as the nearness of a real or the mean (x) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries. Accuracy includes both precision and recovery and is expressed as percent recovery (% REC). The MS sample is used to determine the percent recovery. The matrix spike percent recovery (% REC) is calculated by the following equation:

$$\%REC = \frac{SSR - SR}{SA} \times 100$$

Where:

SSR = spike sample results

SR = sample results

SA = spike added from spiking mix

## 2.4 Precision

Precision is defined as the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analyses.

Analytical precision is expressed in terms of RPD. The RPD is calculated using the following formula:

$$RPD = \frac{D^1 - D^2}{(D^1 + D^2)/2} \times 100$$

Where:

RPD = relative percent difference

D<sup>1</sup> = first sample value

D<sup>2</sup> = second sample value (duplicate)

## 2.5 Sensitivity

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve quantification levels low enough to meet the required detection limits specified by NYSDEC ASP and to meet all site-specific standards, criteria and guidance values (SGCs) established for this project.

## 2.6 Representativeness

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of that site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on site. The representativeness of samples is assured by adherence to sampling procedures described in the IRM Work Plan.

## 2.7 Completeness

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers, and should be between 70 and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form of summaries, QC data, and raw analytical data. The laboratory will be required to submit data packages that follow NYSDEC ASP reporting format which, at a minimum, will include the following components:

1. All sample chain-of-custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analytes in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.
5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate/matrix spike blank results.
7. QC check sample and standard recovery results

8. Blank results (field, trip, and method).
9. Internal standard area and RT summary.

## **2.8 Laboratory Custody Procedures**

The following elements are important for maintaining the field custody of samples:

- Sample identification
- Sample labels
- Custody records
- Shipping records
- Packaging procedures

Sample labels will be attached to all sampling bottles before field activities begin; each label will contain an identifying number. Each number will have a suffix that identifies the site and where the sample was taken. Approximate sampling locations will be marked on a map with a description of the sample location. The number, type of sample, and sample identification will be entered into the field logbook. A chain-of-custody form, initiated at the analytical laboratory will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first received blank space. After each sample is collected and appropriately identified, entries will be made on the chain-of-custody form that will include:

- Site name and address
- Samplers' names and signatures

### **3.0 ANALYTICAL PROCEDURES**

#### **3.1 Laboratory Analysis**

Samples will be analyzed by the NYSDOH ELAP laboratory for one or more of the following parameters: VOCs + TICs in soil / groundwater by USEPA Method 8260C, SVOCs + TICs in soil / groundwater by USEPA Method 8270D, Target Analyte List (TAL) Metals + Mercury in soil and groundwater (total and dissolved) by EPA Method 6010C/7471B/7472, pesticides / PCBs by USEPA Method 8081B/8082A, TPH by EPA method 8015D, total cyanide EPA Method 9014 or 9012B and VOCs in air by USEPA Method TO15. If any modifications or additions to the standard procedures are anticipated and if any nonstandard sample preparation or analytical protocol is to be used, the modifications and the nonstandard protocol will be explicitly defined and documented. Prior approval by EBC's PM will be necessary for any nonstandard analytical or sample preparation protocol used by the laboratory, i.e., dilution of samples or extracts by greater than a factor of five (5).

## **4.0 DATA REDUCTION, REVIEW, AND REPORTING**

### **4.1 Overview**

The process of data reduction, review, and reporting ensures the assessments or a conclusion based on the final data accurately reflects actual site conditions. This plan presents the specific procedures, methods, and format that will be employed for data reduction, review and reporting of each measurement parameter determined in the laboratory and field. Also described in this section is the process by which all data, reports, and work plans are proofed and checked for technical and numerical errors prior to final submission.

### **4.2 Data Reduction**

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Analytical results shall be presented on standard NYSDEC ASP-B forms or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used.

Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data. Specifics on internal laboratory data reduction protocols are identified in the laboratory's SOPs.

Following receipt of the laboratory analytical results by EBC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

### **4.3 Laboratory Data Reporting**

All sample data packages submitted by the analytical laboratory will be required to be reported in conformance to the NYSDEC ASP (7/2005), Category B data deliverable requirements as applicable to the method utilized. All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format.

## 5.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the EBC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable) and the NYSDEC project manager.

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During the field investigation, all changes to the sampling program will be documented in field logs/sheets and the EBC PM advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify the PM, who will consult with other project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PM shall be responsible for controlling, tracking, implementing and distributing identified changes.



**TABLE 2**  
**SAMPLE COLLECTION AND ANALYSIS PROTOCOLS**

<b>Sample Type</b>	<b>Matrix</b>	<b>Sampling Device</b>	<b>Parameter</b>	<b>Sample Container</b>	<b>Sample Preservation</b>	<b>Analytical Method#</b>	<b>CRQL / MDLH</b>	<b>Holding Time</b>
Soil	Soil	Scoop Direct into Jar	VOCs +TICs	(1) 2 oz Jar	Cool to 4° C	EPA Method 8260C	Compound specific (1-5 ug/kg)	14 days
Soil	Soil	Scoop Direct into Jar	SVOCs +TICs	(1) 8 oz jar	Cool to 4° C	EPA Method 8270D	Compound specific (1-5 ug/kg)	14 day ext/40 days
Soil	Soil	Scoop Direct into Jar	Pest/PCBs	from 8oz jar above	Cool to 4° C	EPA Method 8081B/8082A	Compound specific (1-5 ug/kg)	14 day ext/40 days
Soil	Soil	Scoop Direct into Jar	Metals + Mercury	from 8oz jar above	Cool to 4° C	TAL Metals 6010C EPA Method7471B	Compound specific (01-1 mg/kg)	6 months

*Notes:*

All holding times listed are from Verified Time of Sample Receipt (VTSR) unless noted otherwise. \* Holding time listed is from time of sample collection.

The number in parentheses in the "Sample Container" column denotes the number of containers needed.

Triple volume required when collected MS/MSD samples

The number of trip blanks are estimated.

CRQL / MDL = Contract Required Quantitation Limit / Method Detection Limit

NA = Not available or not applicable.

# **ATTACHMENT C CHASP**

# **TOMAT SERVICE STATION SITE**

**1815-1825 OCEAN AVENUE**

**BROOKLYN, NEW YORK**

**Block 7656 Lot 55 & 58**

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## **CONSTRUCTION HEALTH AND SAFETY PLAN**

MAY 2016

*Prepared for:*

Ocean Unites LLC

1274 49<sup>th</sup> Street Suite 443

Brooklyn, NY 11219

*Prepared by:*



**ENVIRONMENTAL BUSINESS CONSULTANTS**

1808 Middle Country Road

Ridge, NY 11961

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## **STATEMENT OF COMMITMENT**

This Construction Health and Safety Plan (CHASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Interim Remedial Measure (IRM) at the Tomat Service Station Site, 1815-1825 Ocean Avenue, Brooklyn, NY

This CHASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This CHASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees.

## 1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for the planned Intern Remedial Measure (IRM) at the Tomat Service Station Site, 1815-1825 Ocean Avenue, Brooklyn, New York to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during remedial activities. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to excavation, tank removal, loading and other soil disturbance activities and is based on the best information available. The CHASP may be revised by EBC at the request of Ocean Unites LLC and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

Work performed under the remedial action will not involve confined space entry since the excavations will be large and sloped back in accordance with NYCDOB shoring requirements and will not have a limited or restricted means for entry or exit.

### 1.1 Training Requirements

Personnel entering the exclusion zone or decontamination zone are required to be certified in health and safety practices for hazardous waste site operations as specified in the Federal OSHA Regulations CFR 1910.120e (revised 3/6/90).

Paragraph (e - 3) of the above referenced regulations requires that all on-site management personnel directly responsible for or who supervise employees engaged in hazardous waste operations, must initially receive 8 hours of supervisor training related to managing hazardous waste work.

Paragraph (e - 8) of the above referenced regulations requires that workers and supervisors receive 8 hours of refresher training annually on the items specified in Paragraph (e-1) and/or (e-3).

Additionally all on-site personnel must receive adequate site-specific training in the form of an on-site Health and Safety briefing prior to participating in field work with emphasis on the following:

- Protection of the adjacent community from hazardous vapors and / or dust which may be released during intrusive activities.
- Identification of chemicals known or suspected to be present on-site and the health effects and hazards of those substances.
- The need for vigilance in personnel protection, and the importance of attention to proper use, fit and care of personnel protective equipment.
- Decontamination procedures.
- Site control including work zones, access and security.
- Hazards and protection against heat or cold.



- The proper observance of daily health and safety practices, such as entry and exit of work zones and site. Proper hygiene during lunch, break, etc.
- Emergency procedures to be followed in case of fire, explosion and sudden release of hazardous gases.

Health and Safety meetings will be conducted on a daily basis and will cover protective clothing and other equipment to be used that day, potential and chemical and physical hazards, emergency procedures, and conditions and activities from the previous day.

## 1.2 Medical Monitoring Requirements

Field personnel and visitors entering the exclusion zone or decontamination zone must have completed appropriate medical monitoring required under OSHA 29 CFR 1910.120(f) if respirators or other breathing related PPE is needed. Medical monitoring enables a physician to monitor each employee's health, physical condition, and his fitness to wear respiratory protective equipment and carry out on-site tasks.

## 1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the CHASP. Amendments to the CHASP are acknowledged by completing forms included in **Appendix B**.

## 1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Mrs. Chawinie Reilly	EBC- Project Manager	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000
Mr. Kevin Waters	Health and Safety Officer	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this CHASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this CHASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.
2. Coordinating site safety decisions with the project manager.
3. Designating exclusion, decontamination and support zones on a daily basis.
4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.
5. Maintaining the work zone entry/exit log and site entry/exit log.
6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

## 2.0 SITE BACKGROUND AND SCOPE OF WORK

The street address for the Site is 1815-1825 Ocean Avenue, Brooklyn, NY. The Site is located in the Midwood section of Kings County and is comprised of two tax parcels totaling 16,555 square feet (0.38). The Site has approximately 150.5 ft of frontage along Ocean Avenue and is approximately 110 ft deep. Currently the property is developed with a one-story gasoline service station building (Lot 55) and a parking lot (Lot 58). The building has a footprint approximately 2,190 s.f. which, according to the NYC Department of Buildings, was constructed in 1931. These building are being demolished as part of the redevelopment of the Site.

The Site has a long history of use as a gas station since the 1930's.

### 2.1 Previous Investigations

#### 2.1.1 December 30, 2013 –Subsurface Assessment Report (Hydrotech Environmental Corp)

Hydro Tech Environmental, Corp. has performed a Subsurface Assessment at the property located at 1815 Ocean Avenue, Brooklyn, New York. This assessment was conducted on behalf of Tomat Service Center Inc. based upon their request to investigate the overall soil and groundwater quality.

The assessment consisted of the performance of the installation and sampling of a series of soil probes, groundwater probes, and monitoring wells. A Hydro Tech geologist screened all soil samples in the field for organic vapors utilizing a Photoionization Detector. Select soil, groundwater, and monitoring well samples were analyzed at a State-certified laboratory for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). A select soil and groundwater sample was additionally analyzed for diesel range organic compounds and gasoline range organic compounds.

VOCs were detected in soil samples at the groundwater interface and in the groundwater in the vicinity of a fuel oil UST located to the north of the building at concentrations exceeding their respective regulatory standards. The petroleum compounds identified in the soil and groundwater samples was been classified as #2 fuel oil, as per the fingerprint analysis, obtained from the 23-25 foot soil sample from SP-9 and the groundwater sample from MW-1.

Dissolved VOCs (MW2 and MW3) were detected in groundwater beneath the southern portion of the Site, to the south of gasoline tanks and pump islands, at high concentrations exceeding their regulatory standards. Total VOCs in MW2 were noted to be 4,006.6 ug/L and at 6,471.7 ug/L in MW3. These findings indicated that groundwater had been impacted. Spill #1408472 is associated with the Site.

In addition, a ground penetrating radar survey (GPR) was conducted to clear sampling locations and discover any anomalies. One anomaly was identified on the north side of the interior of the site and is associated with a UST

#### 2.1.2 Phase II Investigation Report – 1815 Ocean Avenue, Brooklyn NY. Environmental Business Consultants (EBC) dated February 25, 2015

The field work portion of the investigation was performed on February 7, 2015. The work

consisted of the installation of four soil borings, two permanent monitoring wells, two temporary monitoring wells, and the collection and analysis of related samples. Four soil boring locations (B1 through B4) were selected. All of the borings were advanced with Geoprobe™ direct push equipment to a depth of 25 ft. Soil was characterized as a brown silt and sand with some historic fill material mixed in from surface grade to generally 1 foot below grade with the deepest locations at approximately 6-8 feet below grade followed by a brown silt and brown coarse fine sand to the termination depth. Groundwater was encountered and is expected at approximately 17 to 22 ft below grade.

PID readings of 130 ppm and petroleum odors were noted in B1 within the 21-25 foot interval. Petroleum odors were noted in the 21-25 foot interval of B2. PID readings of 250 ppm and petroleum odors were noted in B3 within the 21-25 foot interval. PID readings of 200 ppm were noted in B4 within the 21-25 foot interval. Soil samples were collected from the following intervals; 0-2 feet (B2 and B3) and 22-24 feet (B1-B4).

EBC collected four groundwater samples from each of the characterization borings (B1, B2, B3, B4). Permanent monitoring wells were installed for locations GW2 and GW4 by advancing the borehole to the water table (approx. 17 to 22 ft bgs) and installing a one-inch diameter PVC well 5-feet below the water table interface. Groundwater samples were collected in pre-cleaned, laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix Laboratories for analysis of VOCs by EPA Method 8260.

Deep soil and groundwater samples were analyzed for volatile organic compounds (VOCs) by USEPA method 8260. Shallow soil samples were analyzed for total lead.

Soil sample results were compared to the Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives (SCOs) as presented in 6 NYCRR Part 375 Subparts 375-1 to 375-4 & 375-6. The following VOCs; 1,2,4-trimethylbenzene (maximum of 31,000 µg/Kg), 1,3,5-trimethylbenzene (maximum of 9,900 µg/Kg), m&p-Xylenes (maximum of 2,300 µg/Kg), methylene chloride (maximum of 280 µg/Kg), naphthalene (at 14,000 µg/Kg) and o-xylene (maximum of 570 µg/Kg) were detected above Unrestricted Use SCOs in samples B1 and B2. VOCs including 2-isopropyltoluene (230 µg/Kg), acetone (maximum 34 µg/Kg), ethylbenzene (maximum 480 µg/Kg), n-butylbenzene (maximum 2,700 µg/Kg), n-propylbenzene (maximum 2,100 µg/Kg), p-isopropyltoluene (maximum 600 µg/Kg), sec-butylbenzene (maximum 860 µg/Kg) were detected at trace amounts in all soil samples. Lead was detected above Unrestricted Use SCOs in B2 and B3 shallow soil samples; at a maximum of 366 mg/kg.

Groundwater results were compared to the New York State Ambient Water Quality Standards and Guidance Values (6 NYCRR Part 703) as presented in the Technical & Operational Guidance Series (TOGS) 1.1.1 (1998). Several VOCs including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, isopropylbenzene, m&p-Xylenes, naphthalene, n-butylbenzene, n-propylbenzene, o-xylene, p-isopropyltoluene and sec-butylbenzene were reported in all of the four monitoring wells above groundwater standards. 2-isopropyltoluene was reported in one groundwater well (GW4) above groundwater standards. Acetone was reported in two groundwater well (GW2 and GW3) above groundwater standards. Benzene was reported in one groundwater well (GW1) above groundwater standards. Toluene was reported in two groundwater well (GW1 and GW4) above groundwater standards.

Soil and groundwater samples collected in the vicinity of the USTs indicate gasoline contamination. Several gasoline related VOCs were detected above Unrestricted Use SCOs in soil samples B1 and B2. Lead was detected above Unrestricted Use SCOs in B2 and B3 shallow soil samples. Gasoline related VOCs were noted above groundwater standards in all groundwater samples. These results indicate that further remedial action will be required.

### *2.1.3 Phase II Data Summary for 1825 Ocean Avenue, Brooklyn, NY. Environmental Business Consultants (EBC) dated April 29, 2015*

The field work portion of the investigation was performed on April 22, 2015. The work consisted of the installation of five soil borings, three permanent monitoring wells, and the collection and analysis of related samples. Five soil boring locations (B1 through B5) were selected. Borings B1 and B2 were advanced with Geoprobe™ direct push equipment to a depth of 25 ft. Borings B3, B4 was advanced with Geoprobe™ direct push equipment to a depth of 15 ft. B5 was advanced with a Geoprobe™ to a depth of 20-23 feet. Soil was characterized as a brown medium fine sand with some historic fill material mixed in from surface grade to approximately 6-8 feet below grade followed by a brown sand to the termination depth. Groundwater was encountered and is expected at approximately 23 ft below grade.

Petroleum odors were noted in B1 and B2 within the 20-25 foot interval. Soil samples were collected from the following intervals; 0-2 feet (B1, B2 and B3) and 23-25 feet (B1 and B2).

EBC collected three groundwater samples from each of the characterization borings (B1, B2 and B5). Permanent monitoring wells were installed for locations B1, B2 and B5 by advancing the borehole to the water table (approx. 20 to 23 ft bgs) and installing a one-inch diameter PVC well 5-feet below the water table interface. Groundwater samples were collected in pre-cleaned, laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix Laboratories for analysis of VOCs by EPA Method 8260.

Deep soil and groundwater samples were analyzed for volatile organic compounds (VOCs) by USEPA method 8260. Shallow soil samples were analyzed for SVOCs (CP51), PCBs and TAL Metals. Deep soil samples were analyzed for (VOCs) by USEPA method 8260 and SVOCs (CP51).

Soil sample results were compared to the Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives (SCOs) as presented in NYSDEC CP51 Soil Cleanup Guidance (10/21/10). The following VOCs; ethylbenzene (maximum of 22,000 µg/Kg), m&p-Xylenes (maximum of 45,000 µg/Kg), naphthalene (at 27,000 µg/Kg), n-Butylbenzene (at 17,000 µg/Kg) and n-Propylbenzene (at 35,000 µg/Kg) were detected above Unrestricted Use SCOs in samples B1 and B2. The following VOCs; 1,3,5-trimethylbenzene (maximum of 70,900 µg/Kg) and 1,2,4-trimethylbenzene (maximum of 230,000 µg/Kg) were above RRSCOs in sample B2. No SVOCs and PCBs were detected above UUSCOs. The following metals; copper (at 56.1 mg/Kg), mercury (at 0.32 mg/Kg) and zinc (at 193 mg/Kg) were detected above UUSCOs in sample B3. Lead (at 1,860 mg/Kg) was detected above RRSCOs in sample B3.

Groundwater results were compared to the New York State Ambient Water Quality Standards and Guidance Values (6 NYCRR Part 703) as presented in the Technical & Operational

Guidance Series (TOGS) 1.1.1 (1998). Several VOCs including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-Isopropyltoluene, benzene, ethylbenzene, isopropylbenzene, m&p-Xylenes, naphthalene, n-butylbenzene, n-propylbenzene, o-xylene, p-isopropyltoluene, sec-butylbenzene and toluene were reported in all of the three monitoring wells above groundwater standards.

Soil and groundwater samples collected indicate gasoline contamination. Several gasoline related VOCs were detected above Unrestricted Use and Residential Restricted SCOs in soil samples B1 and B2. Lead was detected above Residential Restricted SCOs in the B3 shallow soil sample. Gasoline related VOCs were noted above groundwater standards in all groundwater samples. These results indicate that further remedial action will be required. A spill was called in for this site and assigned a SPILL # 1501018

#### *2.1.4 Phase I Screening for 1815-1825 Ocean Avenue, Brooklyn, NY. Environmental Business Consultants (EBC) dated April 30, 2015.*

Prior to the construction of the existing improvements (circa 1950), the Site was occupied by a gas station (lot 55) and 2-story dwelling (lot 58) in the 1930's. From 1895 to 1906, the site was vacant land (lot 55) and a 2-story dwelling (lot 58).

In the 1930 Sanborn map four gasoline tanks are depicted on the west side of the Site. In the 1950-2007 Sanborn maps, five gasoline tanks are depicted on the west side of the Site.

## **2.2 Redevelopment Plans**

The redevelopment project consists of the demolition of the existing gas station and auto repair facility and the construction of a new 8-story residential building which will cover 65 percent of the Site. The Site will be developed with a full cellar. The cellar will occupy the entire footprint of the building down to about 10-12 feet below grade. The cellar will be utilized for bike storage, refuse area, elevator mechanical room, sprinkler room, water meter room, electrical meter room, plumbing room, recreation rooms and a gas meter room. The slab on grade area (44.3 x 110 foot area) on the north side of the Site will be excavated to a depth of 2 feet. The elevator pit will be excavated to approximately 15 feet below grade. The first floor of the Site will be developed with residential units, recreation space, and 45 parking spaces. The upper floors are developed with residential units. The maximum height of the building will be proposed at eighty feet tall with additional height provided for accessory spaces as permitted. The front yard will match the adjacent buildings on the street with a minimum of forty feet in the rear yard. The building will be proposed up to the side lot property lines. The building will be proposed with a maximum of ninety-three units with a mix of one, two and three bedroom units.

## **2.3 Description of Interim Remedial Measure**

This Interim Remedial Measure (IRM) Work Plan addresses the removal of underground storage tanks and related tank system components, oil water separators, hydraulic lifts and the remediation of contaminants in shallow soil (to 12 ft below grade) at the Site through excavation. Removal of the USTs and shallow impacted soil will reduce the threat of potential exposure while development of a comprehensive remedial plan for the Site proceeds. Removing the shallow impacted soil will also facilitate the installation of remedial system components for deeper soils and groundwater which are to be installed beneath the new building.



### **3.0 HAZARD ASSESSMENT**

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

#### **3.1 Physical Hazards**

##### *3.1.1 Tripping Hazards*

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

##### *3.1.2 Climbing Hazards*

During site activities, workers may have to work on excavating equipment by climbing. The excavating contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

##### *3.1.3 Cuts and Lacerations*

Field activities that involve excavating activities usually involve contact with various types of machinery. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

##### *3.1.4 Lifting Hazards*

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the excavation program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

##### *3.1.5 Utility Hazards*

Before conducting any excavation, the excavation contractor will be responsible for locating and verifying all existing utilities at each excavation.

##### *3.1.6 Traffic Hazards*

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with NYCDOT guidelines. The excavation contractor shall carry on his operations without undue interference or delays to traffic. The excavation contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

#### **3.2 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.

### 3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

#### 1. Prevention

- a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
- b. Work in Pairs. Individuals should avoid undertaking any activity alone.
- c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
- d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

#### 2. Recognition and Treatment

##### a. Heat Rash (or prickly heat):

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

Treatment: Remove source of irritation and cool skin with water or wet cloths.

##### b. Heat Cramps (or heat prostration)

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.

Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.

##### c. Heat Stroke

Cause: Same as heat exhaustion. This is also an extremely serious condition.

Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.



### 3.2.2 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as:

- Shivering;
- reduced blood pressure;
- reduced coordination;
- drowsiness;
- impaired judgment;
- fatigue;
- pupils dilated but reactive to light; and,
- numbing of the toes and fingers.

### 3.3 Chemical Hazards

The RI Investigation identified chlorinated and petroleum volatile organic compounds (VOCs) in soil, groundwater and soil vapor and free phase fuel oil and semi-volatile compounds in soil at the Site. In addition “Urban fill” materials which contain elevated levels of SVOCs and metals as well as other compounds were identified throughout the Site. These “contaminants” are not related to a chemical release occurring on the site, but are inherent in the reworked fill material in the area which contains ash and bits of tar and asphalt. Considering the previous sampling results and the past and present use of the site, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyl’s (PCBs), and heavy metals such as arsenic, chromium, lead and mercury.

Based on the findings of the Remedial Investigation and the inherent properties of urban fill, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and heavy metals.

Volatile organic compounds reported to be present in soil include the following:

1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	ethylbenzene	isopropylbenzene
n-Butylbenzene	Toluene	naphthalene	
n-propylbenzene	m&p-xylenes	o-xylenes	

Semi-Volatile organic compounds expected to be in the fill materials include the following:

Napthalene
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Metals expected to be present in fill materials include the following:

Barium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
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The primary routes of exposure to these contaminants are inhalation, ingestion and absorption.

**Appendix C** includes information sheets for suspected chemicals that may be encountered at the site. Also included under the appendix are procedures for handling and storing the chemical oxidant. These procedures will be followed to protect workers and the public.

### *3.3.1 Respirable Dust*

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150  $\mu\text{g}/\text{m}^3$  over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with high efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils or groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

### *3.3.2 Dust Control and Monitoring During Earthwork*

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150  $\mu\text{g}/\text{m}^3$  over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

### *3.3.3 Organic Vapors*

Elevated levels of chlorinated VOCs were detected in soil, soil gas and groundwater samples collected during previous investigations at the site. Therefore, excavation activities may cause the release of organic vapors to the atmosphere. The site safety officer will periodically monitor organic vapors with a Photoionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

## 4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

### 4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work uniform, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

### 4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

### 4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of drilling locations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

## 5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

### 5.1 Air Monitoring Requirements

If excavation work is performed, air will be monitored for VOCs with a portable ION Science 3000EX photoionization detector, or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRam Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

### 5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage are exceeded:

- 1 The SSO will be consulted immediately
- 2 All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (eg from the exclusion zone).
- 3 Monitoring will be continued until intrusive work resumes.

### 5.3 Action Levels During Excavation Activities

Instrument readings will be taken in the breathing zone above the excavation pit unless otherwise noted. Each action level is independent of all other action levels in determining responses.

Organic Vapors (PID)	LEL %	Responses
0-1 ppm above background	0%	<ul style="list-style-type: none"><li>• Continue excavating</li><li>• Level D protection</li><li>• Continue monitoring every 10 minutes</li></ul>

1-5 ppm Above Background, Sustained Reading	1-10%	<ul style="list-style-type: none"> <li>• Continue excavating</li> <li>• Go to Level C protection or employ engineering controls</li> <li>• Continue monitoring every 10 minutes</li> </ul>
5-25 ppm Above Background, Sustained Reading	10-20%	<ul style="list-style-type: none"> <li>• Discontinue excavating, unless PID is only action level exceeded.</li> <li>• Level C protection or employ engineering controls</li> <li>• Continue monitoring for organic vapors 200 ft downwind</li> <li>• Continuous monitoring for LEL at excavation pit</li> </ul>
>25 ppm Above Background, Sustained Reading	>20%	<ul style="list-style-type: none"> <li>• Discontinue excavating</li> <li>• Withdraw from area, shut off all engine ignition sources.</li> <li>• Allow pit to vent</li> <li>• Continuous monitoring for organic vapors 200 ft downwind.</li> </ul>

Notes: Air monitoring will occur in the breathing zone 30 inches above the excavation pit. Readings may also be taken in the excavation pit but will not be used for action levels.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right hand column should be taken. If instrument readings do not return to acceptable levels after the excavation pit has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the pit with suppressant foam.

If, during excavation activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, excavation will stop until sustained levels are less than 5 ppm (see Community Air Monitoring Plan).

## **6.0 SITE CONTROL**

### **6.1 Work Zones**

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book. If contamination is encountered then the Site Safety officer will establish the zones as follows:

Tasks requiring OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training are carried out in the exclusion zone. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

### **6.2 General Site Work**

A general excavation contractor may complete the site excavation/grading as needed for the footing installation, or as deemed necessary by the Interim Remedial Measure Work Plan and/or Project Manager. All onsite employees must have obtained OSHA 24-hour Hazardous Waste Operations and Emergency Response Operations training prior to performing soil disturbing activities.

## 7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

### 7.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

\* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

### 7.2 Emergency Telephone Numbers

General Emergencies	911
New York City Police	911
New York Community Hospital	1-718-692-5300
NYSDEC Spills Division	1-800-457-7362
NYSDEC Division of Env. Remediation	1-718-482-4900
NYCDEP	1-718-699-9811
NYC Department of Health	1-212-788-4711
NYC Fire Department	911
National Response Center	1-800-424-8802
Poison Control	1-212-340-4494
Site Safety Officer	1-631-504-6000
Alternate Site Safety Officer	1-631-504-6000

### 7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;



- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;
- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;
- Determine the cause of incidents and make recommendations to prevent recurrence; and,
- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- |                       |                                     |
|-----------------------|-------------------------------------|
| • Project Manager     | Mrs. Chawinie Reilly (631) 504-6000 |
| • Site Safety Officer | Mr. Kevin Waters (631) 504-6000     |

#### **7.4 Medical Emergencies**

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**).and information on the chemical(s) to which they may have been exposed (**Appendix C**).

#### **7.5 Fire or Explosion**

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

#### **7.6 Evacuation Routes**

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these

instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

## **7.7 Spill Control Procedures**

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

## **7.8 Vapor Release Plan**

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

***APPENDIX A***  
***SITE SAFETY ACKNOWLEDGEMENT FORM***

## DAILY BRIEFING SIGN-IN SHEET

Date: \_\_\_\_\_ Person Conducting Briefing: \_\_\_\_\_

Project Name and Location: \_\_\_\_\_

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc...):

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2. OTHER ISSUES (HASP changes, attendee comments, etc...):

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3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

***APPENDIX B***  
***SITE SAFETY PLAN AMENDMENTS***

## SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: \_\_\_\_\_

Site Name: \_\_\_\_\_

Reason for Amendment: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Alternative Procedures: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Required Changes in PPE: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Project Superintendent (signature)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Health and Safety Consultant (signature)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Site Safety Officer (signature)

\_\_\_\_\_  
Date

# ***APPENDIX C***

## ***CHEMICAL HAZARDS***

### **CHEMICAL HAZARDS**

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

# International Chemical Safety Cards

## 1,2,4-TRIMETHYLBENZENE

ICSC: 1433



Pseudocumene  
 $C_9H_{12}$   
 Molecular mass: 120,2

ICSC # 1433  
 CAS # 95-63-6  
 RTECS # [DC3325000](#)  
 UN # 1993  
 EC # 601-043-00-3  
 March 06, 2002 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
<b>EXPLOSION</b>	Above 44°C explosive vapour/air mixtures may be formed.	Above 44°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		PREVENT GENERATION OF MISTS!	
• <b>INHALATION</b>	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Redness. Dry skin.	Protective gloves.	Rinse skin with plenty of water or shower.
• <b>EYES</b>	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Xn symbol N symbol R: 10-20-36/37/38-51/53 S: 2-26-61 UN Hazard Class: 3 UN Packing Group: III

### SEE IMPORTANT INFORMATION ON BACK

ICSC: 1433

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.




# International Chemical Safety Cards

## 1,2,4-TRIMETHYLBENZENE

ICSC: 1433

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> The substance decomposes on burning producing toxic and irritating fumes Reacts violently with strong oxidants causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: (as mixed isomers) 25 ppm as TWA (ACGIH 2004). MAK: (as mixed isomers) 20 ppm 100 mg/m<sup>3</sup> Peak limitation category: II(2) Pregnancy risk group: C (DFG 2004). OSHA PEL<sup>†</sup>: none NIOSH REL: TWA 25 ppm (125 mg/m<sup>3</sup>) NIOSH IDLH: N.D. See: <a href="#">IDLH INDEX</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes the skin and the respiratory tract If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure , resulting in chronic bronchitis The substance may have effects on the central nervous system blood See Notes.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 169°C Melting point: -44°C Relative density (water = 1): 0.88 Solubility in water: very poor Relative vapour density (air = 1): 4.1</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 44°C c.c. Auto-ignition temperature: 500°C Explosive limits, vol% in air: 0.9-6.4 Octanol/water partition coefficient as log Pow: 3.8</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish.</p>	
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### NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. See also ICSC 1155 1,3,5-Trimethylbenzene (Mesitylene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethylbenzene (mixed isomers). 1,3,5-Trimethylbenzene (Mesitylene) is classified as a marine pollutant.

Transport Emergency Card: TEC (R)-30GF1-III  
NFPA Code: H0; F2; R0;

### ADDITIONAL INFORMATION

<p><b>ICSC: 1433</b></p>	<p><b>1,2,4-TRIMETHYLBENZENE</b></p>
<p>(C) IPCS, CEC, 1994</p>	

<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

## 1,3,5-TRIMETHYLBENZENE

ICSC: 1155



Mesitylene  
C<sub>9</sub>H<sub>12</sub>  
Molecular mass: 120.2

ICSC # 1155  
CAS # 108-67-8  
RTECS # [OX6825000](#)  
UN # 2325  
EC # 601-025-00-5  
March 06, 2002 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
<b>EXPLOSION</b>	Above 50°C explosive vapour/air mixtures may be formed.	Above 50°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		PREVENT GENERATION OF MISTS!	
• <b>INHALATION</b>	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Redness. Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
• <b>EYES</b>	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Marine pollutant. Xi symbol N symbol R: 10-37-51/53 S: 2-61 UN Hazard Class: 3 UN Packing Group: III

### SEE IMPORTANT INFORMATION ON BACK

ICSC: 1155

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.


# International Chemical Safety Cards

## 1,3,5-TRIMETHYLBENZENE

ICSC: 1155

<b>I M P O R T A N T D A T A</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> The substance decomposes on burning producing toxic and irritating fumes. Reacts violently with strong oxidants causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV (as mixed isomers): 25 ppm; (ACGIH 2001). MAK (all isomers): 20 ppm; 100 mg/m<sup>3</sup>; class II 1 © (2001) OSHA PEL†: none NIOSH REL: TWA 25 ppm (125 mg/m<sup>3</sup>) NIOSH IDLH: N.D. See: <a href="#">IDLH INDEX</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes the skin and the respiratory tract If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure, resulting in chronic bronchitis. The substance may have effects on the central nervous system blood See Notes.</p>
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<b>PHYSICAL PROPERTIES</b>	<p>Boiling point: 165°C Melting point: -45°C Relative density (water = 1): 0.86 Solubility in water: very poor Vapour pressure, kPa at 20°C: 0.25</p>	<p>Relative vapour density (air = 1): 4.1 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 50°C (c.c.) Auto-ignition temperature: 550°C Octanol/water partition coefficient as log Pow: 3.42</p>
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<b>ENVIRONMENTAL DATA</b>	<p>The substance is harmful to aquatic organisms. Bioaccumulation of this chemical may occur in fish.</p>	
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### NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. See ICSC 1433 1,2,4-Trimethylbenzene (Pseudocumene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethylbenzene (mixed isomers).

Transport Emergency Card: TEC (R)-30S2325  
NFPA Code: H0; F2; R0

### ADDITIONAL INFORMATION

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ICSC: 1155

1,3,5-TRIMETHYLBENZENE

(C) IPCS, CEC, 1994

<b>IMPORTANT LEGAL NOTICE:</b>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

**ETHYLBENZENE**

ICSC: 0268



Ethylbenzol  
Phenylethane  
EB  
 $C_8H_{10} / C_6H_5C_2H_5$   
Molecular mass: 106.2

ICSC # 0268  
CAS # 100-41-4  
RTECS # [DA0700000](#)  
UN # 1175  
EC # 601-023-00-4  
March 13, 1995 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
<b>EXPLOSION</b>	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		PREVENT GENERATION OF MISTS!	
• <b>INHALATION</b>	Cough. Dizziness. Drowsiness. Headache.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>	Redness. Pain. Blurred vision.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	(Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking liquid in covered containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: A filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-20 S: 2-16-24/25-29 UN Hazard Class: 3 UN Packing Group: II

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0268**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.


# International Chemical Safety Cards

## ETHYLBENZENE

ICSC: 0268

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH AROMATIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> The vapour mixes well with air, explosive mixtures are easily formed.</p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong oxidants. Attacks plastic and rubber.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 100 ppm as TWA 125 ppm as STEL A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 3A; (DFG 2004). OSHA PEL: TWA 100 ppm (435 mg/m<sup>3</sup>) NIOSH REL: TWA 100 ppm (435 mg/m<sup>3</sup>) ST 125 ppm (545 mg/m<sup>3</sup>) NIOSH IDLH: 800 ppm 10%LEL See: <a href="#">100414</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes the skin and the respiratory tract Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system Exposure far above the OEL could cause lowering of consciousness.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact with skin may cause dermatitis.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 136°C Melting point: -95°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 20°C: 0.015 Vapour pressure, kPa at 20°C: 0.9 Relative vapour density (air = 1): 3.7</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 18°C c.c. Auto-ignition temperature: 432°C Explosive limits, vol% in air: 1.0-6.7 Octanol/water partition coefficient as log Pow: 3.2</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is harmful to aquatic organisms.</p>	
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### NOTES

The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-30S1175 or 30GF1-I+II  
NFPA Code: H2; F3; R0

### ADDITIONAL INFORMATION

<div>ICSC: 0268<div>ETHYLBENZENE</div></div>	
<div>(C) IPCS, CEC, 1994</div>	

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# International Chemical Safety Cards

**CUMENE**

ICSC: 0170



(1-Methylethyl)benzene  
2-Phenylpropane  
Isopropylbenzene  
 $C_9H_{12}$  /  $C_6H_5CH(CH_3)_2$   
Molecular mass: 120.2

ICSC # 0170  
CAS # 98-82-8  
RTECS # [GR8575000](#)  
UN # 1918  
EC # 601-024-00-X  
April 13, 2000 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 31°C explosive vapour/air mixtures may be formed.	Above 31°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		PREVENT GENERATION OF MISTS!	
• <b>INHALATION</b>	Dizziness. Ataxia. Drowsiness. Headache. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants, acids. Cool. Keep in the dark. Store only if stabilized.	Marine pollutant. Note: C Xn symbol N symbol R: 10-37-51/53-65 S: 2-24-37-61-62 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0170**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.




# International Chemical Safety Cards

**CUMENE**

**ICSC: 0170**

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts violently with acids and strong oxidants causing fire and explosion hazard. The substance can form explosive peroxides.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 50 ppm as TWA (ACGIH 2004). MAK: 50 ppm 250 mg/m<sup>3</sup> Peak limitation category: II(4); skin absorption (H); Pregnancy risk group: C; (DFG 2004). OSHA PEL: TWA 50 ppm (245 mg/m<sup>3</sup>) skin NIOSH REL: TWA 50 ppm (245 mg/m<sup>3</sup>) skin NIOSH IDLH: 900 ppm 10%LEL See: <a href="#">98828</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and through the skin.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes and the skin Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system Exposure far above the OEL may result in unconsciousness.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact with skin may cause dermatitis.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 152°C Melting point: -96°C Relative density (water = 1): 0.90 Solubility in water: none Vapour pressure, Pa at 20°C: 427 Relative vapour density (air = 1): 4.2</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 31°C c.c. Auto-ignition temperature: 420°C Explosive limits, vol% in air: 0.9-6.5 Octanol/water partition coefficient as log Pow: 3.66</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p>	
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## NOTES

<p>Check for peroxides prior to distillation; eliminate if found.</p>	<p>Transport Emergency Card: TEC (R)-30S1918 or 30GF1-III NFPA Code: H2; F3; R1</p>
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## ADDITIONAL INFORMATION

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<p><b>ICSC: 0170</b></p>	<p><b>CUMENE</b></p>
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(C) IPCS, CEC, 1994

<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

## NAPHTHALENE

ICSC: 0667



Naphthene  
C<sub>10</sub>H<sub>8</sub>

Molecular mass: 128.18

ICSC # 0667  
CAS # 91-20-3  
RTECS # [QJ0525000](#)  
UN # 1334 (solid); 2304 (molten)  
EC # 601-052-00-2  
April 21, 2005 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 80°C explosive vapour/air mixtures may be formed. 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!	
• <b>INHALATION</b>	Headache. Weakness. Nausea. Vomiting. Sweating. Confusion. Jaundice. Dark urine.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	MAY BE ABSORBED! (Further see Inhalation).	Protective gloves.	Rinse skin with plenty of water or shower.
• <b>EYES</b>		Safety spectacles.	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. Diarrhoea. Convulsions. Unconsciousness. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, food and feedstuffs. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 22-40-50/53 S: 2-36/37-46-60-61 UN Hazard Class: 4.1 UN Packing Group: III

### SEE IMPORTANT INFORMATION ON BACK

ICSC: 0667


Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.



# International Chemical Safety Cards

## NAPHTHALENE

ICSC: 0667

<b>I M P O R T A N T D A T A</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> WHITE SOLID IN VARIOUS FORMS , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b> On combustion, forms irritating and toxic gases. Reacts with strong oxidants .</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 10 ppm as TWA; 15 ppm as STEL; (skin); A4 (not classifiable as a human carcinogen); (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 2; Germ cell mutagen group: 3B; (DFG 2004). OSHA PEL<sup>+</sup>: TWA 10 ppm (50 mg/m<sup>3</sup>) NIOSH REL: TWA 10 ppm (50 mg/m<sup>3</sup>) ST 15 ppm (75 mg/m<sup>3</sup>) NIOSH IDLH: 250 ppm See: <a href="#">91203</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. See Notes.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance may cause effects on the blood , resulting in lesions of blood cells (haemolysis) . See Notes. The effects may be delayed. Exposure by ingestion may result in death. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance may have effects on the blood , resulting in chronic haemolytic anaemia. The substance may have effects on the eyes , resulting in the development of cataract. This substance is possibly carcinogenic to humans.</p>
<b>PHYSICAL PROPERTIES</b>	<p>Boiling point: 218°C</p> <p>Sublimation slowly at room temperature</p> <p>Melting point: 80°C</p> <p>Density: 1.16 g/cm<sup>3</sup></p> <p>Solubility in water, g/100 ml at 25°C: none</p>	<p>Vapour pressure, Pa at 25°C: 11</p> <p>Relative vapour density (air = 1): 4.42</p> <p>Flash point: 80°C c.c.</p> <p>Auto-ignition temperature: 540°C</p> <p>Explosive limits, vol% in air: 0.9-5.9</p> <p>Octanol/water partition coefficient as log Pow: 3.3</p>
<b>ENVIRONMENTAL DATA</b>	<p>The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
<b>NOTES</b>		
<p>Some individuals may be more sensitive to the effect of naphthalene on blood cells.</p> <p>Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF1-II+III (solid); 41S2304 (molten)</p> <p>NFPA Code: H2; F2; R0;</p>		
<b>ADDITIONAL INFORMATION</b>		
<b>ICSC: 0667</b> <div style="text-align: right;"><b>NAPHTHALENE</b></div> <div style="text-align: center;">(C) IPCS, CEC, 1994</div>		
<b>IMPORTANT LEGAL NOTICE:</b>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>	

# Material Safety Data Sheet

Normal-Butylbenzene, 99+ %

ACC# 55434

## Section 1 - Chemical Product and Company Identification

**MSDS Name:** Normal-Butylbenzene, 99+ %

**Catalog Numbers:** AC107850000, AC107850050, AC107850250, AC107850500, AC107851000, AC107852500  
AC107852500

**Synonyms:** 1-Phenylbutane

**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
104-51-8	n-Butylbenzene	>99	203-209-7

## Section 3 - Hazards Identification

### EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 59 deg C.

**Warning! Flammable liquid and vapor.** May cause eye and skin irritation. May cause respiratory and digestive tract irritation. The toxicological properties of this material have not been fully investigated.

**Target Organs:** Liver, nervous system.

### Potential Health Effects

**Eye:** May cause eye irritation. The toxicological properties of this material have not been fully investigated.

**Skin:** May cause skin irritation. The toxicological properties of this material have not been fully investigated.

**Ingestion:** May cause gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.

**Inhalation:** May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. Vapors may cause dizziness or suffocation.

**Chronic:** No information found.

## 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. Wash clothing before reuse.

**Ingestion:** Never give anything by mouth to an unconscious person. Get medical aid immediately. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or 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. Vapors may form an explosive mixture with air. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

**Extinguishing Media:** For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Use agent most appropriate to extinguish fire. Do NOT use straight streams of water.

**Flash Point:** 59 deg C ( 138.20 deg F)

**Autoignition Temperature:** 412 deg C ( 773.60 deg F)

**Explosion Limits, Lower:** .80 vol %

**Upper:** 5.80 vol %

**NFPA Rating:** (estimated) Health: 1; Flammability: 2; 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. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

## Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. 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. Flammables-area.

## Section 8 - Exposure Controls, Personal Protection

**Engineering Controls:** Use adequate ventilation to keep airborne concentrations low. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.

### Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
n-Butylbenzene	none listed	none listed	none listed

**OSHA Vacated PELs:** n-Butylbenzene: 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:** Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions. 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:** None reported.

**pH:** Not available.

**Vapor Pressure:** 1.33 hPa @ 23 C

**Vapor Density:** 4.6

**Evaporation Rate:** Not available.

**Viscosity:** Not available.

**Boiling Point:** 183 deg C @ 760.00mm Hg

**Freezing/Melting Point:** -88 deg C

**Decomposition Temperature:** > 183 deg C

**Solubility:** insoluble

**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, strong oxidants.

**Incompatibilities with Other Materials:** Oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

**Hazardous Polymerization:** Has not been reported.

## Section 11 - Toxicological Information

**RTECS#:**

**CAS#** 104-51-8: CY9070000

**LD50/LC50:**

Not available.

**Carcinogenicity:**

**CAS#** 104-51-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

**Epidemiology:** No information available.

**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:** Rapidly volatilizes into the atmosphere where it is photochemically degraded by hydroxyl radicals.

**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>	BUTYL BENZENES	No information available.
<b>Hazard Class:</b>	3	
<b>UN Number:</b>	UN2709	
<b>Packing Group:</b>	III	

## Section 15 - Regulatory Information

### US FEDERAL

#### TSCA

CAS# 104-51-8 is listed on the TSCA inventory.

#### Health & Safety Reporting List

CAS# 104-51-8: Effective 6/1/87, Sunset 12/19/95

#### 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 # 104-51-8: 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# 104-51-8 can be found on the following state right to know lists: 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:

Not available.

#### Risk Phrases:

R 10 Flammable.

#### Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.

S 24/25 Avoid contact with skin and eyes.

S 33 Take precautionary measures against static discharges.

S 37 Wear suitable gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 9 Keep container in a well-ventilated place.

S 28A After contact with skin, wash immediately with plenty of water

#### WGK (Water Danger/Protection)

CAS# 104-51-8: 1

#### Canada - DSL/NDSL

CAS# 104-51-8 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

## Section 16 - Additional Information

**MSDS Creation Date:** 4/15/1998

**Revision #4 Date:** 3/16/2007

*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

Version 4.0

Revision Date 07/28/2010

Print Date 12/07/2011

## 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Propylbenzene

Product Number : P52407

Brand : Aldrich

Company : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

Emergency Phone # : (314) 776-6555

## 2. HAZARDS IDENTIFICATION

## Emergency Overview

## OSHA Hazards

Combustible Liquid

## Target Organs

Lungs, Eyes, Kidney

## GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H226

Flammable liquid and vapour.

H304

May be fatal if swallowed and enters airways.

H335

May cause respiratory irritation.

H401

Toxic to aquatic life.

Precautionary statement(s)

P261

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P301 + P310

IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.

P331

Do NOT induce vomiting.

## HMIS Classification

Health hazard:

0

Chronic Health Hazard:

\*

Flammability:

2

Physical hazards:

0

## NFPA Rating

Health hazard:

1

Fire:

2

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**

Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Synonyms : 1-Phenylpropane

Formula : C<sub>9</sub>H<sub>12</sub>

Molecular Weight : 120.19 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
<b>Propylbenzene</b>			
103-65-1	203-132-9	601-024-00-X	-

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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**

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed**

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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**5. FIRE-FIGHTING MEASURES****Suitable extinguishing media**

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

**Special protective equipment for fire-fighters**

Wear self contained breathing apparatus for fire fighting if necessary.

**Further information**

Use water spray to cool unopened containers.

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**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

**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**

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

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**7. HANDLING AND STORAGE****Precautions for safe handling**

Avoid inhalation of vapour or mist.



Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

#### Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

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## 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 respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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

For prolonged or repeated contact use protective gloves.

#### Eye protection

Face shield and safety glasses

#### Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

#### 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	liquid, clear
Colour	colourless

### Safety data

pH	no data available
Melting point	-99 °C (-146 °F) - lit.
Boiling point	159 °C (318 °F) - lit.
Flash point	42.0 °C (107.6 °F) - closed cup
Ignition temperature	450 °C (842 °F)
Lower explosion limit	0.8 %(V)
Upper explosion limit	6 %(V)
Density	0.862 g/cm <sup>3</sup> at 25 °C (77 °F)
Water solubility	slightly soluble

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## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

Vapours may form explosive mixture with air.

### Conditions to avoid

Heat, flames and sparks.

**Materials to avoid**

Strong oxidizing agents

**Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides

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**11. TOXICOLOGICAL INFORMATION****Acute toxicity**

LD50 Oral - rat - 6,040 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity).

LC50 Inhalation - rat - 2 h - 65000 ppm

**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**

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

**Specific target organ toxicity - single exposure (Globally Harmonized System)**

May cause respiratory irritation.

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

no data available

**Aspiration hazard**

May be fatal if swallowed and enters airways.

**Potential health effects****Inhalation**

May be harmful if inhaled. May cause respiratory tract irritation.

**Ingestion**

Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

**Skin**

May be harmful if absorbed through skin. May cause skin irritation.

**Eyes**

May cause eye irritation.

**Signs and Symptoms of Exposure**

Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

**Additional Information**

RTECS: DA8750000

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**12. ECOLOGICAL INFORMATION****Toxicity**

Toxicity to fish

LC50 - Oncorhynchus mykiss (rainbow trout) - 1.55 mg/l - 96.0 h

Toxicity to daphnia  
and other aquatic  
invertebrates.

Immobilization EC50 - Daphnia magna (Water flea) - 2 mg/l - 24 h

**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.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Avoid release to the environment.

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**13. DISPOSAL CONSIDERATIONS**

**Product**

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

**Contaminated packaging**

Dispose of as unused product.

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**14. TRANSPORT INFORMATION**

**DOT (US)**

UN-Number: 2364 Class: 3 Packing group: III  
Proper shipping name: n-Propyl benzene  
Marine pollutant: No  
Poison Inhalation Hazard: No

**IMDG**

UN-Number: 2364 Class: 3 Packing group: III EMS-No: F-E, S-D  
Proper shipping name: PROPYLBENZENE  
Marine pollutant: No

**IATA**

UN-Number: 2364 Class: 3 Packing group: III  
Proper shipping name: n-Propylbenzene

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**15. REGULATORY INFORMATION**

**OSHA Hazards**

Combustible Liquid

**DSL Status**

All components of this product are on the Canadian DSL list.

**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**

Fire Hazard

**Massachusetts Right To Know Components**

Propylbenzene

CAS-No.  
103-65-1Revision Date  
2007-03-01**Pennsylvania Right To Know Components**

Propylbenzene

CAS-No.  
103-65-1Revision Date  
2007-03-01**New Jersey Right To Know Components**

Propylbenzene

CAS-No.  
103-65-1Revision Date  
2007-03-01**California Prop. 65 Components**

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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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 Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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# International Chemical Safety Cards

**o-XYLENE**

ICSC: 0084



ortho-Xylene  
1,2-Dimethylbenzene  
o-Xylol  
 $C_6H_4(CH_3)_2 / C_8H_{10}$   
Molecular mass: 106.2

ICSC # 0084  
CAS # 95-47-6  
RTECS # [ZE2450000](#)  
UN # 1307  
EC # 601-022-00-9  
August 03, 2002 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 32°C explosive vapour/air mixtures may be formed.	Above 32°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• <b>INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0084**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.


# International Chemical Safety Cards

**o-XYLENE**

**ICSC: 0084**

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong acids strong oxidants</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m<sup>3</sup> Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL<sup>†</sup>: TWA 100 ppm (435 mg/m<sup>3</sup>) NIOSH REL: TWA 100 ppm (435 mg/m<sup>3</sup>) ST 150 ppm (655 mg/m<sup>3</sup>) NIOSH IDLH: 900 ppm See: <a href="#">95476</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the central nervous system. Exposure to the substance may enhance hearing damage caused by exposure to noise. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 144°C Melting point: -25°C Relative density (water = 1): 0.88 Solubility in water: none Vapour pressure, kPa at 20°C: 0.7</p>	<p>Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 32°C c.c. Auto-ignition temperature: 463°C Explosive limits, vol% in air: 0.9-6.7 Octanol/water partition coefficient as log Pow: 3.12</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p> 
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<p><b>NOTES</b></p> <p>Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0086 p-Xylene and 0085 m-Xylene.</p> <p>Transport Emergency Card: TEC (R)-30S1307-III NFPA Code: H 2; F 3; R 0;</p>		
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<p><b>ADDITIONAL INFORMATION</b></p>		
<p><b>ICSC: 0084</b></p>	<p><b>o-XYLENE</b></p> <p>(C) IPCS, CEC, 1994</p>	

<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

**p-XYLENE**

ICSC: 0086



para-Xylene  
1,4-Dimethylbenzene  
p-Xylol  
 $C_6H_4(CH_3)_2 / C_8H_{10}$   
Molecular mass: 106.2

ICSC # 0086  
CAS # 106-42-3  
RTECS # [ZE2625000](#)  
UN # 1307  
EC # 601-022-00-9  
August 03, 2002 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• <b>INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants, strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0086**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.


# International Chemical Safety Cards

**p-XYLENE**

**ICSC: 0086**

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong acids strong oxidants</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m<sup>3</sup> Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL<sup>+</sup>: TWA 100 ppm (435 mg/m<sup>3</sup>) NIOSH REL: TWA 100 ppm (435 mg/m<sup>3</sup>) ST 150 ppm (655 mg/m<sup>3</sup>) NIOSH IDLH: 900 ppm See: <a href="#">95476</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the central nervous system. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 138°C Melting point: 13°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.9</p>	<p>Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 528°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.15</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p>	
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## NOTES

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0085 m-Xylene.

Transport Emergency Card: TEC (R)-30S1307-III  
NFPA Code: H 2; F 3; R 0;

## ADDITIONAL INFORMATION

<p><b>ICSC: 0086</b></p>	<p><b>p-XYLENE</b></p>

(C) IPCS, CEC, 1994

<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

m-XYLENE

ICSC: 0085



meta-Xylene  
1,3-Dimethylbenzene  
m-Xylol  
 $C_6H_4(CH_3)_2 / C_8H_{10}$   
Molecular mass: 106.2

ICSC # 0085  
CAS # 108-38-3  
RTECS # [ZE2275000](#)  
UN # 1307  
EC # 601-022-00-9  
August 03, 2002 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		STRICT HYGIENE!	
• <b>INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

## SEE IMPORTANT INFORMATION ON BACK

ICSC: 0085

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.


# International Chemical Safety Cards

**m-XYLENE**

**ICSC: 0085**

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong acids strong oxidants</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m<sup>3</sup> Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL<sup>+</sup>: TWA 100 ppm (435 mg/m<sup>3</sup>) NIOSH REL: TWA 100 ppm (435 mg/m<sup>3</sup>) ST 150 ppm (655 mg/m<sup>3</sup>) NIOSH IDLH: 900 ppm See: <a href="#">95476</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the central nervous system Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 139°C Melting point: -48°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.8</p>	<p>Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 527°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.20</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p>	
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## NOTES

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0086 p-Xylene.

NFPA Code: H 2; F 3; R 0;  
Transport Emergency Card: TEC (R)-30S1307-III

## ADDITIONAL INFORMATION

<p><b>ICSC: 0085</b></p>	<p><b>m-XYLENE</b></p>
<p>(C) IPCS, CEC, 1994</p>	

<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

**TOLUENE**

ICSC: 0078



Methylbenzene  
Toluol  
Phenylmethane  
 $C_6H_5CH_3 / C_7H_8$   
Molecular mass: 92.1

ICSC # 0078  
CAS # 108-88-3  
RTECS # [XS5250000](#)  
UN # 1294  
EC # 601-021-00-3  
October 10, 2002 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
<b>EXPLOSION</b>	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• <b>INHALATION</b>	Cough. Sore throat. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. 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>	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Evacuate danger area in large spill! Consult an expert in large spill! Remove all ignition sources. Ventilation. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: self-contained breathing apparatus		Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-38-48/20-63-65-67 S: 2-36/37-46-62 UN Hazard Class: 3 UN Packing Group: II

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0078**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.


# International Chemical Safety Cards

**TOLUENE**

**ICSC: 0078**

<p align="center"><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> The vapour mixes well with air, explosive mixtures are formed easily. As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts violently with strong oxidants causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 50 ppm as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 50 ppm 190 mg/m<sup>3</sup> H Peak limitation category: II(4) Pregnancy risk group: C (DFG 2004). OSHA PEL<sup>†</sup>: TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak) NIOSH REL: TWA 100 ppm (375 mg/m<sup>3</sup>) ST 150 ppm (560 mg/m<sup>3</sup>) NIOSH IDLH: 500 ppm See: <a href="#">108883</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes and the respiratory tract The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure at high levels may result in cardiac dysrhythmia and unconsciousness.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the central nervous system Exposure to the substance may enhance hearing damage caused by exposure to noise. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p align="center"><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 111°C Melting point: -95°C Relative density (water = 1): 0.87 Solubility in water: none Vapour pressure, kPa at 25°C: 3.8 Relative vapour density (air = 1): 3.1</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 4°C c.c. Auto-ignition temperature: 480°C Explosive limits, vol% in air: 1.1-7.1 Octanol/water partition coefficient as log Pow: 2.69</p>
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<p align="center"><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p>	
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## NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Use of alcoholic beverages enhances the harmful effect.

Transport Emergency Card: TEC (R)-30S1294  
NFPA Code: H 2; F 3; R 0;

## ADDITIONAL INFORMATION

**ICSC: 0078**

**TOLUENE**

(C) IPCS, CEC, 1994

<p align="center"><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

## NAPHTHALENE

ICSC: 0667



Naphthene  
 $C_{10}H_8$

Molecular mass: 128.18

ICSC # 0667

CAS # 91-20-3

RTECS # [QJ0525000](#)

UN # 1334 (solid); 2304 (molten)

EC # 601-052-00-2

April 21, 2005 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 80°C explosive vapour/air mixtures may be formed. 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!	
• <b>INHALATION</b>	Headache. Weakness. Nausea. Vomiting. Sweating. Confusion. Jaundice. Dark urine.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	MAY BE ABSORBED! (Further see Inhalation).	Protective gloves.	Rinse skin with plenty of water or shower.
• <b>EYES</b>		Safety spectacles.	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. Diarrhoea. Convulsions. Unconsciousness. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, food and feedstuffs. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol. N symbol. R: 22-40-50/53. S: 2-36/37-46-60-61. UN Hazard Class: 4.1. UN Packing Group: III.

### SEE IMPORTANT INFORMATION ON BACK

ICSC: 0667

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.


# International Chemical Safety Cards

## NAPHTHALENE

ICSC: 0667

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> WHITE SOLID IN VARIOUS FORMS , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b> On combustion, forms irritating and toxic gases. Reacts with strong oxidants</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 10 ppm as TWA 15 ppm as STEL (skin) A4 (not classifiable as a human carcinogen); (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 2; Germ cell mutagen group: 3B; (DFG 2004). OSHA PEL: TWA 10 ppm (50 mg/m<sup>3</sup>) NIOSH REL: TWA 10 ppm (50 mg/m<sup>3</sup>) ST 15 ppm (75 mg/m<sup>3</sup>) NIOSH IDLH: 250 ppm See: <a href="#">91203</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. See Notes.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance may cause effects on the blood , resulting in lesions of blood cells (haemolysis) See Notes. The effects may be delayed. Exposure by ingestion may result in death. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance may have effects on the blood , resulting in chronic haemolytic anaemia. The substance may have effects on the eyes , resulting in the development of cataract. This substance is possibly carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 218°C Sublimation slowly at room temperature Melting point: 80°C Density: 1.16 g/cm<sup>3</sup> Solubility in water, g/100 ml at 25°C: none</p>	<p>Vapour pressure, Pa at 25°C: 11 Relative vapour density (air = 1): 4.42 Flash point: 80°C c.c. Auto-ignition temperature: 540°C Explosive limits, vol% in air: 0.9-5.9 Octanol/water partition coefficient as log Pow: 3.3</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
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### NOTES

Some individuals may be more sensitive to the effect of naphthalene on blood cells.

Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF1-II+III (solid); 41S2304 (molten)  
NFPA Code: H2; F2; R0;

### ADDITIONAL INFORMATION

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<p>ICSC: 0667</p>	<p>NAPHTHALENE</p>
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(C) IPCS, CEC, 1994

<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

**BARIUM SULFATE**

ICSC: 0827



Barium sulphate  
Blanc fixe  
Artificial barite  
 $\text{BaSO}_4$

Molecular mass: 233.43

ICSC # 0827

CAS # 7727-43-7

RTECS # [CR0600000](#)

October 20, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P1 filter respirator for inert particles.			R: S:
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0827		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	



# International Chemical Safety Cards

## BARIUM SULFATE

ICSC: 0827

I M P O R T A N T D A T A	<b>PHYSICAL STATE; APPEARANCE:</b> ODOURLESS TASTELESS, WHITE OR YELLOWISH CRYSTALS OR POWDER.	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its aerosol.
	<b>PHYSICAL DANGERS:</b>	<b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly.
	<b>CHEMICAL DANGERS:</b> Reacts violently with aluminium powder.	<b>EFFECTS OF SHORT-TERM EXPOSURE:</b>
	<b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 10 mg/m <sup>3</sup> as TWA; (ACGIH 2004). MAK: (Inhalable fraction) 4 mg/m <sup>3</sup> ; (Respirable fraction) 1.5 mg/m <sup>3</sup> ; (DFG 2004). OSHA PEL <sup>+</sup> : TWA 15 mg/m <sup>3</sup> (total) TWA 5 mg/m <sup>3</sup> (resp) NIOSH REL: TWA 10 mg/m <sup>3</sup> (total) TWA 5 mg/m <sup>3</sup> (resp) NIOSH IDLH: N.D. See: <a href="#">IDLH INDEX</a>	<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Lungs may be affected by repeated or prolonged exposure to dust particles, resulting in baritosis (a form of benign pneumoconiosis).

<b>PHYSICAL PROPERTIES</b>	Melting point (decomposes): 1600°C Density: 4.5 g/cm <sup>3</sup>	Solubility in water: none
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<b>ENVIRONMENTAL DATA</b>	
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### NOTES

Occurs in nature as the mineral barite; also as barytes, heavy spar. Card has been partly updated in October 2005. See section Occupational Exposure Limits.

### ADDITIONAL INFORMATION

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<b>ICSC: 0827</b>	<b>BARIUM SULFATE</b>
(C) IPCS, CEC, 1994	

<b>IMPORTANT LEGAL NOTICE:</b>	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.
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# International Chemical Safety Cards

**CHROMIUM**

ICSC: 0029



Chrome  
Cr  
Atomic mass: 52.0  
(powder)

ICSC # 0029  
CAS # 7440-47-3  
RTECS # [GB4200000](#)  
October 27, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible under specific conditions.	No open flames if in powder form.	In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>		Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
<b>EXPOSURE</b>		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P2 filter respirator for harmful particles.		R: S:

SEE IMPORTANT INFORMATION ON BACK

**ICSC: 0029**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

**CHROMIUM**

ICSC: 0029

<b>I</b>	<b>PHYSICAL STATE; APPEARANCE:</b> GREY POWDER	<b>ROUTES OF EXPOSURE:</b>
<b>M</b>	<b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.	<b>INHALATION RISK:</b> A harmful concentration of airborne particles can be reached quickly when dispersed.
<b>P</b>		

O R T A N T D A T A	<b>CHEMICAL DANGERS:</b> Chromium is a catalytic substance and may cause reaction in contact with many organic and inorganic substances , causing fire and explosion hazard.		<b>EFFECTS OF SHORT-TERM EXPOSURE:</b> May cause mechanical irritation to the eyes and the respiratory tract.			
	<b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: (as Cr metal, Cr(III) compounds) 0.5 mg/m³ as TWA A4 (ACGIH 2004). MAK not established.		<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b>			
	OSHA PEL*: TWA 1 mg/m³ <a href="#">See Appendix C</a> *Note: The PEL also applies to insoluble chromium salts.					
	NIOSH REL: TWA 0.5 mg/m³ <a href="#">See Appendix C</a>					
	NIOSH IDLH: 250 mg/m³ (as Cr) See: <a href="#">7440473</a>					
<b>PHYSICAL PROPERTIES</b>		Boiling point: 2642°C Melting point: 1900°C Density: 7.15 g/cm³			Solubility in water: none	
<b>ENVIRONMENTAL DATA</b>						
<b>NOTES</b>						
The surface of the chromium particles is oxidized to chromium(III)oxide in air. See ICSC 1531 Chromium(III) oxide.						
<b>ADDITIONAL INFORMATION</b>						
<b>ICSC: 0029</b>						
<b>CHROMIUM</b>						
(C) IPCS, CEC, 1994						
<b>IMPORTANT LEGAL NOTICE:</b>		Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.				

# International Chemical Safety Cards

**COPPER**

ICSC: 0240



Cu  
(powder)

ICSC # 0240

CAS # 7440-50-8

RTECS # [GL5325000](#)

September 24, 1993 Validated

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.	R: S:

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0240**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

**COPPER**

ICSC: 0240

<b>I</b>	<b>PHYSICAL STATE; APPEARANCE:</b> RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.
<b>M</b>	<b>PHYSICAL DANGERS:</b>	<b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.
<b>P</b>	<b>CHEMICAL DANGERS:</b>	

O R T A N T  D A T A	Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard.		<b>EFFECTS OF SHORT-TERM EXPOSURE:</b> Inhalation of fumes may cause metal fume fever. See Notes.
	<b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.2 mg/m³ fume (ACGIH 1992-1993). TLV (as Cu, dusts & mists): 1 mg/m³ (ACGIH 1992-1993). Intended change 0.1 mg/m³ Inhal., A4 (not classifiable as a human carcinogen); MAK: 0.1 mg/m³ (Inhalable fraction) Peak limitation category: II(2) Pregnancy risk group: D (DFG 2005). OSHA PEL*: TWA 1 mg/m³ *Note: The PEL also applies to other copper compounds (as Cu) except copper fume. NIOSH REL*: TWA 1 mg/m³ *Note: The REL also applies to other copper compounds (as Cu) except Copper fume. NIOSH IDLH: 100 mg/m³ (as Cu) See: <a href="#">7440508</a>		<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact may cause skin sensitization.
	PHYSICAL PROPERTIES	Boiling point: 2595°C Melting point: 1083°C Relative density (water = 1): 8.9	Solubility in water: none
	ENVIRONMENTAL DATA		
	NOTES		
	The symptoms of metal fume fever do not become manifest until several hours.		
	ADDITIONAL INFORMATION		
	ICSC: 0240		
(C) IPCS, CEC, 1994			
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.		

# International Chemical Safety Cards

**LEAD**

ICSC: 0052



Lead metal  
Plumbum  
Pb  
Atomic mass: 207.2  
(powder)

ICSC # 0052

CAS # 7439-92-1


RTECS # [OF7525000](#)

October 08, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.		Separated from food and feedstuffs incompatible materials See Chemical Dangers.	R: S:
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0052		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

# International Chemical Safety Cards

I M P O R T A N T T A D A	<p><b>PHYSICAL STATE; APPEARANCE:</b> BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.</p> <p><b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b> On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.05 mg/m<sup>3</sup> A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004). MAK: Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004). EU OEL: as TWA 0.15 mg/m<sup>3</sup> (EU 2002). OSHA PEL*: 1910.1025 TWA 0.050 mg/m<sup>3</sup> <a href="#">See Appendix C</a> *Note: The PEL also applies to other lead compounds (as Pb) -- <a href="#">see Appendix C</a>. NIOSH REL*: TWA 0.050 mg/m<sup>3</sup> <a href="#">See Appendix C</a> *Note: The REL also applies to other lead compounds (as Pb) -- <a href="#">see Appendix C</a>. NIOSH IDLH: 100 mg/m<sup>3</sup> (as Pb) See: <a href="#">7439921</a></p> <p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b></p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.</p>
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<b>PHYSICAL PROPERTIES</b>	Boiling point: 1740°C Melting point: 327.5°C Density: 11.34 g/cm <sup>3</sup> Solubility in water: none
<b>ENVIRONMENTAL DATA</b>	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment. 

## NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-51S1872

## ADDITIONAL INFORMATION

ICSC: 0052 <div style="text-align: right;">LEAD</div> <div style="text-align: center;">(C) IPCS, CEC, 1994</div>	

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# International Chemical Safety Cards

**MERCURY**

ICSC: 0056



Quicksilver  
Liquid silver  
Hg  
Atomic mass: 200.6

ICSC # 0056  
CAS # 7439-97-6  
RTECS # [OV4550000](#)  
UN # 2809  
EC # 080-001-00-0  
April 22, 2004 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
• <b>INHALATION</b>	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• <b>SKIN</b>	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
• <b>EYES</b>		Face shield, or eye protection in combination with breathing protection.	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. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed.	Special material. Do not transport with food and feedstuffs. T symbol N symbol R: 23-33-50/53 S: 1/2-7-45-60-61 UN Hazard Class: 8 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0056**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.




# International Chemical Safety Cards

## MERCURY

ICSC: 0056

<b>I M P O R T A N T D A T A</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.025 mg/m<sup>3</sup> as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 0.1 mg/m<sup>3</sup> Sh Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003). OSHA PEL: C 0.1 mg/m<sup>3</sup> NIOSH REL: Hg Vapor: TWA 0.05 mg/m<sup>3</sup> skin Other: C 0.1 mg/m<sup>3</sup> skin NIOSH IDLH: 10 mg/m<sup>3</sup> (as Hg) See: <a href="#">7439976</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance may have effects on the central nervous system kidneys, resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.</p>
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<b>PHYSICAL PROPERTIES</b>	<p>Boiling point: 357°C Melting point: -39°C Relative density (water = 1): 13.5 Solubility in water: none</p> <p>Vapour pressure, Pa at 20°C: 0.26 Relative vapour density (air = 1): 6.93 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009</p>
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<b>ENVIRONMENTAL DATA</b>	<p>The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.</p> 
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### NOTES

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

### ADDITIONAL INFORMATION

ICSC: 0056

(C) IPCS, CEC, 1994

MERCURY

<b>IMPORTANT LEGAL NOTICE:</b>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

NICKEL

ICSC: 0062



Ni  
Atomic mass: 58.7  
(powder)

ICSC # 0062  
CAS # 7440-02-0  
RTECS # [QR5950000](#)  
EC # 028-002-00-7  
October 17, 2001 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable as dust. Toxic fumes may be released in a fire.		Dry sand. NO carbon dioxide. 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! AVOID ALL CONTACT!	
• <b>INHALATION</b>	Cough. Shortness of breath.	Local exhaust or breathing protection.	Fresh air, rest.
• <b>SKIN</b>		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>		Safety spectacles, or eye protection in combination with breathing protection.	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.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles.	Separated from strong acids.	Xn symbol R: 40-43 S: 2-22-36

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

NICKEL

ICSC: 0062

I	<b>PHYSICAL STATE; APPEARANCE:</b> SILVERY METALLIC SOLID IN VARIOUS FORMS.  <b>PHYSICAL DANGERS:</b>	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of the dust.
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M P O R T A N T I N F O R M A T I O N	<p>Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b>  Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b>  TLV: (Inhalable fraction) 1.5 mg/m<sup>3</sup> as TWA A5 (not suspected as a human carcinogen); (ACGIH 2004).  MAK: (Inhalable fraction) sensitization of respiratory tract and skin (Sah); Carcinogen category: 1; (DFG 2004).  OSHA PEL*†: TWA 1 mg/m<sup>3</sup> *Note: The PEL does not apply to Nickel carbonyl.  NIOSH REL*: Ca TWA 0.015 mg/m<sup>3</sup> <a href="#">See Appendix A</a>  *Note: The REL does not apply to Nickel carbonyl.  NIOSH IDLH: Ca 10 mg/m<sup>3</sup> (as Ni) See: <a href="#">7440020</a></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>  May cause mechanical irritation. Inhalation of fumes may cause pneumonitis.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b>  Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.</p>
<b>PHYSICAL PROPERTIES</b>	Boiling point: 2730°C Melting point: 1455°C Density: 8.9 g/cm <sup>3</sup> Solubility in water: none
<b>ENVIRONMENTAL DATA</b>	
<b>NOTES</b>	
At high temperatures, nickel oxide fumes will be formed. Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.	
<b>ADDITIONAL INFORMATION</b>	
<b>ICSC: 0062</b> <div>(C) IPCS, CEC, 1994</div> <b>NICKEL</b>	
<b>IMPORTANT LEGAL NOTICE:</b>	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, 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. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

## ZINC POWDER

ICSC: 1205



Blue powder  
Merrillite  
Zn  
Atomic mass: 65.4  
(powder)

ICSC # 1205  
CAS # 7440-66-6  
RTECS # [ZG8600000](#)  
UN # 1436 (zinc powder or dust)  
EC # 030-001-00-1  
October 24, 1994 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Highly flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with acid(s), base (s) and incompatible substances (see Chemical Dangers).	Special powder, dry sand, NO other agents. NO water.
<b>EXPLOSION</b>	Risk of fire and explosion on contact with acid(s), base(s), water and incompatible substances.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Prevent deposition of dust.	In case of fire: cool drums, etc., by spraying with water but avoid contact of the substance with water.
<b>EXPOSURE</b>		<b>PREVENT DISPERSION OF DUST! STRICT HYGIENE!</b>	
• <b>INHALATION</b>	Metallic taste and metal fume fever. Symptoms may be delayed (see Notes).	Local exhaust.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin.	Protective gloves.	Rinse and then wash skin with water and soap.
• <b>EYES</b>		Safety spectacles.	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. Wash hands before eating.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Extinguish or remove all ignition sources. Do NOT wash away into sewer. Sweep spilled substance into containers. then remove to safe place. Personal protection: self-contained breathing apparatus.	Fireproof. Separated from acids, bases oxidants Dry.	Airtight. F symbol N symbol R: 15-17-50/53 S: 2-7/8-43-46-60-61 UN Hazard Class: 4.3 UN Subsidiary Risks: 4.2

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 1205**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

## ZINC POWDER

ICSC: 1205

I M P O R T A N T  D A T A	<b>PHYSICAL STATE; APPEARANCE:</b> ODOURLESS GREY TO BLUE POWDER.		<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.	
	<b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.		<b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.	
	<b>CHEMICAL DANGERS:</b> Upon heating, toxic fumes are formed. The substance is a strong reducing agent and reacts violently with oxidants. Reacts with water and reacts violently with acids and bases forming flammable/explosive gas (hydrogen - see ICSC0001) Reacts violently with sulfur, halogenated hydrocarbons and many other substances causing fire and explosion hazard.		<b>EFFECTS OF SHORT-TERM EXPOSURE:</b> Inhalation of fumes may cause metal fume fever. The effects may be delayed.	
	<b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV not established.		<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact with skin may cause dermatitis.	
	<b>PHYSICAL PROPERTIES</b>			
	<b>ENVIRONMENTAL DATA</b>			
<b>NOTES</b>				
Zinc may contain trace amounts of arsenic, when forming hydrogen, may also form toxic gas arsine (see ICSC 0001 and ICSC 0222). Reacts violently with fire extinguishing agents such as water, halons, foam and carbon dioxide. The symptoms of metal fume fever do not become manifest until several hours later. Rinse contaminated clothes (fire hazard) with plenty of water. <div>Transport Emergency Card: TEC (R)-43GWS-II+III NFPA Code: H0; F1; R1;</div>				
<b>ADDITIONAL INFORMATION</b>				
ICSC: 1205		ZINC POWDER		
(C) IPCS, CEC, 1994				

### IMPORTANT LEGAL NOTICE:

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***APPENDIX D***  
***HOSPITAL INFORMATION AND MAP***  
***FIELD ACCIDENT REPORT***

## FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME \_\_\_\_\_ PROJECT. NO. \_\_\_\_\_

Date of Accident \_\_\_\_\_ Time \_\_\_\_\_ Report By \_\_\_\_\_

Type of Accident (Check One):

☐ ( ) Vehicular

☐ ( ) Personal

☐ ( ) Property

Name of Injured \_\_\_\_\_ DOB or Age \_\_\_\_\_

How Long Employed \_\_\_\_\_

Names of Witnesses \_\_\_\_\_  
\_\_\_\_\_

Description of Accident \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Action Taken \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Did the Injured Lose Any Time? \_\_\_\_\_ How Much (Days/Hrs.)? \_\_\_\_\_

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? \_\_\_\_\_  
\_\_\_\_\_

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

## HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

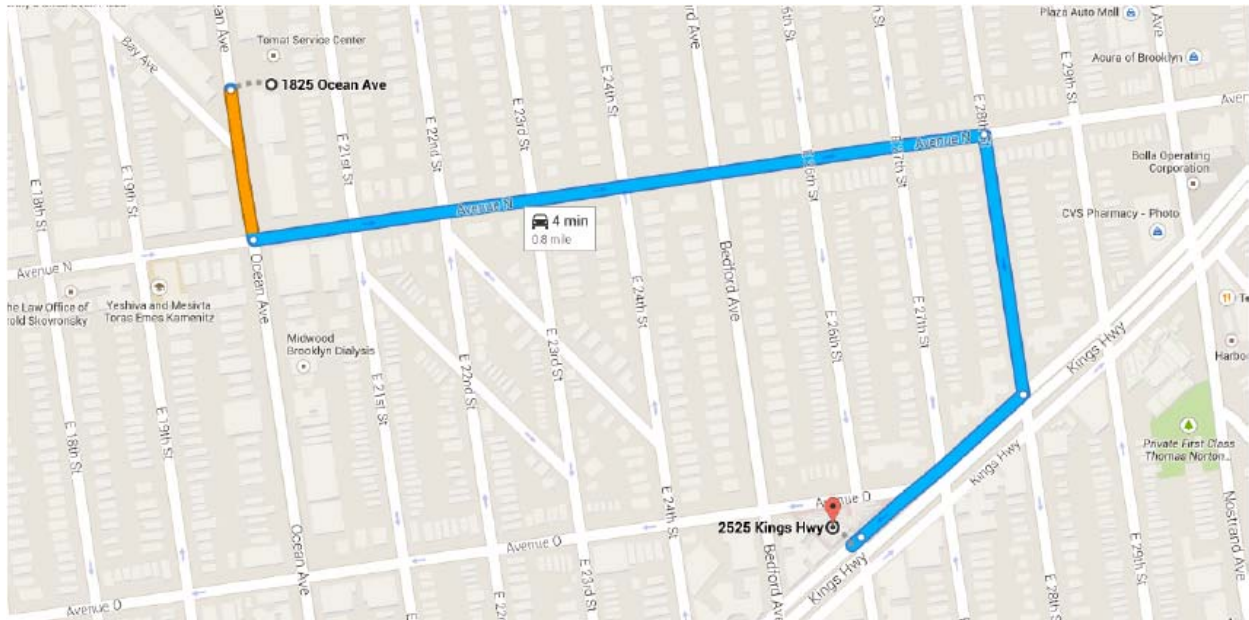
### New York Community Hospital

2525 Kings Highway

Brooklyn, New York 11229

0.8 miles – 4 min

(718)-692-5300



#### 1825 Ocean Ave

Brooklyn, NY 11230

1. Head south on Ocean Ave toward Bay Ave  
↑ 436 ft
  2. Turn left onto Avenue N  
↶ 0.4 mi
  3. Turn right onto E 28th St  
↷ 0.1 mi
  4. Turn right onto Kings Hwy  
↷ 0.1 mi
  5. Keep right to stay on Kings Hwy  
↷ 36 ft
- i** Destination will be on the right

#### 2525 Kings Hwy

Brooklyn, NY 11229