SITE CHARACTERIZATION WORK PLAN FOR THE FORMER FARRINGTON STREET GAS WORKS

Queens, New York

Prepared For:

Consolidated Edison Company of New York, Inc.

31-01 20th Avenue
Long Island City, NY 11105

Prepared By:

PARSONS

Liverpool, New York 13088

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TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

SECTION 1

INTRODUCTION

1.1 PROJECT BACKGROUND

The Consolidated Edison Company of New York, Inc. (Con Edison) has entered into a Voluntary Cleanup Agreement with the New York State Department of Environmental Conservation (NYSDEC) to investigate, and if necessary, remediate potential impacts at former manufactured gas plant (MGP) properties. One of these facilities, the former Farrington Street Gas Works, was operated on a property formerly owned by several different power companies from1887 until 1936, when Con Edison assumed operation of the MGP. The former Farrington Street Gas Works Site (Site) is located at 31-06 to 31-24 and 31-37 to 31-53 Farrington Street, Queens, New York (Figure 1).

Historical research was previously conducted for the former Farrington Street Gas Works Site as further described in Section 2.3. Results of that effort are documented in the *Manufactured Gas Plant Site History Research Report for the Former Farrington Street Gas Works 31-06 to 31-24 and 31-37 to 31-53 Farrington Street, Queens, New York* (ENSR, 2003). Based on historical operations, a Site Characterization of the former Farrington Street Gas Works Site will be conducted to (1) characterize and identify potential subsurface conditions that may pose a risk to human health and the environment; and (2) to ascertain the potential need for further investigation or remediation. This work plan presents the scope of work and methods to be used during the Site Characterization.

1.2 PROJECT OBJECTIVES

The specific objectives of the Site Characterization are to assess whether hazardous substances have been released to the environment and may be present onsite, if they may have migrated offsite, and whether they may have impacted human health or the environment. If no potential impacts are identified, a "no further action" conclusion may be warranted. If potential impacts are verified, additional sampling may be needed to determine the nature and extent of those impacts, or the need for remediation and interim measures to protect onsite occupants. These objectives are consistent with those of the NYSDEC's comprehensive remedial investigation process.

SECTION 2

SITE BACKGROUND

2.1 SITE DESCRIPTION

The Site is located at 31-06 to 31-24 and 31-37 to 31-53 Farrington Street, Queens, New York. For the purposes of describing the Site, it has been divided into Parcels 1, 2 and 3 (Figure 2). The Site consists of approximately 6.17 acres, which contains several commercial properties, identified as Block 4407 Lot 1, Block 4406 Lots 30, 32, and 99, and Block 4408 Lot 1. The Site is bordered to the north by 31st Road (formerly Bayside Avenue), to the east by Farrington and Linden Streets, and to the south by 32nd Avenue (formerly Myrtle Avenue). The western boundary of the Site is approximately 200 feet east of Downing Street. The Site is located approximately 2,000 feet northeast of Flushing Creek, 1,200 feet southwest of Mill Creek, and 4,000 feet east of Flushing Bay. According to the New York City Department of City Planning, the Site and northwestern, western, southwestern, and southern abutting properties are zoned as M2-1; medium manufacturing districts (medium performance), and the abutting properties east of Farrington Street are zoned as M1-1; light manufacturing districts (high performance) (ENSR, 2003).

In Parcel 1, the Site presently contains a Pathmark grocery and pharmacy, various stores, and a paved parking area. These properties were built in 1972 and are presently owned by Feinrose Associates (ENSR, 2003). Con Edison currently owns the portions of the Site located in Parcel 2. Parcel 2 consists of a mixed paved and gravel lot that is utilized as an equipment storage, a trailer storage, a material lay down area, and a vehicle storage yard/lot. Parcel 3 was previously investigated and an Interim Remedial Investigation (IRM) was implemented in 2002 and 2003 as furthered discussed in Section 2.4. Current site operations in Parcel 3 include a Con Edison truck flush facility.

2.2 ADJOINING PROPERTY DESCRIPTION

To the north, 31st Road (formerly Bayside Avenue) borders the Site, beyond which is a strip mall (built in 1974) containing several commercial properties, associated parking areas and Whitestone Bridge Boulevard. The intersection of 31st Road and Farrington Street abuts the Site to the northeast, beyond which is an office building and parking area. A Quick Lube and car wash, two residences, a warehouse and the intersection of 31st Drive and Farrington Street abut the Site to the east. Commercial and residential properties are situated southeast of the Site beyond the intersections of Farrington Street and 32nd Avenue and Linden Street and 32nd Avenue. 32nd Avenue borders the subject property to the south, beyond which are commercial properties such as a deli, antique shop, auto service, and several unidentified businesses. A gravel vehicle and equipment storage lot owned by Con Edison, a collision corporation (built 1979), a motor vehicle repair shop (built in 1969) and a lot owned by the NYSDEC abut the Site to the southwest and west. To the northwest, beyond 31st Drive, there is a large paved parking area and two strip malls (built 1966 and 1977) containing a Blockbuster, Laundromat, restaurants, a dentist office, a bedding service, and other commercial properties (ENSR, 2003).

2.3 SITE HISTORY

Historical research was previously conducted, and documented in the *Site History Research Report* (ENSR, 2003). Based on this report, the Site was owned and/or operated as an MGP by several different power companies between 1887 and the late 1940s. Prior to the initiation of manufactured gas operations in 1887, the original Site boundaries included a smaller tract of land (the southwestern portion of Parcel 2), which was originally subdivided into smaller private properties. Flushing Gas Light Company acquired portions of the original site property between 1859 and 1901 and operated the MGP until 1889. Between 1901 and 1905, Newton and Flushing Gas Company, a subsidiary of the New York and Queens Gas Co, operated the Site and MGP, in addition to expanding the property boundaries into the northwestern portion of Parcel 2 in 1901. In 1905, The New York and Queens Company acquired the portion of the property previously owned by Flushing Gas Light Company and Newton and Flushing Gas Light Company. Between 1909 and 1921, New York and Queens Gas Company acquired and expanded the MGP into the eastern portions of Parcels 1 and 2. Con Edison then purchased Parcel 3 from New York and Queens Gas Company on February 26, 1924. Between 1924 and 1976, a three million cubic foot waterless gasholder and related equipment and structures occupied Parcel 3. After the MGP was retired in 1944, the holder on Parcel 3 was used for storage of gas that was produced at other Con Edison plants or purchased from other utilities. New York and Queens Gas Company merged with Con Edison on June 1, 1936, at which time Con Edison assumed operation of the MGP, then located in present-day Parcels 1, 2 and 3 (ENSR, 2003).

2.4 PREVIOUS INVESTIGATIONS/REMEDIAL MEASURES

In 2001, Con Edison contracted Parsons to conduct a Preliminary Site Assessment (PSA) of Parcel 3 where they intended to construct a new central collection facility (CCF) building and various below ground settlement basins and collection tanks to upgrade the existing truck flush facility. In anticipation of the construction activities associated with the flush truck facility upgrade project, a PSA was conducted to characterize and identify potential subsurface conditions in Parcel 3 that could pose a risk to the health and safety of Site workers and the public during those activities (Parsons, 2001). The PSA identified former gasholder-related structures (tar pumps, skimmer pumps, piping and tanks) and several areas within and outside of the proposed CCF building footprint that contained MGP-impacted soils.

To address the former MGP structures and impacted soils prior to construction of the new building, an Interim Remedial Measures (IRM) Work Plan (Parsons, 2002) was developed and approved by the New York State Department of Environmental Conservation (NYSDEC). The IRM was subsequently conducted between November 2002 and March 2003 in accordance with the work plan. IRM activities are documented in the IRM Report (Parsons, 2004) and are summarized below;

- Approximately 6,355 tons of impacted soil were excavated at depths ranging from 4 to 18 feet below ground surface.
- The entire former gasholder concrete slab, foundation, and footers were removed.
- Several former belowground structures along the perimeter of the former gasholder (tar and skimmer pumps/tanks) were removed.

- Belowground piping associated with the former gasholder that was encountered during the IRM were removed or abandoned in place.
- Two 550-gallon former gas-oil underground storage tanks located in the northeast corner of Parcel 3 were removed.
- Approximately 1,435 tons of fill material were imported for backfill and site restoration.

The IRM also included implementation of a post-IRM monitoring plan, which involved installing seven new monitoring wells in Parcel 3. Since the well installations in 2004, sample events have taken place semi-annually on a two-year cycle. Eight wells have been used for this monitoring plan. The following summarizes results from the monitoring events conducted between 2004 and 2007:

- SVOCs, including potential MGP-related constituents, have not been detected at concentrations above the Ambient Water Quality Standards and Guidance Values (AWQSGVs) in six of the eight monitoring wells sampled over the four-year period. Exceedances of Class GA Groundwater Standards/Guidance were limited to two monitoring wells, MW-9 and MW-10 (Figure 3).
- VOCs have been consistently detected in MW-6, which is located near the upgradient property boundary. The detection of these VOCs in the upgradient portion of the site indicates that there may be an upgradient or non-MGP-related source of these constituents. The detection of MTBE and CVOCs, which are not typical MGP-related compounds, in MW-6 provides further indication of an off-property or non-MGP related source of VOCs.
- The concentrations of total VOCs and BTEX compounds have generally been consistent over the four-year period.
- A year to year comparison of results between 2004 and 2007, considering the potential for seasonal variability, indicate that groundwater flow and groundwater quality across the site is generally consistent.

Based on observations and results through 2007, two additional years of semi-annual sampling was recommended in January 2008 to further monitor and evaluate groundwater quality at the site (Parsons, 2008).

No previous investigations have been conducted in Parcels 1 or 2 based on available site information.

2.5 SITE SETTING

2.5.1 Topography and Surface Water Drainage

The Site is located in the northern portion of Queens County, which is characterized by low rolling hills overlooking and extending into the East River between various salt-water bays, of which Flushing Bay is the largest. The overall elevation of the Site and the surrounding properties is approximately 14 feet above mean sea level (amsl). A relatively narrow ridge, ranging in elevation from 160 to 260 feet amsl, trends approximately east-northeast in the central part of Queens County. This ridge, situated approximately 3,000 feet southeast of the Site, is

part of the Harbor Hill Terminal Moraine, which marks the furthest advance of the Wisconsin Glaciation in this area. A plain slopes gently southward from the ridge to the Atlantic Ocean. Flushing Meadow, a large flat-bottomed valley, extends northward from this ridge to Flushing Bay on the East River (ENSR, 2003).

The Site lies in a relatively flat area approximately 2,000 feet northeast of Flushing Creek, 1,200 feet southwest of Mill Creek and 4,000 feet east of Flushing Bay. According to the NYSDEC, the surface water classification for Flushing Creek is Class I, described as saline surface waters which are best suited for secondary contact recreation and fishing, and are suitable for propagation and survival. Mill Creek is classified as Class C, which is described as saline surface waters, which are best used for fishing, and can be suitable for fish survival. A substantial portion of the precipitation runs off paved surfaces to sewers, and is discharged to the adjacent water bodies through the storm systems located in the adjacent roadways. Some precipitation infiltrates the ground surface in unpaved areas.

2.5.2 Geology and Hydrogeology

Based on information provided in the *Site History Research Report* (ENSR, 2003), a layer of low permeability glacial till material is likely to be present. The bedrock underlying the Site and surrounding properties consists of undifferentiated schists and gneisses with a depth to bedrock ranging from 35 to 45 feet below ground surface. The bedrock is overlain uncomformably by Pleistocene glacial deposits and scattered postglacial material. The glacial deposits include ground moraine deposits, which is an unsorted and unstratified mixture of clay, sand, gravel, and boulders that were accumulated at the front of a continental glacier during a period of melting, specifically, the glacial period of the Wisconsin age.

The Site and abutting properties are underlain by the Upper Glacial Aquifer in the Brooklyn/Queens Aquifer System. The Upper Glacial Aquifer in this location consists of glacial till. The unconsolidated sediments and glacial till aquifer underlying the Site are approximately 35 to 45 thick, and rest directly upon the bedrock surface. According to the NYSDEC, groundwater classification for the Flushing vicinity of Queens County is classified as Class GA for fresh groundwater. Groundwater in the vicinity of the subject property is not used for drinking water purposes. Residents of the area are connected to the New York City public water supply system (ENSR, 2003).

Groundwater has typically been encountered between 13 and 15 feet below ground surface and tends to flow east-southeast based on previous investigations and groundwater monitoring events at Parcel 3.

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SECTION 3

SCOPE OF WORK

The following sections present the scope of work to be conducted during the Site Characterization. Modifications to the work plan due to conditions encountered during the field activities will be made in consultation with, and under the approval of, the NYSDEC. The scope of the field investigation activities includes the installation of test pits, soil borings, and monitoring wells. Samples of soil, groundwater, and free product (if present) will be collected for laboratory analysis. All proposed sampling locations as well as existing monitoring well locations in Parcel 3 are shown on Figure 3. Table 1 provides the rationale for test pit, soil boring, and monitoring well locations; and Table 2 provides a summary of the anticipated number of samples and chemical analyses.

Sampling procedures are described in detail in Appendix A, the Field Sampling Plan (FSP). Quality assurance/quality control (QA/QC) procedures are described in Appendix B, the Quality Assurance Project Plan (QAPP). A Health and Safety Plan (HASP) is provided as Appendix C.

3.1 SITE INSPECTION AND PRELIMINARY INVESTIGATION ACTIVITIES

An inspection will be conducted to refine the locations of the proposed investigation points. The proposed scope of work will be reviewed with representatives of the current property owners. As-built diagrams will be reviewed for access, feasibility, occupant health and safety, worker health and safety, and crowd control. Subsurface utility locations will be reviewed. The inspection will allow the most efficient and effective methods to be employed during the Site Characterization. Proposed locations and proposed methods may be altered in the field based on site conditions, access, utilities, and public safety. Alterations, if necessary, will be made in consultation with the NYSDEC.

3.2 UNDERGROUND UTILITY CLEARANCE

Prior to beginning the field investigation work, the Dig Safely New York One-Call Center will be contacted for a Code 753 utility mark-out. No drilling will be conducted until the following minimum requirements have been met:

- The Parsons Project Manager and/or field team leader have thoroughly inspected the drilling location and surrounding area for the Code 753 mark-out and the location is clear of marked utilities;
- All drilling locations have been checked by Con Edison using an electromagnetic cable locator, or a private utility locating contractor has conducted a geophysical survey of the proposed sampling locations to locate potential underground utilities or obstructions;
- All drilling locations have been cleared with a metal detector by Parsons;
- Utility plates for the Site and surrounding area have been provided to Parsons by Con Edison's Construction Management staff, and reviewed;

- Parsons has met with and reviewed all of the drilling locations with a facility representative, a Con Edison Construction Management representative, and/or Con Edison's Project Manager, and verified that all drilling locations have been marked; and
- Each drilling location has either been hand-augered to a minimum depth of 5 feet, or a test pit has been hand-dug or vacuum excavated to a minimum depth of 5 feet, as determined by Con Edison during the site inspection.

Additional utility clearance measures may be required based on the Site inspection and/or Con Edison requirements.

3.3 AIR MONITORING

The proposed investigation and sampling activities may generate fugitive dust or organic vapors. Worker breathing zone air monitoring will be conducted as described in Section 3.3.1. A community air monitoring program will also be implemented as described in Section 3.3.2. The HASP (Appendix C) provides the air monitoring action levels and corresponding response actions.

3.3.1 Worker Air Monitoring

Air monitoring of the worker breathing zone will be conducted continuously during all intrusive activities to assure proper health and safety protection for the team and any occupants of the facilities. Readings will be taken prior to start of intrusive work at the Site to establish background conditions. Initially, air monitoring will be conducted at the site of the investigation (potential source area). If air monitoring identifies the presence of VOCs in the worker breathing zone, guidelines in the HASP (Appendix C) will be followed regarding action levels, permissible exposure, engineering controls, and personal protective equipment. The following equipment will be used to conduct air monitoring:

- A PID (RaeSystems MiniRae 2000 or equivalent) will be used to monitor for organic vapors and benzene;
- A MiniRAM Portable Aerosol Monitor will be used to monitor particulate dust and aerosolized vapors; and
- Cyanide color detector tubes will be used to monitor for hydrogen cyanide, if necessary.

Air monitoring results will be recorded in the field book during investigation activities and made available for NYSDEC and New York State Department of Health (NYSDOH) review.

3.3.2 Community Air Monitoring

Community air monitoring will be conducted using the NYSDOH's Generic Community Air Monitoring Plan (NYSDOH, 2000) as a guidance document. Real-time air monitoring for volatile compounds and particulates at the perimeter of the hot zone will be performed as described below.

VOC Monitoring

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of groundwater samples. Periodic monitoring may include obtaining measurements upon arrival at a location, while opening a monitoring well cap, when bailing/purging a well, and upon leaving the location. In some instances, depending on the proximity of exposed individuals, continuous monitoring may be conducted during these activities.

Continuous monitoring for VOCs will be conducted during all ground intrusive activities (i.e., test pitting, soil boring installation, and monitoring well installation). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the hot zone. Monitoring will be conducted with a PID equipped with a 10.6 eV lamp capable of calculating 15-minute running average concentrations. The following actions will be taken based on organic vapor levels measured:

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the hot zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions (see the last paragraph in Section 3.4 for possible corrective actions), and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.
- If the total organic vapor level is above 25 ppm at the perimeter of the hot zone, activities will be shutdown.

All 15-minute readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, will also be recorded.

Particulate Monitoring

During ground intrusive activities, particulate concentrations will be monitored continuously at the downwind perimeter of the hot zone with a portable real-time particulate monitor capable of measuring particulate matter less than 10 micrometers in size and capable of integrating over a period of 15 minutes (or less). The equipment will include an audible alarm to indicate exceedence of the action level. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. The following actions will be taken based on particulate concentrations measured:

- If the downwind particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) above background for the 15-minute period or if dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust

suppression provided that the downwind particulate level does not exceed 150 µg/m^3 above background, and no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, the downwind particulate level is greater than 150 µg/m^3 above background, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind particulate level to within 150 µg/m^3 of the background (upwind) level and in preventing visible dust migration.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review.

3.4 TEST PIT EXCAVATION

Test pits will be excavated at six locations (TP-10 through TP-15) to determine the presence of MGP structure remnants and/or impacted subsurface materials. Proposed test pit locations are depicted on Figure 3. The test pits will be excavated using a rubber-tired or tracked excavator or backhoe to groundwater, bedrock, or limits of the excavator (typically 10 to 15 feet), whichever is encountered first. Generally, test pits will measure approximately 10 feet long (or more) and will be the width of the excavator bucket (2 to 3 feet). During excavation activities, the test pit walls and floor will be investigated for evidence of MGP-related impacts, (odors, staining, sheens, non-aqueous-phase liquid [NAPL], elevated PID readings) and remnant structures. Soil retrieved from test pits will be visually classified for soil type, grain size, texture, moisture content, and visible evidence of staining or impacts, and screened for the presence of VOCs with a PID. All test pits will be photographed.

If impacted materials are encountered in a test pit, one composite sample will be collected from the impacted test pit sidewalls. A second composite sample will be collected from the 2-foot interval beneath the impacted zone to define the vertical extent of impacts. If the vertical extent of impacts cannot be confirmed due to the limitation in test pit depth, samples will not be collected from the test pit, and the vertical extent of impacts in that area will be confirmed during the soil boring program. If no impacted materials are encountered in a test pit, two composite samples will be collected, one from the bottom and the second from the sidewalls of the test pit to confirm no impacts are present. Multiple samples may be collected from larger test pits, if necessary. The samples will be submitted for laboratory analysis for TCL VOCs by EPA Method 8260, TCL SVOCs by EPA Method 8270, TAL metals by EPA Method 6000/7000 Series, and cyanide by EPA Method 9012 (see Table 2).

If NAPL is observed in any of the test pits, a representative sample of the product will be submitted for forensic hydrocarbon fingerprint analysis by modified Method 8100**.** This analysis will be used to help determine the source of the NAPL. Test pits will remain open for the time it takes to perform the excavation, log and photograph the subsurface conditions, collect samples, and measure the dimensions of the subsurface features. The excavated soil will be temporarily placed on impervious plastic sheeting adjacent to the test pit and put back into the excavation in the reverse order from which it was removed, to the extent possible. To mitigate potential odors, emissions and dust during excavation activities, test pits will be backfilled immediately following observation and recording of subsurface conditions and sample collection. Any grossly impacted materials (i.e., NAPL-saturated) removed from the excavation will be covered with polyethylene sheeting while being staged next to the excavation. In the event that the above

measures are not effective in addressing odors and emissions, excavation activities will be temporarily stopped and additional control measures such as the application of water and/or odor control suppressants (Rusmar AC-645 Long Duration foam or Biosolve®) will be implemented.

3.5 SOIL BORINGS

A total of six soil borings (SB-17 through SB-22) will be advanced to characterize subsurface conditions. Figure 3 depicts the proposed boring locations and Table 1 summarizes the sampling rationale. All boring locations are subject to change based on accessibility, utility clearance, and site conditions encountered during the site inspection and field activities. Additional soil borings may also be added during the course of the filed investigation based on subsurface conditions encountered.

Each soil boring location will be cleared for utilities as described above in Section 3.1. Soil borings will be advanced using direct-puch (Geoprobe™) drilling methods, if possible. Accessibility of soil boring locations, as well as the subsurface conditions encountered, will govern the drilling techniques used. Soil borings will be drilled to 30 feet, bedrock, or refusal, whichever is less, unless visually impacted materials are observed. If visually impacted materials are observed at the bottom of the boring, the boring will be continued until unimpacted soils are observed, bedrock is encountered, or the limit of the drilling equipment is reached.

Soil samples will be collected continuously to the bottom of the borings using a 2-foot long, 2-inch diameter discrete samplers. Soil samples retrieved from each boring will be visually classified for soil type, grain size, texture, moisture content, and visible evidence of staining or impacts. Each sample will also be screened for the presence of VOCs with a PID. In addition, a sample from each 2-foot interval will be collected in a sealed plastic bag and the sample headspace will be screened for the presence of VOCs with a PID. Each soil boring will be grouted to the surface when complete.

Two soil samples will be selected from each boring location and submitted to a laboratory for chemical analysis (see Table 2). The two samples will be collected as follows:

- One sample will be collected from the zone with the highest PID readings or visual impacts from the boring. If no visual impacts or elevated PID readings are observed, a sample will be collected from directly above the water table.
- One sample will be collected below the impacted zone or near the base of the boring to define the vertical extent of impacts at that location.

Additional soil samples may be collected based on field observations. The soil samples will be analyzed for TCL VOCs and SVOCs, cyanide, and TAL metals. In addition, if free phase NAPL is encountered, one representative sample will be submitted for forensic fingerprinting analysis to a lab that specializes in analyzing and determining the origin of NAPL samples.

Borings that are not converted into monitoring wells will be grouted to the surface following completion. Holes in asphalt or concrete will be repaired and patched with similar materials. Drilling equipment will be decontaminated between each boring in accordance with procedures specified in Appendix A, the FSP. Drill cuttings and decontamination water will be

containerized in accordance with procedures also specified in the FSP. A description of the decontamination pad is also provided in Section 3.1 of Appendix A.

3.6 MONITORING WELL INSTALLATION

Nine overburden monitoring wells (MW-13 through MW-21) will be installed at the proposed locations shown on Figure 3. Table 1 summarizes the sampling rationale. Groundwater is anticipated to be approximately 10 to 15 feet below ground surface (bgs) based on data from Parcel 3; therefore, overburden monitoring wells will be installed to depths of approximately 20 to 25 feet unless visually impacted materials are observed. If visually impacted materials are observed at the bottom of the boring, the boring will be continued until no visually impacted soils are observed, bedrock is encountered, or the limit of the drilling equipment is reached. The data collected from the overburden monitoring wells will be used to: characterize groundwater conditions, assess groundwater flow direction, evaluate the presence of NAPL, and ascertain the potential impact of MGP residuals and other constituents on groundwater quality.

As with the soil borings, overburden monitoring well borings will be advanced using 4.25-inch inner diameter HSAs. Soil samples will be collected continuously to the bottom of the borings using 2-foot long discrete split-spoon samplers. Soil samples retrieved from each overburden monitoring well boring will be visually characterized for soil type, grain size, texture, moisture content, and visible evidence of staining or impacts. Each sample will also be screened for the presence of VOCs with a PID. In addition, a sample from each 2-foot interval will be collected in a sealed plastic bag and the sample headspace will be screened for the presence of VOCs with a PID.

Two soil samples will be selected from each overburden monitoring well boring location and submitted to the laboratory for chemical analysis. The two samples will be collected as follows:

- One sample will be collected from the zone with the highest PID readings or visual impacts from either the test pit (hand auger) or boring. If no visual impacts or elevated PID readings are observed, a sample will be collected from directly above the water table.
- One sample will be collected below the impacted zone or near the base of the boring to define the vertical extent of impacts at that location.

Additional soil samples may be collected based on field observations. The soil samples will be analyzed for TCL VOCs and SVOCs, cyanide, and TAL metals (see Table 2).

The overburden monitoring wells will be constructed with 2-inch ID, threaded, flush-joint, PVC casing and approximately 10 feet of 0.02-inch slot screens. A 2-foot sump will be placed below the screens at locations where NAPL is observed during installation of the monitoring well boring. The annulus around the screens will be backfilled with silica sand having appropriate size for the subsurface conditions (e.g., Morie No. 2). The screens will be placed across the water table interface to allow for the monitoring of light non-aqueous phase liquid (LNAPL), if present. The wells will be contained in flush-mounted vaults to maintain accessibility to the area after completion.

After a minimum of 24 hours, the monitoring wells will be developed until the well is reasonably free of sediment (less than 50 NTU if possible) or until the pH, temperature and conductivity stabilize. A maximum of one to two hours of development time per well is anticipated. The level of effort, however, is dependent upon the nature of the soils at each location. Monitoring well installation, construction, development, decontamination, and investigation-derived waste handling procedures are specified in the FSP (Appendix A).

3.7 SITE SURVEY

The locations and elevations of the soil borings and monitoring wells will be surveyed by a licensed surveyor. Vertical control of elevations for soil borings, monitoring wells and test pits will be established to the nearest 0.01-foot and will be based on a USGS datum and benchmarks established on the Site. Horizontal control will be based on New York State plane coordinate system with established and referenced control points.

3.8 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater sampling will commence a minimum of two weeks after well development. Groundwater samples will be collected from the nine new monitoring wells (MW-13 through MW-21). Prior to sampling, the headspace within each well will be measured with a PID. An oil/water level interface probe and/or a water level indicator will be used to measure the depths to the water table and thickness of any free product in the wells. The monitoring wells will be purged using low-flow purging techniques to remove a minimum of three times the volume of standing water in the well to allow for collection of a representative sample. Groundwater samples will then be collected using dedicated sampling equipment (e.g., bailer or pump tubing).

Prior to filling the sample bottles, the turbidity, pH, temperature, and conductivity of the sample will be measured and recorded. The groundwater samples will be analyzed for TCL VOCs and SVOCs, total cyanide, and TAL metals. Sampling procedures are described in detail in the FSP (Appendix A). QA/QC procedures are described in the QAPP (Appendix B). In addition, if NAPL is encountered in a well, a representative sample will be submitted for forensic fingerprinting analysis to a lab specialized in analyzing and determining the origin of NAPL samples.

3.9 GROUNDWATER LEVEL MEASUREMENTS

Following installation of the nine new monitoring wells proposed herein, groundwater level measurements from each new well, in addition to the eight existing monitoring wells in Parcel 3 will be obtained to facilitate development of a groundwater contour map, showing groundwater flow direction.

3.10 WASTE MANAGEMENT

Investigation-derived wastes (IDW) generated during the site characterization will be containerized. Soils will be placed in 55-gallon Department of Transportation (DOT-) approved drums which are labeled appropriately. Plastic sheeting and personal protective equipment will be consolidated in DOT-approved drum(s). Fluids will be placed in DOT-approved fluid drums with closed tops. The drums will be staged in a secure area as determined by Con Edison and facility representatives prior to proper characterization and disposal.

3.11 LABORATORY ANALYSIS AND DATA VALIDATION

Laboratory analyses of soil and groundwater samples will be conducted by a NYSDOH Environmental Laboratory Analysis Program (ELAP) approved laboratory certified for analyses using the most recent Analytical Services Protocol (ASP). Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and standard deliverable format.

Table 2 summarizes the anticipated analytical methods and quality control samples required. QA/QC procedures required by the SW-846 methods will be followed, including initial and continuing instrument calibrations, standard compound spikes, surrogate compound spikes, and analysis of other samples (blanks, laboratory control samples, matrix spikes/matrix spike duplicates, etc.). The laboratory will provide sample bottles, which have been pre-cleaned and preserved in accordance with the SW-846 methods. Aqueous VOC samples will be preserved using hydrochloric acid. NYSDEC ASP holding times will be adhered to. Note that the SW-846 methods have are incorporated into the NYSDEC ASP. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP shall take precedence.

Data validation will be performed in accordance with USEPA Region II standard operating procedures (SOPs) for organic and inorganic data review. These validation guidelines are regional modifications to the National Functional Guidelines for organic and inorganic data review (USEPA 1999 and 2004). Validation will include the following:

- Verification of 100% of all quality control (QC) sample results (both qualitative and quantitative);
- Verification of the identification of 100% of all sample results (both positive hits and non-detects);
- Re-calculation of 10% of all investigative sample results; and
- Preparation of a Data Usability Summary Report (DUSR).

Data reduction, validation, and reporting procedures are provided in the QAPP (Appendix B).

3.12 SITE CHARACTERIZATION REPORT

Upon completion of fieldwork and receipt of laboratory analytical results, a Site Characterization Report (SCR) will be prepared. The general outline of the SCR will be as follows:

- Section 1 (Introduction) will include a site overview and history;
- Section 2 (Site Characterization Activities) will describe the investigation activities completed and any deviations from this work plan;
- Section 3 (Site Characterization Results) will present the results of the investigation, including extent of MGP-related impacts and a human health exposure assessment; and
- Section 4 (Conclusions and Recommendations) will summarize the results of the investigation and present any conclusions and recommendations for future investigation or remediation.

SECTION 4

PROJECT MANAGEMENT

4.1 ORGANIZATION AND STAFFING

This Site Characterization will be completed for Con Edison by Parsons. Key members of the project team and their responsibilities are described below:

Key Position	Contact Name	Responsibilities
Con Edison		
Project Manager:	Ms. Yelena Skorobogatov Telephone: (718) 204-4205 Fax: (718) 932-2687 E-mail: skorobogatovy@coned.com	Con Edison's Project Manager is responsible for managing the project within Con Edison and for ensuring the consultant completes the work in accordance with the Work Plan.
Con Edison's Consultant (Parsons)		
Project Manager	Mr. Shane Blauvelt Telephone: (315) 451-9560 Fax: (315) 451-9570 E-mail: Shane.Blauvelt@parsons.com	The Project Manager is responsible for maintaining the project schedule, keeping the project within budget, and ensuring the technical adequacy of the work performed. The Project Manager will be the primary contact with Con Edison on all technical, scheduling, and budget issues.
Field Representative:	TBD Telephone: Fax: E-mail:	The Field Supervisor will be responsible for working with the Project Manager to coordinate, oversee and ensure that all requirements are strictly adhered to on field activities.
Technical Director	Ms. Megan A. Miller, P.E. Telephone: (315) 451-9560 Fax: (315) 451-9570 E-mail: Megan.Miller@parsons.com	The Technical Director will provide technical support and overall quality assurance for the project. The primary objective of the Technical Director is to ensure compliance with all regulatory guidance and regulations.
Health and Safety Officer	Mr. Gregory Beck Telephone: (732) 537-3502 Fax: (732) 868-3110 E-mail: gregory.beck@parsons.com	The Health and Safety Officer will ensure that the health and safety plan is properly implemented and that all personnel and subcontractor site personnel are trained in the site-specific project health and safety requirements, as well as those of Con Edison.

Key Position	Contact Name	Responsibilities
Subcontractors		
Utility Clearance/GPR Survey	Enviroprobe	Conduct GPR survey of Site to detect underground utilities.
Test Pit Excavation	Environmental Closures (ECI)	Perform test pit excavation activities.
Drilling/Well Installation	TBD	Install soil borings and monitoring wells.
Surveyor	The Chazen Companies	Survey sampling locations.
Laboratory	Chemtech	Conduct laboratory analyses of soil and water samples in accordance with the QAPP.

4.2 PROJECT SCHEDULE

The anticipated project schedule for the Site Characterization is shown on Figure 4.

SECTION 5

REFERENCES

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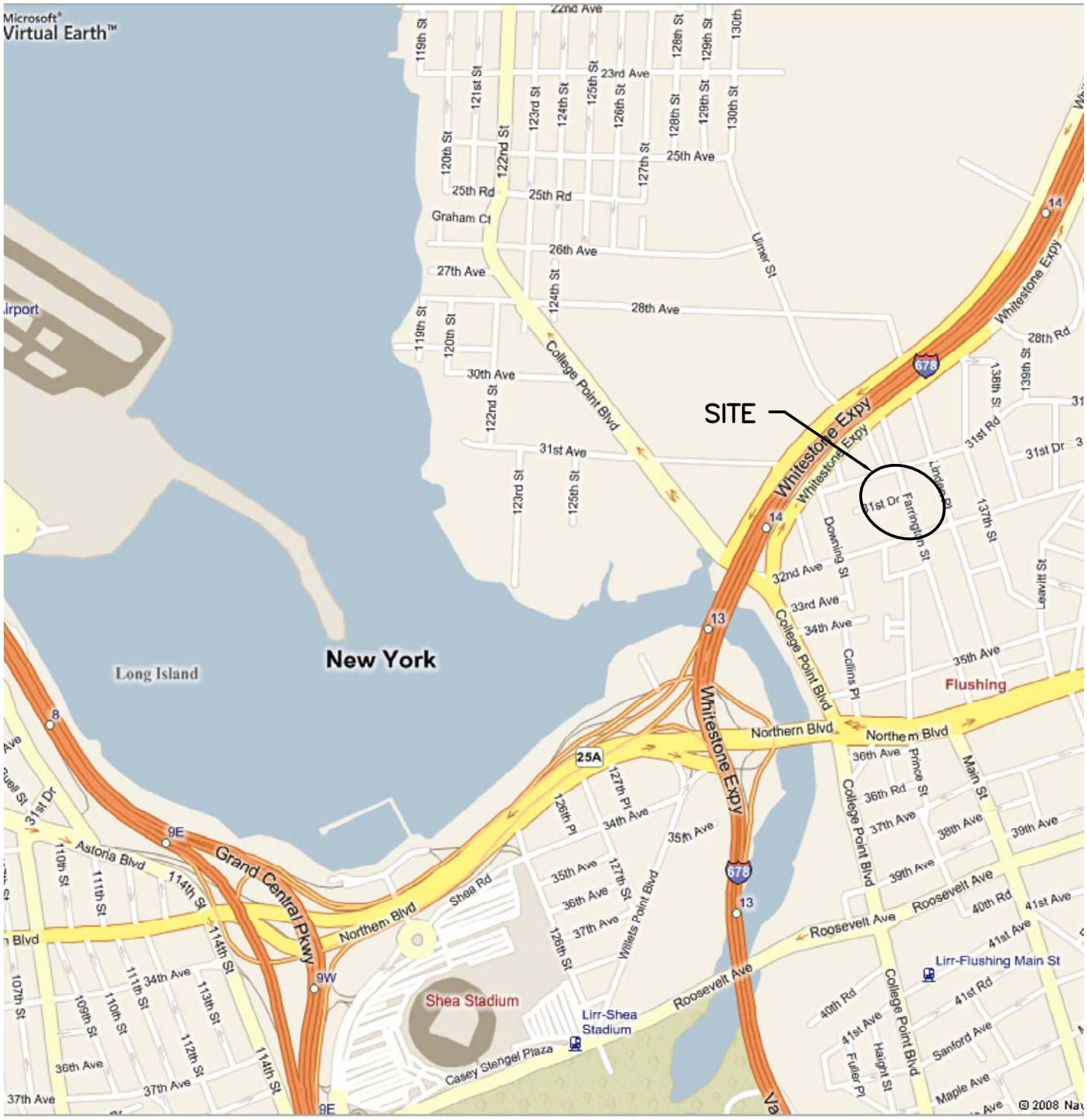
FIGURES



BASE MAP FROM MSN LIVE SEARCH MAPS 2008.

FIGURE 1

CONSOLIDATED EDISON
FORMER FARRINGTON STREET GAS WORKS
QUEENS, NEW YORK

SITE LOCATION MAP

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

FILE NAME: P:\CONED\444575 - FARRINGTON STREET GAS WORKS\CAD\444575-C-002.DWG
PLOT DATE: 6/18/2008 10:18 AM PLOTTED BY: RUSSO, JILL

COMMERCIAL AREA

WILLETS POINT BLVD.

WHITESTONE BRIDGE BOULEVARD

WENDY'S

RADISSON SHOPS

CHINESE RESTURAUNT

ERTAIN. ENTER

DENTIST

PARKING AREA

STRATTON ST.

McDONALD'S

GNC

SUBWAY

PIZZA SHOP

MISC. COMMERCIAL PROPERTIES

OFFICE BUILDINGS

PARKING AREA

31st ROAD (BAYSIDE AVE.)

BLOCK BUSTER

LAUNDROMAT

BEDDING SERVICE

PARKING AREA

ULMER

PATHMARK

PARKING AREA

1

VARIOUS STORES

PARKING AREA

FARRINGTON ST.

QUICK LUBE & CARWASH

RESIDENCES

WAREHOUSE

LINDEN ST.

COMMERCIAL/RESIDENTIAL PROPERTIES

NAIL SUPPLIES & EQUIPMENT

31st DRIVE (CENTER ST.)

DOWNING ST.

BAKERY

NYDEC LOT

MOTOR VEHICLE REPAIR SHOP

NORTH SHORE COLLISION CO.

CON EDISON VEHICLE & EQUIPMENT STARAGE YARD

MILLER STREET (BYRDS ALLEY)

CON EDISON

2 TRAILERS, EQUIPMENT & VEHICLE STORAGE YARD

SHED

3

CON EDISON TRUCK FLUSH FACILITY

32nd AVE (MYRTLE AVE.)

AUTO SERVICE

CHAS LOBSON & SON

MILLER STREET

JEVASON CORP.

ANTIQUE SHOP

UNICA MECHANICAL

BILLIARDS & DELI

GRAPHIC SCALE

130 0 65 130

(IN FEET)

1 inch = 130 ft.

LEGEND

SITE PARCEL BOUNDARY

FENCELINE

NOTE:

BASE DRAWING FROM ENSR INTERNATIONAL, LANGHORNE, PA. TITLED QUADRANT LAYOUT MAP, FIGURE 3, DATED 6/27/02, PROJECT 01869-048

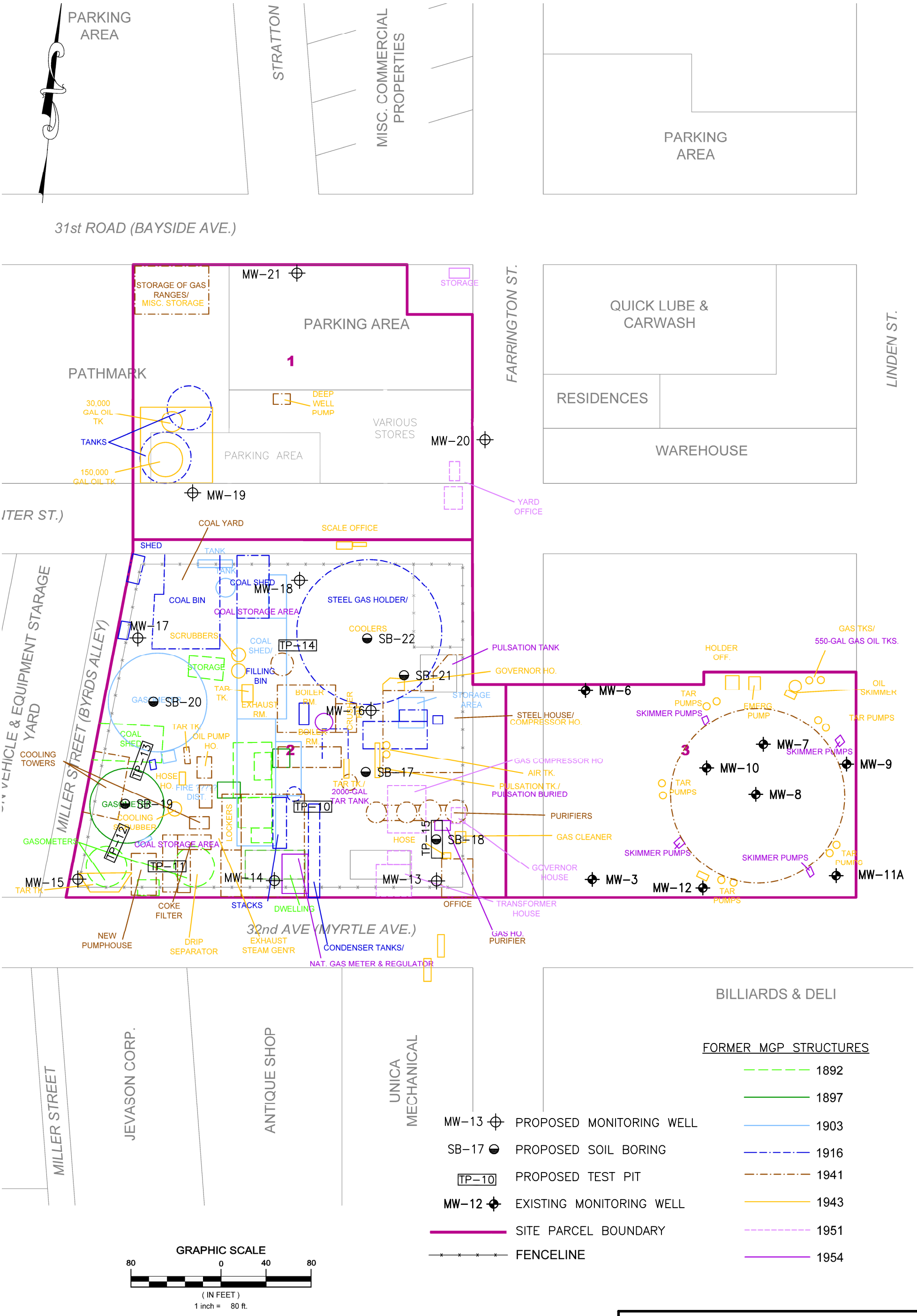
FIGURE 2

CONSOLIDATED EDISON
FORMER FARRINGTON STREET GAS WORKS
QUEENS, NEW YORK

CURRENT SITE LAYOUT

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

FILE NAME: P:\CONED\444575 - FARRINGTON STREET GAS WORKS\CAD\444575-C-003.DWG
PLOT DATE: 6/19/2008 11:42 AM PLOTTED BY: RUSSO, JILL



NOTE:

BASE DRAWING FROM ENSR INTERNATIONAL, LANGHORNE, PA. TITLED SANBORN OVERLAY, FIGURE 4, DATED 6/27/02, PROJECT 01869-048

FIGURE 3

CONSOLIDATED EDISON
FORMER FARRINGTON STREET GAS WORKS
QUEENS, NEW YORK

SAMPLE LOCATION MAP

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

FILE NAME: P:\CONED\444575 - FARRINGTON STREET GAS WORKS\CAD\444575-C-001.DWG
PLOT DATE: 9/30/2008 9:28 AM PLOTTED BY: RUSSO, JILL

Figure 4

Anticipated Project Schedule
Former Farrington Street Gas Works Site, Queens, New York

	Duration (Working Days)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Site Characterization Activities								
Utility Mark-Out/Site Inspection (All Locations)	**2**							
Test Pit Excavation TP-10 through TP-15	**6**							
Vacuum or Hand Excavation of Drilling Locations (to 5' bgs) MW-13 through MW-21, SB-17 through SB-22	**10**							
Soil Boring SB-17 through SB-22	**4**							
Monitoring Well Installation/Development MW-13 through MW-21 (install/develop)	**11**							
Groundwater Sampling MW-13 through MW-21	**5**							
Site Survey	**2**							

Anticipate submittal of Site Characterization Report to NYSDEC/NYSDOH for review within 10 weeks following completion of field investigation activities.

TABLES

TABLE 1

SAMPLING RATIONALE

Sample Location	Depth	Rationale
Existing Monitoring Wells MW-3, MW-6 through MW-10, MW-11A, MW-12	21 – 25 feet	• Collect groundwater elevation data to assess groundwater flow direction.
Monitoring Wells MW-20 and MW-21	20 – 25 feet	• Collect soil and groundwater samples from up-gradient and side-gradient of former MGP structures to determine the presence and the nature and extent of MGP residues, NAPL, or other constituents. • Collect groundwater elevation data to assess groundwater flow direction.
Monitoring Wells MW-16 through MW-19	20 – 25 feet	• Collect soil and groundwater samples from the vicinity of former MGP structures to determine the presence and the nature and extent of MGP residues, NAPL, or other constituents. • Collect groundwater elevation data to assess groundwater flow direction.
Monitoring Wells MW-13 through MW-15	20 – 25 feet	• Collect soil and groundwater samples from the most downgradient location on the property to determine the presence and the nature and extent of MGP residues, NAPL, or other constituents, and if impacts may be migrating off site. • Collect groundwater elevation data to assess groundwater flow direction.
Soil Borings SB-19 through SB-22	30 feet or refusal	• Collect soil samples from inside the footprint of former gas holders to determine the presence of MGP residues, NAPL, or other constituents, and confirm the presence and depth of any remaining structures.
Soil Borings SB-17 and SB-18	30 feet or refusal	• Collect soil samples in the vicinity of former MGP structures (tank structures, purifiers, transformer house) to determine the presence and the nature and extent of MGP residues, NAPL, or other constituents.
Test Pits TP-10 through TP-15	Water, bedrock or limits of excavator	• Observe subsurface conditions in the areas of former MGP structures (gas holders, purifiers and tanks). Collect soil samples to determine the presence and the nature and extent of MGP residues, NAPL, or other constituents.

TABLE 2

SUMMARY OF SAMPLES AND ANALYSES

Matrix	Parameter	Analytical Method	Field Samples				QC Blanks	Total
			Field Samples	Field Duplicate	MS/MSD[(a)] (Total)	Sub-Total	Trip Blank	
Soil Samples (from soil borings, test pits, and monitoring well borings)	TCL VOCs	EPA SW 8260	42	3	3/3	51	0	51
	TCL SVOCs	EPA SW 8270B	42	3	3/3	51	0	51
	Cyanide	EPA SW 335.2	42	3	3/3	51	0	51
	TAL Metals	EPA SW 6010, 7470/7471, 7841, 9010	42	3	3/3	51	0	51
Groundwater Samples	TCL VOCs	EPA SW 8260	9	1	1/1	12	3[(b)]	15
	TCL SVOCs	EPA SW 8270	9	1	1/1	12	-	12
	Cyanide (total)	EPA SW 335.2	9	1	1/1	12	-	12
	TAL Metals	EPA SW OIA-1677	9	1	1/1	12	-	12
		EPA SW 6010, 7470/7471, 7841, 9010						
Free Product Samples	Hydrocarbon Fingerprinting	Modified Method 8100	?[(c)]	-	-	-	-	?

(a) Matrix spike / matrix spike duplicate for organic analyses; matrix spike and laboratory duplicate for inorganic analysis is collected for every 20 samples collected.

(b) Trip blanks will be collected for each day a groundwater VOCs sample is sent to the laboratory.

(c) Number of free product samples collected for analysis (if any) will be determined in the field.

APPENDIX A

FIELD SAMPLING PLAN

APPENDIX A

FIELD SAMPLING PLAN FOR SITE CHARACTERIZATION OF THE FORMER FARRINGTON STREET GAS WORKS SITE Queens, New York

Prepared For:

Consolidated Edison Company of New York, Inc.

31-01 20th Avenue
Long Island City, NY 11105

Prepared By:

PARSONS

290 Elwood Davis Road, Suite 312
Liverpool, New York 13088
Phone: (315) 451-9560
Fax: (315) 451-9570

SEPTEMBER 2008

TABLE OF CONTENTS

Page

TABLE OF CONTENTS

Page

LIST OF FIGURES

SECTION 1

INTRODUCTION

This Field Sampling Plan (FSP) defines the methods and procedures to be used for conducting the Site Characterization at the Former Farrington Street Gas Works Site.

1.1 OVERVIEW OF FIELD ACTIVITIES

The following field activities will be performed as part of the characterization work:

- **Test Pits –** Test pits will be excavated at five locations to observe subsurface conditions, determine the presence of former MGP structures, and characterize the presence of MGP residues or other constituents that could impact human health and the environment. Soil samples from test pits will be analyzed for volatile and semivolatile organic compounds (VOCs and SVOCs), cyanide, and metals.
- **Soil and Monitoring Well Borings** – Six soil and nine monitoring well borings will be completed to characterize the presence of MGP residues or other constituents that could impact human health and the environment. Two soil samples will be analyzed from each boring for VOCs, SVOCs, cyanide, and metals.
- **Monitoring Well Installation** – Monitoring wells will be installed at nine locations. The objective of the monitoring wells will be to characterize groundwater quality and to determine the potential impact of MGP residuals on human health and the environment.
- **Groundwater Sampling** - Groundwater samples will be collected from the nine new monitoring wells, and will be analyzed for VOCs, SVOCs, total cyanide, and metals.
- **Surveying** - The locations of the sampling points will be surveyed. The location and elevation of the well casings will be determined to support assessment of groundwater flow direction.

SECTION 2

GENERAL FIELD GUIDELINES

2.1 SITE HAZARDS

Potential on-site surface hazards, such as sharp objects, overhead power lines, energized areas, and building hazards will be identified prior to initiation of fieldwork. Generally, such hazards will be identified during a site visit prior to the first day of fieldwork.

2.2 UNDERGROUND UTILITIES

Prior to beginning the field investigation work, Con Edison and the Dig Safely New York One-Call Center will be contacted for a Code 753 utility mark-out. No drilling will be conducted until the following minimum requirements have been met:

- The Parsons Project Manager and/or field team leader have thoroughly inspected the drilling location and surrounding area for the Code 753 mark-out and the location is clear of marked utilities;
- All drilling locations have been checked by Con Edison using an electromagnetic cable locator, or a private utility locating contractor has conducted a geophysical survey of the proposed sampling locations to locate potential underground utilities or obstructions;
- All drilling locations have been cleared with a metal detector by Parsons;
- Utility plates for the site and surrounding area have been provided to Parsons by Con Edison's Construction Management staff and reviewed;
- Parsons has met with and reviewed all of the drilling locations with a facility representative, a Con Edison Construction Management representative, and/or Con Edison's Project Manager, and verified that all drilling locations have been marked; and
- Each drilling location has either been hand-augered to a minimum depth of 5 feet, or a test pit has been hand-dug or vacuum excavated to a minimum depth of 5 feet, as determined by Con Edison during the site inspection.

Additional utility clearance measures may be required based on the site inspection and/or Con Edison requirements.

2.3 FIELD LOG BOOKS

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is obtained. The field log book will provide a legal record of the activities conducted at the site. Accordingly:

- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Field Team Leader while field work is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of fieldwork.
- Erroneous entries made while fieldwork is in progress will be corrected by the person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction.
- Corrections made after departing the field will be made by the person who made the original entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing and dating the time of the correction.

At a minimum, daily field book entries will include the following information:

- Location of field activity;
- Date and time of entry;
- Names and titles of field team members;
- Names and titles of any site visitors and site contacts;
- Weather information, for example: temperature, cloud coverage, wind speed and direction;
- Purpose of field activity;
- A description of the field work conducted;
- Sample media (soil, sediment, groundwater, etc.);
- Sample collection method;
- Number and volume of sample(s) taken;
- Description of sampling point(s);
- Volume of groundwater removed before sampling;
- Preservatives used;
- Analytical parameters;
- Date and time of collection;
- Sample identification number(s);
- Sample distribution (e.g., laboratory);
- Field observations;
- Any field measurements made, such as pH, temperature, conductivity, water level, etc.;

- References for all maps and photographs of the sampling site(s);
- Information pertaining to sample documentation such as:
  - Bottle lot numbers;
  - Dates and method of sample shipments; and
  - Chain-of-Custody Record and Federal Express Air Bill numbers.

SECTION 3

FIELD EQUIPMENT DECONTAMINATION AND MANAGEMENT OF INVESTIGATION DERIVED WASTES

3.1 DECONTAMINATION AREA

A temporary decontamination (de-con) area lined with polyethylene sheeting will be constructed for steam-cleaning the drilling equipment. The de-con pad will be constructed of two layers of approximately 6-mil polyethylene fitted over wood timbers. The pad will be sloped if possible, creating a sump. Sheets of plywood or pallets will be placed inside the de-con pad. Tools and equipment to be cleaned will be placed on the pallets or plywood, to prevent puncture. Also, the de-con pad will be constructed on a paved area, which minimizes the potential for puncture by tree roots or other obstacles.

The location of the decontamination area will be coordinated with Con Edison and other facility representatives. Water collected from the decontamination activities will be collected in 55-gallon drums and managed as described in Section 3.3.

3.2 EQUIPMENT DECONTAMINATION

The following procedures will be used to decontaminate equipment used during the Site Characterization activities.

- All drilling equipment including the drilling rig, augers, bits, rods, tools, split-spoon samplers and tremie pipe will be cleaned with a high-pressure steam cleaning unit before beginning work.
- The bucket of the excavator or backhoe will be cleaned with a high-pressure steam cleaning unit before beginning work, between test pit locations, and prior to leaving the site.
- Tools, drill rods, and augers will be placed on sawhorses or polyethylene plastic sheets following steam cleaning. Direct contact with the ground will be avoided.
- All augers, rods, and tools will be decontaminated between each drilling location according to the above procedures.
- The back of the drill rig and all tools, augers, and rods will be decontaminated at the completion of the work and prior to leaving the Site.

3.2.1 Sampling Equipment Decontamination

Suggested Materials:

- Potable water
- Phosphate-free detergent – ***Simple Green***

- Distilled water
- Aluminum foil
- Plastic/polyethylene sheeting
- Plastic buckets and brushes
- Personal protective equipment in accordance with the Project Safety Plan

Procedures:

- Prior to sampling, all non-dedicated sampling equipment (bowls, spoons, interface probes, etc.) will be either steam cleaned or washed with potable water and a phosphate-free detergent (***Simple Green***). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc.
- The sampling equipment will then be rinsed with potable water followed by a deionized water rinse.
- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil if necessary. At no time will washed equipment be placed directly on the ground.
- Equipment will be wrapped in polyethylene plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

3.3 MANAGEMENT OF INVESTIGATION DERIVED WASTES

3.3.1 Decontamination Fluids

Decontamination fluids will be collected in DOT approved 55-gallon drums. The drums will be labeled as investigation derived wastewater and temporarily stored in a secured area to be determined by Con Edison and facility representatives. The drums will be placed on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

3.3.2 Drill Cuttings

Drill cuttings will be contained in 55-gallon drums. The soils will be segregated by drill location to the extent practical. The drums will be labeled as investigation derived waste soils from the corresponding boring or source area, and temporarily stored in a secured area to be determined by Con Edison and facility representatives. The drums will be placed on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

3.3.3 Development and Purge Water

All development and purge water will be contained in 55-gallon drums. The drums will be labeled as investigation derived wastewater from the corresponding well and temporarily stored in a secured area to be determined by Con Edison and facility representatives. The drums will be placed on wooden pallets in a plastic-lined containment area pending characterization and proper disposal.

3.3.4 Personal Protective Equipment

All personal protective equipment (PPE) will be placed in 55-gallon drums or roll-off containers for proper disposal by Con Edison.

3.3.5 Dedicated Sampling Equipment

All dedicated soil sampling equipment (Macrocore sampler liners and catchers) and groundwater sampling equipment (dedicated disposable polyethylene bailer and dedicated polypropylene line) will be placed in 55-gallon drums for disposal by Con Edison.

SECTION 4

TEST PITTING, DRILLING, AND SOIL SAMPLING

4.1 INTRODUCTION

Investigation activities to be conducted at the Former Farrington Street Gas Works Site consist of:

- Test Pitting;
- Soil borings;
- Monitoring well installations; and
- Collection of subsurface soil samples.

These procedures are described in the following sections. Equipment decontamination procedures are described in Section 3.

4.2 TEST PIT INSTALLATION AND SOIL SAMPLING

The following equipment and methods will be used for installing test pits and collecting subsurface soil samples.

Suggested Equipment

- Field book
- Project plans
- Personal protective equipment in accordance with the Project Safety Plan
- Stakes and flagging
- Ziploc bags or one-pint containers for lithology samples
- Tape measure
- Stainless steel spatula
- Hand auger with extension handle
- Decontamination supplies including Simple Green
- PID
- Camera
- Clear tape, duct tape
- Laboratory sample bottles
- Coolers and ice

- Shipping supplies

Installation and Soil Sampling Method

- The location and number of test pits to be installed, and the frequency of soil samples to be collected and the associated analytical parameters are summarized in the Site Characterization Work Plan.
- Excavate soil with tracked excavator or backhoe in 2-foot intervals. At each 2-foot interval, examine and classify the soils. Typical maximum excavation depth for excavators is approximately 10 to 15 feet below ground surface.
- Soil samples from the test pit to be used for PID screening or visual observation will be collected from the backhoe bucket. If possible, soil samples collected for laboratory analysis will be collected from the sidewalls of the test pit using a dedicated stainless steel spatula or a decontaminated hand auger with an extension handle.
- A representative sample from each depth interval will be placed in a plastic "ziplock" bag or an eight-ounce sample jar filled approximately half full. The container will be labeled with the boring number and interval sampled. The containers will be closed tightly.
- After a minimum of 10 minutes, the tip of the PID will be inserted under the cap or into the bag to measure the headspace for organic vapors.
- Record observations, test pit dimensions, and PID measurements on the Test Pit Record (Figure 4.1).
- The test pit will be terminated when ground water, bedrock, or the limit of the excavator is reached.
- Following completion of test pit and sample collection, the test pit will be backfilled with the excavated material.
- Each test pit location will be photographed before, during, and after excavation. The number and location of each photograph will be recorded on the test pit record (Figure 4.1).
- The bucket of the backhoe or excavator will be decontaminated between each test pit location in accordance with methods specified in Section 3.2.

4.3 SOIL BORINGS AND SOIL SAMPLING

The following methods will be used for conducting the soil borings.

Suggested Equipment

- Field book
- Project plans
- Personal protective equipment in accordance with the HASP
- Metal detector
- Stakes and flagging

- One pint containers for lithology samples
- Tape measure
- Decontamination supplies including Simple Green
- Water level indicator
- PID
- Dust Monitor
- Camera
- Clear tape, duct tape
- Aluminum foil
- Laboratory sample bottles
- Coolers and ice
- Shipping supplies

Drilling and Geologic Logging Method

- Soil borings will be advanced using direct push or hollow-stem auger drilling methods.
- Soil samples will be collected continuously to the bottom of the borings using 2-foot long, 2-inch diameter discrete samplers, or Macrocore samplers advanced two feet per sampling run.
- Soil samples retrieved from the borehole will be visually described for:
  1. percent recovery,
  2. soil type,
  3. color,
  4. moisture content,
  5. texture,
  6. grain size and shape,
  7. consistency,
  8. visible evidence of staining, and
  9. any other observations.

  The descriptions will be in accordance with the Unified Soil Classification System (USCS).
- Soil samples will be immediately screened for the evolution of organic vapors with a PID.

- A representative portion of the sample will be placed in a plastic "ziplock" bag or an eight-ounce sample jar filled approximately half full. The container will be labeled with the boring number and interval sampled. The containers will be closed tightly.
- After a minimum of 10 minutes, the tip of the PID will be inserted under the cap or into the bag to measure the headspace for organic vapors.
- Remaining soil will be disposed of in accordance with methods specified in Section 3.3.
- All borings not converted to monitoring wells will be sealed with bentonite or cement/bentonite grout following completion.
- All drilling equipment will be decontaminated between each boring in accordance with methods specified in Section 3.2.
- The designated field geologist will log borehole geology and headspace measurements in the field book for later transfer to the Drilling Record shown in Figure 4.2, or similar form.

Soil Sampling

- The number and frequency of samples to be collected from each boring and the associated analytical parameters are summarized in the Site Characterization Work Plan.
- Subsurface samples for VOC analyses will be collected directly from the split-spoons or acetate liners, placed into appropriate containers, and compacted to minimize head space and pore space. Care will be taken during transfer to minimize VOC loss and disturbance of the sample. The remaining sample volume will be homogenized, and placed in appropriate containers for the other analyses.
- The sample containers will be labeled, placed in a laboratory-supplied cooler and packed on ice (to maintain a temperature of 4^{o} C). The coolers will be shipped overnight to the laboratory for analysis.
- Chain-of-custody procedures will be followed as outlined in the QAPP.
- The sampling equipment will be decontaminated between samples in accordance with procedures described in Section 3.
- Excess soil remaining after sampling will be contained in accordance with methods specified in Section 3.3.
- The sample locations, descriptions, and depths will be recorded in the field book.

4.4 MONITORING WELL INSTALLATION AND DEVELOPMENT

The following methods will be used for drilling, installing, and developing the monitoring wells.

Suggested Equipment

- Field book

- Project plans
- Personal protective equipment in accordance with the Project Safety Plan
- Metal detector
- One pint containers for lithology samples
- Tape measure
- Decontamination supplies
- Water level indicator
- PID
- Camera
- Clear tape, duct tape
- Aluminum foil
- Laboratory sample bottles
- Coolers and ice
- Shipping supplies
- Polyethylene disposable bailers (development)
- Polypropylene rope (development)
- Waterra pump or other purge pump (development)
- Stainless steel or glass beakers (development)
- Turbidity meter (development)
- Temperature, conductivity, pH meter (development)

Overburden Monitoring Well Installation

Figure 4.3 shows a cross-section for a typical overburden monitoring well. The monitoring wells will be installed in accordance with the following specifications:

- The monitoring well borings will be advanced with 4.25-inch inner diameter (ID) hollow stem augers.
- As described above for soil borings, continuous soil samples will be collected from monitoring well borings for visual description and PID screening.
- Wells will be constructed with two-inch ID, threaded, flush-joint, PVC casings and screens.
- Screens will be ten feet long with 0.02-inch slot openings. A two-foot sump will be installed at the base of the screen at locations where NAPL was observed during installation of the well boring. Alternatives may be used at the discretion of the field geologist and approval of Con Edison, based on site conditions.

- The annulus around the screens will be backfilled with silica sand having appropriate size (e.g., Morie No. 1) to a minimum height of two feet above the top of the screen. Auger flights will be withdrawn as sand is poured in a manner that will minimize hole collapse and bridging.
- A bentonite pellet seal or slurry seal with a minimum thickness of two feet will be placed above the sand pack. The bentonite seal (pellets) will be allowed to hydrate before placement of grout above the seal. Auger flights will be withdrawn in a manner that will minimize hole collapse and bridging.
- The remainder of the annular space will be filled with a cement-bentonite grout to near the ground surface. The grout will be pumped from the bottom up. The grout will be allowed to set for a minimum of 24 hours before wells are developed. Auger flights will be withdrawn in a manner that will minimize hole collapse and bridging.
- Each monitoring well will have a sealed cap (J-plug) and will be contained in a flush-mounted vault. The J-plug will be used to keep surface water from infiltrating into the well during rain events, high water conditions, etc.
- The concrete seal or pad will be sloped slightly to channel water away from the well, and be deep enough to remain stable during freezing and thawing of the ground. Monitoring wells will be installed so that the vault and concrete pad do not pose a trip hazard when completed.
- The top of the PVC well casing will be marked and surveyed to 0.01 foot, and the elevation will be determined relative to a fixed benchmark or datum.
- The measuring point on all wells will be on the innermost PVC casing.
- Monitoring well construction details will be recorded in the field book and on the Drilling Record shown in Figure 4.2, or similar form.

Monitoring Well Development

- After approximately 24 hours following completion, the monitoring wells will be developed by surging/bailing, using a centrifugal or peristaltic pump and dedicated polyethylene tubing, a Waterra positive displacement pump and dedicated polyethylene tubing, or other methods at the discretion of the field geologist.
- Water levels will be measured in each well to the nearest 0.01 foot prior to development.
- The wells will be developed until the water in the well is reasonably free of visible sediment (50 NTU if possible) or until pH, temperature and specific conductivity stabilize. A maximum of one to hours of development time per well is anticipated. The level of effort, however, is dependent upon the nature of the soils at each location. NYSDEC field concurrence on the sufficiency of the development effort will be obtained, when needed.
- Development water will be contained in accordance with methods specified in Section 3.3.

- Following development, wells will be allowed to recover for at least 7 days before groundwater is purged and sampled. All monitoring well development will be overseen by a field geologist and recorded in the field book.

FIGURE 4.1

PARSONS
TEST PIT RECORD

PROJECT NAME:	**TEST PIT ID:**
PROJECT NUMBER:	**LOCATION:**
WEATHER	Approximate L X W X D
DATE/TIME START:	=
DATE/TIME FINISH:	
CONTRACTOR:	
INSPECTOR:	

DEPTH (feet bgs)	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

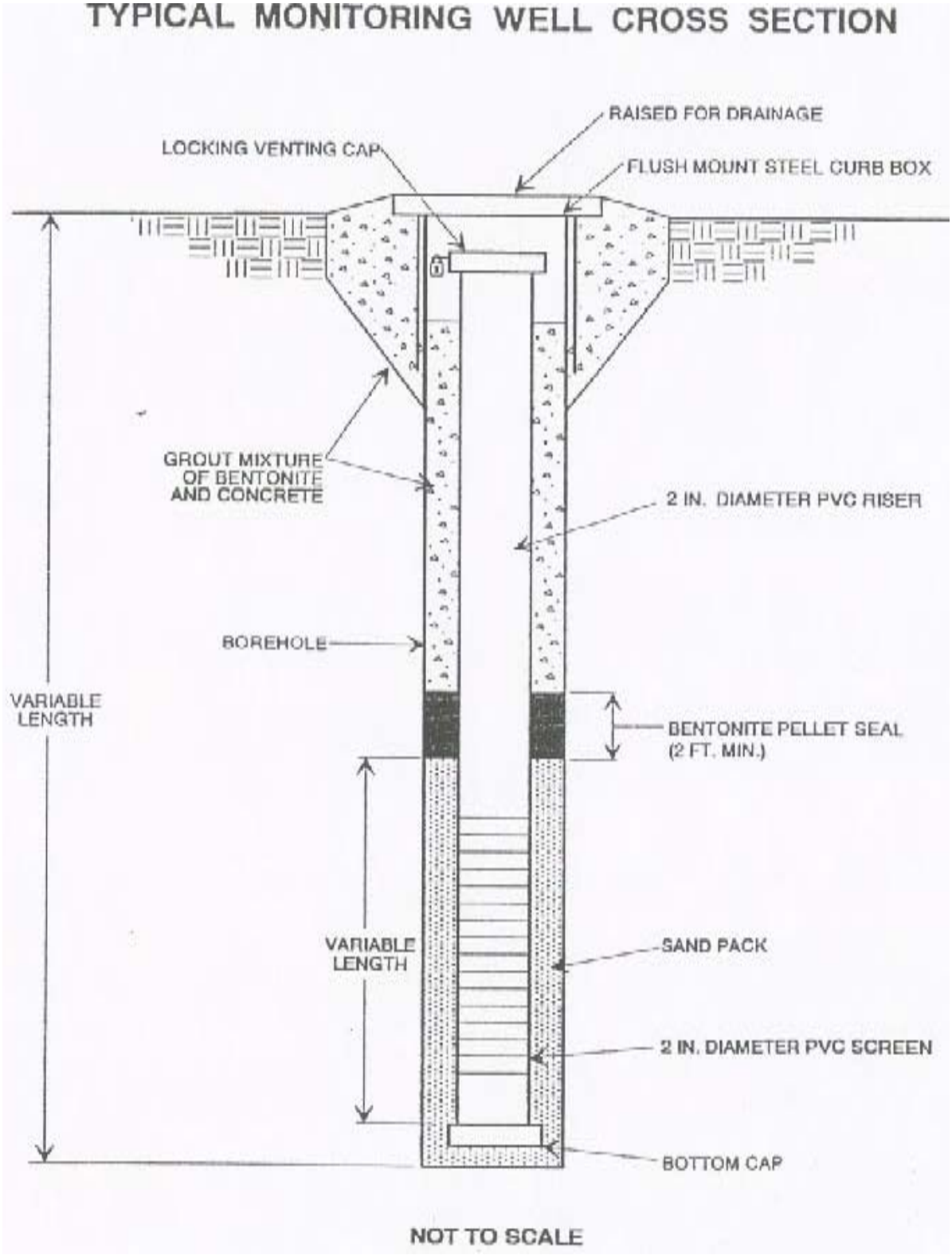
FIGURE 4-2

Contractor:					PARSONS **DRILLING RECORD**		**BORING/ WELL NO.** Sheet of	
Driller:							**Location Description:**	
Inspector:					**PROJECT NAME:**			
Rig Type:					**PROJECT NUMBER:**			
GROUNDWATER OBSERVATIONS							**Location Plan**	
Water Level					**Weather:**			
Date					**Date/Time Start:**			
Time								
Meas. From					**Date/Time Finish:**			
Sample Depth	**Sample I.D.**	**SPT**	**% Rec.**	**PID (ppm)**	**FIELD IDENTIFICATION OF MATERIAL**		**SCHEMATIC**	**COMMENTS**
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								

COMMENTS:

SAMPLING METHOD
SS = SPLIT SPOON
A = AUGER CUTTINGS
GP = GEOPROBE - DIRECT PUSH

FIGURE 4-3


TYPICAL MONITORING WELL CROSS SECTION
RAISED FOR DRAINAGE
LOCKING VENTING CAP
FLUSH MOUNT STEEL CURB BOX
GROUT MIXTURE OF BENTONITE AND CONCRETE
2 IN. DIAMETER PVC RISER
BOREHOLE
VARIABLE LENGTH
BENTONITE PELLET SEAL (2 FT. MIN.)
VARIABLE LENGTH
SAND PACK
2 IN. DIAMETER PVC SCREEN
BOTTOM CAP
NOT TO SCALE

SECTION 5

GROUNDWATER SAMPLING PROCEDURES

5.1 INTRODUCTION

Procedures for obtaining groundwater samples are described in this section. Sample handling procedures are described in Section 8.

5.2 GROUNDWATER SAMPLING

The following method will be used to collect groundwater samples from monitoring wells.

Suggested Equipment and Supplies

- Field book
- Project plans
- Personal protective equipment in accordance with the HASP
- Oil/Water Interface Probe
- Temp, conductivity, pH meters
- Turbidity meter
- 250-mL glass beaker
- Decontamination supplies
- Peristaltic or other low-flow purge pump
- Plastic tubing
- Plastic sheeting
- PID
- Clear tape, duct tape
- Coolers and ice
- Laboratory sample bottles
- Federal Express labels

Groundwater Sampling Method

Purging

- The number and frequency of groundwater samples to be collected and the associated analytical parameters are summarized in the Site Characterization Work Plan.

- Prior to sampling, the static water level and thickness of any free product will be measured to the nearest 0.01 foot from the surveyed well elevation mark on the top of the PVC casing with a decontaminated oil/water interface probe. The measurement will be recorded in the field book.
- The probe will be decontaminated according to procedures outlined in Section 3.
- The well will be purged by removing a minimum of three well volumes of water. Purging will be conducted using low-flow sampling methods such as a peristaltic pump.
- If a well goes dry before the required volumes are removed, it will be allowed to recover, purged a second time until dry or the required volumes are removed, and sampled when it recovers sufficiently. If field conditions (based on geology observed during drilling) indicate that water level recovery may be slow, then slow purging will be conducted. If the well goes dry during slow purging, it will be allowed to recover, then sampled without a second purge.
- Purge water will be managed and disposed of in accordance with procedures described in Section 3.

Sampling

- Samples will be collected using low-flow sampling methods such as a peristaltic pump and dedicated tubing.
- Prior to filling the sample bottles, one "clean" container will be filled with water. The temperature, pH, and conductivity will be measured with a precalibrated probe and recorded in the field book.
- Sample containers for VOCs will be filled first. Sample containers for the other analytes will follow. If turbidity is less than 50 NTU, the sample for metals analysis will not be filtered. If turbidity is greater than 50 NTU, one filtered and one unfiltered sample for metals analysis will be collected and placed in bottles provided by the laboratory.
- The sample containers will be labeled, placed in a laboratory-supplied cooler and packed on ice (to maintain a temperature of 4^{o} C). The cooler will be shipped overnight or delivered to the laboratory for analysis.
- Chain-of-custody procedures will be followed as outlined in the QAPP.
- After all samples are collected, dedicated sampling equipment (i.e. polypropylene rope and bailer) will be disposed of in accordance with methods described in Section 3.3.
- Well sampling data will be recorded in the field log book and on the Groundwater Sampling Record shown in Figure 5.1, or similar form.

FIGURE 5.1

PARSONS
GROUNDWATER SAMPLING RECORD

SITE NAME: _____

PROJECT NUMBER: _____

SAMPLE NUMBER: _____ WEATHER: _____

DATE: _____ TIME: _____

SAMPLERS: _____ of Parsons ES

_____ of Parsons ES

DESCRIPTION OF SAMPLING POINT

Sample Location: Monitoring well MW-

Screen/Sample Depth: _____

Sampling Method: _____

GROUNDWATER PURGING

Initial Static Water Level: _____

One Well Volume: 3 Volumes

2-Inch Casing:	____	Feet of Water x 0.16 Gallons/Foot =	____	Gallons	____
3-Inch Casing:	____	Feet of Water x 0.36 Gallons/Foot =	____	Gallons	____
4-Inch Casing:	____	Feet of Water x 0.65 Gallons/Foot =	____	Gallons	____

Volume of groundwater purged: _____ Gallons

Purging Device: _____

Purge Water Disposition (e.g., contained): _____

SAMPLE DESCRIPTION

Color: _____

Odor: _____

Other: _____

Sample Analyzed for: _____

QC Samples at this Location: _____

QC Samples Analyzed for: _____

FIELD MEASUREMENTS

Temperature (C/F): _____ Dissolved Oxygen: _____

pH: _____ Eh (Redox Potential): _____

Conductivity (µohms/cm): _____

Turbidity (NTU): _____

SAMPLE CUSTODY

Chain of Custody Number: _____ Laboratory: _____

Shipped Via: _____ Airbill Number: _____

COMMENTS _____

_____

SECTION 6

AIR MONITORING

6.1 BREATHING ZONE AIR MONITORING DURING EXCAVATION, DRILLING AND SAMPLING

Air monitoring of the breathing zone will be conducted during all intrusive activities in accordance with the Site Characterization Work Plan and Project Safety Plan to assure proper health and safety protection for the team and nearby occupants and workers.

- A RaeSystems MiniRae 2000 photoionization detector (PID) or equivalent will be used to monitor for organic vapors in the breathing zone and to screen the samples.
- A MiniRAM Portable Aerosol Monitor will be used to monitor particulate dust and aerosolized vapors in the breathing zone.
- Cyanide color detector tubes will be used to monitor for hydrogen cyanide in the breathing zone.
- Additional air monitoring may be required as specified in the Project Safety Plan.

The PID readings will be recorded in the field book during drilling activities and later transferred to the boring log form. The procedure for the PID operation and calibration is included in Section 7.

SECTION 7

FIELD INSTRUMENTS AND CALIBRATION

Field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. All instrument calibrations will be documented in the project field book and in an instrument calibration log. Records of all instrument calibration will be maintained by the Field Team Leader and will be subject to audit by the Project Quality Assurance Manager (PQAM). Copies of all of the instrument manuals and/or instruction sheets will be maintained on-site by the Field Team Leader.

The following field instruments will be used during the investigation:

- PID;
- MiniRAM real-time aerosol monitor;
- pH Meter;
- Specific Conductivity Meter and Temperature Probe; and
- Turbidity Meter.

7.1 PORTABLE PHOTOIONIZATION DETECTOR

- The photoionization detector (PID) will be a RaeSystems MiniRae 2000 (or equivalent), equipped with a 10.6 eV lamp. The MiniRae is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV. This accounts for up to 73% of the volatile organic compounds on the Target Compound List.
- Calibration must be performed at the beginning of each day of use with a standard calibration gas having an approximate concentration of 100 parts per million of isobutylene. If the unit experiences abnormal perturbation or erratic readings, additional calibration will be required.
- All calibration data must be recorded in the field logbook.
- A battery check must be completed at the beginning and end of each working day.

7.2 MINIRAM

- The operator shall ensure that the instruments respond properly to the substances that they are designed to monitor. Real time aerosol monitors, such as the MiniRAM, must be zeroed at the beginning of each sampling period. The specific instructions for calibration and maintenance provided for each instrument should be followed.

- All calibration data must be recorded in field notebooks or on calibration log sheets to be maintained on-site.
- A battery check must be completed at the beginning and end of each working day.

7.3 pH METER

- Calibration of the pH meter must be performed at the start of each day of use, and after very high or low readings as required by this plan, according to manufacturer's instructions.
- National Institute of Standards and Technology - traceable standard buffer solutions which bracket the expected pH range will be used. The standards will be pH of 4.0, 7.0 and 10.0 standard units.
- The pH calibration must be used to set the meter to display the value of the standard being checked.
- The calibration data must be recorded on calibration sheets maintained on-site or with the piece of equipment.

7.4 SPECIFIC CONDUCTIVITY METER AND TEMPERATURE PROBE

- Calibration checks using the conductivity standard must be performed at the start of each day of use, after five to ten readings or after very high or low readings as required by this plan, according to manufacturer's instructions.
- The portable conductivity meter must be calibrated using a reference solution of 200 uohms/cm on a daily basis. Readings must be within five percent to be acceptable.
- The thermometer of the meter must be calibrated against the field thermometer on a weekly basis.

7.5 TURBIDITY METER

- The turbidity meter must be checked at the start of each day of use and at the end of the day, according to manufacturer's instructions.

SECTION 8

FIELD SAMPLE IDENTIFICATION AND CUSTODY

8.1 SAMPLE LOCATION NUMBERING SYSTEM

- Test pits will be numbered consecutively beginning with TP-01. Individual samples will also be designated with a depth code (see below).
- Subsurface soil borings will be numbered consecutively beginning with SB-7 (soil borings) or MW-7 (monitoring well borings). Individual samples will also be designated with a depth code (see below).
- Monitoring wells will be numbered consecutively beginning with MW-7.

8.2 SAMPLE IDENTIFICATION

Each sample will be given a unique alphanumeric identifier in accordance with the following classification system:

SAMPLE IDENTIFICATION

LL*	NN*	N-N	LL
Sample Type	Sample Number	Depth Code	QC Identifier

	Solid	Water
Sample Type:	MW - Monitoring Well Boring SB – Soil Boring TP – Test Pit	MW - Monitoring Well
Sample Number:	Number referenced to a sample location map.	
Depth Code:	Depth of sample interval (0-2”, 0-2’, 2-4’, 10-12’, etc.)	
QC Identifier:	FB - Field Blank TB - Trip Blank WB - Wash or Rinse Blank	MS - Matrix Spike MD - Matrix Spike Duplicate MB - Matrix Blank

* L = Letter

* N = Number

Field duplicate samples will be assigned identifiers that do not allow the laboratory to distinguish them as field duplicates. Each sample container will be labeled prior to packing for shipment. The sample identifier, site name, date and time of sampling, and analytical parameters will be written on the label in waterproof ink and recorded in the field book.

8.3 CHAIN OF CUSTODY

- A Chain-of-Custody (COC) record (Figure 8.1 or similar) will accompany the sample containers during selection and preparation at the laboratory, during shipment to the field, and during return shipment to the laboratory.
- The COC will identify each sample container and the analytical parameters for each, and will list the field personnel that collected the samples, the project name and number, the name of the analytical laboratory that will receive the samples, and the method of sample shipment.
- If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample shipment.
- The COC will be completed by field personnel as samples are collected and packed for shipment.
- Erroneous markings will be crossed-out with a single line and initialed by the author.
- The REMARKS space will be used to indicate if the sample is a matrix spike, matrix spike duplicate, or matrix duplicate.
- Trip and field blanks will be listed on separate rows.
- After the samples have been collected and sample information has been listed on the COC form, the method of shipment, the shipping cooler identification number(s), and the shipper airbill number will be entered on the COC.
- A second member of the field team will review the COC for completeness and accuracy whenever possible.
- Finally, a member of the sampling team will write his/her signature, the date, and time on the first RELINQUISHED BY space. Duplicate copies of each COC must be completed.
- One copy of the COC will be retained by sampling personnel. Blind duplicate samples will be identified on the copy retained by the sampling crew. The other copy and the original will be sealed in a plastic bag and taped inside the lid of the shipping cooler without the additional identification of blind duplicate samples.
- Sample shipments will be refrigerated at 4^{o}C, typically by packing with ice, to preserve the samples during shipment.
- After the shipping cooler is closed, custody seals provided by the laboratory will be affixed to the latch and across the front and back of the cooler lid, and signed by the person relinquishing the samples to the shipper.
- The seal will be covered with clear tape, and the cooler lid will be secured by wrapping with packing tape.
- The cooler will be relinquished to the shipper, typically an overnight carrier.

- The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the samples will not be analyzed.
- The samples must be delivered to the laboratory within 48 hours of collection.

8.4 SAMPLE DOCUMENTATION

The field team leader will be retaining a copy of the COC, and, in addition, the field team leader will ensure that the following information about each sample is recorded in the field book:

- Sample identifier;
- Identification of sampled media (e.g., soil, sediment, groundwater);
- Sample location with respect to known reference point;
- Physical description of sample location;
- Field measurements, (e.g., pH, temperature, conductivity, and water levels);
- Date and time of collection;
- Sample collection method;
- Volume of groundwater purged before sampling;
- Number of sample containers;
- Analytical parameters;
- Preservatives used; and
- Shipping information:
  - Dates and method of sample shipments;
  - Chain-of-Custody Record numbers;
  - Federal Express Air Bill numbers; and
  - Sample recipient (e.g., laboratory name).

FIGURE 8-1

CHAIN OF CUSTODY RECORD NO:

CLIENT:	PROJECT NO.	PROJECT MGR:	ANALYSES REQUIRED	Send results to: PARSONS 290 Elwood Davis Road-Suite 312 Liverpool, NY 13088 Telephone: (315) 451-9560 Fax: (315) 451-9570
PROJECT NAME:	NOTES - (Reference QAPP and/or analytical protocols to be used):			Lab Submitted to:
SAMPLERS:				

FIELD SAMPLE ID	LOCATION DESCRIPTION	DATE	TIME	GRAB	COMP	MATRIX	Number of Bottles	REMARKS

Relinquished by: (Signature)	Date:	Time:	Shipped via:	Airbill #:	Received by:(Signature)	Date:	Time:	Cooler Temp: _____ °C Samples Intact: ____Yes ____No
Relinquished by: (Signature)	Date:	Time:	Shipped via:	Airbill #:	Received by:(Signature)	Date:	Time:	Cooler Temp: _____ °C Samples Intact: ____Yes ____No
Relinquished by: (Signature)	Date:	Time:	Shipped via:	Airbill #:	Received by:(Signature)	Date:	Time:	Cooler Temp: _____ °C Samples Intact: ____Yes ____No

TYPE CODES:

SOLID		WATER			MATRIX	QUALITY CONTROL
SD- Sediment	TP- Test Pit/Tank Pit	MW- Monitoring Well	FD- Fuel Dispenser	ST- Storm Water	W - Water	FB- Field Blank (with date)
SS- Surface Soil	DR- Drum Waste	LC- Leachate	MH- Manhole	WW- Waste Water	S - Soil	TB- Trip Blank (with date)
SB- Subsurface Soil	WA- Solid Waste	SW- Surface Water	OW- Oil Water Separator	OL- Other Liquid (eg. Drum liquid)		WB- Wash Blank (with date)
MW- Monitoring Well Boring	OS- Other Solid	DW- Drill Water	PR- Piping Run			

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN FOR THE FORMER FARRINGTON STREET GAS WORKS SITE

Queens, New York

Prepared For:

Consolidated Edison Company of New York, Inc.

31-01 20th Avenue
Long Island City, NY 11105

Prepared By:

PARSONS

290 Elwood Davis Road, Suite 312
Liverpool, New York 13088
Phone: (315) 451-9560
Fax: (315) 451-9570

SEPTEMBER 2008

TABLE OF CONTENTS

PAGE

TABLE OF CONTENTS
(CONTINUED)

PAGE

TABLE OF CONTENTS
(CONTINUED)

PAGE

LIST OF FIGURES

LIST OF TABLES

SECTION 1

PROJECT DESCRIPTION

This Quality Assurance Project Plan (QAPP) specifies analytical methods to be used to ensure that data from the proposed site investigation are precise, accurate, representative, comparable, and complete.

1.1 INTRODUCTION

Con Edison is undertaking a Site Characterization to characterize and identify potential subsurface conditions, which may pose a risk to the health and safety of site workers and the public from the past operation of a manufactured gas plant at the site. The Site Characterization is also intended to identify subsurface conditions that may require special precautions or procedures to mitigate the presence of MGP-related or other constituents, if present.

1.2 PROJECT OBJECTIVES

The objectives of this project are as follows:

- To identify site conditions which could pose a risk to human health and the environment; and
- To identify subsurface conditions that require mitigative measures.

1.3 SCOPE OF WORK

The scope of work at the Former Farrington Street Gas Works Site is described in the Site Characterization Work Plan. Samples will be collected from test pits, soil borings, and groundwater monitoring wells. These samples will be analyzed using the USEPA SW-846 "Test Methods for Evaluating Solid Waste," November 1986, 3rd edition (and subsequent updates).

1.4 DATA QUALITY OBJECTIVES AND PROCESSES

The quality assurance and quality control objectives for all measurement data include:

- ***Precision*** - an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and matrix spike duplicates.
- ***Accuracy*** - a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. Sampling accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.

- ***Representativeness*** - expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness will be determined by assessing a number of investigation procedures, including chain of custody, decontamination, and analysis of field blanks and trip blanks.

- ***Completeness*** - the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.

- ***Comparability*** - expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for both sampling and analysis, instrument calibrations, using standard reporting units and reporting formats, and data validation.

Each of the above objectives is discussed in detail in Section 3.

SECTION 2

PROJECT ORGANIZATION

This Site Characterization will be completed for Con Edison by Parsons. Parsons will arrange for the test pitting and drilling, and provide an on-site field representative to perform the soil logging and soil sampling. Parsons will also arrange for surveying and perform groundwater sampling activities. Parsons will perform the data analysis and reporting tasks.

Key contacts for this project are as follows:

Con Edison Project Manager:	Ms. Yelena Skorobogatov Telephone: (718) 204-4205 Fax: (718) 932-2687
Project Manager:	Mr. Shane Blauvelt Telephone: (315) 451-9560 Fax: (315) 451-9570
Laboratory Representative:	CHEMTECH

SECTION 3

QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES FOR MEASUREMENT OF DATA

3.1 INTRODUCTION

The quality assurance and quality control (QA/QC) objectives for all measurement data include precision, accuracy, representativeness, completeness, and comparability. These objectives are defined in the following subsections. They are formulated to meet the requirements of the USEPA SW-846. The analytical methods and their Contract Required Quantitation Limits (CRQLs) are provided in Section 7.

3.2 PRECISION

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 8), calculating the RPD for duplicate sample results.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where:

RPD	=	Relative Percent Difference.
V1, V2	=	The two values to be compared.
|V1 - V2|	=	The absolute value of the difference between the two values.
(V1 + V2)/2	=	The average of the two values.

The data quality objectives for analytical precision, calculated as the RPD between duplicate analyses, are presented in Tables 3.1 and 3.2.

TABLE 3.1
QUALITY CONTROL LIMITS FOR WATER SAMPLES

		Laboratory Accuracy and Precision					
Analytical Parameters	**Analytical Method (a)**	**Matrix Spike (MS) Compounds**	**MS/MSD (b) % Recovery**	**MS/MSD RPD (c)**	**LCS (d) % Recovery**	**Surrogate Compounds**	**Surrogate % Recovery**
VOCs (e)	8260	All target volatile compounds	Laboratory determined QC limits	Laboratory determined QC limits	Laboratory determined QC limits	Toluene-d8 Bromofluorobenzene 1,2-Dichloroethane-d4	Laboratory determined QC limits
SVOCs (f)	8270	All target semivolatile compounds	Laboratory determined QC limits	Laboratory determined QC limits	Laboratory determined QC limits	Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol 2-Chlorophenol-d4 1,2-Dichlorobenzene-d4	Laboratory determined QC limits
Inorganics	6010,7470/7471, 7841,9010, OIA-1677	Inorganic Analyte	75-125	20	80-120	NA	NA

(a) Analytical Methods: USEPA SW-846, 3rd edition, Revision 1, November 1990; any subsequent revisions shall supersede this information
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) Target Compound List Volatile Organic Compounds
(f) Target Compound List Semivolatile Organic Compounds
NA - Not Applicable

TABLE 3.2
QUALITY CONTROL LIMITS FOR SOIL SAMPLES

		Laboratory Accuracy and Precision					
Analytical Parameter	**Analytical Method (a)**	**Matrix Spike (MS) Compounds**	**MS/MSD (b) % Recovery**	**MS/MSD RPD (c)**	**LCS (d) % Recovery**	**Surrogate Compounds**	**Surrogate % Recovery**
VOCs (e)	8260	All target volatile compounds	Laboratory determined QC limits	Laboratory determined QC limits	Laboratory determined QC limits	Toluene-d8 Bromofluorobenzene 1,2-Dichloroethane-d4	Laboratory determined QC limites
SVOCs (f)	8270	All target semivolatile compounds	Laboratory determined QC limits	Laboratory determined QC limits	Laboratory determined QC limits	Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol 2-Chlorophenol-d4 1,2-Dichlorobenzene-d4	Laboratory determined QC limites
Inorganics	6010, 7470/7471, 7841, 9010	Inorganic Analyte	75-125	20 (k)	80-120	NA	NA

(a) Analytical Methods: USEPA SW-846, 3rd edition, Revision 1, November 1990, any subsequent revisions shall supersede this information
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) Target Compound List Volatile Organic Compounds
(f) Target Compound List Semivolatile Organic Compounds
NA - Not Applicable

3.3 ACCURACY

Accuracy is a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern (Taylor, 1987), or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity which is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes which are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument noise or other variables and thus will be more accurate.

Sampling accuracy may be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike). The %R is calculated as follows:

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

where:

%R = Percent recovery.

SSR = Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added.

SR = Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.

SA = Spiked analyte: concentration of the analyte spike added to the sample.

The acceptance limits for accuracy for each parameter are presented in Tables 3.1 and 3.2.

3.4 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program (USEPA, 1987). Samples must be

representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in the Field Sampling Plan. Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded field duplicate samples. The analytical laboratory will also follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank, duplicate and Chain-of-custody procedures are presented in Sections 4 and 5.

3.5 COMPLETENESS

Completeness is defined as the percentage of measurements made which are judged to be valid (USEPA, 1987). The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness.

V = Number of measurements judged valid.

T = Total number of measurements.

3.6 COMPARABILITY

Comparability expresses the degree of confidence with which one data set can be compared to another (USEPA, 1987). The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;

- Requiring traceability of all analytical standards and/or source materials to the U.S. Environmental Protection Agency (USEPA) or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and
- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

SECTION 4

SAMPLING PROGRAM

4.1 INTRODUCTION

The sampling program will provide data concerning the presence and the nature and extent of contamination of groundwater and soil, if any. This section presents sample container preparation procedures, sample preservation procedures, sample holding times, and field QC sample requirements. Sample locations, and the number of environmental and QC samples to be taken are given in Table 4.1. The sampling procedures are presented in the Field Sampling Plan.

4.2 SAMPLE CONTAINER PREPARATION AND SAMPLE PRESERVATION

Sample containers will be properly washed and decontaminated prior to their use by either the analytical laboratory or the container vendor to the specifications required by the USEPA. Copies of the sample container QC analyses will be provided by the laboratory for each container lot used to obtain samples. The containers will be tagged and the appropriate preservatives will be added. The types of containers are provided in Tables 4.2 and 4.3.

Samples shall be preserved according to the preservation techniques given in Tables 4.2 and 4.3. Preservatives will be added to the sample bottles by the laboratory prior to their shipment in sufficient quantities to ensure that proper sample pH is met. Following sample collection, the sample bottles should be placed on ice in the shipping cooler, cooled to 4^{o}C with ice, and delivered to the laboratory within 24 to 48 hours of collection. Chain-of-custody procedures are described in Section 5.

4.3 SAMPLE HOLDING TIMES

The sample holding times for organic and inorganic parameters are given in Tables 4.2 and 4.3 and must be in accordance with the NYSDEC ASP requirements. The NYSDEC ASP holding times must be strictly adhered to by the laboratory. Any holding time exceedances must be reported to Con Edison.

4.4 FIELD QC SAMPLES

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates (MS/MSDs). The blanks will include:

a. Trip Blanks - A Trip Blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of a 40-ml VOA vial containing distilled, deionized water, which accompanies the other water sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples for target compound list (TCL) volatiles analysis. The Trip Blank will be

analyzed for TCL volatile organic compounds to assess any contamination from sampling and transport, and internal laboratory procedures.

b. Field Blanks - Field Blanks will be taken at a minimum frequency of one per 20 field samples per sample matrix. Field blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. It is a sample of deionized, distilled water provided by the laboratory that has passed through a decontaminated bailer or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The field blank may be analyzed for all or some of the parameters of interest.

The duplicates will consist of:

a. Coded Field Duplicate - To determine the representativeness of the sampling methods, coded field duplicates will be collected. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise.

b. Matrix Spike/Matrix Spike Duplicate (MS/MSD) - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one pair per 20 field samples. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes. The percent recoveries and RPDs are given in Tables 3.1 and 3.2.

TABLE 4.1
SUMMARY OF SAMPLES AND ANALYSES

Matrix	Parameter	Analytical Method	Field Samples				QC Blanks	Total
			Field Samples	Field Duplicate	MS/MSD[(a)] (Total)	Sub-Total	Trip Blank	
Soil Samples (from soil borings, test pits, and monitoring well borings)	TCL VOCs	EPA SW 8260	44	3	3/3	53	0	53
	TCL SVOCs	EPA SW 8270B	44	3	3/3	53	0	53
	Cyanide	EPA SW 335.2	44	3	3/3	53	0	53
	TAL Metals	EPA SW 6010, 7470/7471, 7841, 9010	44	3	3/3	53	0	53
Groundwater Samples	TCL VOCs	EPA SW 8260	17	1	1/1	20	1[(b)]	21
	TCL SVOCs	EPA SW 8270	17	1	1/1	20	-	20
	Cyanide (total)	EPA SW 335.2	17	1	1/1	20	-	20
	TAL Metals	EPA SW OIA-1677 EPA SW 6010, 7470/7471, 7841, 9010	17	1	1/1	20	-	20
Free Product Samples	Hydrocarbon Fingerprinting	Modified Method 8100	?[(c)]	-	-	-	-	?

(a) Matrix spike / matrix spike duplicate for organic analyses; matrix spike and laboratory duplicate for inorganic analysis is collected for every 20 samples collected.

(b) Trip blanks will be collected for each day a groundwater VOCs sample is sent to the laboratory.

(c) Number of free product samples collected for analysis (if any) will be determined in the field.

TABLE 4.2

WATER SAMPLE CONTAINERIZATION, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation [a]	Holding Time [b]
Volatile Organic Compounds (VOCs)	2-40 mL glass vial w/ Teflon septum	Cool to 4°C	12 days
Semivolatile Organics Compounds (SVOCs)	1000 mL glass w/ Teflon lined cap	Cool to 4°C	5 days for extraction, 40 days for analysis
Metals	1000 mL plastic bottle	Nitric Acid to pH < 2 Cool to 4°C	6 months, except mercury (26 days)
Cyanide	500 mL plastic bottle	NaOH to pH > 12 Cool to 4°C	12 days

(a) All samples to be preserved in ice during collection and transport.

(b) Days from validated time of sample receipt (VTSR).

TABLE 4.3

SOIL SAMPLE CONTAINERIZATION AND HOLDING TIMES

Analysis	Bottle Type	Preservation [a]	Holding Time [b]
Volatile Organic Compounds (VOCs)	Wide-mouth glass w/ teflon lined cap	Cool to 4°C	10 days
Other Organic Compounds [c]	Wide-mouth glass w/ teflon lined cap	Cool to 4°C	10 days for extraction, 40 days for analysis
Metals	Wide-mouth plastic or glass	Cool to 4°C	6 months, except mercury (26 days)
Cyanide	Wide-mouth plastic	Cool to 4°C	14 days

(a) All samples to be preserved in ice during collection and transport.

(b) Days from validated time of sample receipt (VTSR).

(c) Semivolatile organic compounds or PCBs.

* Sohxlet or sonication procedures for extraction and concentration of soil/waste samples for SVOCs must be completed within 10 days of VTSR. Extracts of soil samples must be analyzed within 40 days of extraction.

SECTION 5

SAMPLE TRACKING AND CUSTODY

5.1 INTRODUCTION

This section presents sample custody procedures for both the field and laboratory. Implementation of proper custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the Chain-of-custody (COC) and transfer of samples will be trained as to the purpose and procedures prior to implementation.

Evidence of sample traceability and integrity is provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is shown in Figure 5.1. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

5.2 FIELD SAMPLE CUSTODY

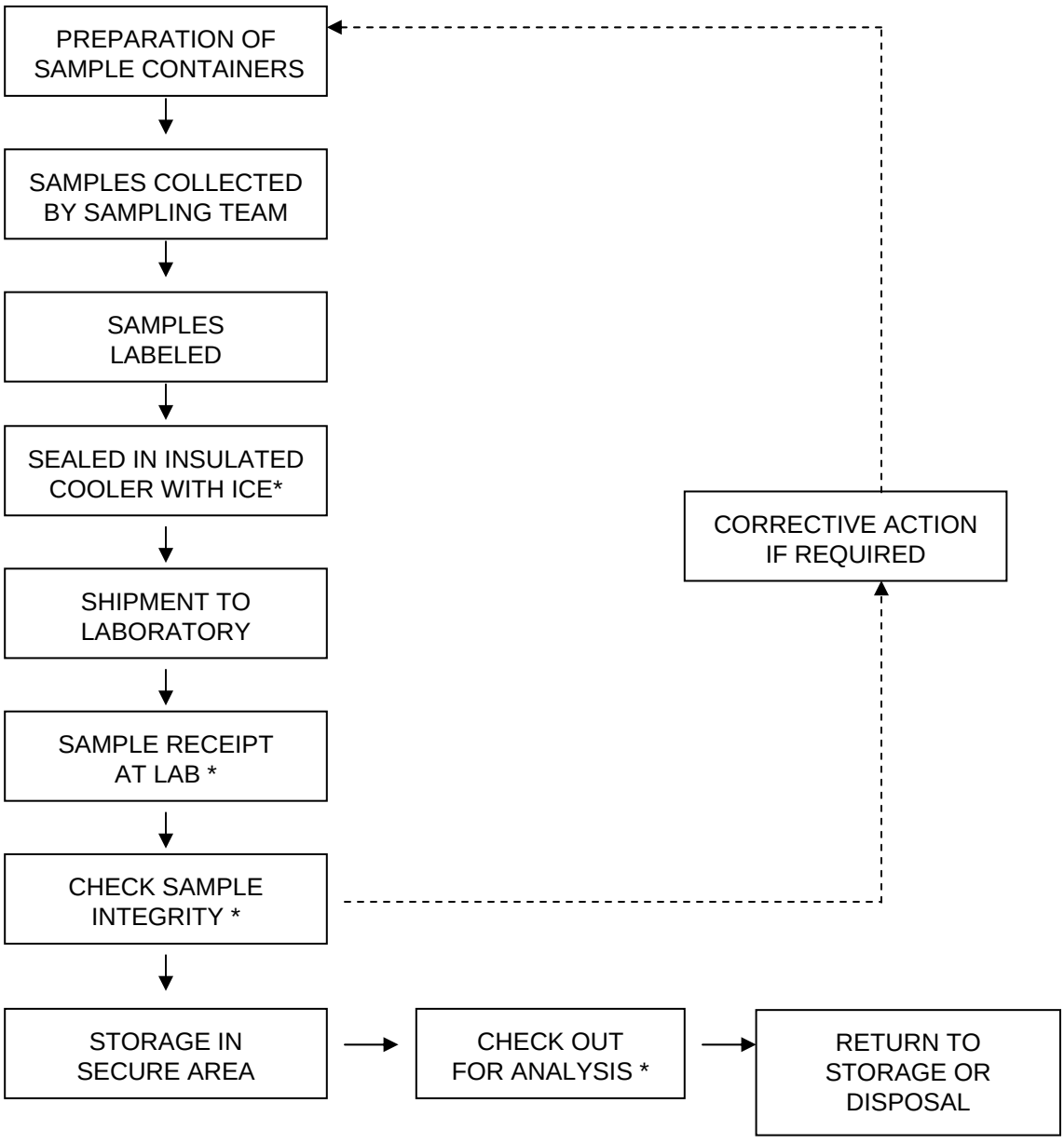
A COC record (Figure 5.2 or similar) accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

The REMARKS space on the COC is used to indicate if the sample is a matrix spike, matrix spike duplicate, or any other sample information for the laboratory. Since they are not specific to any one sample point, trip and field blanks are indicated on separate rows. Once all bottles are properly accounted for on the form, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper airbill number on the top of the COC. Mistakes will be crossed out with a single line in ink and initialed by the author.

FIGURE 5.1

SAMPLE CUSTODY



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

FIGURE 5.2

CHAIN OF CUSTODY RECORD

NO:

CLIENT:	PROJECT NO.	PROJECT MGR:	ANALYSES REQUIRED	Send results to:
				PARSONS ENGINEERING SCIENCE, INC. 290 Elwood Davis Road-Suite 312 Liverpool, NY 13088 Telephone: (315) 451-9560 Fax: (315) 451-9570
PROJECT NAME:	NOTES - (Reference QAPP and/or analytical protocols to be used):			Lab Submitted to:
SAMPLERS:				

FIELD SAMPLE ID	LOCATION DESCRIPTION	DATE	TIME	GRAB	COMP	MATRIX	Number of Bottles	REMARKS

Relinquished by: (Signature)	Date:	Time:	Shipped via:	Airbill #:	Received by: (Signature)	Date:	Time:	Cooler Temp: ____°C Samples Intact: ____Yes ____No
Relinquished by: (Signature)	Date:	Time:	Shipped via:	Airbill #:	Received by: (Signature)	Date:	Time:	Cooler Temp: ____°C Samples Intact: ____Yes ____No
Relinquished by: (Signature)	Date:	Time:	Shipped via:	Airbill #:	Received by: (Signature)	Date:	Time:	Cooler Temp: ____°C Samples Intact: ____Yes ____No

TYPE CODES: SOLID

- SD- Sediment
- SS- Surface Soil
- SB- Subsurface Soil
- MW- Monitoring Well Boring
- TP- Test Pit/Tank Pit
- DR- Drum Waste
- WA- Solid Waste
- OS- Other Solid

WATER

- MW- Monitoring Well
- LC- Leachate
- SW- Surface Water
- DW- Drill Water
- FD- Fuel Dispenser
- MH- Manhole
- OW- Oil Water Separator
- PR- Piping Run
- ST- Storm Water
- WW- Waste Water
- OL- Other Liquid (eg. Drum liquid)

MATRIX

- W - Water
- S - Soil

QUALITY CONTROL

- FB- Field Blank (with date)
- TB- Trip Blank (with date)
- WB- Wash Blank (with date)

NO:

One copy of the COC is retained by sampling personnel (notations identifying blind duplicate samples will be added to this copy of the COC but not the others that will go to the laboratory) and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample will not be analyzed.

5.3 LABORATORY SAMPLE CUSTODY

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities, and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used:

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming chain-of-custody procedure.
- The samples will be stored in a secured area at a temperature of approximately 4 degrees Celsius until analyses commence.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.
- A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records.

SECTION 6

CALIBRATION PROCEDURES

6.1 FIELD INSTRUMENTS

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions and are described in the Field Sampling Plan. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader. Copies of all the instrument manuals will be maintained on-site by the Field Team Leader.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., photoionization detector) are provided in the Health and Safety Plan.

6.2 LABORATORY INSTRUMENTS

The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods identified in Section 7.

SECTION 7

ANALYTICAL PROCEDURES

7.1 INTRODUCTION

Samples will be analyzed according to the USEPA SW-846 "Test Methods for Evaluating Solid Waste," November 1986, 3rd edition and subsequent updates. The methods to be used for the laboratory analysis of water and soil samples are presented in Table 7.1. These methods were selected because they attain the quantitation limits which are compiled on Table 7.1.

TABLE 7.1
PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Quantitation Limits Water (ug/L)	Quantitation Limits Soil (ug/kg)	State of New York Standards Water (ug/L) [a]	State of New York Standards Soil (ug/kg) [b]
	Volatile Organics					
1	1,1,1-Trichloroethane	SW8260B	1	5	5	800
2	1,1,2,2-Tetrachloroethane	SW8260B	1	5	5	600
3	1,1,2-Trichloroethane	SW8260B	1	5	1	
4	1,1-Dichloroethane	SW8260B	1	5	5	200
5	1,1-Dichloroethene	SW8260B	1	5	5	400
6	1,2-Dichloroethane	SW8260B	1	5	0.6	100
7	1,2-Dichloroethene(total)	SW8260B	1	5	5	300
8	1,2-Dichloropropane	SW8260B	1	5	1	
9	2-Butanone (MEK)	SW8260B	10	20		300
10	2-Hexanone	SW8260B	10	20		
11	4-Methyl-2-pentanone(MIBK)	SW8260B	5	20		1000
12	Acetone	SW8260B	10	20		200
13	Benzene	SW8260B	1	5	1	60
14	Bromodichloromethane	SW8260B	1	5		
15	Bromoform	SW8260B	1	5		
16	Bromomethane	SW8260B	2	10	5	
17	Carbon Disulfide	SW8260B	1	5		2700
18	Carbon Tetrachloride	SW8260B	1	5	5	600
19	Chlorobenzene	SW8260B	1	5	5	1700
20	Chloroethane	SW8260B	2	10	5	1900
21	Chloroform	SW8260B	1	5	7	300
22	Chloromethane	SW8260B	2	10	5	
23	cis-1,3-Dichloropropene	SW8260B	1	5	0.4	
24	Dibromochloromethane	SW8260B	1	5	5	
25	Ethyl Benzene	SW8260B	1	5	5	5500
26	Methylene Chloride	SW8260B	1	5	5	100
27	Styrene	SW8260B	1	5	5	
28	Tetrachloroethene	SW8260B	1	5	5	1400
29	Toluene	SW8260B	1	5	5	1500
30	trans-1,3-Dichloropropene	SW8260B	1	5	0.4	
31	Trichloroethene	SW8260B	1	5	5	700
32	Vinyl Chloride	SW8260B	2	10	2	200
33	Xylenes (total)	SW8260B	1	5	5	1200

TABLE 7.1 (Continued)
PROJECT QUANTITATION LIMITS

			Quantitation Limits		State of New York Standards	
	Analysis/Compound	Method	Water (ug/L)	Soil (ug/kg)	Water (ug/L)	Soil (ug/kg)
	Semivolatile Organics					
1	1,2,4-Trichlorobenzene	SW8270C	10	330	5	3400
2	1,2-Dichlorobenzene	SW8270C	10	330	3	7900
3	1,3-Dichlorobenzene	SW8270C	10	330	3	1600
4	1,4-Dichlorobenzene	SW8270C	10	330	3	8500
5	2,2'-oxybis(1-chloropropane)*	SW8270C	10	330	5	
6	2,4,5-Trichlorophenol	SW8270C	25	330	1	100
7	2,4,6-Trichlorophenol	SW8270C	10	330	1	
8	2,4-Dichlorophenol	SW8270C	10	330	1	400
9	2,4-Dimethylphenol	SW8270C	10	330	1	
10	2,4-Dinitrophenol	SW8270C	25	330	1	200
11	2,4-Dinitrotoluene	SW8270C	10	330	5	
12	2,6-Dinitrotoluene	SW8270C	10	330	5	1000
13	2-Chloronaphthalene	SW8270C	10	330		
14	2-Chlorophenol	SW8270C	10	330	1	800
15	2-methyl-4,6-Dinitrophenol	SW8270C	25	330		
16	2-Methylnaphthalene	SW8270C	10	330		36400
17	2-Methylphenol	SW8270C	10	330	1	100
18	2-Nitrolaniline	SW8270C	25	330	5	430
19	2-Nitrophenol	SW8270C	10	330	1	330
20	3,3'-Dichlorobenzidine	SW8270C	10	330	5	
21	3-Nitroaniline	SW8270C	25	330	5	500
22	4-Bromophenyl-phenyl ether	SW8270C	10	330		
23	4-Chloro-3-methylphenol	SW8270C	10	330		240
24	4-Chloroaniline	SW8270C	10	330	5	220
25	4-Chlorophenyl-phenyl ether	SW8270C	10	330		
26	4-Methylphenol	SW8270C	10	330	1	900
27	4-Nitroaniline	SW8270C	25	330	5	
28	4-Nitrophenol	SW8270C	25	330	1	100
29	Acenaphthene	SW8270C	10	330		50000
30	Acenaphthylene	SW8270C	10	330		41000
31	Anthracene	SW8270C	10	330		50000
32	Benzo(a)anthracene	SW8270C	10	330		224
33	Benzo(a)pyrene	SW8270C	10	330		61
34	Benzo(b)fluoranthene	SW8270C	10	330		1100

TABLE 7.1 (Continued)
PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Quantitation Limits Water (ug/L)	Quantitation Limits Soil (ug/kg)	State of New York Standards Water (ug/L)	State of New York Standards Soil (ug/kg)
	Semivolatile Organics, cont.					
35	Benzo(g,h,i)perylene	SW8270C	10	330		50000
36	Benzo(k)fluoranthene	SW8270C	10	330		1100
37	bis(2-Chloroethoxy) methane	SW8270C	10	330	5	
38	bis(2-Chloroethyl) ether	SW8270C	10	330	1	
39	bis(2-ethylhexyl)phthalate	SW8270C	10	330	5	50000
40	Butylbenzylphthalate	SW8270C	10	330		50000
41	Carbazole	SW8270C	10	330		
42	Chrysene	SW8270C	10	330		400
43	Di-n-butylphthalate	SW8270C	10	330	50	8100
44	Di-n-octylphthalate	SW8270C	10	330		50000
45	Dibenz(a,h)anthracene	SW8270C	10	330		14
46	Dibenzofuran	SW8270C	10	330		6200
47	Diethylphthalate	SW8270C	10	330		7100
48	Dimethylphthalate	SW8270C	10	330		2000
49	Fluoranthene	SW8270C	10	330		50000
50	Fluorene	SW8270C	10	330		50000
51	Hexachlorobenzene	SW8270C	NA (8081A)	330		410
52	Hexachlorobutadiene	SW8270C	10	330	0.5	
53	Hexachlorocyclopentadiene	SW8270C	10	330	5	
54	Hexachloroethane	SW8270C	10	330	5	
55	Indeno(1,2,3-cd)pyrene	SW8270C	10	330		3200
56	Isophorone	SW8270C	10	330		4400
57	N-Nitroso-di-n-propylamine	SW8270C	10	330		
58	N-nitrosodiphenylamine	SW8270C	10	330		
59	Naphthalene	SW8270C	10	330		13000
60	Nitrobenzene	SW8270C	10	330	0.4	200
61	Pentachlorophenol	SW8270C	25	330	1	1000
62	Phenanthrene	SW8270C	10	330		50000
63	Phenol	SW8270C	10	330	1	30
64	Pyrene	SW8270C	10	330		50000

TABLE 7.1 (Continued)
PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Estimated Quantitation Limits Water (ug/L)	Estimated Quantitation Limits Soil (ug/kg)	State of New York Standards Water (ug/L)	State of New York Standards Soil (ug/kg)
	Metals		**(mg/L)**	**(mg/kg)**	**(mg/L)**	**(mg/kg)**
1	Antimony	SW6010B	0.006	5.0	0.003	
2	Arsenic	SW6010B	0.01	1	0.025	7.5
3	Barium	SW6010B	0.01	1	1	300
4	Beryllium	SW6010B	0.005	0.5	0.003	0.16
5	Cadmium	SW6010B	0.005	0.5	0.005	1
6	Chromium	SW6010B	0.01	1	0.05	10
7	Copper	SW6010B	0.03	2.5	0.2	25
8	Lead	SW6010B	0.01	0.5	0.025	400[(c)]
9	Mercury	SW7470A/7471A	0.0002	0.01	0.0007	0.1
10	Nickel	SW6010B	0.04	4	0.1	13
11	Selenium	SW6010B	0.01	1	0.01	2
12	Silver	SW6010B	0.01	1	0.05	
13	Thallium	SW7841	0.002	1	0.0005	
14	Zinc	SW6010B	0.02	2	2	20
*15	Vanadium	SW6010B	0.05	1	0.0005	150
*16	Cobalt	SW6010B	0.05	1		30
*17	Aluminum	SW6010B	0.2	20		
*18	Calcium	SW6010B	5	500		
*19	Iron	SW6010B	0.1	10	0.3	2000
*20	Magnesium	SW6010B	5	500	35	
*21	Manganese	SW6010B	0.015	1.5	0.3	
*22	Potassium	SW6010B	5	500		
*23	Sodium	SW6010B	5	500	20	
*24	Cyanide	SW9010A	0.01	0.01	200	

Notes:
N/A - Not Applicable
(a) - Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, NYSDEC, October 1993
(b) - Determination of Soil Cleanup Objectives and Cleanup Levels, NYSDEC, January 24, 1994
(c) - EPA Guidance on Residential Lead-Based Paint, Lead Contaminated Dust, and Lead Contaminated Soil, July 14, 1994

SECTION 8

DATA REDUCTION, VALIDATION, AND REPORTING

8.1 INTRODUCTION

Data collected during the field investigation will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the Chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

8.2 DATA REDUCTION

Two copies of the analytical data packages and an electronic disk deliverable will be provided by the laboratory approximately 30 days after receipt of a complete sample delivery group. The Project Manager will immediately arrange for filing one package; a second copy, and the disk deliverable, will be used to generate summary tables. These tables will form the database for assessment of the site contamination condition.

The electronic deliverable format required is an ASCII comma delimited file with the fields and character lengths summarized in Table 8.1.

Each diskette deliverable must be formatted and copied using an MS-DOS operating system. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). If this can not be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All diskette deliverables must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

TABLE 8.1

FIELD AND CHARACTER LENGTHS FOR DISK DELIVERABLE

Description	Length	Format
Field Sample ID (as shown on COC)	15	Character
Cas. No. (including -'s)	10	Character
Parameter Name	31	Character
Concentration	13	Numeric
Qualifier	4	Character
Units	8	Character
SDG	8	Character
Lab Sample ID	15	Character
Date Sampled (from COC)	D	Date
Matrix (soil/water/air)	5	Character
Method Detection Limit	13	Numeric
Method Code	8	Character
Lab Code	6	Character

8.3 DATA VALIDATION

Data validation will be performed in accordance with the NYSDEC ASP and most current USEPA Region 2 SOPs for organic and inorganic data review. Validation will include the following:

- Verification of 100% of all QC sample results (both qualitative and quantitative);
- Verification of the identification of 100% of all sample results (both positive hits and non-detects);
- Recalculation of 10% of all investigative sample results; and
- Preparation of a Data Usability Summary Report (DUSR).

A DUSR will be prepared and reviewed by the QAO before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Calibrations;
- Blank results;
- Interference check sample;

- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected at given value;
- "UJ" - Estimated not detected at given value;
- "J" - Estimated value;
- “N” – Presumptive evidence at the value given;
- "R" - Result not useable; and
- No Flag - Result accepted without qualification.

SECTION 9

INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

9.1 QUALITY ASSURANCE BATCHING

Each set of samples will be analyzed concurrently with calibration standards, method blanks, matrix spikes (MS), matrix spike duplicates (MSD) or laboratory duplicates, and QC check samples (if required by the protocol). The MS/MSD samples will be designated by the field personnel. If no MS/MSD samples have been designated, the laboratory will contact the Con Edison Project Manager for corrective action.

9.2 CALIBRATION STANDARDS AND SURROGATES

All organic standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the USEPA or NIST, or other similar program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or more frequently, based upon data indicating deterioration.

9.3 ORGANIC BLANKS AND MATRIX SPIKE

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives". The blank water can be generated by reverse osmosis and Super-Q filtration systems, or distillation of water containing $KMnO_4$. The matrix spike is generated by addition of surrogate standard to each sample.

9.4 TRIP AND FIELD BLANKS

Trip blanks and field blanks will be utilized in accordance with the specifications in Section 4. These blanks will be analyzed to provide a check on sample bottle preparation and to evaluate the possibility of atmospheric or cross contamination of the samples.

SECTION 10

QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

10.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the project QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

10.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

10.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation (PE) samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

10.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Noncompliances will be logged, and documented through audit findings which are attached to

and are a part of the integral audit report. These audit finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

SECTION 11

PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

11.1 PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

A list of critical spare parts will be established by the operator. These spare parts will be available for use in order to reduce the downtime. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

11.2 SCHEDULES

Written procedures will establish the schedule for servicing critical items in order to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Required service will be performed by qualified personnel.

11.3 RECORDS

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

SECTION 12

CORRECTIVE ACTION

12.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

12.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12.1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

FIGURE 12.1

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____	_____	_____	_____	_____	_____
Originator	Date	Approval	Date	Approval	Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

SECTION 13

REFERENCES

USEPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986. U.S. Environmental Protection Agency, Washington, D.C.

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7- U.S. Environmental Protection Agency, Washington, D.C.

APPENDIX C

HEALTH AND SAFETY PLAN

APPENDIX C

HEALTH AND SAFETY PLAN
FOR THE SITE CHARACTERIZATION OF THE FORMER FARRINGTON STREET GAS WORKS SITE
Queens, New York

Prepared For:

Consolidated Edison Company of New York, Inc.

31-01 20th Avenue
Long Island City, NY 11105

Prepared By:

PARSONS

290 Elwood Davis Road, Suite 312
Liverpool, New York 13088
Phone: (315) 451-9560
Fax: (315) 451-9570

SEPTEMBER 2008

TABLE OF CONTENTS

Page

TABLE OF CONTENTS
(CONTINUED)

Page

TABLE OF CONTENTS
(CONTINUED)

Page

TABLE OF CONTENTS
(CONTINUED)

Page

LIST OF EXHIBITS

TABLE OF CONTENTS
(CONTINUED)

LIST OF ATTACHMENTS

LIST OF ACRONYMS

AED	Automated External Defibrillator
AHA	Activity Hazard Analysis
CFR	Code of Federal Regulations
CHSO	Corporate Health and Safety Officer
CPR	Cardiopulmonary Resuscitation
EMS	Emergency Medical Services
FCEs	Functional Capacity Exams
FSP	Field Sampling Plan
GBU	Global Business Unit
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDLH	Immediately Dangerous to Life and Health
NAPL	Non-Aqueous Phase Liquid
NIOSH	National Institute for Occupational Safety and Health
OCIP	Owner Controlled Insurance Program
OSHA	Occupational Safety and Health Administration
PARCOMM	Parsons Commercial Technology Group
PEL	Permissible Exposure Limit
PID	Photo Ionization Detector
PPE	Personal Protective Equipment
PSM	Project Safety Manager
HASP	Health and Safety Plan
SCBA	Self Contained Breathing Apparatus
SCWP	Site Characterization Work Plan
SOW	Scope of Work
SSO	Site Safety Officer
SSP	Subcontractor Safety Plan
TBD	To Be Determined
UV	Ultraviolet Radiation
VOC	Volatile Organic Compounds
WP	Work Plan

SECTION 1

INTRODUCTION

This Health and Safety Plan (HASP) has been prepared for the Site Characterization of the Former Farrington Street Gas Works Site (the Site). It provides guidance for office and field activities required to complete the scope of work.

The primary field activities include soil borings, test pit excavation, monitoring well installation, and groundwater sampling. These activities will be conducted in accordance with the Site Characterization Work Plan for the Former Farrington Street Gas Works Site (WP) and the Field Sampling Plan for Site Characterization of the Former Farrinton Street Gas WorksSite (FSP).

During sampling and other field activities, Parsons' staff and its subcontractors may be exposed to hazards associated with chemicals of concern at the Site. Employees will be required to use personal protective equipment (PPE) suitable for the level of contaminates present. Monitoring will be conducted to evaluate contamination levels and implement proper PPE upgrades, if necessary.

Field staff may also be exposed to other hazards that are encountered during field activities including slips, trips, falls, automobiles, traffic, heavy equipment, drill rigs, and winches. Depending upon the time of season, field staff may be exposed to biological hazards, for example insect bites, stings, ticks, and snakes. Meteorological hazards such as lightning, wind, rain, and ultraviolet radiation may also be present.

This HASP addresses these potential exposures for this project. This HASP is based upon the Parsons Model Project Safety Plan provided as Attachment A1 in the SHARP Management Manual, Version 1.5, January 2006. The Parsons Workplace Health and Safety Policy is provided in Exhibit 1.1.

1.1 PARSONS WORKPLACE HEALTH & SAFETY POLICY

Exhibit 1.1 Parsons Workplace Health and Safety Policy

CORPORATE POLICY
Workplace Health & Safety

POLICY: WORKPLACE HEALTH AND SAFETY

STATEMENT OF POLICY:

As an industry-leading engineering, construction and technical services firm, Parsons is firmly committed to maintaining a safe and healthy working environment at all its offices and project facilities. We share the National Safety Council's Safety and Health Code of Ethics as the principles guiding our commitment to safety.

- We will hold safety and health as our highest core value.
- Executive management will lead the safety improvement process.
- Safety will be a responsibility shared by everyone in our organization.
- Safety performance will be a key indicator of our organizational excellence and will be incorporated into our business processes.
- We will communicate safety performance openly with employees.
- All employees will be given the knowledge and skills necessary to safely perform their jobs.
- We will extend our safety efforts beyond the workplace to include transportation, homes and communities.
- We will continually strive to improve our safety and health processes.

To meet its health and safety objectives, all Parsons employees are expected to act proactively with regard to health and safety issues. This requires the combined efforts of a concerned management, responsible and knowledgeable supervision, and conscientious, well-trained employees.

Parsons will take all reasonable action to meet or exceed the applicable occupational health and safety requirements, domestically and internationally, and will continuously monitor and improve operations, procedures, technologies and programs that are conducive to maintaining a safe and healthy working environment.

RESPONSIBILITIES:

Parsons GBU management and supervisory personnel are responsible to:

- Comply with this policy and ensure that the applicable health and safety requirements at each domestic and international office and project facility are effectively implemented and monitored at all times.

1 of 3

The Company may change, rescind or add to any policies, benefits or practices described on the PWEB, other than employment-at-will policies, from time to time in its sole and absolute discretion with or without prior notice. The Company will advise employees of material changes within a reasonable time.

Exhibit 1.1 Parsons Workplace Health and Safety Policy (Cont'd)

RESPONSIBILITIES: (cont'd.)

- Ensure that the applicable health and safety requirements at each domestic and international project facility are effectively integrated with the preparation of proposals, project planning, and project execution.
- Monitor subcontractor safety performance in accordance with contract specifications as required by the contract with client.
- Ensure that safety information and statistics are reported to Parsons Corporate Safety Manager on a consistent and regular basis, as shown in Appendix.1, *Safety Monthly Report*.

Parsons Corporate Safety personnel are responsible to:

- Develop, communicate, and oversee Parsons health and safety programs at all Parsons business units.
- Provide assistance to Parsons business unit managers regarding health and safety regulations, reporting requirements, safety training, and other related issues.
- Monitor the effectiveness of Parsons health and safety programs, conduct investigations, develop OSHA reporting and worker's compensation claim procedures.
- Collect and maintain safety information and statistics for all Parsons business units and operations, as shown in corporate policy Workplace Health and Safety, Appendix.2, *OSHA Safety and Health Statistics*.
- Keep senior management informed of significant internal and external developments regarding health and safety.

Parsons employees are responsible to:

- Exercise maximum appropriate care and good judgment at all times regarding health and safety, and adhere to safety procedures to prevent accidents and injuries.
- Promptly report all accidents and injuries to supervisory personnel.
- Promptly report any near misses, unsafe conditions, equipment, or practices to supervisory personnel.

Exhibit 1.1 Parsons Workplace Health and Safety Policy (Cont'd)

REFERENCES:

National Safety Council Safety and Health Code of Ethics
Parsons Construction Health and Safety Manual
Parsons Injury and Illness Prevention Program (Cal-OSHA IIPP)
Parsons Safety Monthly Reports, Workplace Health and Safety - Appendix.1
Parsons Health and Safety Statistics, Workplace Health and Safety – Appendix 2

DATE: 7/23/04

1.2 THE HEALTH AND SAFETY PLAN

Parsons goal is zero accidents and zero injuries with work tasks designed to minimize or eliminate hazards to personnel, process, equipment, and the general public. No employee should ever perform tasks that may endanger his/her own safety or health or that of others.

This HASP outlines safety and health requirements and guidelines developed by Parsons for project work. When implemented, these requirements will help protect site personnel, visitors, and the public from exposure to potential safety and health hazards.

This HASP shall be updated as conditions change or situations change, usually by addenda to the HASP. All Parsons and subcontractor personnel must understand and implement the safety plans and any addenda. Parsons documents this by having employees sign an acknowledgement form stating that they understand the plan and its requirements.

1.3 SUBCONTRACTOR SAFETY PLANS

Parsons subcontractors must establish a safety program for their work and employees. Contract specifications require all subcontractors to accept Parsons HASP and prepare their own subcontractor safety plan (SSP) for presentation to the Parsons Project Manager and Division Safety Manager at least 10 days before site mobilization. At a minimum, subcontractor safety and health plans must meet the requirements of this HASP and provide safety equipment and safeguards suitable for the hazards involved. This HASP may not cover all potential hazards on every project, and subcontractors must ensure that appropriate safety and health information is available for all project tasks.

All HASP requirements for Parsons personnel (e.g., training, substance abuse screening, and incident reporting) also apply to subcontractor personnel and should be spelled out in the SSP.

If a subcontractor is performing activities that require specialized training (i.e., confined space entry, excavation/trenching, scaffold use, Hazardous Waste Operations and Emergency Response (HAZWOPER, etc.), then copies of training certifications for applicable employees and the supervisor must be provided to Parsons, and copies of those documents will be given to a Con Edison representative. Refer to Section 5.7 for more details on SSP requirements.

Below are the names of the subcontractors and the work activities they will be performing as part of the Site Characterization. All contractors working on site are required to complete a Contractor Safety Evaluation package.

SUBCONTRACTORS	WORK ACTIVITIES	EVALUATION GRADE
1. Chazen	Surveying	D
2. Enviroprobe	Utility Clearance	D
3. Chemtech	Analytical Laboratory	Not Applicable (off-site lab)
4. Aquifer Drilling and Testing (ADT)	Drilling/Well Installation/Excavation	C
5. Environmental Closures (ECI)	Test Pitting	C

SECTION 2

SCOPE OF WORK

2.1 SCOPE OF WORK

Parsons, in their contracted role with Consolidated Edison Company of New York, Inc. (Con Edison), is providing site characterization services for the work as specified in the WP. The work is being performed under the Parsons Commercial Technology Group (PARCOMM) Technology Division, and is the responsibility of Program and Project Managers, Mr. Dan Martoccia and Mr. Shane Blauvelt, respectively.

The field activities associated with the Site Characterization include the installation of soil borings and monitoring wells, monitoring well development, the excavation of test pits, and the collection of soil and groundwater samples. As mentioned in Section 1, ADT will be performing all drilling and well installation work and ECI will be performing the test pit excavations. Parsons will be conducting monitoring well development, sample collection, as well as project oversight. These activities will be conducted in accordance with details provided in the WP and FSP.

2.2 HEALTH AND SAFETY PLAN APPLICATION

The purpose of this HASP is to establish personnel protection standards and mandatory safety practices and procedures for field investigation efforts conducted at the Site. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise during site characterization activities. The standard operating procedures and safety practices presented in this plan shall be followed by all Parsons' personnel and subcontractors conducting work at the Site. The provisions of this plan are mandatory for all Parsons personnel engaged in on-site hazardous waste operations. All subcontractors and agency personnel must review, sign and follow the Parsons safety plan. Subcontractors working for Parsons must prepare and administer a plan with equivalent requirements unless otherwise specified, this safety plan will be added as an addendum to the Parsons safety plan.

SECTION 3

PROJECT SAFETY MANAGEMENT RESPONSIBILITIES AND AUTHORITY

3.1 SAFETY RESPONSIBILITY MATRIX

Exhibit 3.1 summarizes the responsibilities of selected roles related to the primary safety activities identified in the HASP.

Exhibit 3.1 – Roles and Responsibilities

	Work Elements	Project Manager	Project Safety Manager	Project Controls Manager	Project HR Manager	Sector Manager	Division Manager	GBU Safety Manager	GBU QC Manager	GBU Risk Manager	GBU President	Corporate Workers Compensation Analyst	Corporate Safety	Resident Engineer/ Superintendent	GBU BD Manager	Parsons CEO/President
	1. Zero Incident Techniques and SHARP Management	X	D	P	P	R	R	R	E	S	E		E	S	S	E
	2. Business Development Phase	X	P	P	P	R	E	S		S	E		E	P	D	E
Startup Phase	3. Initial Hazards Analysis and Planning	X	P	P	P	R	E	R	E	P	E	P		P		
Startup Phase	4. Project Safety Plan (PSP)	X	D		P	R	E	R		R	E		C			E
Startup Phase	5. Stakeholder PSP Alignment Meeting	X	D			E	E	P					C	P		
Administration/ Design Phase	6. Awareness Campaign	X	D	P	P	E	A	R					C	P		
Administration/ Design Phase	7. Employee Orientation	P	P	P	D	R	A	E					C	P		
Administration/ Design Phase	8. Training	X	D	P	P	R	A	E					C			E
Administration/ Design Phase	9. Health and Safety Committee	X	D	P	P	R	A	R					C			
Administration/ Design Phase	10. Incident Investigations	X	P	P	P	R	R	A				P	E			E
Administration/ Design Phase	11. Measurement and Reporting	X	D	P	P	R	R	S				P	E			E
Administration/ Design Phase	12. Audits, Inspections and Record Keeping	X	X	P	P	R	R	S	R	R			E			E
Construction or Field Phase	13. Preconstruction Safety Activities	X	X			E	E	R					C			
Construction or Field Phase	14. Project Site Orientation	X	D	P	P	E	E	S					C			
Construction or Field Phase	15. Meet Local OSHA, Building Trades, and Other Agencies	X	D			E	E	S					C			
Construction or Field Phase	16. Review Contractor/Subcontractor Safety Programs	E	X			E	E	S					C	P		
Construction or Field Phase	17. Subcontractor Premobilization Meeting	X	P	P		E	E	S					C	P		
Construction or Field Phase	18. Risk Mitigation Planning (Two-week Look-ahead)	P	P			E	E	S					E	X		
Construction or Field Phase	19. Activity Hazard Analysis	E	P			E	E	S					E	X		
Construction or Field Phase	20. Recurring Field Safety Meetings/Training	X	D	P	P			S					E	P		
Construction or Field Phase	21. Project Management Site Safety Inspections	X	D					S					E	P		
	Testing, Commissioning, Operations, and Decommissioning Phases	(to be developed)														
Closeout Phase	22. Lessons Learned and Final Safety Report	E	X		X	E	E	S	R				E	P		
Closeout Phase	23. Records Retention	E	X		P	A	A	R					E			

Legend:

A – Approves tools, plans, etc. established by the project.

C – Consultant providing expert advice to the development leader.

D – Development leader tasked to establish the tools, plans, etc. needed for the work element.

E – Sponsor responsible to reinforce the need to comply with the established requirements.

P – Participants in team or group implementation efforts, supporting the implementation leader.

R – Reviews and comments on tools, plans, etc. established by the project to achieve the goal of the work element.

S – Establishes requirements applicable to the project.

X – Accountable and responsible to ensure that the project develops and implements the work element in accordance with established requirements.

SECTION 4

ADMINISTRATIVE PHASE

4.1 PROJECT SAFETY COMMITTEE

Depending on the size and type of project, a safety committee that includes representation from all project stakeholders shall be formed. If the project has less than five (5) Parsons employees or 25 subcontractors, then a Project Safety Committee will be handled at the Program or Facility level. The Program or Facility H&S Representative is responsible for communicating information from the Division Safety Manager conference call with the project personnel on a monthly basis. Review of the meeting minutes from the Division Safety Manager conference call will take place during the first week of the month at times and locations to be determined and posted by the Project Manager on the safety billboard at least one week in advance.

For this project, there will not be a Project Safety Committee.

4.2 PROJECT ORIENTATION

The Human Resources department has a comprehensive employee orientation program and annual refresher. The Safety Manager helps to develop the safety section of the orientation and meets with new employees to review site procedures and requirements. Topics covered include:

- Names of personnel responsible for site safety and health
- Reporting emergencies, incidents and unsafe conditions
- Emergency/evacuation plans
- Safety, health and other hazards at the site
- Review of relevant activities on site and related Activity Hazard Analyses (AHAs)
- Proper use of personal protective equipment
- Work practices by which a worker can minimize risk from hazards
- Site Access
- Safe use of engineering controls and equipment on site
- Acute effects of compounds at the site
- Decontamination procedures

All personnel, including subcontractors and visitors, on a project must attend the orientation program (Exhibit 4.1) and sign an acknowledgment form (Exhibit 4.2) indicating they attended and understood the orientation. Any individual who is unsure of any information presented in the orientation must request clarification. Individuals who do not participate in the orientation or refuse to sign the acknowledgment cannot work on or access the site.

4.3 AWARENESS CAMPAIGN

The project has established an awareness program consistent with the Parsons safety awareness campaign and its various elements (e.g., signs, posters, banners, and focus briefings). This program promotes worker awareness of safety goals and daily risks, hazards, and exposures in the field. In addition to topics selected by corporate safety each month, the project will supplement the awareness program with information specifically applicable to the scope of work.

Safety bulletin boards maintained by the Project Safety Representative are primary information points for the project awareness campaign. Information required for bulletin boards is located in the field representatives vehicles.

The Project Safety Representative may also provide training, presentations, or informational materials as part of the awareness campaign.

4.4 STAKEHOLDER HASP ALIGNMENT MEETING

A stakeholder PSP alignment meeting must be held for projects that have a high health and safety risk.

This project is considered a low health and safety risk. As a result, the stakeholder PSP alignment meeting will be incorporated into the project kickoff meeting.

4.5 TRAINING

The project has a comprehensive health and safety training program tailored to the scope of work. All employees receive a general safety orientation as outlined in Section 4.2 upon assignment to the project. All Parsons new hires shall receive an employee orientation within the first 7 days of employment, provided by Human Resources, the Safety Representative and the Staff Coordinator. Specific training topics will include:

- Bloodborne Pathogens
- CPR/First Aid/AED
- Back Safety – lifting and carrying
- Defensive Driving
- Emergency Response
- Hazard Communication
- Initial Site Training
- Parsons Accident/Incident Reporting Procedures
- Respiratory Protection
- Con Edison Accident/Injury Reporting Procedures

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate

training as required by 29 Code of Federal Regulations (CFR) 1910.120, including, but not limited to, initial 40-hour, 8-hour Supervisor and annual 8-hour refresher training.

4.6 AUDITS AND INSPECTIONS

The PSM will implement an audit and inspection program in conjunction with the Global Business Unit (GBU) and corporate safety and quality assurance departments. The Project Manager, PSM or their designee, will conduct monthly safety inspections. Additional information on audits and inspections during field work is detailed in Section 6.5 of this HASP.

4.7 MEETINGS

All project meetings of three or more people must begin with a safety topic. The meeting chairperson may present the safety topic or ask for a volunteer to open the discussion. In general, the "safety moment" is only one or two minutes long and is directly relevant to the work at hand or applicable to most individuals outside the workplace.

Daily toolbox safety meetings are held with on-site personnel at the beginning of each shift to review current site conditions, incidents or injuries from the previous shift activities, safe or at-risk observations from the previous shift, activities planned for the current shift, anticipated hazards, engineering controls, work practices, PPE to protect against hazards, and any additional safety topic or comments. Toolbox safety meetings shall be documented and signed by all individuals accessing the site using a Safety Meeting Sign-In Sheet (see Exhibit 7.2 in Section 7 of this HASP).

4.8 MEASUREMENT AND REPORTING

4.8.1 Reporting

To accurately measure performance and comply with corporate and regulatory requirements, Parsons utilizes an online safety reporting system to report monthly work hours, near-miss incidents, first aid cases, property damage and personal injuries for its employees and subcontractors. The online safety reporting system instructions can be found in Attachment A. A wallet card containing Incident Reporting Guidelines, Parsons Accident/Incident Report Form, and Near Miss Report form are also available online and shown in Attachment A.

4.8.2 Measurement

The PSM and Project Manager may establish a measurement system to provide indicators of safety performance, including the following metrics for the project:

- Project and field task start dates
- Days without a recordable injury – updated monthly
- Date of last Occupational Safety and Health Administration (OSHA) recordable injury (if applicable)
- Percent of safe observations from audits

Subcontractors must submit a monthly report of exposure hours (hours worked on the project, paid or unpaid) to the Parsons Project Manager within three (3) days after the end of each month. The Project Manager compiles the figures and submits them to the Program Manager (or via the online safety reporting system if instructed by the Program Manager) and to Con Edison. Where necessary, estimated figures are acceptable. If a project involves air monitoring or personnel wearing any type of respirator, a monthly Field Project Report is also completed and submitted to the Division Safety Manger by the 3rd calendar day after the end of each month.

4.8.3 Incident Reporting

Employees involved in or witnessing an incident or near-miss incident must immediately report it to the responsible Field Team Leader (FTL) or Site Safety Officer (SSO), who in turn immediately relays the report to the Parsons Project Manager, Shane Blauvelt, (315) 451-9560 x 2120. A Con Edison representative will also to be notified immediately in the event of any chemical/oil spill incidents, and injuries/close calls to anyone on site or to any Member of the Public. No supervisor may decline to accept or relay a report of injury or significant near-miss incident from a subordinate.

The Project Manager must ensure that all incidents are reported to Anthony Miller, GBU Safety Manager, (704) 558-4079, Greg Beck, Division Safety Manager, (908) 887-1973, and to Dan Martoccia, (732) 537-3557, the Program Manager, and other management personnel (as required) within four hours. The Project Manager (who has been trained on Parsons' reporting requirements and Online Safety Reporting System) then prepares and submits the incident information.

The GBU Safety Manager must notify the local OSHA office immediately if an accident involves the death of an employee or hospitalization of three or more workers.

4.9 INCIDENT INVESTIGATIONS

All incidents and significant near-miss incidents are investigated by an individual or team with training in accident investigation and root cause analysis. Subcontractors must investigate incidents involving their employees or activities and submit an investigation report to the Parsons Project Manager within 48 hours of an incident.

If an injury occurs, all work stops, a Con Edison Contractor Injury Report form (Attachment B) must be completed and given to a Con Edison representative within 24 hours. Parsons is to provide an investigation report that includes a description of the incident, root cause analyses, and preventive actions to be taken to deter recurrence. Work will not re-commence on the activity where the injury occurred, until Con Edison considers Parsons' preventive action plan acceptable.

In Parsons, the GBU Safety Manager investigates or assigns an investigator to each significant incident. The investigator submits a final investigation report using the online safety reporting system within 72 hours of the incident. The PSM maintains the investigation file.

Copies of any incident/accident investigation reports must be provided to the Con Edison Construction EH&S Representative.

4.10 RESPONSIBILITY/IDENTIFICATION OF KEY LINE PERSONNEL

These personnel have the authority and responsibility for implementing the provisions of ***this program.***

Project Office:	Parsons - Syracuse	
Address:	290 Elwood Davis Raod, Suite 312, Liverpool, NY 13088	
Telephone	***Fax***	***Email***
(315) 451-9560	(315) 451-9570	
Company Executive responsible for project		***Contact No.***
Dan Martoccia		(732) 537-3557
Project Manager/Superintendent		***Contact No.***
Shane Blauvelt		(315) 451-9560
Safety Manager		***Contact No.***
Shane Blauvelt		(315) 451-9560
Project Scientist		***Contact No.***
Lee Gayle		(732) 537-3500
Field Team Leader/Site Safety Representative		***Contact No.***
Paul Kies		(732) 537-3500
Client - Project Management		***Contact No.***
Ms. Yelena Skorobogatov		(718) 204-4205

4.11 MEDICAL REQUIREMENTS AND WORKERS COMPENSATION

In accordance with corporate requirements, the PSM (or the GBU Safety Manager) has established and implemented the following medical requirements for the project:

4.11.1 Medical Surveillance and/or Functional Capacity Exams (FCEs)

All personnel engaged in activities that results in the exposure to chemicals at or above the OSHA Permissible Exposure Limit (PEL) or wear a respirator for more than 30 days in a year, must comply with 29 CFR 1910.120(f) – medical surveillance. All personnel who wear a respirator must be medically qualified by a physician, trained and fit-tested on an annual basis, even if they are not required to participate in a medical surveillance under 29 CFR 1910.120(f).

Documentation verifying that each on-site Parsons employee has successfully been medically cleared and respiratory fit tested will either be provided in this HASP or the employee will bring the proper documentation with them to the site. Medical clearance and respiratory fit test documentation for subcontractor personnel will either be provided in the Subcontractor Safety Plan required by Parsons from each subcontractor, or the subcontractor employee will

bring the proper documentation with them to the site. At Con Edison's request, the actual memos or letters from the physician will be provided within one business day from the request.

FCEs are not applicable for this project.

4.11.2 Substance Abuse and Alcohol Testing

The Division Safety Manager administers required substance abuse tests, including random drug and alcohol testing. A link to the corporate policy follows:

https://livelink.parsons.com/livelink/livelink.exe/Substance_Abuse.doc?func=doc.Fetch&nodeId=2471927&vernum=6&docTitle=Substance+Abuse%2Edoc

Con Edison does not require additional drug and/or alcohol testing. Parsons may conduct random testing on a monthly basis.

4.11.3 Medical Services and Panel of Physicians

The following medical facilities are suggested to treat work-related injuries and illnesses:

Non-Emergency Medical Services

- New York Westchester Square, 2475 Saint Raymond Ave, Bronx, NY 10461, Phone (718) 430-7300; or
- Englewood Hospital & Medical Center, 350 Engle Street, Englewood, NJ 07631, Phone (201) 894-3000.

Emergency Medical Services

- New York Flushing Hospital, 4500 Parsons Blvd, Flushing, NY 11355, Phone (718) 670-0500 (Figure 4.1).

Note: Transportation to a medical facility for non-emergencies must be done by at least two (2) individuals (i.e. driver and observer).

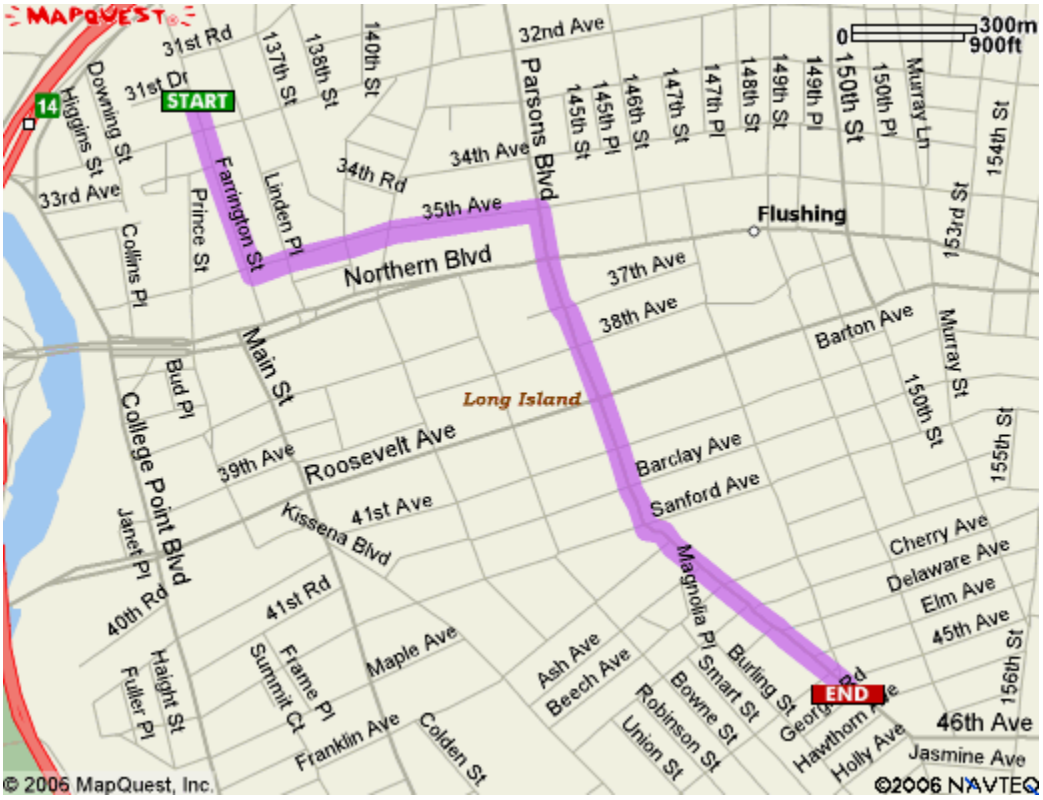
Figure 4.1

New York Flushing Hospital

4500 Parsons Blvd

Flushing, NY 11355

(718)- 670- 0500



Directions:

1. Start out going SOUTH on FARRINGTON ST toward 32ND AVE.

2. Turn LEFT on 35TH AVE.

3. Turn RIGHT onto PARSONS BLVD.

4. End at 4500 Parsons Blvd, Flushing, NY 11354

Total Est. Time: 5 minutes **Total Est. Distance: 1.58 miles**

4.11.4 Emergency Medical Response

The project shall display posters/signs with emergency telephone numbers and locations of facilities in visible locations and at selected phone locations throughout the project area (including subcontractor facilities).

Emergency Contacts	Phone Number
Ambulance	**911**
Fire Department	**911**
State Police (NYS)	**911**

Ms. Yelena Skorobogatov (Con Edison)	(718) 204-4205 – office
	(917) 380-4421 – pager
Mr. Eddy Louie (Con Edison)	(718) 204-4262 – office
	(917) 616-1529 - pager
Pollution Toxic Chemical Oil Spills	(800) 424-8802
New York Flushing Hospital (Emergency)	(718) 670-0500
Poison Control Center	(800) 222-1222

4.11.5 Workers Compensation Program

The Corporate Risk Management department establishes the appropriate workers compensation carrier. If a workers compensation loss occurs, the Corporate Workers Compensation Analyst (Donna Miller, 661-904-0978) handles all communication with the carrier.

This project does not participate in an Owner Controlled Insurance Program (OCIP) or project-specific insurance program. The workers compensation policy covering Parsons employees on this project is as follows:

AIG
P.O. Box 2310
New York, NY 10272
(212) 770-0100
Policy Number: WC 0007169963

4.11.6 Medical Monitoring

Based on the activities listed in Section 2.1, the following potential hazards or activities are associated with this project. As a result, medical surveillance will be required as listed below:

Name/Job Classification	Hazard/Activity	Medical Surveillance/Training
Field team (i.e. those working around excavators, drill rigs, including drillers and operators, field team leader, site safety officer and other personnel located within near vicinity of noise source.)	Noise – (Drilling, operating heavy machinery)	Activities with the potential for noise hazards will be initially mitigated with hearing protection. Noise level monitoring may be conducted to determine if an employee must participate in a Hearing Conservation Program. If noise exposures exceed 85 decibels over an 8-hour time weighted average, an employee must participate in a Hearing Conservation Program.
Field Team (e.g. those who handle and process samples, including drillers and operators, field team leader, site safety officer, and other personnel located within the exclusion zone.)	Chemical exposures – (Drilling, soil sampling, test pit excavation, see Table 6.2.1 for list of chemical to be monitored)	If an employee is exposed at or above the Permissible Exposure Limit (PEL) of a chemical for more than 30 days in a year, they must participate in a Medical Surveillance Program.
Field Team (e.g. those who handle and process samples, including drillers and operators, field team leader, site safety officer, and other personnel located within the exclusion zone)	Respirator use – (If conditions dictate PPE upgrade, see Table 6.2.1 for action levels)	Medical qualification, training and fit-testing must be received on an annual basis. If an employee wears a respirator more than 30 days per year, they must participate in a Medical Surveillance Program.

Gregory H. Beck, Division Safety Manager, (908) 887-1973 administers the medical surveillance program.

Exhibit 4.1 Project Orientation Outline

I. Names of personnel responsible for site safety and health

A. Site Safety Representative/Field Team Leader-Paul Kies Contact Information

- Paul Kies 732-537-3500 (office)
  201-452-8006 (cell)

II. Emergencies

A. Call 911 and/or your Supervisor for emergencies.

B. Route to Hospital

1. Start out going SOUTH on FARRINGTON ST toward 32ND AVE.
2. Turn LEFT on 35TH AVE.
3. Turn RIGHT onto PARSONS BLVD.
4. End at 4500 Parsons Blvd, Flushing, NY 11354

C. Other Emergency numbers

Emergency Contacts	Phone Number
Ambulance	**911**
Fire Department	**911**
State Police (NYS)	**911**
Ms. Yelena Skorobogatov (Con Edison)	(718) 204-4205 – office
	(917) 380-4421 – pager
Mr. Eddy Louie (Con Edison)	(718) 204-4262 – office
	(917) 616-1529 - pager
Dig Safely New York	811
Pollution Toxic Chemical Oil Spills	(800) 424-8802
New York Flushing Hospital (Emergency)	(718) 670-0500
Poison Control Center	(800) 222-1222

III. Incidents

A. Parsons Accident/Incident- Reporting Procedures- report all incidents (any unplanned or unexpected event that results in personal injury, property damage or environmental release) and "near-miss incidents" to your Supervisor and the SSO. The SSO will immediately inform a Con Edison Construction Manager/representative, and will also inform Parsons Project Manager within 4 hours. Near incidents COULD HAVE been an incident, but didn't because of a slight change in conditions or luck. However, they have the same causal factors as an incident, so it is just important to investigate them for identifying solutions to prevent recurrence and share lessons learned.

IV. Safety, health, and other hazards at the site

A. Physical activity, working around heavy equipment, and Review specific AHAs as appropriate to the worker's activities. working in adverse weather conditions pose the greatest risk for hazards.

B. Chemicals of concern and associated hazards

a. Non Aqueous Phase Liquids (NAPL)
    i. Oil/tar like appearance with a hydrocarbon odor. Often brown or black in color.
    ii. Associated with former MGP structures including gas holders, tar tanks, etc.
    iii. Avoid dermal contact as it can be a cause mild to severe skin irritation. Strong hydrocarbon odors are associated with NAPL. A PID will be utilized to screen for VOCs emitted from any NAPL that may be encountered. The VOC action level is sustained readings of 1 ppm. Above 1 ppm, draeger tubes will be utilized to screen for benzene. If sustained VOC readings exceed 5 ppm, or benzene levels exceed 1 ppm, Level C PPE will be donned. Prior to donning level C PPE, a cartridge change-out schedule will be developed and reviewed by Con Edison and Parsons Division Safety Manager for acceptance.
b. Hydrogen Cyanide (HCN)
    i. Colorless gas or bluish white liquid with a bitter almond odor.
    ii. Often associated with purifier waste. As part of the MGP process, gases were passed through wood chip to remove impurities. These wood chips often turned to a bluish color and contain elevated levels of HCN.
    iii. A multi-gas meter (VRae) will be utilized to screen for HCN during investigation activities. The HCN action level is 5 ppm.

C. Other hazards
a. Slip, Trips and Falls
    i. Take the time to observe your surroundings and make note of uneven surfaces and/or obstructions.
b. Traffic
    i. The majority of the property is currently owned by Con Edison and used as a substation, a gas regulator station, and for equipment storage. The facility currently functions as a reporting center for transformer repairs, and has 38 employees. The remainder of the former holder station is part of a BMW dealership and is used for storing cars. Don high visibility clothing/vests at all times and establish visible barriers around the work area.
c. Heavy Equipment
    i. Establish non-verbal communication methods prior to starting work.
    ii. Always establish eye contact prior to entering the reach or swing radius for a piece of equipment.
    iii. Be aware of overhead obstructions (e.g. electrical lines, etc.)

V. Proper use of personal protective equipment

A. Minimum Personal Protective Equipment – Level D
a. Level D PPE shall include steel-toe boots, safety glass with side shields, safety vests, and hard hat (not blue or white).

B. Additional Personal Protective Equipment

a. Hearing protection must be worn when working within 25 feet of heavy equipment
b. Appropriate hand protection must be donned during work activities (e.g. nitrile gloves when handling samples, abrasion resistance gloves when operating drilling equipment, etc.)
c. Metatarsal foot protectors must be donned when sawing or jack hammering.

VI. Work practices by which the employee can minimize risk from hazards

A. Training - all personnel must receive site-specific training (e.g. site orientation) and attend/review daily toolbox safety meetings.
B. Contamination - no eating, drinking or smoking in the work zone.
C. Proper hygiene – wash hands and face before eating, drinking and smoking and only in designated areas.
D. "Buddy System" – use two-way radio/ cell phone for communicating and reporting emergencies.

VII. Site Access

A. Restrict access around and near work site, including areas surrounding excavated areas and decontamination zones, to site employees. Barriers and tape may be used to demarcate the work areas.

VIII. Safe use of engineering controls and equipment on the site

A. Mobile equipment – use horns to alert others, mirrors and back-up/travel alarm must be functional.

IX. Decontamination procedures

A. Personnel Decontamination Procedures – Review Table 6.2.3.
   a. For work zones, equipment, PPE (e.g., coveralls, gloves, footwear) must be decontaminated or disposed before leaving the exclusion zone. Use boot wash stations when appropriate.
B. Equipment Decontamination Procedures
   a. Prior to starting work, all non-dedicated equipment will be either steam cleaned for washed with potable water and phosphate-free detergent (Simple Green).
   b. Sampling equipment will be rinsed with potable water followed by a deionized water rinse.

Exhibit 4.2 Project Orientation Attendance Sheet

(For All Parsons and subcontract employees on site)

I hereby confirm that site-specific health and safety training has been conducted by the site health and safety officer which included:

- Names of personnel responsible for site safety and health
- Safety, health, and other hazards at the site
- Proper use of personal protective equipment
- Work practices by which the employee can minimize risk from hazards
- Safe use of engineering controls and equipment on the site
- Acute effects of compounds at the site
- Decontamination procedures

For the following project:

(Project Title)	(Project Number)	(City, State)

Name (print)	Signature	Company	Date

Note: Maintain in Health & Safety Plan file on-site.

SECTION 5

PRE-FIELD WORK PHASE

5.1 RISK ANALYSIS AND SAFETY SPECIFICATION DEVELOPMENT

Procurement procedures require that a site-specific risk analysis be conducted before issuance of investigation and remediation request for proposals (RFPs). Using the site specific risk review checklist (Exhibit 5.1), the Project Manager leads this analysis, which documents existing exposures that may impact the work, surrounding facilities, equipment, workers, or the public at large. The analysis includes locating, documenting, and photographing items such as:

- Overhead and underground power lines
- Sewer and water utilities
- Existing building interferences
- Traffic
- Security
- Fences
- Water hazards
- Existing geographical and environmental conditions
- Investigation Derived Waste (IDW) Disposal
- Underground gas mains

Upon completion of the site specific risk analysis, high-risk activities are listed in the RFPs (as applicable), and bidders must describe controls and mitigation strategies in their proposals. The RFP notes that the list is representative and that the selected contractor must identify and control all work-related hazards.

Pre-field work safety activities include a detailed analysis of the scope of work and safety specifications in the prime contract, Parsons' project schedule and HASP, draft RFPs, and proposed subcontractor agreements. The Project's standard safety specifications are given below.

- Site Specific Risk Review Checklist – Exhibit 5.1
- Pre-Field Work Safety Meeting – Exhibit 5.2
- Project Technical and General Conditions Specification Review – Exhibit 5.3

5.2 DESIGN AND REMEDIAL ACTION REVIEW

Periodic remedial action reviews are held in accordance with the project management plan. The Project Safety Manager participates in the review to ensure that safety issues are adequately addressed. During the remedial action review, the discussion focuses on how work is sequenced, interferences with continuing operations, and safe work approaches. Specific activity hazards analyses conducted before the scheduled work can mitigate identified/presumed risks.

5.3 PRE-BID MEETING

Pre-bid meetings are required to ensure that bidders understand the RFP, including expectations for safety and health performance. Subcontractors must complete a Parsons Safety Evaluation package as outlined in Section 5.6, prior to attending a pre-bid meeting. During the pre-bid meeting, the Project Manager uses the Pre-Field Work Safety Meeting Checklist (Exhibit 5-1) to review project safety philosophy, principles, and Parsons requirements with all prospective bidders. Although this information is included in the RFP, the meeting reinforces the message.

5.4 SUBCONTRACTOR PREQUALIFICATION REVIEW

Project procurement procedures require that all subcontractors submit prequalification documentation for evaluation. The Procurement Manager or Division Safety Manager conducts the safety prequalification evaluation in accordance with the Parsons Contractor Safety Evaluation Package. Subcontractors will be used on this project as identified in Section 1.3.

5.5 PRE-FIELD WORK MEETING

The Project Manager holds a Pre-field Work meeting before the subcontractor begins work which may be combined with the Mobilization/Kickoff Safety Meeting (Section 5.8). During the safety review, the meeting participants review specific safety site/area, pre-bid risk analysis, competent person and site-specific safety plan requirements. In addition, the Project Manager obtains a safety point of contact and emergency management information. The attached Pre-Field Work Safety Meeting Checklist (Exhibit 5.2) is used by the Project Manager to document the meeting.

5.6 COMPETENT PERSON SUBMISSION REVIEW

Parsons and its subcontractors must identify OSHA-regulated and certified competent persons for work or tasks requiring that level of supervision. The Parsons personnel listed below will be assigned to the project and have the designated certifications.

Name	Job Title	40-hr HAZWOPER	8-hr HAZWOPER Supervisor	8-hr HAZWOPER refresher expires	Other training (i.e. excavation, confined space)
Lee Gayle	Project Scientist	1992*		2/28/09	LPS training
Paul Kies	Field Team Leader	6/1/00	6/23/05	8/31/08	First Aid, excavation competent, respirator clearance

*actual date not available for 40-hr

Parsons subcontractors supervisor and competent person sign and submit the attached Parsons subcontractor competent person document to the Parsons Project Manager (Exhibit 5.4). The supervisor of the competent person must certify in writing the specific competencies of the named competent person.

5.7 SUBCONTRACTOR SAFETY PLAN SUBMISSION REVIEW

All subcontractors must submit safety plans to the Parsons Project Manager and Division Safety Manager for review before they begin work on site. The plan will be reviewed for adequacy in accordance with the Subcontractor Safety Plan Review Sheet, which is included as Exhibit 5.5.

At least ten days before work begins, each subcontractor must submit two copies of its SSP to the Parsons Project Manager and Division Safety Manager for review. The Project Manager and Division Safety Manager review the SSP to ensure that it meets Parsons' requirements.

If a contractor needs assistance developing an SSP, the PSM provides an electronic copy of Parsons' sample SSP from Attachment A2 of the SHARP Management manual.

The SSP must address the following elements:

- Responsibility
- Compliance
- Communication
- Hazard assessment
- Accident exposure and investigation
- Hazard correction
- Training and instruction
- Recordkeeping

The SSP must include applicable requirements of Parsons HASP and OSHA CFR 1910/1926:

- Scope of work evaluation that describes the sequence of work and associated hazardous activities.
- Specific AHA.
- A project site employee orientation program that addresses location specific issues relative to safety and health.
- A site-specific emergency action plan that includes a list of key management contacts with home office, project site, home, and cellular telephone numbers.
- A site-specific medical emergency plan that lists qualified first aid personnel by name and includes copies of their current certificates.

- Key line management personnel, by name and position, who will enforce the SSP.
- Key competent or qualified personnel by name and copy of current documentation identifying specific certified competency (e.g., scaffolding, excavations, and fall protection).
- Written progressive disciplinary program for violations of safety procedures.
- Trenching and shoring plan (if applicable).
- HAZWOPER training documentation (if applicable).
- Contractor task hazard planning.
- Subcontractor weekly safety planning submission.
- Contractor workers daily task safety planning.

5.8 MOBILIZATION/KICKOFF SAFETY MEETING

The Project Manager, or designee, and SSO conduct the Mobilization/Kickoff Safety Meeting on the first day of subcontractor mobilization in the field and at the work site. The meeting includes documentation with the Mobilization/Kickoff Safety Meeting (Exhibit 5.6) and the completion of a Site-Specific Risk Review Checklist (Exhibit 5.1) combined with a walkthrough of the work area to locate items on the site specific risk review checklist.

Exhibit 5.1 Site-Specific Risk Review Checklist

Date:_____ Project or Location:_____

Risk/Hazard	Detail	Present
Employee Exposure	Hazardous chemicals	_____
	Lead	_____
	Asbestos	_____
	UXO	_____
	PCB	_____
	Airborne contaminants (dust, mists, fumes)	_____
	Other (specify)	_____
	_____	_____
Hazardous Waste	Handling, removal or storage of hazardous is required	_____
	_____	_____
Crane Work	Mobile cranes	_____
	Tandem lifts	_____
	Bridge cranes	_____
	Derricks	_____
	_____	_____
Powered Industrial Trucks	Forklift training is required	_____
Aerial Lifts	Hydraulic booms	_____
	Scissor lifts	_____
	Mobile scaffolding	_____
	_____	_____
Drilling		
Soil Sampling	Geoprobe	_____
	Split Spoon Sampling	_____
Electrical	Staging area	_____

Risk/Hazard	Detail	Present
Personal Protective Equipment	Work activities or work site requires hearing protection	_____
	Work activities or location requires using respirators	_____
	Work activities or location requires special protective clothing	_____
	_____	_____
Public Exposure	Work activities or location requires special precautions to protect the public	
	_____	_____
Permits	required	_____
	Hot permit	_____
Other Exposures	Other exposure or high-risk activities (list)	
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

Exhibit 5.1 Site-Specific Risk Review Checklist

Notes: _____

_____

Reviewed by: _____ Title: _____ Date: _____

Exhibit 5.2 Pre-Field Work Safety Meeting

Date:		Project/Location:	
Subcontractor Representative:		Parsons Project Manager:	
Phone:		Phone:	
Subcontractor Safety Rep:		Parsons Safety Manager:	
Phone:		Phone:	

The following items were identified and reviewed with the subcontractor.

Health & Safety		Medical	
Site-Specific Safety Plans/Model Program		Substance Abuse Screening	
Competent/Qualified Person Documentation		Emergency Procedures	
Safety Audits/Inspections		Site Security	
Subcontractor Responsibilities		Smoking Policy	
Site Orientation Requirements		Medical Services Requirements	
Premobilization Safety Meeting/Date		Treatment Locations/Addresses/Phone List	
Crane Inspection Certification		Other	
Personal Protective Equipment (PPE)			
Environmental Hazards			
Other			

Additional Notes/Comments:

Exhibit 5.3 Project Technical and General Conditions Specification Review

Date: Project/Location:
Project Manager: Safety Manager:

The project specification review has revealed the following high-risk activities. Activities checked must be followed up during intrusive work with training, written plans and/or a specific Activity Hazard Analysis. This list should be reviewed with prospective bidders during the pre-bid meeting.

Excavations/Trenching		Demolition	
Powered Industrial Trucks, Fork Lifts		Heavy Hauling	
Work Involving Hazardous Materials		Concrete	
Electrical Tie-ins/Lockout–Tagout		Work Adjacent to Production Areas	
Drilling		Site Security/Visitor Control/Public Exposure	
Underground, Caissons, Cofferdams		Process Safety Management (PSM)	

High Risk Activities and Other Project Concerns:

Exhibit 5.4 Subcontractor Competent Person Form

Definition

A competent person is a person having the ability to recognize existing and predictable hazards and having the authority to correct them.

Responsibility

The designated subcontractor competent person is responsible for recognizing and correcting safety risks/hazards. This person has the authority to stop work in a potential safety concern on the jobsite. This Subcontractor Manager and competent person are considered the contacts for Parsons projects.

This form must be completed by each subcontractor's manager and the subcontractor's designated competent persons. *Where a subcontractor is responsible for multiple crafts, it will be necessary to maintain additional designated competent persons and forms.* Each subcontractor on a Parsons project must submit this completed form to the Parsons Construction Manager before beginning work on the project and must update it any time the designated representative(s) changes.

Acknowledgment

I,_____ representing, _____
Subcontractor Manager Subcontractor Company Name

have assigned _____ to be the competent person in the areas indicated and I _____ acknowledge that this individual has been thoroughly trained and is experienced in hazard recognition and has the authority to stop work and correct hazards in the event of a potential hazardous or imminent danger situation.

_____ _____
Subcontractor Manager (Signature) Date

I, _____ acknowledge that I have been thoroughly trained and have the experience
Competent Person (Signature)

to perform the duties as the _____competent person in the areas marked below and
Subcontractor Company Name

I understand that I have the responsibility and authority to correct hazards and to stop work in the event of a potential hazardous or imminent danger situation.

_____ Asbestos	_____ Hearing Protection	_____ Welding/Cutting
_____ Respiratory Protection	_____ Scaffolding	_____ Rigging
_____ Cranes/Derricks	_____ Electrical	_____ Lead
_____ Fall Protection	_____ Ladders	_____ Excavations/Trenches
_____ Demolition	_____ Tunnels/Shafts	_____ First Aid/CPR
_____ Underground Const.	_____ Material/Personnel Hoists	_____ Concrete/Forms/Shoring
_____ Marine Work/Diving	_____ Bolting/Riveting/Fitting	_____ Mechanical Demolition
_____ Sediment Sampling	_____ Permits	_____

PARSONS

Exhibit 5.5 Subcontractor Safety Plan Review

Date: _____ Project/Location: _____

Subcontractor: _____ Parsons Safety Manager: _____

The information provided here is based on a review of a subcontractor's safety plan. Areas identified as incomplete are reevaluated and modified based on the standards in the contract specifications and the Project Safety Program manual. Subcontractors resubmit corrected sections of the SSP to the Parsons Construction Manager within one week of receiving review documentation.

Section	Complete	Incomplete	Section	Complete	Incomplete
Site Specific Safety Plan			Specific Activity Hazard Analysis (AHA)		
Responsibilities assigned			Project Site Employees Orientation Program		
Compliance			Emergency Action Plan		
Hazard Communication			Site Specific Medical Emergency Plan		
Hazard Assessment			Identification of Key Line Personnel		
Accident Investigation			Identification of Competent & Qualified Personnel		
Hazard Correction			Written Progressive Disciplinary Program		
Training and Instruction			Written Trenching and Shoring Plan (if applicable)		
Recordkeeping			Written 100% Fall Protection Plan (if applicable)		
Scope of Work Evaluation			Other		

Additional Comments:

_____

_____

_____

_____

Reviewed by:

Name Title

_____ _____ _____

PARSONS

Exhibit 5.6 Mobilization/Kick Off Safety Meeting Checklist

Date: _____ Project/Location: _____

CM Representative: _____Subcontractor Representative:_____

The following project site safety, health, and security requirements, procedures, and hazards have been identified and reviewed with the subcontractor.

SSP/Emergency Planning/Response Plan			Demolition	
Competent/Qualified Person			Personal Protective Equipment	
Hazardous Materials/Waste			Cranes/Hoists/Annual Inspection Certificate	
Vehicle/Heavy Equipment			Overhead Power Lines	
Lockout/Tagout			Confined Spaces (Permit/Non-Permit)	
Electrical			Excavations/Trenching	
Fire Protection			Site Security/Visitor Control/Public Exposure	
Hot Work/Welding/Cutting			Process Safety Management (PSM)	
Fall Protection/Guardrails/ Scaffolding/Ladders			Permits (Excavation/Scaffolding/Demolition/Traffic/Confined Space/Hot/etc.)	
Drilling			Electrical and other utilities for stage area	
Sediment Sampling – Vibracore/grab samples				

Additional Project Concerns:

_____

_____

_____

_____

_____

Other Attendees:

Name	Title	Company

SECTION 6

INVESTIGATION PHASE

6.1 SITE RISK ANALYSIS

Before work begins, Project Managers lead a team that performs a risk analysis at each work site to identify hazards that require specific control measures. During weekly progress meetings, the FTL and subcontractors submit written summaries of upcoming work tasks and associated risks and control measures to the Project Manager using Exhibit 6.1 located at the end of this section. The weekly summaries identify upcoming mobilization or demobilizations tasks, audits and inspections, competent person changes, training and new activities requiring an AHA. Subcontractors add activities to these summaries at least two weeks in advance of the work. Potential hazards that may be encountered during the pre-design investigation are listed below. The AHA for the work activities are found in Attachment C.

6.1.1 Chemical Hazards

Health hazards and the exposure limits associated with chemicals of concern are presented in Table 6.1. These hazards can be encountered during subsurface and intrusive investigation in and around the Site. Parsons will perform both real time breathing zone air-monitoring and CAMP monitoring, using a photoionization detector, a multi-gas meter, and a dust monitor. The real time data will be recorded in the field book by Parsons field investigator/SSO, following each observation, during intrusive activities and sampling activities. CAMP monitoring data will be downloaded daily and kept as an electronic file.

6.1.2 Physical Hazards

Physical hazards that may be encountered during daily field activities include but are not limited to heat stress, cold-related illness, electrocution, ultra-violet radiation, and noise hazards.

Parsons will not access any manholes or vaults. Workers on this project will not be entering into confined spaces, which may include, but not limited to vaults, test pits, trenches and waste disposal containers.

Asbestos:

If potential asbestos containing material is encountered during investigation activities, follow the procedures listed below.

- Stop investigation activities and notify all site workers of a temporary stand down
- Notify Con Edison CM
- Notify Parsons Project Manager (Shane Blauvelt) or, in his absence, notify Parsons Program Manager (Dan Martoccia)

- Cover the exposed material with plastic and secure plastic with sand bags or equivalent. Minimize disturbance of material.
- Leave undisturbed (un-excavated) material that may be present in-place. Cover with plastic if safe to do so (i.e., shallow test pit excavation)
- Await further direction from Con Edison management regarding characterization and management of exposed material.

Heat Stress:

Heat stress is one of the most common (and potentially serious) illnesses that affect field personnel. When site personnel are engaged in operations involving hot environments, a number of physiological responses can occur which may seriously affect the health and safety of the workers. Heat stress can result in health effects ranging from transient heat fatigue to serious illness or death. Heat stress can be eliminated or controlled through the use of a comprehensive heat stress prevention and monitoring program.

Cold-Related Illness:

Cold-related illness, like heat stress, is very common and can seriously affect field personnel if the appropriate controls are not established. Exposure to low temperatures presents a risk to employee safety and health, in the form of hypothermia and frostbite. Both can be controlled or eliminated by implementing employee training, periodic physiological screening, establishment of administrative controls, selecting proper work clothing, and wind-chill monitoring which all contribute to the prevention of hypothermia and frostbite.

Electrocution:

All drilling and excavation equipment will be kept a safe distance from live sources of electricity in accordance with Parsons Pre-drilling protocol. Drill rods and other metal objects will not be raised above the height of the rig. The length of drill rods will be less than the distance to the nearest live electrical source so if the drill string is dropped it cannot fall across electrified equipment. All subsurface and overhead electrical sources and lines will be identified before digging, drilling, or sampling activities commence. Where possible and/or practical, electric lines and sources will be deactivated or insulated before digging, drilling, or sampling activities are commenced.

Ultraviolet Radiation:

The sun emits ultraviolet radiation (UV) as heat and light. The skin's natural defense mechanisms attempt to reject the UV by distributing melanin pigmentation where needed. However, overexposure to direct sunlight can cause inflammation or blistering of the skin (sunburn). The use of sunscreen, long sleeve shirts, and wide brim hats can help prevent sunburn. Chronic exposure to UV radiation is known to cause skin cancer. In case of sunburn, do not apply burn ointment, cold cream, or butter to relieve pain. Use a dry dressing and get medical attention for severe, extensive sunburns.

Noise:

Operating heavy equipment can be a potential noise source. Hearing protection will be worn by personnel operating heavy equipment, or other personnel within 25 feet of the equipment. Earplugs will be provided on-site for personnel who may be working in or around heavy equipment.

If noise hazards are of concern for a particular project (e.g. exceed 85 decibels over an 8-hour time weighted average), appropriate hearing protection should be used. The noise level will determine the appropriate type of hearing protection needed (e.g., earplugs or ear muffs).

6.1.3 Biological Hazards

Biological hazards can result from encounters with mammals, insects, snakes, spiders, ticks, plants, parasites, and pathogens. Mammals can bite or scratch when cornered or surprised. The bite or scratch can result in local infection or infection with systemic pathogens or parasites. Insect and spider bites can result in severe allergic reactions in sensitive individuals. Exposure to poison ivy, poison oak or poison sumac results in skin rash. Ticks carry a number of serious diseases. Dead animals, organic wastes, and contaminated soil and water can harbor parasites and pathogens. Most of the field activities will occur in a densely populated area; however, the possibility of encountering biological hazards still exists.

Poison Ivy:

Some of the most common and severe allergic reactions result from contact with poison ivy, poison oak, and poison sumac. Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

Ticks:

Ticks may be common during the spring and summer. Two types of ticks may be encountered: the dog tick and the deer tick. The dog tick is the larger, more common tick. After biting, the dog tick will remain attached to the victim until engorged with blood. Dog ticks may transmit rocky mountain spotted fever and other diseases. The deer tick is much smaller, ranging from poppy seed to grape seed size, and does not remain attached to the skin for very long after biting. Deer ticks can transmit Lyme disease, which can have serious, long-term health effects if left untreated. Lyme disease is characterized by a bulls-eye type rash; light in the center with an outer red area. Flu-like symptoms may also occur. These signs may occur at different times and the rash may not appear. If you discover any bites on the skin, wash the affected area and seek medical attention if a rash or flu-like symptoms appear.

Bees, Wasps, Hornets, and Other Insects:

Symptoms of an insect bite are normally a sharp, immediate pain in the body part bitten. Poisonous insects and insect-like creatures that may be encountered at the Site include the following:

- Bees (honeybees, bumble bees, wasps, and hornets);
- Caterpillars; and
- Beetles/Bugs

Spiders:

The two poisonous spiders that may be encountered at the Site are the Brown Recluse and the Black Widow. The Brown Recluse is up to one inch long with a violin or "fiddle" shaped mark on the top of the head. The Black Widow is a smaller, bulbous black spider with a red hourglass-shaped mark on the underside.

Reactions to a Brown Recluse spider bite include mild to severe pain within two to eight hours and a star shaped area around the bite within three to four days. Significant tissue death and loss accompanies a Brown Recluse spider bite. Reactions to a Black Widow spider include intense pain at the site of the bite after approximately 15 to 60 minutes, followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils, and generalized swelling of face and extremities.

Persons that have been bitten by a Brown Recluse or Black Widow spider should be immediately transported to a hospital. The spider should be collected (if possible) for confirmation of the species.

6.1.4 Environmental Hazards

Slip, Trip, and Fall Hazards:

Site workers may encounter slip, trip, and fall hazards due to uneven surfaces at sidewalk/pavement interfaces and obstructions protruding from the ground, such as:

- Holes, pits, tree roots, or ditches.
- Slippery surfaces.
- Steep grades.
- Uneven grades.
- Sharp objects, such as nails, metal shards, and broken glass.

Thunderstorm Hazards:

During the course of field operations, severe weather may be encountered, including thunderstorms, lightning, rainstorms, and other unsafe weather conditions (i.e., high winds and tornadoes). Criteria indicating that severe weather conditions may exist include:

- High winds (greater than 40 miles per hour – depending on the tree cover and other site specific conditions);
- Tornado watch or warning in place for the area including the site;
- Visible lightning;
- Extreme temperatures (e.g., greater than 100 degrees F); or
- Heavy rainfall that makes footing treacherous and visibility difficult.

If severe weather is approaching, the SSO and FTL will determine if weather conditions justify a stoppage of work activities. The SSO and FTL will also determine if weather conditions allow for restart of work activities following the severe weather. In general, work will not commence for 20 minutes after any lightning event. Monitor weather radio and if possible monitor weather radar via internet.

6.1.5 Fire Hazards

Although fires and explosions may arise spontaneously, they are more commonly the result of carelessness during the conduct of site activities, such as moving drums, mixing/bulking of site chemicals and during refueling of heavy or hand held equipment. Some potential causes of explosions and fires include:

- Mixing of incompatible chemicals, which cause reactions that spontaneously ignite due to the production of both flammable vapors and heat;
- Ignition of explosive or flammable chemical gases or vapors by external ignition sources;
- Ignition of materials due to oxygen enrichment;
- Agitation of shock or friction-sensitive compounds;
- Sudden release of materials under pressure.

6.1.6 Site Characterization Activity Hazard Analysis

(To be updated as new task/activities are required.)

- Activities - Field
- Site Visit or Site Walk
- Operation- Motor Vehicle
- Operation- Heavy Equipment or Machinery

- Fueling- Motor Vehicle
- Fueling- Heavy Equipment*
- Survey- Geophysical Investigation*
- Sampling- Soil
- Sampling- Water
- Sampling- Processing
- Decontamination- Area Set-up
- Decontamination- Large Equipment
- Decontamination- Personnel
- Decontamination- Portable Tools

* Indicates that these work activities will be primarily accomplished by subcontractors who will submit an updated AHA (to be added).

6.2 FIVE HAZARD CONTROL MEASURES – ORDER OF PRECEDENCE

Site hazards and hazards resulting from investigation and remediation activities are controlled using one or more of the control measures listed below. The order of precedence is as follows:

6.2.1 Engineer/Design to Eliminate or Minimize Hazards

A major component of the design or planning phase is to select appropriate safety features to eliminate a hazard and render it fail-safe or provide redundancy using backup components.

Exclusion Zone

The exclusion zone will be established at the site for each intrusive activity. The zone will be defined by temporary posts/stanchions and caution tape. Unprotected onlookers should be located 50 feet upwind of drilling or environmental sampling activities. In the event that action levels are exceeded in the breathing zone, all personnel in the exclusion zone must stop work, evacuate, evaluate the situation. If the actions levels continue to exceed recommended limits, upgrade the level of personal protective equipment on properly trained and certified crew members to continue work.

Decontamination Zone

A decontamination zone will be established between the exclusion zone and the support zone. This zone will also be delineated utilizing stanchions and caution tape, and will be up to 10 feet in width. Personnel decontamination must take place prior to leaving the decontamination area and prior to entering any personnel hygiene facilities, or before eating, drinking, or smoking. Any decontamination water will be contained for appropriate disposal. Soiled PPE will be removed and placed in drums.

Support Zone

A support zone will be established. Break areas, operational direction and support facilities (to include supplies, equipment storage and maintenance areas) will be located in this area. No equipment or personnel will be permitted to enter the support zone from the exclusion zone without passing through the personnel or equipment decontamination zone.

6.2.2 Guard the Hazard

Hazards that cannot be eliminated by design must be reduced to an acceptable risk level by safety guards or isolation devices that render them inactive.

6.2.3 Provide Warnings

Hazards that cannot be totally eliminated by design or guarding are controlled through using a warning or alarm device.

Exposure/Air Monitoring Program

An environmental and personal monitoring program will be developed based on site-specific information for the project. This plan describes general information on wind direction monitoring, volatile organic compound (VOC) monitoring, dust monitoring, and hydrogen cyanide monitoring. The corresponding monitoring equipment will be calibrated at the start of each day and Parsons employees will follow manufacturer's calibration procedures that will be provided on site with monitoring equipment.

Wind Direction Monitoring

A wind direction indicator (such as survey flagging tied to a stake) will be erected at every active work site. This will enable the SSO and on-site personnel to determine upwind locations necessary for proper health and safety procedure implementation, (work areas relative to the excavation) and, if necessary, evacuation procedures.

Volatile Organics Monitoring

Field work at sites with VOC contamination shall use photoionization detector (PID) (OVM-580B/580S or equivalent) equipped with a 10.6e V lamp or other monitoring instrument deemed appropriate by the PSM to monitor VOC concentrations in the working area. Readings detected by the PID or other instrument will be used to determine the appropriate levels of protection. Action levels for VOCs and particulates are presented in Table 6.2.1.

Cyanide Vapor Monitoring

A multi-gas meter (VRae) calibrated to detect hydrogen cyanide or other monitoring instrument deemed appropriate by the PSM to monitor hydrogen cyanide in the working areas will be utilized. Readings detected by the analyzer or other instrument will be used to determine the appropriate levels of protection. Action levels are presented in Table 6.2.1.

Carbon Monoxide Monitoring

A multi-gas meter (VRae) calibrated to detect carbon monoxide or other monitoring instrument deemed appropriate by the PSM to monitor carbon monoxide in the working areas will be utilized. Readings detected by the analyzer or other instrument will be used to determine the appropriate levels of protection. Action levels are presented in Table 6.2.1.

Dust Monitoring

If site activities generate sustained (15 minutes), visible dust due to wind erosion of soils, a personal DataRAM meter will be obtained to monitor worker breathing zones for total dust levels. Readings will consider upwind background dust levels, as well as diesel particulate emissions from heavy equipment before upgrades to higher levels of PPE are initiated as shown in Tables 6.2.1 and 6.2.2.

Community Air Monitoring Plan

Community air monitoring will be conducted in compliance with the New York State Department of Health's (NYSDOH's) Generic Community Air Monitoring Plan (CAMP). Real-time air monitoring for volatile compounds and particulates at the perimeter of the hot zone will be performed as described below.

VOC Monitoring

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of soil, sediment, and groundwater samples. Periodic monitoring may include obtaining measurements upon arrival at a location, while opening a monitoring well cap, when overturning soil, when bailing/purging a well, and upon leaving the location. In some instances, depending on the proximity of exposed individuals, continuous monitoring may be conducted during these activities.

Continuous monitoring for VOCs will be conducted during all ground intrusive activities (i.e., hand clearing, soil boring and monitoring well installation). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the hot zone. Monitoring will be conducted with a PID equipped with a 10.6 eV lamp capable of calculating 15-minute running average concentrations.

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the hot zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. The corrective actions may include physically covering the

source area and/or application of foam. After these steps work activities will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.

- If the total organic vapor level is above 25 ppm at the perimeter of the hot zone, activities will be shutdown.

All 15-minute readings will be recorded and available for New York State Department of Environmental Conservation (NYSDEC) and NYSDOH personnel to review. Instantaneous readings, if any, will also be recorded.

Particulate Monitoring

Particulate concentrations will be monitored continuously at the downwind perimeter of the hot zone with a portable real-time particulate monitor capable of measuring particulate matter less than 10 micrometers in size and capable of integrating over a period of 15 minutes (or less). The equipment will include an audible alarm to indicate exceedence of the action level. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations.

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

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review.

6.2.4 Provide Special Procedures or Training

When design, guarding, or warnings cannot eliminate hazards, subcontractors must develop procedures, training, and audits to ensure safe completion of work. Training cannot be a substitute for hazard elimination when life-threatening hazards are present.

Decontamination Procedure

Level D or Modified Level D protection will be worn for initial entry on-site and initially for all activities. If air concentrations exceed action levels, workers will employ engineering controls first before upgrading the level of protection. Personal decontamination may be necessary for activities involving the use of Level C or Level B PPE. Table 6.2.3 includes the

proper decontamination procedures that must be implemented if chemical contamination is present and PPE protection greater than Level D is used. The SSO will determine the proper procedures for decontamination based on the work activities and amount of contamination.

Temporary wash facilities will be provided in the decontamination zone for personnel hand/face washing. This may be substituted with disposable wet towels based on the weather conditions. Waste water and solid waste generated during decontamination procedures will be transferred to appropriate 55 gallon drums and will be labeled as IDW. For this project we anticipate IDW will be non-hazardous and that an onsite waste storage area will be available. Parsons will collect representative waste characterization samples for laboratory analysis and arrange for transportation and disposal of IDW periodically using a Con Edison approval transporter (Auchter Industrial Vac Service, Inc.) and TSDF(s) (TBD based on waste characterization results).

6.2.5 Provide Personal Protective Equipment

To protect workers from injury, the last method in the order of precedence is the use of personal protective equipment, such as hard hats, gloves, eye protection, and other protective equipment with the understanding that bulky, cumbersome, and heavy personal protective equipment is often discarded or not used, rendering this method ineffective without proper controls. Emergency eyewash stations will be kept in the cab of the truck/drill rig to keep it from freezing and remain operational at all times.

PPE Selection

The selection and use of PPE at individual sites will be initially Level D unless specified by the SSO. The unknown nature of hazardous waste site work and the possibility of changing conditions during the work may require changes in the personal protective equipment. When changes in personal protective equipment become necessary, these changes shall be made in accordance with the action levels and criteria set forth in this plan. As a rule, levels of PPE will need to be reassessed if any of the following occur:

- Appearance of previously unidentified or anticipated chemical conditions or task hazards (this may require a HASP Addendum for Con Edison review and acceptance prior to proceeding).
- Ambient weather conditions change which impact the use of assigned PPE.
- A new task is introduced or a previously assigned and evaluated task is expanded in scope.

If work tasks are added to the Scope of Work (SOW) after approval of this HASP, the Division Safety Manager or PSM shall identify and assess the task hazards, complete and sign an AHA form and designate the level and type of PPE to be used during conduct of the task. The new AHA, along with any other additions, changes or modifications to the approved HASP shall be approved by the Division Safety Manager, PSM and/or the Project Manager. Subsequently, these modifications, resulting in a HASP Addendum, shall be reviewed and accepted by Con Edison's Construction EH&S representative, prior to proceeding.

Initially for all activities, personnel will be in Level D protection. This includes safety glasses with permanent side shields, steel toe boots, hearing protection (e.g. when working within 25 feet of heavy equipment – the FTL or SSO may decide to perform noise monitoring if she determines that quantitative measurement is necessary), metatarsal foot protectors (when sawing or jack hammering), long pants or jeans, traffic safety vests (when working on streets, sidewalks, parking lots, or driveways), disposable boot covers (when in contact with disturbed soil), short or long sleeve shirts, nitrile outer and PVC inner gloves (required during all sampling activities), and hard hat (cannot be blue or white). Required equipment for Levels B, C, and D are detailed in Table 6.2.2, Description of Personal Protective Equipment and Levels of Protection.

The organic vapor monitor and multi-gas meter will be the primary instruments for determining contaminant concentrations that may trigger a change in respiratory protection during intrusive and sampling activities. Other instruments such as Draeger tubes, miniRAMs and/or other particulate air monitors may also trigger changes in PPE. Action levels for changes in personal protection equipment are shown in Table 6.2.1.

In the event that personal protective equipment is ripped or torn, work shall stop and PPE shall be removed and replaced as soon as possible.

OSHA Requirements for Personal Protective Equipment:

All personal protective equipment must meet the following OSHA standards:

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133 29 CFR 1926.102	ANSI Z87.1-1968
Respiratory	29 CFR 1910.134 29 CFR 1926.103	ANSI Z88.1-1980
Head	29 CFR 1910.135 29 CFR 1926.100	ANSI Z89.1-1969
Foot	29 CFR 1910.13629 CFR 1926.96	ANSI Z41.1-1967

ANSI = American National Standards Institute

Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.1025; 29 CFR 1910.134). In addition, if Level C protection is required, a cartridge change-out schedule will be developed.

Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency;
- IDLH concentrations;
- High relative humidity;

- For chemicals with poor warning properties (e.g., carbon monoxide and hydrogen sulfide) [These chemicals do not have odors (or the body loses its sensitivity to odors), so a person wearing a respirator would not detect breakthrough]; and,
- If contaminant levels exceed designated use concentrations.

6.3 ACTIVITY HAZARDS ANALYSIS

Parsons and its subcontractors are required to conduct an activity hazards analysis for all aspects of the work. The activity hazards analyses consist of the following three steps:

- Identify the task and break it down into steps.
- Identify the hazards associated with each step.
- Identify the specific hazard control measure used for each step in accordance with the order-of-precedence method of control.

The U.S. Army Corps of Engineers website www.swl.usace.army.mil/safety/asaindex.html contains a library of sample AHAs that may be useful on projects. The Parsons PWeb should also be checked for AHAs. The Project Managers may use the following list as a guide in determining the investigation and remediation activity hazards analyses for various high-hazard operations and critical tasks.

- **Premobilization inspection**. Conduct an initial site inspection for pre-job planning. The inspection should cover potential exposures such as the location of electrical lines, underground utilities, nearby structures, traffic conditions, site security needs, public exposures general liability, and other potential exposures.
- **Traffic Controls.** Control measures include warning signs, flagmen, traffic stoppage and control, and unloading procedures. Internal traffic control plans should include ways to restrict the number of vehicles on site, the flow of vehicles accessing the site and driving through the site, haul roads, speed controls, subcontractor employee parking areas, merging of site traffic with local vehicle traffic, pedestrian controls in traffic zones, access by emergency and rescue vehicles and operator controls.
- **Vehicle Operation.** Although driving a vehicle may be second nature to many individuals, there are many hazards and controls that need to be identified. Fatigue and distractions are two hazards that many individuals do not think about on a regular basis. Operating off-road vehicles such as an All-Terrain Vehicle (ATV) also require training.
- **Field Activities.** Many different types of activities occur in the field from excavations, groundwater sampling, soil sampling, liner installation, well installation and monitoring, and pump tests. A variety of hazards could be incurred with each activity such as biological, slip/trips/falls and lacerations. An activity hazard analysis is required for each different field activity to identify the hazards and controls.
- **Field Visit.** When a field visit occurs, it may be before any field activities are taking place. However, there may still be hazards present such as walking or driving in fields with uneven terrain, poisonous vegetation, etc. Although personal protective equipment

such as a hard hat and safety glasses may not be needed, sturdy work boots, long pants, long sleeve shirts and sunscreen may be necessary.

- **Mobilization/Demobilization.** Conduct an initial site inspection for pre-job planning. The inspection should cover potential exposures such as the location of electrical lines, underground utilities, nearby structures, traffic conditions, site security needs, public exposures general liability, and other potential exposures.
- **Material storage**. Consider where materials and equipment will be stored on site. Implement measures to protect against chemical spills/releases, fire, vandalism and theft of tools, equipment, or materials. Also consider the hazards that may exist for workers when they are storing or retrieving those materials.
- **Material handling**. Consider the size and weight of loads, the equipment to be used, how the equipment is set up and protected, and safety and maintenance inspections of material handling and rigging equipment. Also consider to employee training in the use of the equipment or personal body mechanics when engaged in manual material handling activities.
- **Heavy equipment controls**. Evaluate the use of heavy equipment in operations such as site clearing, grading, drilling and excavation or lifting. Controls should include equipment alarms, use of qualified operators, pre-use inspections, and any specific OSHA regulatory requirements.
- **Personal protective equipment (PPE**). Consider operations where PPE is required and the type of PPE required (e.g. eye, head, foot, respiratory, hearing and hand protection, and types of special protective clothing – Tyvek and Nomex coveralls).
- **Portable hand and power tools**. Evaluate the tools to be used and the ways that workers are protected from the hazards associated with the use of tools. Consider tool maintenance requirements; electrical requirements; the use of ground fault circuit interrupters, grounding, extension cords, and tool inspection procedures; and employee training and PPE requirements.
- **On-site traffic**. Internal traffic control plans should include ways to restrict the number of vehicles on site, the flow of vehicles through the site, haul roads, speed controls, subcontractor employee parking areas, merging of site traffic with local vehicle traffic, pedestrian controls in traffic zones, access by emergency and rescue vehicles and operator controls.
- **Employee training**. Always review the safety training needs of employees. Training should include initial site safety orientations. Some operations (e.g., HAZWOPER activities, excavation, blasting, scaffold erection, tunneling, confined space, and operating heavy equipment and working in highly hazardous plant process operations) may require special training that must be checked and evaluated.

Exhibit 6.1 is a sample activity hazards analysis form. Exhibit 6.2 shows a training record to be completed and kept on file for each activity hazards analysis. Completed AHAs can be found in Attachment C.

6.4 SAFETY SYSTEMS ANALYSIS

GBU Safety Managers use the safety systems analysis for field staff and subcontractors whose work requires that they be on site for over six months. The analysis provides management with a rating that reflects the safety and health program effectiveness. Attachment B1 to the SHARP Management manual provides the program, protocol, and methodology.

6.5 SITE INSPECTION CHECKLIST AND DAILY SITE WALK

The site inspection is a protocol designed to identify and correct unsafe acts and conditions, as well as recognize safe work practices and accomplishments, in Parsons or subcontractors' scope of work. The Project Manager or PSM should develop standard safety checklists appropriate to the work being performed. Exhibit 6.3 is an example of a simple checklist to evaluate a project's status. The Project Manager shall develop a checklist based on questions from the audit programs in Attachment B of the SHARP Manual.

Inspections involve a daily or weekly site walk of a project site that focuses on safety. The Project Manager or FTL responsible for the work conducts inspections, accompanied by the PSM as necessary. Daily site walks do not have to be documented, but once a week the Project Manager, or designee, prepares an inspection report using Exhibit 6.3 and forwards it to the PSM for maintaining in the project file. Items found to be out of compliance must be assigned to the responsible party for corrective action and the corrective action tracked to completion. Subcontractors shall be advised of noncompliance items using a Notice of Subcontractor Violation, included as Exhibit 6.4 and Exhibit 6.5.

6.6 SAFETY AND HEALTH ENFORCEMENT

Parsons and its subcontractors enforce all applicable requirements of OSHA 1910 and 1926, where applicable. In addition, subcontractors must comply with and enforce Parsons' site requirements.

Parsons and its subcontractors have written progressive disciplinary systems available for review in the respective Human Resources departments.

6.7 NOTICE OF VIOLATION OF SAFETY AND HEALTH REGULATIONS

The project has a formal notice of subcontractor violation of safety and health regulations program to ensure that violations are issued in an immediately dangerous to life and health (IDLH) situation or when the subcontractor repeatedly fails to comply with safety and health requirements.

The notice (Exhibit 6.4) documents poor performance and requires a response from subcontractor senior management. The notice contains five distinct levels of discipline, from submission of a recovery plan to contract termination.

6.8 COMPETENT FIRST AID PERSON

The OSHA Regulations (29 CFR 1910.151 and 1926.50) state the employer shall ensure the ready availability of medical personnel for advice and consultation on matters of occupational health. In the absence of an infirmary, clinic, hospital, or physician, that is reasonably accessible in terms of time and distance to the worksite (i.e. 4 minutes for activities that can be expected to result in an accident involving suffocation, severe bleeding, or other life threatening or permanently disabling injury or illness and 15 minutes for other types of injuries), which is available for the treatment of injured employees, a person who has a valid certificate in first-aid training from the U.S. Bureau of Mines, the American Red Cross, or equivalent training that can be verified by documentary evidence, shall be available at the worksite to render first aid. First-aid supplies must be accessible for immediate use and be of sufficient size and number to handle common first aid incidents.

The response time and distance to the nearest clinic, hospital or physician identified in Section 4.11.3 has been determined to be 3 minutes; however this may vary depending traffic. Based on the activities provided in the Scope of Work (Section 2.1) and the list of AHA included in Section 6.1.6, the project has the potential for an accident involving suffocation, severe bleeding, or other medical emergencies or permanently disabling injury or illness. Since the response time for Emergency Medical Services (EMS) may be greater than four minutes if traffic conditions are not favorable, the project will require at least one individual at the work location have a valid certificate in CPR and first aid.

The employee(s) listed below are assigned to the project on a full time basis and will have a valid certificate in CPR and first aid:

TBD - Parsons

TABLE 6.1
HEALTH HAZARD QUALITIES OF HAZARDOUS SUBSTANCES OF CONCERN
AT THE FORMER FARRINGTON STREET HOLDER SITE

Compound (Synonym)	OSHA PEL[(1)] (ppm)	IDLH (ppm)	LEL (%)	Odor Threshold[(2)] (ppm)	Odor Character	Vapor Pressure (mm Hg)	Physical State	Detectable w/ 10.6 eV lamp PID (I.P. eV)	
Benzene	1 5 [STEL]	500 [Ca]	1.2	119	Aromatic, sweet	75	Flammable Liquid	Yes	(9.24)
o-,m-, p- Xylenes	100 150 [STEL]	900	0.9	20	Aromatic	7,9,9	Flammable Liquid vapor	Yes	(8.4-8.6)
Toluene	200 300 [CEIL]	500	1.1	37	Sweet, pungent Benzene-like	20	Flammable Liquid vapor	Yes	(8.82)
Ethyl Benzene	100 125 [TLV-STEL]	800	0.8	0.6	Oily Solvent	10	Flammable Liquid	Yes	(8.76)
Hydrogen Sulfide	10	100	4.0	0.8	Rotten Egg	17.6	Flammable Gas	Yes	(10.46)
Naphthalene	10 15 [TLV-STEL]	250	0.9	0.64	Mothballs/ Tar/ Creosote	0.08	Combustible Solid	Yes	(8.12)
Polynuclear Aromatic Hydrocarbons (PAH's)	0.2 mg/m³	80 mg/m³ [CA]	varies	varies	varies	very low	Combustible Solid	No	
Cyanide	5.0 mg/m³	50	5.6	5	Bitter almond	630	Flammable Liquid	No (Draeger Tube)	(13.6)

(1) 29 CFR 1910, June 30, 1993 (8-hour Time weighted average unless otherwise specified.)
(2) ACGIH 1989 Highest reported value of acceptable odor threshold range.
[IDLH] Immediately dangerous to life or health.
[CA] Suspect carcinogen - Minimize all possible exposures.
[STEL] 15 minute Short Term Exposure Limit
[SKIN] Designates that skin is an important possible route of exposure.
[CEIL] Ceiling Limit - not to de exceeded at any time during a work day.
[TLV] Threshold Limit Value.

Table 6.2.1
Action Levels for Changes in Respiratory Protection

Contaminant	PEL/TLV/ TWA	Monitoring Instrument	Action Level	PPE	Action Taken
VOCs	n/a	PID	<1 ppm	Level D	None.
			1-5 ppm	Level D	Implement engineering controls to suppress vapor levels. Monitor for benzene with draeger tube.
			5-25 ppm	Level C (qualitative fit test)	Take 3 consecutive readings. If confirmed, wear half or full facepiece respirator if readings do not exceed 10 ppm. Wear full facepiece respirator if action levels are greater than 10 ppm and less than 25 ppm. Continue engineering controls to suppress vapor levels.
			> 25 ppm		Stop work activities until engineering controls are implemented to suppress vapor levels.
Hydrogen Cyanide	10 ppm	Multi-gas Meter	< 5 ppm	Level D	None
			> 5 ppm		Stop work activities until engineering controls are implemented to suppress levels.
Carbon Monoxide	OSHA PEL 50 ppm	Multi-gas Meter	Less than 25 ppm	Level D	None
			Greater than 25 ppm		Stop work activities until engineering controls are implemented to reduce levels below 25 ppm.
Dust	n/a	Mini-RAM	<5 mg/m^3	Level D	None
			>5 mg/m^3	Level C (qualitative fit test)	Take 3 consecutive readings. If confirmed, wear half or full facepiece respirator. Implement engineering controls to suppress dust levels.
Benzene	1.0 ppm	Draeger tube	<0.5 ppm	Level D	None
			0.5 - 5 ppm	Level C (qualitative fit test)	Take 3 consecutive readings. If confirmed, wear half or full facepiece respirator. Continue engineering controls to suppress benzene levels.

Table 6.2.1 (Continued)
Action Levels for Changes in Respiratory Protection

Contaminant	PEL/TLV/ TWA	Monitoring Instrument	Action Level	PPE	Action Taken
			5 - 25 ppm	Level C (quantitative fit test)	Stop work activities. Take 3 consecutive readings. If confirmed, wear full facepiece respirator.
			> 25 ppm	Level B	Stop work activities. Take 3 consecutive readings to confirm. If trained and fit tested, donn supplied air respirator.

Note: All readings that will be used to determine the appropriateness of an upgrade in PPE shall be taken in the worker's breathing zone. PID readings shall be sustained readings of 15 minutes or more. Multi-gas meter readings shall be 30 second sampling periods with the meter held in the worker's breathing zone.

Readings will be taken at the beginning of the day, changes in work activities and during all sampling activities. If readings exceed level D, then stop work, leave the area or allow to ventilate. If actions levels are maintained then consult with the PSM on upgrading PPE appropriately.

If Level C PPE (respiratory protection) is required, contaminant concentrations measured during on-site air monitoring will be used to estimate the breakthrough times of the organic vapor cartridges using the Gerry O. Wood Math Model (Wood, G.O., Estimating Service Lives of Organic Vapor Cartridges, *American Industrial Hygiene Association Journal, 55:11-15, 1994).* Prior to donning level C PPE, a cartridge change-out schedule will be developed and reviewed by Con Edison and Parsons Division Safety Manager for acceptance.

Table 6.2.2
Description of Personal Protective Equipment and Levels of Protection

LEVEL D

Level D protection will be worn for initial entry on-site and for all activities unless otherwise noted by the SSO. Level D protection will consist of:

- Standard work clothes
- Steel-toe safety boots
- Safety glasses (goggles must be worn when splash hazard is present)
- Hearing protection (when working within 25 feet of vacuum excavation equipment, drill rigs, sawing, or jack hammering)
- Metatarsal foot protectors (when sawing or jack hammering)
- Traffic safety vests (when working on streets, sidewalks, parking lots, and driveways)
- Nitrile outer gloves and nitrile inner gloves (sampling operations)
- Hard hat (must be worn during all site activities and cannot be blue or white)
- Disposable boot covers will be worn when in contact with disturbed soils

MODIFIED LEVEL D

Modified Level D protection, unless otherwise specified by the SSO, will consist of Level D equipment and the following additional equipment:

- Nitrile outer gloves and nitrile inner gloves
- Tyvek coveralls if particulate hazards only are present, poly-coated Tyvek coveralls if liquid hazards are present

LEVEL C

Level C protection, unless otherwise specified by the SSO, will consist of Level D equipment and the following additional equipment:

- Full-face air-purifying respirator
- Combination HEPA filter/organic vapor cartridges
- Tyvek coveralls if particulate hazards only are present, poly-coated Tyvek coveralls if liquid hazards are present
- PVC or nitrile inner and nitrile outer gloves

LEVEL B

If the concentration of volatile organics or cyanide equals or exceeds the specified action levels, all field personnel associated with the project will immediately retreat to a location up-wind of the source of contamination. At this point the SSO must consult with Con Edison to discuss appropriate actions. Level B PPE will not be worn until authorization is given by the Parsons Safety Manager.

Table 6.2.3

Decontamination Procedure

* Decontamination procedures can be modified by the SSO based on work activities and potential contamination.

STATION	NAME	DESCRIPTION
Station 1	Segregated Equipment Drop	Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.
Station 2	Suit, Safety Boots, and Outer Glove Wash	Thoroughly wash chemically resistant suit, safety boots and outer-gloves. Scrub with long-handle, soft-bristle scrub brush and copious amounts of Simple Green/water solution. Necessary equipment includes: • Wash tub (30 gallon or large enough for person to stand in); • Simple Green/water solution; and, • Long-handle soft-bristle scrub brushes.
Station 3	Suit, Safety Boots, and Outer Glove Rinse	Rinse off Simple Green/water solution using copious amounts of water. Repeat as many times as necessary. Necessary equipment includes: • Wash tub (30 gallon or large enough for person to stand in); • Spray unit; • Water; and, • Long-handle, soft-bristle scrub brushes.
Station 4	Outer Gloves Removal	Remove the outer gloves and deposit in individually marked plastic bags. Necessary equipment includes: • Plastic bag
Station 5	Canister, Air Tank, or Mask Change	If a worker leaves the exclusion zone to change a canister, mask or air tank, this is the last step in the decontamination procedures. The worker's canisters or tank are exchanged, new outer glove donned, and joints taped. Worker returns to duty. Otherwise the worker proceeds to Station 6. Necessary equipment includes: • Canisters, air tanks, or mask; • Tape; and, • Gloves.
Station 6	Removal of Chemically Resistant Suit	With assistance of helper, remove suit. Deposit in container with plastic liner. Necessary equipment includes: • Container with plastic liner
Station 7	Inner-Glove Wash	Wash inner gloves with Simple Green/water solution that will not harm skin. Repeat as many times as necessary. Necessary equipment includes: • Simple Green/water solution; • Wash tub; and, • Long-handle, soft-bristle brushes.
Station 8	Inner-Glove Rinse	Rinse inner-gloves with water. Repeat as many times as necessary. Necessary equipment includes: • Water; and, • Wash tub.

Table 6.2.3
(continued)

Decontamination Procedure

* Decontamination procedures can be modified by the SSO based on work activities and potential contamination.

STATION	NAME	DESCRIPTION
Station 9	Respirator Removal	Remove face-piece. Avoid touching face. Wash respirator in clean, sanitized solution, allow to dry and deposit face-piece in plastic bag. Store in clean area. Necessary equipment includes: • Plastic bags; • Sanitizing solution; and, • Cotton
Station 10	Inner-Glove Removal	Remove inner gloves and deposit in container with plastic liner. Necessary equipment includes: • Container with plastic liner
Station 11	Field Wash	Wash hands and face. Necessary equipment includes: • Water; • Soap; • Tables; • Wash basins or buckets; and, • Clean towels.
Station 12	Redress	If re-entering Exclusion Zone put on clean field clothes (e.g., Tyvek, gloves, etc.). Necessary equipment includes: • Table; and, • Clothing. The site safety officer (SSO) will monitor the decontamination system for effectiveness.

Exhibit 6.1 Activity Hazards Analysis Form

Project Name & Number:	AHA No.	Date:	New:
Location:	Contractor:		Revised:
Required Personal Protective Equipment		Analysis by:	Date:
	Superintendent/Competent Person	Reviewed by:	Date:
Work Operation:		Approved by:	Date:

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements

Training Requirements:

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity and review it with their Supervisor during their Daily Safety Huddle.

Exhibit 6.2 Activity Hazards Analysis Training Record

JOB NUMBER_____

AHA NUMBER_____

JOB LOCATION_____

DATE:_____

NAME OF TRAINER:_____

SUBJECTS COVERED:_____

_____

_____

_____

TRAINING AIDS USED:_____

_____

_____

ATTENDEES (PLEASE SIGN NAME LEGIBLY):

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

(Use additional sheets if necessary)

Parsons

Exhibit 6.3
Site Safety And Health Inspection Checklist

Project: _____ Date: _
Name: . Time: _
Any items that have been found deficient must be corrected before work or use. This checklist includes, but is not limited to, the following:

	Yes	No
Safe Access and Workspace		
Are safe access and adequate space for movement available for:		
Emergencies		
Work area		
Walkways and passageways		
Are ladders, stairways, and elevators properly located and functioning?		
Is protection provided for floor and roof openings?		
Is overhead protection provided for all areas of exposure?		
Is lighting adequate?		
Planning Work for Safety		
Are employees provided with all required protective equipment?		
Have other contractors and trades been coordinated with to prevent congestion and avoid hazards?		
Is all temporary flooring, safety nets, and scaffolding provided where required?		
Utilities and Services Identification		
High voltage lines		
Have all been identified by signs?		
Have high voltage lines been moved or de-energized, or barriers erected to prevent employee contact?		
Sanitary Facilities		
Drinking water		
Are toilet facilities adequate?		
Work Procedures – Materials Handling		
Is material handling space adequate?		
Is material handling equipment adequate and proper?		
Is material handling equipment in good condition?		
Other (e.g., tunnels, excavations, shafts)		

Comments:

Exhibit 6.4 Notice of Subcontractor Violation of Safety and Health Regulations

Date: _____

Contractor Name: _____
Address: _____

_____

_____

Attention: _____

This letter officially notifies you that you have been found to be in violation of the following Safety Regulations:

_____

on (date) _____, by_____.

Confined Space Entry __	Lockout/Tagout __	Hot Work __	Personal Protective Equipment __
Knowledge of the environment __	Awareness of warning alarms __	Evacuation routes __	Back-up Alarms __
Assembly locations __	Fall Protection __	Scaffolding __	Environmental/Hazardous Material Storage __
Safe Work Practices __	Security Practices __	__	__

Other: _____

_____

_____

This/These violations occurred at the following locations: _____

_____

at the following times_____ and dates _____

The name of the employees was/were _____

under the supervision of_____.

Exhibit 6.5 Notice of Noncompliance with Safety and Health Regulations

Under conditions of this enforcement procedure check all items that apply:

_____ 1. You are being notified of this violation and should take corrective action to prevent a reoccurrence. The corrective action shall be documented to the Parsons Construction Management representative immediately.

_____ 2. You must submit a plan for compliance to your Parsons Construction Management representative and the Construction Safety Manager within two days of receipt of this letter. The compliance plan must include the means or methods of compliance and the date that the requirements for compliance will be completed. Once compliance has been achieved, a follow up letter must be sent to the Parsons Construction Management representative and Construction Safety Manager. Failure to comply will result in disciplinary action against your Company.

_____ 3. You are required to review the stated procedures with your Parsons Construction Management representative. Work may not commence on the site until the review is complete and the Subcontractor responds formally that the procedure is understood and will comply.

_____ 4. You are required to review the stated procedures with your Parsons Construction Management representative. Work may not commence on the site until the review is complete and you **must** confirm formally the disciplinary action to be taken against the supervisor and employees.

_____ 5. All work on the site will stop until the Parsons Construction Management representative reviews all the facts with the Subcontractor and determines if the contract between the parties will be terminated.

Sincerely,

_____

Parsons Representative

cc: Issuing Construction Manager Representative
Job File
GBU Safety Manager
Project Manager

SECTION 7

SAFETY TRAINING

7.1 PROJECT SAFETY ORIENTATION

The Parsons Project Manager, PSM, FTL, or SSO conducts the site-specific orientation for all new Parsons staff and subcontractor management personnel.

The Orientation takes approximately one hour to complete and consists of applicable Con Edison, Parsons, and regulatory reference material, including:

- Applicable OSHA 1910 General Industry and 1926 Construction Regulations and others as required
- Parsons applicable requirements, including items covered in Section 4.2
- Subcontractor requirements

All visitors must receive a brief orientation as described in Section 4.2, and be escorted by the Project Manager, PSM, FTL, SSO or a designee familiar with the potential hazards on the project.

Subcontractors must conduct similar orientations for their staff and craft employees and must document all orientations using the Employee/Subcontractor Training Acknowledgement and sample form (Exhibit 7.1). The Project Manager maintains the orientation documents and acknowledgement forms.

7.2 PARSONSU SAFETY MODULES AND START TRAINING – ZERO INCIDENT TECHNIQUES

Consistent with Parsons corporate initiatives in safety training, the Project Manager will identify all applicable personnel (i.e. managers, engineers and supervisors, including subcontractor personnel), that shall be current in the completion of safety modules on ParsonsU and that should receive START training to further Parsons' goal of zero incidents.

The GBU and Division Safety Manager serve as the certified trainers for periodic START training sessions for new personnel. They should be contacted if personnel need to receive training.

7.3 DAILY TOOLBOX SAFETY MEETINGS

Parsons and its subcontractors conduct daily toolbox safety meetings at the beginning of each day. These meetings include topics relevant to upcoming work and may include reviews of recent incidents on the project. The Project Manager or the FTL is responsible for the toolbox safety training content and documenting and retaining attendance records using Exhibit 7.2.

7.4 ACTIVITY HAZARDS ANALYSIS TRAINING

When the activity hazards analysis is complete, the Parsons Project Manager, FTL, SSO or subcontractor conducts a training session with all employees involved with the analyzed task. The training may be informal and at the site where the task is performed. Employees should be given an opportunity to provide input regarding task steps, hazards identified, and appropriate control measures.

The Project Manager documents and maintains the activity hazards analyses using Exhibit 6.2.

7.5 REGULATORY TRAINING PROGRAMS

OSHA regulations require specific training in certain circumstances. Based on the scope of work and meetings with regulatory officials, the following training topics are provided on the project:

- General – all workers engaged in activities which are potentially exposed to hazardous substances and health hazards must be trained to meet 1910.120(e)(1). Annual 8-hour refresher training as per 29 CFR 1910.120(e)(3) is required for workers and supervisors must be trained to meet 29 CFR 1910.120(e)(4).
- CPR/AED/First aid – provided to personnel based on project activities identified in the Scope of Work (i.e. life threatening) and EMS response time (i.e. more than 3 minutes). See Section 6.8.
- Emergency response – only applicable to workers engaged in emergency response as per 29 CFR 1910.120(q).
- Respiratory protection – must meet 29 CFR 1910.134. Medical qualification by a physician is required to wear a respirator. Annual fit testing and training is also required.
- **Others to be added as needed or determined**

The Project Manager determines the necessary training and coordinates the training with the PSM.

7.6 OSHA OUTREACH PROGRAMS

- *NOT APPLICABLE FOR CURRENT PHASE OF WORK*

7.7 SPECIALIZED TRAINING AND ORIENTATIONS

Project personnel receive specialized training on client rules and requirements as well as the unique tools, equipment, and procedures used to perform the work. The project budget includes funding for the following training:

Description	Attendees	Schedule
General rules and safety requirements	All workers assigned to the site	Half-hour training session, provided to new employee on the first day of work at the site.

Exhibit 7.1 Employee/Subcontractor Training Acknowledgment

Name of Trainer: _____

Training Subject: _____

Training materials used: _____

Name of employee: _____

Date of hire/assignment: _____

I, _____, hereby certify that I have received training as described above in the following areas:

- The potential occupational hazards in general in the work area and associated with my job assignment.
- General safety requirements indicate the safe work conditions, safe work practices and personal protective equipment required for my work.
- The hazards of any chemicals to which I may be exposed and my right to information contained on material safety data sheets for those chemicals, and how to understand this information.
- My right to ask questions, or provide any information to the employer on safety either directly or anonymously without any fear of reprisal.
- Disciplinary procedures the employer will use to enforce compliance with general safety requirements.

I understand this training and agree to comply with general safety requirements for my work area.

_____ _____

Employee Signature Date

Exhibit 7.2 Employee Meeting Sign-In Sheet

Safety Meeting Presenter: _____Date: _____

Current Weather Conditions:

Temperature (^{o}F) = _____ Wind Direction = _____ Wind Speed = _____

Clear - Sunny – Cloudy – Rain - Snow Forecast = _____

Current Site Conditions (circle as appropriate):

Dry - Wet - Muddy - Frozen - Snow Covered - Other (describe) _____

1. Incidents or Injuries to report from Previous Day Activities: No □ Yes □ - explain below:

_____

2. Safe and/or At-Risk Observations from Previous Day Activities: _____

_____

_____

3. Activities Taking Place Today: _____

_____

_____

3. Anticipated Hazards: _____

_____

_____

4. Engineering Controls-Work Practices-PPE to Protect Against Hazards: _____

_____

_____

5. Additional Safety Topic or Comments: _____

_____

Exhibit 7.2 Employee Meeting Sign-In Sheet

PRINTED NAME	SIGNATURE	COMPANY

SECTION 8

RECORD KEEPING AND POSTING

Parsons and its subcontractors must comply with the recordkeeping requirements of OSHA, Con Edison, Parsons Corporation, and this safety program, including:

- OSHA 300 logs
- Medical treatment and follow-up
- Cranes
- Heavy equipment inspection logs
- Fall protection
- Training
- Inspections
- Audits
- Others as required

The Project Manager is the official record keeper for files relating to Parsons employees. Each subcontractor will provide copies of HAZWOPER training and certification, first aid and CPR certification to the FTL or SSO.

SECTION 9

SAFETY AND HEALTH REQUIREMENTS

9.1 SAFETY AND HEALTH REQUIREMENTS

Exhibit 9.1 represents OSHA, owner, and Parsons corporate regulations and requirements applicable to the project. Based on the most recent risk assessments, Parsons Project Manager and PSM update the listed topics periodically. Training and other requirements are updated in this HASP as required by changes to Exhibit 9.1.

Parsons and its subcontractors are individually responsible for training their respective employees and for complying with all project requirements. Failure to comply could lead to disciplinary actions against Parsons employees and subcontractors or their employees.

Exhibit 9.1 Competent Person and Activity Hazards Analysis Requirements

Safety and Health Requirement	OSHA Regulation	Competent Qualified Person-Supv	Training Required	Written Plan and AHA Required
General Safety & Health	1926.20	Yes	Yes	Yes
Safety Training	1926.21	Yes	Yes	Yes
First Aid and Medical	1926.23, 50	Yes	Yes	Yes
Emergency Employee Action Plans	1926.35	Recommended	Yes	Yes
Hazard Communication	1926.59	Yes	Yes	Yes
Hazardous Waste Operations and Emergency Response	1910.120; 1926.65	Yes Supv – 8 hr	Yes	Yes
Waste Disposal	1926.252	Yes	Yes	Yes
Excavations	1926.650-652	Yes	Yes	Yes

ATTACHMENT A

PARSONS REQUIREMENTS

- **PARSONS ONLINE REPORTING INSTRUCTIONS**
    - **PARSONS INCIDENT/ACCIDENT REPORT FORM**
    - **PARSONS NEAR MISS REPORT FORM**
    - **PARSONS WALLET CARD-INCIDENT REPORTING GUIDELINES**

PARSONS MONTHLY FIELD/PROJECT REPORTING FORM & SUPPLEMENTAL INFORMATION FORM

On-Line Safety Reporting System

Policy Requirements

- Initial incident reports for all incidents, including near misses, shall be reported within 2 hours.
- Detail incident reports are required within 24 hours.
- Reporting is done via on-line (PWeb) incident report form.
- Injuries with Days Away from Work - immediate supervisor and PM must teleconference with GBU President within 4 hours.
- Projects enter hours via on-line form by FIRST Friday of new period.

Reporting Incidents

Corporate policy requires that all employees report safety incidents to their supervisor immediately. Supervisors must report all incidents to the appropriate Project Manager (Department Manager if the incident is not related to a project), who must officially report the incident to the GBU within four hours. This official reporting is done via the PWeb, unless PWeb is unavailable, in which case the incident can be reported by email, fax or telephone.

"Incidents" include work related injuries, work related illness, accidents with property damage only and near misses. "Near misses" are any unplanned event that had the potential to (but did not) result in injury or property damage.

Incident reports should reflect the best available information at the time. Where exact information is not known (recordability, days away from work, etc.) the PM's best judgment should be used when completing the initial incident report. This information can be subsequently revised when the detail incident report is submitted.

When in doubt, submit an initial report or contact the GBU Safety Manager.

On-line Reporting System

The on-line reporting system can be found on the PI&T Safety Page on PWeb. To locate the system, follow these steps:

1. From the Corporate PWeb Homepage, select PI&T from the Org Units menu
2. Locate and select "Safety" from the list of pages in the right hand column
3. Select the "Incident Reporting Form" link

To create and submit a new incident report, select the orange "Add" button from the main page of the reporting system. To update and existing incident report or complete the Detail Incident page, locate and select the appropriate incident from the list.

Creating or Updating Incidents

The Initial Incident page of the report must be completed within four hours of the incident occurring. This page includes basic information needed for the first notification to our insurance carriers. If possible, all of the fields should be completed in the initial report. A list is provided at the end of this document describing all fields contained on the initial incident page.

Incident Detail Reports

Within 24 hours of the incident occurring, the Incident Detail page of the on-line report must be completed. This page includes detailed information about the injured party, the nature and extent of injuries, medical treatment provided, corrective actions taken, and witness statements. In the event of property damage, this page also includes descriptive information on the property owner. Finally, the page includes a section to include electronic attachments. These might include photographs, signed witness statements, etc.

Monthly Reporting of Hours

Hours must be entered into the on-line reporting system no later than the first Friday of the new period. If an accurate accounting of hours is not available, estimated hours are submitted into the system. The estimated hours can be revised later in the month, or the following month, when accurate data is available.

From the "Hours" page, select the GBU and the period (month and year) that is being reported. The system only allows hours to be entered for the period selected. MTD and PTD figures are calculated totals based on the sum of all monthly entries. To enter or correct a prior period entry, simply select that month from the drop-down box and correct the figures for that month.

Be sure to select the correct month and year when entering hours.

Hours must be entered for each (as applicable) of six different labor categories. The categories are as follows:

- Contractor (Field/Craft)
- Contractor (Office/Admin)
- JV Partner (Field/Craft)
- JV Partner (Office/Admin)
- Parsons Employee (Field/Craft)
- Parsons Employee (Office/Admin)

Monthly Statistics Summary Reports

The on-line reporting system automatically calculates incident rates based on incidents and hours entered into the system. To view the statistics, select the "Reports" page from the on-line system. Select "Parsons Safety Statistics Summary", the appropriate GBU, and the appropriate period. (NOTE: The system does not yet provide reports at the Division and Sector level. That enhancement is pending.) Use the checkboxes to select the labor categories desired.

Contact Rick McAlpin or Jim Owen for Assistance

Initial Incident Report Fields

1. GBU – Select the GBU from the drop down box. Incidents are reported primarily by project, and the GBU should reflect the unit responsible for the project. This may be different from the GBU that employees the person injured.
2. Field Project Name, Office Location or Other – If the applicable project is listed in the "Field Project" list, select from that box. If not, and if the incident occurred in a Parsons corporate office, select the office from the drop box. Otherwise, type in the name of the responsible organizational unit in the "Other" field. The GBU must be selected BEFORE attempting to select a Project/Office. Do NOT select both a field project AND an Office Location (or Other). If the appropriate Project or Office name can not be found, manually enter it into the "Other" field.
3. Job and WBS Numbers – These fields should reflect the charge number responsible for the incident. In general, that will be the number that the employee was charging at the time of the incident. Projects are responsible for visitors, regardless of what charge number they use while visiting the job. For example, if the Division Manager is injured while visiting Project X, the project number is entered, not the division overhead account.
4. Near Miss – Check this box if the report is for a near miss only (no injury or property damage occurred).
5. Emergency Response Notified – Check this box if fire, police or ambulance was called as a result of the incident.
6. Three or More Employees Hospitalized – Check this box if three or more employees were injured as the result of a single incident. In this case, the GBU or Corporate Safety Manager must also be immediately notified by telephone.
7. Extent of Injury – Select the appropriate radio button. First aid cases are as defined by OSHA 1904 criteria. All other injuries are considered recordable.
8. Restricted Duty (# of days) – If the injured person was limited (by a physician) to less than normal work duration or duties, enter the number of days. Estimate the days if unknown, and correct the number later. NOTE: this is the number of CALENDAR days (not scheduled work days), and it does NOT include the day of the injury.
9. Days Away From Work (# of days) – If the injured person was ordered by a physician not to return to work, enter the number of days missed. Estimate the days if unknown, and correct the number later. NOTE: this is the number of CALENDAR days (not scheduled work days), and it does NOT include the day of the injury. Injuries with Days Away From Work require a phone call to the GBU President within 4 hours.
10. Fatality (Date of Death) – In the event of a work related fatality, enter the date of death here. NOTE: Fatalities require immediate phone notification of the Division Manager, GBU President, GBU Safety Manager, and Corporate Safety Manager.
11. Property Damage – Check the appropriate boxes if applicable.
12. Place – Describe the exact location that incident occurred. For example, "in the north stairwell of building 21, between the second and third floor."
13. Date – This field reflects the date the incident occurred, not necessarily the date it was reported. If the exact date is not known, an estimate should be used.
14. Time – This field reflects the time of day that the incident occurred. If the exact time is not known, an estimate should be used.

15. Incident Description – Provide a detailed description of the incident. This is a memo field and text will scroll down the window as it is entered. Use as much space as needed to accurately describe the incident and the resulting injuries.
16. Reported by – This field defaults to the employee login ID that was used to access PWeb. However, the field can be over-written if needed.
17. Name – First and last name of the injured party.
18. Status – Select the most appropriate category from the drop box (Employee - Field, Subcontractor - Field, Partner - Field, Employee - Office, Subcontractor - Office, Partner - Office or 3rd Party).
19. Trade/Function – Select the most appropriate category from the drop box.

Parsons Project Incident/Accident Report Form

PLEASE PRINT

Project Information	Project Title		Location	
	Subcontractor			
	Address			
	City, State, Zip			
	Contact Name		Phone Number	

Incident Type	☐ **Worker's Compensation** ☐ Emergency Response Notified (Police, Fire, Medic, etc.) ☐ First-Aid Only ☐ Recordable Injury	☐ **General Liability** ☐ Bodily Injury/Illness ☐ Real Property Damage ☐ Personal Property Damage ☐ Utility Property Damage	☐ **Builder's Risk** ☐ Equipment ☐ Supplies ☐ Machinery ☐ Work

Incident Location	Date of Loss		Time of Loss	
	Place (exact location)			

Incident Description	Detailed Description of Accident

Worker's Comp Or Personal Injury (circle one)	Injured Name			
	Address			
	City, State, Zip			
	Home Phone		Date of Birth	
	Nature of Injury			
	Medical Facility		Work Status	
	Treatment Received			

Property Damage Or Builder's Risk (circle one)	Owner's Name			
	Address			
	City, State, Zip			
	Home Phone		Work Phone	
	Damage Type		Estimated Cost	
	Utility Type		Marked or Unmarked	
	Description of Damage			

Witness Information	Name			
	Address			
	City, State, Zip			
	Home Phone		Work Phone	
	Where to contact		Time to contact	

Contractor Subcontractor Action	Describe actions taken

Signature _____ Employer _____
Print Name _____ Date _____
Phone No. _____ Fax Number _____

PARSONS	NEAR MISS REPORT FORM

EMPLOYER

1. Name: _____
2. Mail Address: _____
   (No. and Street) (City or Town) (State and Zip)
3. Location :_____
   (if different from mail address)

NEAR MISS DESCRIPTION

4. Location of near miss:_____
   (No. and Street) (City or Town) (State and Zip)
5. Project: _____
6. Was place of near miss on employer's premises? Yes ( ) No ( )
7. Time of near miss: _____
8. Date of near miss: _____
9. How did the near miss occur? _____
   (Describe fully the events that resulted in the near miss.)

   _____

   Tell what happened and how. Name objects and substances involved. Give details on all factors that led to

   _____

   near miss. Use separate sheet for additional space).
10. What was employee doing when near miss occurred?_____
    (be specific-was employee using tools or equipment

    _____

    or handling material?)

    _____

WITNESS TO MISS

_____ _____
(Name) (Affiliation) (Phone No.)

_____ _____
(Name) (Affiliation) (Phone No.)

RECOMMENDATIONS TO PREVENT NEAR MISS FROM RECURRING

_____
_____
_____

Parsons Wallet Card-Incident Reporting Guidelines

PARSONS (PARCOMM Tech. Div.)

Procedures following a Parsons/Subcontractor Incident

Incident Definition: any unexpected or unplanned event involving the above. This includes near-misses, personal injuries, property damage or environmental releases. NOTE: Personal injuries involving medical treatment and incidents resulting in more than $1K shall be verbally reported and submitted on the PWeb within four (4) hours.

Within four (4) hours, verbally notify the following:

- Program Manager, Project Manager and Safety Manager

Within 72 hrs of an incident (except as noted otherwise):

- Enter incident information on the PWeb (PARCOMM Home Page) using the Online Safety Reporting System.
- Complete an incident investigation report to determine root causes and corrective actions to prevent recurrence. 9/07

PARSONS (PARCOMM Tech. Div.)

Additional Instructions and Phone Numbers

If the incident is known or believed to be life threatening, immediately notify the following by telephone/in-person:

- President – John Small: (704) 517-7034
- Division Manager – Dean Harwood: (704) 907-0628
- Safety Director – Anthony Miller: (704) 264-6159
- Human Resources – Debra Fiori: (704) 408-4999

Within 24 hours, report all near-misses, first aid cases and other incidents resulting in less than $1K to:

- Safety Manager – Greg Beck: (908) 887-1973

PARSONS Emergency Contact Numbers:

- US/Canada: (866) 727-1411; International: (775) 326-4594

Parsons Wallet Card-Incident Reporting Guidelines

Field/Project Monthly Report Form

Instructions: Enter the total number of labor hours spent in the field by all Parsons employees and subcontractors during the reporting period. Cost Type (CT) "04" used for WebTime labor entries should represent these hours for Parsons employees. Labor hours spent in the office are classified as CT "01" in WebTime. Incidents/near-miss incidents, air monitoring completed and the type of PPE worn by personnel (i.e. Parsons employees and contractors) must also be reported. Submit by the 3rd working day of the following month (an estimation of the monthly field hours based on number of people working on the project each day is acceptable).

Definitions and Reporting Criteria

Field Hours - **time spent by the employee working at a job site or field project, even if performing office/administrative work (i.e. in a modular trailer). Working in another Parsons office or at a client's corporate/main office is not considered field hours for the purposes of this reporting.**

Incident - **any unplanned or unexpected event, including near-misses, first aid cases, personal injuries requiring medical treatment, vehicle or equipment damage or an environmental release.**

Near-miss Incident (NI) - **an unplanned or unexpected event that has the potential to result in a personal injury, vehicle or equipment damage, or environmental release, but does not occur (i.e. almost happened).**

PPE - **Personal Protective Equipment above Level D (work clothes) or Modified Level D (Tyvek or fire retardant coveralls). This includes Level C (chemical resistant suit and/or air-purifying respirator), Level B (chemical resistant suit and/or supplied air) or Level A (full encapsulation suit with SCBA).**

Subcontractor - contractors hired by Parsons or a Parsons contractor, to perform activities in the field. Contractor company names should be listed and tracked separately in the Table below, followed by the hiring company in parentheses (i.e. Parsons or subcontractor).

Project Name:		Client:			
Project Location:		Client Contact:			
Parsons Contact:		Project #:		Month:	

Parsons and/or Contractor	Hours	Type of Activities	Incident or NI
Parsons			Yes No
			Yes No
			Yes No
			Yes No

Air Monitoring

Was there any air monitoring that took place during the month? No Yes - If "Yes", indicate below the potential hazards/chemicals monitored (i.e. O2, LEL, dust, VOCs), the monitoring equipment used (i.e. PID, FID, Draeger tubes, 4-gas, DataRAM, cassettes), whether the air monitoring results exceeded an Action Level (AL) or Permissible Exposure Limit (PEL), the level of PPE worn above Level D (C, B or A) and the number of days working in the specific PPE.

Chemical Monitored	Equipment Used	Exceed AL– Exceed PEL	PPE	Days in PPE
		Yes No - Yes		

Parsons Wallet Card-Incident Reporting Guidelines

		Yes No - Yes		
		Yes No - Yes		
		Yes No - Yes		

NOTE: If an AL/PEL is exceeded or PPE above Level D is worn, a Supplemental Information Form (available in the Industrial Division Safety Folder on ParShare) must be completed. All incidents must be reported on the PWeb (PARCOMM Online Safety Reporting System).

PARSONS PARCOMM®

Field/Project Monthly Report Form

Instructions: Enter the total number of labor hours spent in the field by all Parsons employees and subcontractors during the reporting period. Cost Type (CT) "04" used for WebTime labor entries should represent these hours for Parsons employees. Labor hours spent in the office are classified as CT "01" in WebTime. Incidents/near-miss incidents, air monitoring completed and the type of PPE worn by personnel (i.e. Parsons employees and contractors) must also be reported. Submit by the 3rd working day of the following month (an estimation of the monthly field hours based on number of people working on the project each day is acceptable).

Definitions and Reporting Criteria

Field Hours - **time spent by the employee outside his/her home office working at a job site or traveling to/returning from either the job site or a client's office. Working in another Parsons office or at a client's office is not considered field hours for the purposes of this reporting.**

Incident - **any unplanned or unexpected event. This includes near-misses, first aid cases, personal injuries requiring medical treatment, property damage or environmental release.**

Near-miss Incident (NI) - **an unplanned or unexpected event that has the potential for personal injury, property damage or environmental release, but does not occur or almost happened.**

PPE - **Personal Protective Equipment above Level D (work clothes) or Modified Level D (coveralls e.g. Tyvek). This includes Level C (chemical resistant suit and/or air-purifying respirator), Level B (chemical resistant suit and/or supplied air) or Level A (full encapsulation suit with SCBA).**

Subcontractor - contractors hired by Parsons or their subcontractor, to perform activities in the field. Contractor company names should be listed and tracked separately in the Table below, followed by the hiring company in parentheses (i.e. Parsons or subcontractor).

Project Name:		Client:			
Project Location:		Client Contact:			
Parsons Contact:		Project #:		Month:	

Parsons and/or Contractor	Hours	Type of Activities	Incident or NI
Parsons			Yes No
			Yes No
			Yes No
			Yes No

Air Monitoring

Was there any air monitoring that took place during the month? No Yes - If "Yes", indicate below the potential hazards/chemicals monitored (i.e. O2, LEL, dust, VOCs), the monitoring equipment used (i.e. PID, FID, Draeger tubes, 4-gas, DataRAM, cassettes), whether the air monitoring results exceeded an Action Level (AL) or Permissible Exposure Limit (PEL), the level of PPE worn above Level D (C, B or A) and the number of days working in the specific PPE.

Chemical Monitored	Equipment Used	Exceed AL– Exceed PEL	PPE	Days in PPE
		Yes No - Yes		
		Yes No - Yes		
		Yes No - Yes		
		Yes No - Yes		

NOTE: If an AL/PEL is exceeded or PPE above Level D is worn, a Supplemental Information Form (available in the Industrial Division Safety Folder on LiveLink) must be completed. All incidents must be reported on the PWeb (PARCOMM Online Safety Reporting System).

PARSONS PARCOMM®

MONTHLY FIELD/PROJECT REPORT – SUPPLEMENTAL INFORMATION

Employee Name: **Job Title:** **Facility:**

Chemical Exposure Records

Date	Project Name	Chemical Involved	Exposure Duration	Chemical Concentration

Personal Protective Equipment (PPE) Records

Date	Project Name	Level of PPE (A, B or C)	Length of Use (hrs)

ATTACHMENT B

CON EDISON REQUIREMENTS

- **CON EDISON UTILITY CLEARANCE CHECKLIST**
- **CON EDISON CONTRACTOR INJURY REPORT**
- **CON EDISON EH&S HAZARD ANALYSIS FOR CONTRACTOR WORK**
- **CON EDISON EH&S PLAN CHECKLIST**
- **CALLING A TIME OUT**
- **SPECIFICATION: G-11863-6- CON EDISON INSPECTION AND MAINTENANCE REQUIREMENTS ASSOCIATED WITH EXCAVATION ACTIVITIES NEAR GAS PIPELINES OPERATING AT 125 PSIG AND ABOVE**
    - **APPENDIX A- WEEKLY TRANSMISSION MAIN PATROL REPORT**
    - **APPENDIX B- DAMAGE PREVENTION CHECKLIST FOR CONSTRUCTION AND ERC FOR EXCAVATIONS WITHIN 25' OF TM**
    - **APPENDIX C- TELEPHONE NUMBERS-GAS OPERATIONS**
    - **APPENDIX D- PROCESS FLOW DIAGRAMS**

Utility Clearance
Site Walk Summary Table

Sampling Location	Nearest Utility Distance	Nearest Utility Type	Depth	Clearance Required (Y/N)	Accepted Clearance Method	Rationale for Clearance Method	Depth of Clearance	Date Utility Cleared	Findings /Comments

Signature of Site Walk Participants - Remediation PM: _____ Date Site Walk Conducted:

Construction Management: _____

Consultant PM: _____

Contractor: _____

CON EDISON CONSTRUCTION

CONTRACTOR INJURY REPORT

Injury Date: _____ *Time of Injury:* _____ *Work Location:* _____

Date Reported: _____ *Time Reported:* _____

Name of Injured: _____ *Contractor Co:* _____

Home Address: _____

Date of Birth: _____ *SS# (Last 4 digits):* _____ *Length of Svce:* _____

Supervisor: _____ *Phone:* _____ *Shift:* _____

PART OF BODY

Be as specific as possible (e.g. right index finger, left foot, etc.)

_____	1. Head	_____	15. Chest
_____	2. Nose	_____	16. Abdomen
_____	3. Ears	_____	17. Back
_____	4. Eyes	_____	18. Hip
_____	5. Mouth	_____	19. Knee
_____	6. Face	_____	20. Ankle
_____	7. Jaw	_____	21. Leg
_____	8. Neck	_____	22. Foot
_____	9. Shoulder	_____	23. Toe
_____	10. Elbow	_____	24. Body
_____	11. Wrist	_____	25. Heart
_____	12. Arm	_____	26. Lungs
_____	13. Hand	_____	27. Skin
_____	14. Finger	_____	28. Throat

NATURE OF INJURY / ILLNESS

_____	1. Laceration	_____	9. Burns
_____	2. Puncture	_____	10. Shock
_____	3. Contusion / Bruise	_____	11. Inhalation
_____	4. Sprain / Strain	_____	12. Infection
_____	5. Fracture / Dislocation	_____	13. Hernia
_____	6. Concussion	_____	14. Skin Disorder
_____	7. Amputation	_____	15. Irritation
_____	8. Foreign Matter	_____	16. Unconsciousness

INJURY CLASSIFICATION

Medical Treatment _____

Restrictions (if yes, please describe): _____

Lost Time _____

First Aid _____

Non-recordable (FYI) _____

TYPE OF INCIDENT

_____	1. Animal	_____	10. Falling Objects	_____	19. Stepped In	_____	28. Steam
_____	2. Insect	_____	11. Gas / Fumes	_____	20. Caught Between	_____	29. Heat
_____	3. Electric flash	_____	12. Handling Objects	_____	21. Altercation	_____	30. Sun
_____	4. Electric contact	_____	13. Pushing Objects	_____	22. Improper Body Pos	_____	31. Chemicals
_____	5. Burns (Other)	_____	14. Pulling Objects	_____	23. Vehicle Accident	_____	32. Plants
_____	6. Slip	_____	15. Lifting Objects	_____	24. Improper Tool Use	_____	33. Carrying Obj
_____	7. Trip	_____	16. Striking Objects	_____	25. Flames	_____	34. Hearing Loss
_____	8. Fall	_____	17. Struck By Objects	_____	26. Smoke	_____	35. Repetitive Motion
_____	9. Flying Objects	_____	18. Stepped On	_____	27. Vapors	_____	36. Other

Describe nature, extent and type of injury (if not listed above): _____

_____

Describe fully how injury was sustained: _____

_____

_____

_____

_____

Witnesses (Name & Address): 1) _____

2) _____

Hospital: _____ Address: _____

Physician: _____ Admitted to Hospital: _____YES _____NO

Treatment Received: _____

Report Prepared By: _____ Emp #: _____ Phone: _____ Date: _____

CCI / Supervisor: _____ Emp #: _____ Phone: _____

EH&S Rep: _____ Emp #: _____ Phone: _____

Please fax completed report to:
EHS&T - Construction
917-534-4490

UTILITY CLEARANCE PROCESS FOR INTRUSIVE ACTIVITIES
E H&S REMEDIATION PROGRAM

1.0 INTRODUCTION

This document outlines the process that should be used to identify, locate and clear subsurface utilities as part of all Environmental Health and Safety Department's Remediation Section intrusive site investigations. The various activities that comprise this process are specified in efforts to eliminate or substantially reduce the risk of encountering a subsurface utility while performing intrusive activities. Where appropriate, reference is made to other existing safety procedures, which should also be considered.

Due to the potential presence of subsurface utilities and the inherent variable of their size, depth and layout, it is not possible to address all situations and circumstances that may be encountered during intrusive activities. However, adherence to the steps outlined here will effectively minimize physical impacts to subsurface utilities and prevent associated health and safety risks that might otherwise result from field investigation activities. The activities prescribed below should not be blindly followed. Rather, it is the intent of this document that **ALL FIELD PERSONNEL**:

1) Understand the terms of this process;

2) Develop an awareness and be mindful of, the potential and actual risks associated with utilities and other related hazards at a site;

3) Become familiar with the location(s) and configuration(s) of all subsurface utilities at the site, as marked out and as delineated on available drawings;

4) Develop an awareness and understanding of the potential uncertainties associated with utility locations as marked out;

5) Maintain a high level of vigilance while implementing all components of intrusive fieldwork.

ALL FIELD PERSONNEL, including the Con Edison Project Manager (PM), Construction Management (CM), consultants and contractors should be become with these fundamental provisions of this utility clearance process PRIOR to engaging in any field activities.

The process described in the remainder of this document consists of the three (3) primary components summarized below. These components are designed for use in an integrated manner.

Process Narrative – The narrative provides detailed descriptions of the specific steps that should be taken prior to and during intrusive activities to minimize the potential of encountering subsurface utilities.

Utility Clearance Flow Chart: The key steps of the utility clearance process, as outlined in the narrative, are shown graphically on the flow chart provided in **Attachment A**. The flow chart serves as a guide and should not replace the narrative for developing an understanding of and/or implementing the process.

Utility Clearance Checklist - A key component of this process is the completion of the checklist provided in **Attachment B**. **The checklist shall, in a cooperative effort, be completed and subsequently signed by ALL FIELD PERSONNEL involved with the planning and implementation of an intrusive field investigation.** The intent of the checklist is two-fold. First, it will serve to ensure that all appropriate steps of the process described herein have been completed. Second, it will be used to document that all reasonable steps were taken to prevent conditions that may be potentially harmful to the on-site workers and the surrounding community at large, and that might otherwise adversely impact the physical integrity of, or cause damage to, the utility. The completed checklist will be incorporated in the project files maintained by the Con Edison PM.

2.0 APPLICABILITY

The utility clearance process shall be performed prior to and/or during the intrusive site investigation activities listed below.

- Excavation of Soil Borings
- Installation of Monitoring Wells
- Installation of Soil Gas Sampling Probe Points
- Excavation of Exploratory Test Pits/Trenches

3.0 SUBSURFACE UTILITY CLEARANCE PROCESS

The key activities that comprise the process are listed below and a detailed description of each is provided in the remainder of this document in the order in which they should be completed (as shown in the Utility Clearance Flow Chart in Attachment A).

- Obtain Plates, Drawings and Maps
- Notification to Con Edison Operating Groups and Submission of Site-Specific HASP for Review

- Code 753 Utility Mark-Out
- Site Walk
- Utility Clearance - Sample Location Confirmation
- Checklist Completion

It is noted that completion of some steps may not be warranted for all intrusive activities at all sites. The process is designed to be flexible and, thus, allows the Con Edison PM to incorporate those utility clearance activities that are appropriate given site-specific conditions, knowledge of the site, previous work completed at a site, etc. Exceptions are summarized in Section 5.0 of this document. The key premise is that any deviations and the rationale for each are well documented and reflect sound judgment on the part of the Con Edison PM and other project personnel.

3.1 Obtain Plates, Drawings and Maps

Hard copies of available utility plates, drawings and/or maps should be obtained. Drawings, plates, etc. should be reviewed as a preliminary step to determine the type, size and location of utilities in the vicinity of the work site. The drawing title, most recent revision date on the drawings, approximate scale and source shall be documented in the appropriate space(s) on the Utility Clearance Checklist (**Attachment B**).

The source of the drawings may vary depending on whether the site is a Con Edison owned/operated facility, private/public property, or extends into a public street/sidewalk. The various sources for substation utility drawings are discussed below and listed in **Table 1**. Drawings for private properties and facilities, such as apartments, schools, churches, residences, etc., can typically be reviewed at, and/or obtained from, the property/facility manager and Department of Public Works and/or Department of Buildings in the municipality where the property is located.

NOTE: Copies of all drawings obtained during this step should be available at the site during all site walks/inspections and at all times during subsequent intrusive activities. The drawings should be reviewed immediately prior to implementing intrusive activities at each new site location where intrusive activities are to be performed.

Steam, Gas and Electric

Conduit and Duct Occupancy (C&DO) utility plates should be obtained from the appropriate Con Edison engineering group(s) including, electric (e.g., distribution lines, transmission feeders, etc.) steam and gas by the Con Edison PM. All electric and gas plates are available on Con Edison's intranet by searching for 'maps' or accessing the Advanced Mapping System website listed below.

http://maps/AdvancedMappingHomePage.htm

AFTER accessing the website and obtaining the required drawings, the appropriate party listed in **Table 1** may be contacted with inquiries regarding electric and steam plates or for questions regarding use of the Advanced Mapping System. Similarly, steam plates can be obtained by selecting "Active" and "Archived" Steam Plates from the website:

http://maps/steam.htm

Sewer and Water

Drawings showing water and sewer utilities should be obtained as appropriate by contacting the New York City Department of Environmental Protection (NYCDEP) personnel at the telephone numbers listed in **Table 1**.

Subterranean Tunnels

Drawings showing locations and depths of tunnels including subways and automobile tunnels and related subsurface infrastructure should be obtained as appropriate by contacting the appropriate organization listed below.

- Subways: New York City Transit Authority (NYCTA)
- Hudson River Tunnels: Port Authority of NY and NJ (PANYNJ)
- East River Tunnels: Triboro Bridge and Tunnel Authority (TBTA)

Personnel and telephone numbers for these parties are listed in **Table 1**.

Miscellaneous

Con Edison generally does not maintain plates and drawings showing detailed information of utility distribution on private property. However, as discussed above, facility managers, property owners, Department of Public Works and/or Department of Buildings of the municipality where the site is located, should be contacted in efforts to obtain available utility drawings for the facility. Contact information (e.g., telephone numbers, e-mail addresses, etc.) for municipalities can typically be obtained by accessing the municipality's website. The name, address and telephone numbers for the Department of Buildings in New York City are listed in **Table 1**.

3.2 Complete Utility Markouts

Due to the diversity and nature of sites investigated by the EH&S Remediation Group and the potential utilities at these sites, an effective mark out may require an M-scope survey by Con Edison, request a Code 753 utility survey, and/or a subsurface utility survey by a private utility-locating contractor. The applicability of each of these is discussed below.

3.2.1 Overview of Utility Markout Methods

Code 753
The Con Edison PM should instruct their consultant and/or contractor to request a Code 753 utility mark out as per the 16 New York City Rules and Regulations (NYCRR) Part 753. Consistent with the One-Call (also called Dig Safe New York) criteria, the request should be made at least 72 hours prior to initiating fieldwork. The telephone numbers of the various one-call systems are listed by region below.

New York City / Long Island: (800) 272-4480
Westchester (800) 962-7962

Confirmation that mark outs completed under Code 753, and as received by facsimile or telephone from the participating utility companies, should be documented on spaces provided on the Utility Clearance Checklist (**Attachment B**). The markouts should be maintained by the Con Edison PM or designated representative. If the markings become faint or obscure they should be refreshed as needed. When the utility markouts are being refreshed, a Con Edison representative or their designee **MUST** be present and observe this activity.

Con Edison M-Scope Survey
Con Edison engineering groups (see below for contacts) can conduct utility surveys using a 'M-Scope'. This tool uses the magnetic susceptibility of subsurface features such as electrical conduits, electric cables, pipes, etc. This method of survey can be subject to interference by other conductive bodies at grade or in the subsurface, such as buried pieces of metal, rebar in concrete, iron-rich soil, etc., and can be ineffective or produce misleading results in these types of conditions. A utility survey using an M-Scope can be requested by contacting the appropriate party listed below.

County	Contact Name	Telephone Number
Manhattan	Jane Shin	(212) 894-9345
Brooklyn & Queens	John Haas	(718) 348-6725
Bronx	Greg Kasbarian	(718) 904-4659
Westchester	Faney Bantin	(914) 789-6715
Staten Island	Joseph Nappi	(718) 890-6231

Private Utility Contractor

Private utility contractors employ a variety of utility detection and location techniques, which may include:

- Ground Penetrating Radar (GPR)

- Magnetometer
- M-Scope
- Electrical Conductivity
- Electrical Resistance
- Accoustics

Use of multiple methods may permit the detection and surveying of conducting and non-conducting buried utilities.

3.2.2 Applicability of Utility Clearance Resources

The use of the various utility markout resources that may be employed at various sites summarized in the table below and discussed in the remainder of this section.

Site Setting	Utility Survey by Con Edison	Utility Survey by Private Contractor	Code 753 (1)
Con Edison Facility	X	X (optional)	X[1]
Street / Sidewalk			X
Private Property	X (optional)	X	X[1]

(1) At larger Con Edison Properties (e.g., Astoria) or large private or publicly owned properties, a Code 753 survey may not be warranted.

Con Edison Facility

Utility markouts at Con Edison facilities should be coordinated by the Con Edison PM with support from the Construction Management (CM) inspector assigned to the project (if any) and/or facility personnel, as appropriate. At a minimum, an M-Scope survey should be completed. In some circumstances, a independent utility locating contractor should also be used. The use of an independent utility mark-out contractor is strongly recommended at sites where a variety of utilities are known or suspected to be present and which may not be readily identified or mapped using M-Scope alone. A benefit of using a utility locator contractor is that, as described above, they can provide a greater array of tools to locate a variety of subsurface utilities that are non-conductive, such as concrete sewer lines, PVC pipes, etc. in addition to identifying/confirming the presence and location of conductive utilities.

Private Property (including Soil Gas Sampling Probes)

A independent utility locator should be used for utility markouts on private properties. It is noted that utility markouts in basements or slab-on-grade constructed buildings may be inconclusive due to the presence of rebar or welders-mesh commonly used as reinforcement in concrete. Accordingly, a thorough inspection of the basement floor and walls should be performed to identify where utilities enter and leave the building. Sub- or in-floor utilities often enter the floor perimeter, at support columns, and/or dividing walls. The observation of utilities entering the floor may indicate utilities that lie within or immediately beneath the concrete basement slab. If the location of the utility layout of any such sub- or in-floor utility cannot be effectively determined, then any intrusive work must be discussed with the Con Edison PM and may require that no intrusive activities be performed at that location.

Public Street / Sidewalk

A combination of Con Edison utility survey staff and independent utility locator contractors should be used for work areas located in and along roadways. Since Con Edison maintains utilities in streets and along sidewalks, in addition to the mark outs performed through the Code 753 survey, an M-scope survey should be performed within a 10 foot radius of each proposed sample location.

3.3 Site Walk

After completion of the activities outlined above, a site walk shall be conducted by the Con Edison PM with participation from Construction Management, contractors (drillers, soil gas, excavators, etc.), Con Edison facility managers, NYSDEC (as deemed appropriate by the Con Edison PM), and private facility managers/property owners. The key objectives of the site walk are to:

- Review the all planned locations where invasive activities will be performed,
- Adjust the positions of the locations away from utilities as marked out (as necessary)
- Collectively determine the appropriate utility clearance activities (e,g., test pits, etc.) that will be performed at each location (as described in Section 3.4) and document all decisions and /or concerns using the Utility Clearance Checklist (as described in Section 4.0) and in **Table 2**.

Other site conditions and project issues assessed during the site walk should include:

- Presence and location of overhead utilities and/or obstructions that might prevent the safe operation of drilling /excavating equipment;

- Presence of, or need for, appropriate grounding for electrical equipment at the site;
- Site access to equipment;
- Storage of equipment/supplies overnight (e.g., establish a staging area);
- Storage and management of investigative derived waste (IDW);
- Hours of on-site work;
- Permits needed, if any;
- Review roles and responsibilities of all project personnel who will be onsite;
- Review site and emergency contacts; and
- Review anticipated schedule of work.

3.4 Utility Clearance - Sample Location Confirmation

The appropriate actions necessary to confirm the location and/or absence of utilities, which are agreed on during the site walk and as documented in the Utility Clearance Checklist and in **Table 2**, will be implemented at each sample location during the investigation. As discussed above, and consistent with th Utility Clearance Process Flow Chart, the actions will generally include one or more of the following:

- Moving the location outside the *tolerance zone*, if possible. If no *tolerance zone* is marked out during the utility survey (i.e., only a utility center line is marked), the *tolerance zone* will be defined in the field as: *the distance of one-half of the known diameter of the utility plus two feet on either side of the centerline as marked out.*
- Performing a utility clearance test pit at each location where intrusive work will be performed; and/or
- Performing a utility clearance test pit using non-mechanical means to expose and physically verify the exact location and configuration of all nearby utilities.

Brief descriptions of the activities that will be completed during the various investigation activities are discussed below.

NOTE: When working within 12 feet of high pressure gas lines (i.e., 125 psig or greater), Gas operations shall be contacted and the gas line will be carefully excavated by hand in accordance with the Gas Operations Standard G-11863, titled "Inspection and Maintenance Requirements Associated with the Excavation Activities Near Gas Pipelines Operating at 125 psig and Above".

Soil Borings / Monitoring Wells

All locations within the tolerance zone should be moved outside the zone, if possible. After moving the location, a utility clearance test pit should be excavated to a minimum of 5-feet below ground surface using non-mechanical methods, such as hand auger, post-hole digger and/or vacuum truck. The diameter of the test pit should be at least two inches wider than the outer diameter (OD) of the mechanized drilling equipment. The 5-foot depth is consistent with the concept that most utilities are typically installed within the top five feet of the subsurface. Vacuum excavation shall be accomplished with vacuum excavation equipment (e.e., Vactors, Guzzlers, Cuscos, etc.) that is equipped with a manual ("butterfly" valve) or remote (immtediate) electronic vacuum cut-off control that is operational.

NOTE: Utilities may be deeper than five feet due to buildup of surface grade on properties and or streets or right-of-ways. Although the original depth of utilities is anticipated to be within the upper five feet, utilities that are buried in areas that have been built up will presently be deeper by the thickness of the built-up material.

Intrusive investigation locations where physical space prohibits the relocation of proposed sample locations outside the tolerance zone, the adjacent utility(ies) will be exposed by excavating using non-mechanical methods to visually confirm its physical location and configuration. This confirmatory excavation will be completed in addition, a 5-foot excavation at the specific location being investigated (e.g., soil boring, monitoring well boring, etc.), as described above.

Soil Gas Sampling

At soil gas sample locations, test pits will also be excavated to one foot below grade or below the bottom of a concrete floor, if present, prior to installation of soil gas sample probes points. The one-foot depth specified is consistent with the concept that most utilities that could be impacted by the advancement and emplacement of the probe points, such as telephone lines, local electric (e.g., for outdoor lighting), cable television, in-ground sprinkler lines, etc., are typically installed from grade to a depth of one foot.

Basements / Indoor Soil Borings and Monitoring Wells

Prior to installing a soil boring, monitoring well or soil gas sample probe point in a basement and after identifying that no utilities are present in the floor of the basement or foundation slab (as per Section 3.2.2), an electric powered diamond core drill, concrete

saw or jack hammer will be used to advance through the concrete and expose the underlying soil. At each location where soil borings and/or monitoring wells will be installed, a hand excavated test pit will then be advanced to a depth of five feet below the

bottom of concrete slab. This test pit should be excavated using hand auger, post-hole digger and/or vacuum truck in tandem with a non-conductive probe rod, which can be used to confirm the absence of utilities to a depth of five feet below the bottom of the concrete slab.

NOTE: The use of a jack-hammer to loosen compact soil while hand excavating a utility clearance test pit is strictly prohibited, except as noted above.

Exploratory Test Pit/Trench

Exploratory test pits/trenches will be performed to identify the presence or absence of subsurface structures related to former operating facilities at the site, such as gas holder foundations at former manufactured gas plant (MGP) sites, and should not be confused with *utility clearance test pits* discussed above. The *exploratory test pits* or *trenches* will typical have dimensions of approximately five feet wide by 10 feet deep by 10 to 20 long, accordingly, excavating them by hand is impracticable. The excavation of *exploratory test pits/trenchs* must be approached with heightened awareness as the potential for damaging subsurface utilities, if present, is great.

In efforts to develop a reasonable degree of confidence that utilities will not be encountered during excavation of *exploratory test pits/trenches*, a focused utility survey will be conducted in the area immediately surrounding the test pit or the area defined by a boundary established by measuring five feet perpendicular from all sides of the proposed exploratory test pit boundaries. For example, if the surface dimensions of the exploratory test pit are 10 feet long by 5 feet wide, the surrounding area of the focused utility survey will have dimensions 20 feet long by 15 feet wide. It is suggested that the focused utility survey should be completed after all other on-site surveys have been completed. This will allow the surveyor(s) to develop a better understanding of the site-wide subsurface utility configuration.

Following completion of the focused utility survey, *utility clearance test pits* will be excavated by hand to confirm the presence of any and all utilities identified within five feet from the exploratory test pit/trench. After exposing the utilities, the excavator can proceed to excavate the *exploratory test pit/trench*, however, the operator should be experienced with digging in areas where underground utilities may be present and should use the utmost care when performing the excavation. Excavation should proceed slowly enough so that any obstruction/structure encountered can be evaluated and to confirm that the structure is not a utility.

4.0 Checklist Completion

The Utility Clearance Checklist (**Attachment B**), as well as the overall Utility Clearance Process to locate and clear utilities was designed to be dynamic. Accordingly the Utility

Clearance Checklist should be updated throughout the process as each utility clearance activity is completed. During the site walk and after all utility-related issues at each location have been identified and addressed to the satisfaction of all project personnel, the

relevant portions of the Utility Clearance Checklist will be completed and signed by all participating parties. It is noted that the Utility Clearance Checklist will be considered complete only after all proposed utility clearance actions identified during the site walk have been successfully implemented and all pertinent sections have been signed.

5.0 Exceptions to Requirements of the Utility Clearance Process

Due to the inherent diversity and conditions present at project sites, some general exceptions to the utility clearance process are identified below.

- Sites where extensive utility mapping has been completed and/or where extensive intrusive activities have already been performed.
- Locations where facility layout is well documented and understood.
- Sites or portions of large sites (e.g., Astoria facility) where utilities are known not to exist currently or to not have ever existed throughout the life of the facility, property or site.

All circumstances where one or more steps of this process are not being implemented must be discussed with the Con Edison PM and must be duly documented. Regardless of whether or not exceptions are made during the utility clearance process, a Utility Clearance Checklist should always be completed for each site, in accordance with the terms outlined in Section 4.0 of this document.

ATTACHMENT A

Utility Clearance Process Flow Chart

Utility Clearance Process During Intrusive Activities
E H & S – Remediation Group

CON EDISON FACILITY

PM to Obtain & Review
Facility Excavating Procedure

As stringent as Remediation's process?

No

PM to Obtain Plates for all CE Utilities
Steam, Electric, Gas, etc.

Yes

Use Facility Clearance Protocol

Perform Utility Markout:
- Con Edison Mark-out Staff and/or
- Private Utility Locating Contractor

PRIVATE PROPERTY

PM to Review Drawings
- Department of Buildings
- Department of Public Works
- Building Plans at Facility

Perform Utility Markout:
- Private Utility Locating Contractor
- Con Edison Mark-out Staff

Contractor to Request Code 753 Mark-out:
- Provide maps of locations
- Request sn-site work
- Obtain mark-out confirmations

STREET / SIDEWALK

PM to Obtain Plates for all CE Utilities
Steam, Electric, Gas, etc.

Review Drawings
- Department of Buildings
- Department of Public Works
- Others (NYCTA, DEP, etc.)

Contractor to Request Code 753 Mark-out:
- Provide maps of locations
- Request on-site work
- Obtain mark-out confirmations

No

Indoors / Basement

Yes

Inspect Basement
Attempt to visually locate all utility service lines into and out of the walls and floors of building.

Drill Through Concrete
(Use Core Drill)

Soil gas sample below slab?

Yes

Box A
Hand auger one foot prior to driving soil gas sample probe to required depth

No

Site Walk for Location Confirmation
Prior to Intrusive Activities
- Con Edison PM
- Construction Management
- Project Consultant
- Contractor (Driller, excavator, etc.)
- Complete Utility Clearance Checklist

Yes

Utilities identified within 2 feet from proposed sample location

NOTE: If location is near a high pressure Gas main (>125 psig then) MUST contact Gas Ops and hand expose.

No

Can location be moved at least 2 feet from all utilities?

Yes

Move it

No

Hand Excavate
To locate nearby utility

Excavate Test Pit by Hand or Vacuum Truck

- Soil Boring / Monitoring Wells

Excavate test pit using hand auger , post-hole digger and/or vacuum truck: minimum hole diameter 2-inches greater than diameter of Auger and minimum of 5 ft deep. Use non-conducting probe rod during excavation.

(**NOTE:** for soil gas only go to **Box A**)

ATTACHMENT B

Utility Clearance Process Checklist

Table 1 - Summary Table of Resources for Obtaining Subsurface Utility Plates and Drawings

Utility Type	County	Company	Organization	Name	Telephone Number
Electric	All	Con Edison	Electric Engineering	http://maps/AdvancedMappingSystem.htm(1)	
			For Questions contact:	John Ensemplare (Mgr. – B&Q)	(718) 802-5540
				Mike Mitchell (Mgr. – Manhattan)	(212) 460-1119
				Richard Mariani (Mgr. – Westchester)	(914) 925-6026
Gas	All	Con Edison	Gas Engineering	http://maps/steam.htm(1)	
			For Questions contact:	Mike Verlizzo (Mgr.)	TBD
Steam	All	Con Edison	Steam Engineering	http://maps/steam.htm(1)	
		Con Edison	For Questions contact:	Tony Barbera	(212) 460-4843
Sewer	NYC	NYC DEP /		TBD	TBD
Water	NYC	NYC DEP /		TBD	TBD
Tunnels	Subway	NYCTA /		TBD	TBD
	Crossing the East River	TBTA		TBD	TBD
	Crossing the Hudson River	Port Authority of NY/NJ		TBD	TBD

(1) “Maps” website listed is accessible on the Con Edison Intranet.

ATTACHMENT 3
EH&S HAZARD ANALYSIS FOR CONTRACTOR WORK
CONSTRUCTION MANAGEMENT: Buildings & Stations - Remediation
PROJECT: **MGP Site Characterization**
LOCATION: **Former Farrington Street Gas Works Site, Queens, New York**

Section	Applicable Yes	Applicable No	Comments	Indicate Section in EHASP item(s) discussed
1.0 Introduction	X		Provide Scope of Work, Chain-of-Command, Responsibilities	
2.0 Air Resources	X		State that vehicles/equipment not permitted to idle in excess of three minutes unless operation is required for work (e.g. vacuum truck, bucket truck, etc.)	
3.0 Asbestos Awareness		X		N/A
4.0 Bloodborne Pathogens Exposure Control Plan (including first aid)	X		Please indicate the First Aid and BBP equipment you will maintain at the site and employee training as required by OSHA.	
5.0 Chemical Safety & Handling	X		Please provide MSDS sheets for any chemicals that will be used. MSDSs must be the most current ones available and will not be accepted if they are older then 5 years. Chemicals must be pre-approved before arriving on site. Discuss HAZCOM training, container labeling, etc.	
6.0 Confined Space Program		X	Entries into confined spaces, including manholes, should not occur. If this is not the case, Parsons will need to prepare a HASP Addendum for this activity.	N/A
7.0 Electrical Safety	X		Include a statement regarding underground utility clearance overhead clearance limits, as applicable, as well as use of GFCI, appropriate extension cord use with no breaks in outer cover, ground pins in place, etc.	
8.0 Electrical Enclosed Spaces		X		N/A
9.0 Excavation & Trenching	X			
10. Fish, Wildlife and Wetlands		X		N/A
11. Fire Protection & Prevention	X		Discuss fire prevention issues (e.g. extinguishers present, re-fueling procedures, etc.) as appropriate.	
12. Gas Enclosed Spaces		X		N/A
14. Hearing Conservation	X		Discuss Action Levels for wearing hearing protective devices (HPD), noise monitoring and calibration equipment, and the types of HPDs to be used.	
15. Insulation Materials		X		N/A
16. Lead Management Program		X	Con Edison assumes that all paint contains lead unless tested otherwise. Employees must have awareness level training.	N/A
17. Management of Change	X		Please indicate how you will manage unexpected changes in the scope of the work (i.e. HASP addenda with Con Edison review/acceptance prior to beginning that work).	

Section	Applicable Yes	Applicable No	Comments	Indicate Section in EHASP item(s) discussed
18. Material Handling	X		Please indicate how materials and equipment will be moved about the site.	
19. Mechanical Equipment	X		Address all safety and environmental issues related to the equipment being used ("Guzzlers", drill rigs, etc.).	
20. Mercury Management		X		N/A
21. Noise	X		Please address how you will manage community noise issues.	
22. Oil & Dielectric Fluid	X		Please address spill cleanup equipment that will be available to clean up/prevent any spills (e.g. oily water found upon opening manholes, etc.)	
23. PCB Management		X	Con Edison assumes that all paint contains PCBs unless tested otherwise. Employees must have awareness level training (HAZCOM).	N/A
24. Personal Protective Equipment	X		Please indicate the appropriate PPE for the various tasks to be performed.	
25. Pesticide/Herbicide		X		N/A
26. Respiratory Protection Program	X		If any task requires respiratory Protection please describe. Copies of medical clearance and fit test documentation will be required to be provided to Con Edison for each worker who may wear a respirator.	
27. Sampling	X		Describe any/all dust, noise, fume/vapor OSHA-type sampling to be performed. Include the instrumentation to be used and calibration procedures for that equipment.	
28. Vehicle Management	X		Concerned particularly with vehicle/equipment spills. Describe how any fluids released will be prevented from getting into the environment.	
29. Waste Management	X		How/by whom IDW will be managed (i.e. stored, characterized, and to where it will be transported and disposed).	
30. Water Resources	X		See Waste Management, No. 29, above	
31. Welding & Burning		X		N/A
32. Work Area Protection	X		Describe how your work space will be protected from vehicles/traffic for any activities in the streets. Also describe how the EZ, CRZ, and SZ will be delineated.	
33. Working at Elevations	X		Open manhole protection precautions (i.e. manhole cages?)	
34. Drug and Alcohol Program		X		N/A
35. FR Clothing		X		N/A
36. Close Call Program	X		Contractors shall report close calls. Provide a statement as such. Additionally, Con Edison expects the Contractor to prepare a root cause investigation report and Preventative Action Plan (PAP) with Con Edison acceptance of the PAP for all Close Calls experienced on the job.	

Section	Applicable Yes	No	Comments	Indicate Section in EHASP item(s) discussed
37. Job Briefings	X		Provide that daily documented job briefings are required	
38. Time Out Program	X		Contractor's employees and subs are authorized to call a *Time Out*. Provide a statement/program as such. See attached example program for the Contractor's use should they want.	
39. Other – Emergencies/Injuries/Accidents	X		State that Contractor shall prepare a root cause investigation report and Preventative Action Plan (PAP) with Con Edison acceptance of the PAP for all injuries to workers, Con Edison personnel, or the Public.	

Provided by: Con Edison Maintenance & Construction Services: Remediation (*date*): [03/03/08]

(a) Environmental & Safety – *Thomas O'Connell, Project Specialist*
O'Connellt@coned.com

Received by:
Contractor Representative: _____
(Name & Date)

Calling A Time Out

1.0 PURPOSE

The purpose of this guideline is to outline how a “Time Out” or work stoppage is called by a Con Edison Contractor’s employee due to a safety, health and/or an environmental concern and how the “Time Out” is to be resolved prior to proceeding with work.

2.0 INTRODUCTION

Con Edison’s Contractor employees are encouraged to call a “Time Out” if they are unsure of how to proceed on a job because of a safety, health, and/or environmental concern.

The Company’s commitment to safety, health, and environmental excellence requires that all work proceed only after it is safe and environmentally sound. The responsibility for ensuring that this takes place rests with every worker performing on Con Edison projects. Effectively meeting these responsibilities depends upon open communication between individuals and their supervisors prior to work beginning, and – in certain cases – after safety, health and/or environmental issues are identified. All jobs should begin with a pre-job briefing in which all safety, health, and environmental issues should be addressed.

3.0 TIME OUT GUIDELINES

When a safety, health or environmental concern arises on a job, Con Edison’s Contractor employees are encouraged to call a “Time Out”. Upon calling a “Time Out”, the worker must immediately notify his/her supervisor and provide him/her with information regarding the nature of the safety, health or environmental concern. When a “Time Out” is called, work stops.

The supervisor should contact or meet with the worker with the intent of resolving the worker’s concerns. If the concerns are resolved to the satisfaction of the worker and the supervisor the “Time Out” is over and work proceeds. If the concerns are not resolved to the satisfaction of the worker and/or the supervisor, work does not proceed, and the following process should be followed to resolve the concerns:

- The Con Edison site representative is to be contacted to obtain assistance in resolving the concerns. Using his/her expertise, safety, health, and environmental rules, regulations, and procedures, the Con Edison site representative will attempt to resolve the matter. The Con Edison site representative may call upon his/her project EH&S representative and/or subject matter experts from other areas of the Company as necessary, including, but not limited to Engineering, Corporate EH&S, the work rules committee, or operations.

- In emergency and other situations where extensive job and procedural reviews are necessary to resolve the concerns, an alternate work plan, where practical, will be implemented to complete the job pending resolution of the “Time Out.” In this instance, before proceeding with any work prior to the resolution of this “Time Out,” it is the responsibility of the Contractor’s Site Supervisor, the Con Edison site representative and his/her project EH&S representative to ensure that the work will be performed in full accord with safety, health, and environmental procedures, that all rules and regulations are followed and that the work also satisfactorily minimizes safety, health, and environmental risks.

When a “Time Out” has been called, and the worker and supervisor resolve the issue themselves and the work proceeds, the supervisor should notify the Con Edison site representative. In all “Time Out” situations, the Con Edison project EH&S representative will review the incident in a timely manner, determine if the “Time Out” has implications outside the specific project, and take steps, as appropriate, to communicate and work to prevent its reoccurrence.

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LAST REVIEW DATE:	REVIEW CYCLE:
1/30/08	5 Years

SPECIFICATION: **G-11863-6**

TITLE: **"INSPECTION AND MAINTENANCE REQUIREMENTS ASSOCIATED WITH EXCAVATION ACTIVITIES NEAR GAS PIPELINES OPERATING AT 125 PSIG AND ABOVE"**

VOLUME: **1 and 10**

REGISTRATION NO.: **GAS0178**

GAS TARGET TRAINING GROUPS: **Gas Construction, Major Projects, Maps & Records, Pipeline Integrity, LNG, Corrosion Control, Pressure Control, Emergency Response Center, Tunnels,**

★ **OTHER TARGET TRAINING GROUPS:** **Construction, Electric Operations, Steam Operations**

REVISIONS:(See ★)

1)	Cover Page	-	Revised Target Training Groups to reflect new Construction Group Names.
2)	Various	-	Changed “Maintenance and Construction Services” department to “Construction” in the following sections: 3.0, 5.1, 7.0, 7.2, 7.3, 7.4, 7.7, 7.8, 7.10, 7.11, 8.0, 9.4, 9.5 and 9.6.
3)	Various	-	Added Pipeline Integrity group in the following sections: 5.5, 5.6, 6.1,6.2, 6.3, 8.0 and 9.5.
4)	Section 4.1	-	Added “Company Contractors, Municipal Contractors”
5)	Section 4.2	-	Added “within 25’ of a gas pipeline operating at 125 PSIG and above.”
6)	Section 5.1	-	Added: “ERC will document excavation activities using the “Damage Prevention Checklist” found in Appendix B as a guideline, based on communication with Construction Inspectors/company personnel as described in Sec 7.0, Responsibilities – Construction.”

7)	Section 5.2	-	Further defined and clarified when valve standby is required
8)	Section 5.4	-	Added requirement for Construction to arrange for Corrosion inspection
9)	Section 5.5	-	Replaced “between 5’ and 25’…” with “within 25’…”. Added “or approved company personnel”
10)	Section 5.6	-	Clarified wording
11)	Section 5.7	-	Replaced “excavation work” with “all work within 25 feet of a gas pipeline operating at or above 125 psig”
12)	Section 6.1	-	Added Pipeline Integrity group. Added Rubber mat requirement.
13)	Section 7.0	-	Changed title to “RESPONSIBILITIES – CONSTRUCTION AND/OR ALL OPERATING AREAS WITH EXCAVATION ACTIVITIES”
14)	Section 7.1	-	Revised bulleted notification information
15)	Section 7.4	-	Fig. 1 redrawn; Wording change to align w/Code 753.
16)	Section 7.5	-	Changed wording to align with Code 753.
17)	Section 7.6	-	Changed requirement to arrange for Corrosion inspection from ERC to Construction
18)	Section 7.7	-	Backfilling activities shall be reported to ERC via email.
19)	Section 7.8	-	Section reworded for clarity.
20)	Section 7.11	-	Removed requirement for Construction Inspector to complete and fax Appendix B. Tracking of excavations and work in the vicinity of the TM will be handled via email communications between ERC, Construction and Gas Engineering.
21)	Section 9.8	-	Section Added; Renumbered subsequent sections.
22)	Section 9.9	-	Reworded section. Removed test and inspection requirements and replaced with reference to spec. G-11814 and Con Edison’s integrity Management Plan for detailed testing requirements. Added follow-up activities.

23)	Section 11.0	-	Added new section on descriptive Process Flow Diagrams. Renumbered remaining sections.
24)	Section 12.0	-	Added G-11814 to “Reference Specifications” section.
25)	Appendix B	-	Changed Appendix B to a guideline for use by ERC and Construction in accordance with Sec 5.0 and Sec 7.0.
26)	Appendix D	-	Added new descriptive Process Flow Diagrams.

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Gas Operations Standards

TITLE: INSPECTION AND MAINTENANCE REQUIREMENTS ASSOCIATED WITH EXCAVATION ACTIVITIES NEAR GAS PIPELINES OPERATING AT 125 PSIG AND ABOVE

EFFECTIVE DATE: February 29. 2008

TABLE OF CONTENTS

TITLE: INSPECTION AND MAINTENANCE REQUIREMENTS ASSOCIATED WITH EXCAVATION ACTIVITIES NEAR GAS PIPELINES OPERATING AT 125 PSIG AND ABOVE

1.0 SCOPE

This specification covers the inspection and maintenance procedures that Con Edison will perform associated with any excavation activity within 25 feet of a gas pipeline (mains and services) operating at 125 psig and above.

2.0 LEGAL REQUIREMENTS

FEDERAL: Title 49 of the Code of Federal Regulations Part 192 Sections 459, 614, 705, 706 and 935.

STATE: 16NYCRR Part 255 Sections 459, 614, 705 and 706 and Part 753.

★ 3.0 ORGANIZATIONS APPLICABLE

All Con Edison Departments (Gas Operations, Electric Operations, Steam Operations, etc.) that perform excavation work or have contractors that excavate for them in Manhattan, Queens, Bronx and Westchester. This also includes the Construction Department, who oversees and monitors municipal (including New York City) contractors, company contractors, third party contractors and the Code Rule 753 markout vendor(s).

Also included are the Gas Emergency Response Center (ERC), Gas Engineering, and Corrosion Control, who all have responsibilities associated with this procedure.

4.0 NOTIFICATIONS

★ 4.1 The Emergency Response Center at telephone number 718-319-2330 must be notified of any excavation activity within 25 feet of a pipeline operating at 125 psig and above. This notification includes planned and emergency work by all Company forces, Company Contractors, Municipal Contractors and all third party Contractors excavating.

★ 4.2 Con Edison's Code Rule 753 mark out vendor(s) and/or Company personnel will make this notification when they receive a mark out request associated with any plans to excavate within 25' of a gas pipeline operating at 125 PSIG and above. However, all Company departments actually doing the excavating shall also make this notification. Corrosion Control is responsible for making other notifications associated with the patrol of the pipelines as shown in Section 9.0.

4.0 **NOTIFICATIONS** (Continued)

4.3 The ERC must also be notified anytime a pipeline operating at 125 PSIG and above is exposed.

5.0 **RESPONSIBILITIES – EMERGENCY RESPONSE CENTER**

★ 5.1 Upon notification, the ERC will prepare and issue an e-mail contingency notification to Gas Engineering, the applicable Gas Construction and Gas Distribution Services groups, Gas Control and Construction Department. They will also establish and maintain a tracking system for all new and completed reports of excavations crossing or within 25 feet of a pipeline operating at 125 psig and above. ERC will document excavation activities using the "Damage Prevention Checklist" found in Appendix B as a guideline, based on communication with Construction Inspectors/company personnel as described in Sec 7.0, Responsibilities – Construction.

★ 5.2 The ERC will arrange for crews to standby valves whenever an excavator is using mechanical excavation equipment within 5 feet of a pipeline operating at 125 psig and above or whenever any heavy mechanical construction work is being performed within 5 feet of an exposed pipeline operating at 125 psig and above (e.g. lifting/placing of heavy materials that could potentially damage an exposed main). They will also arrange for valve crews when otherwise requested by Gas Engineering.

5.3 The ERC will maintain appropriate mailing lists for their notifications.

★ 5.4 The ERC shall be notified whenever a pipeline operating at 125 psig and above is exposed and when Construction has arranged for an inspection by Corrosion Control.

★ 5.5 If the ERC receives notification of a suspected water leak, they shall dispatch Gas Distribution Services (GDS) or other department to investigate the water leak. If the water leak is within 5' of a pipeline operating at 125 psig and above, the ERC shall request a review by Gas Engineering - Pipeline Integrity or Major Projects. Based on their inspection, Gas Engineering - Pipeline Integrity or Major Projects will determine the need to excavate. If the water leak is within 25' of a pipeline operating at 125 psig and above, Gas Distribution Services or

5.0 **RESPONSIBILITIES – EMERGENCY RESPONSE CENTER** (Continued)

approved company personnel shall perform a gas leak investigation. If the water leak is greater than 25' feet away from a pipeline operating at 125 psig and above, no further action is required.

If the ERC receives any notifications of a water services being installed using trenchless technology, that crosses a pipeline operating at 125 psig and above,

they shall notify Gas Engineering - Pipeline Integrity or Major Projects to review.

★ 5.6 If the ERC receives a notification of coating and/or pipe damage, they shall notify Gas Engineering – Pipeline Integrity or Major Projects and Corrosion Control to arrange for a damage inspection.

★ 5.7 After all work within 25 feet of a gas pipeline operating at or above 125 psig is completed, the ERC will issue a notice to cancel the contingency.

6.0 **RESPONSIBILITIES – GAS ENGINEERING**

★ 6.1 Gas Engineering – Pipeline Integrity or Major Projects will arrange for any test pits required when an unknown patch, plate or unmonitored excavation is discovered over or within 5 feet of a pipeline operating at 125 psig and above as reported to them by the ERC. This shall be done as soon as possible. Unless Company personnel can provide written verification that the pipeline was not exposed, it shall be exposed and examined for coating and/or pipe damage by Corrosion Control as described in Section 9.0. Test pits shall also be requested when a water service crossing a pipeline operating at 125 psig and above was installed using trenchless technology.

Gas Engineering shall specify the placement of water impingement rubber mat(s) (Class & Stock #: 059-5306) between a water facility and the transmission main, anytime a new water service or main crosses the transmission pipeline and/or an existing facility is discovered without rubber mat protection. Rubber mat installations shall be in accordance with specification G-8005.

★ 6.2 Gas Engineering –Pipeline Integrity or Major Projects will review any reports by Corrosion Control or others of defects or damage to the pipeline. They will also

6.0 **RESPONSIBILITIES – GAS ENGINEERING** (Continued)

determine what corrective actions, if any, are needed. A report of their review and the corrective actions taken will be prepared and maintained for the life of the structure.

★ 6.3 Gas Engineering –Pipeline Integrity or Major Projects will determine if special circumstances warrant crews standing by valves when not required per Section 5.2.

6.4 Gas Engineering – Maps and Records will notify Corrosion Control anytime an M&S Plate is updated that has a pipeline operating at or above 125 psig.

6.5 Gas Engineering – Maps and Records will correct any verified mapping errors.

★ 7.0 **RESPONSIBILITIES – CONSTRUCTION AND/OR ALL OPERATING AREAS WITH EXCAVATION ACTIVITIES**

★ 7.1 Construction will notify the ERC of all excavation work with which they are involved within 25 feet of a gas pipeline operating at 125 psig and above. This includes any Code 753 markout requests as well as any contractors they oversee working for Con Edison, a municipality or private contractors. Whenever feasible, this notification should be made as a result of Code 753 requests and faxed or e-mailed to the ERC.

This notification will include:

- the location of the work
- name and telephone number of the Contractor
- start and completion dates
- brief description of the planned excavation
- remarks (i.e. identifying where work will take place)
- gas transmission main size
- M&S plate number

All notifications should be made at least two working days prior to the start of the excavation, when known. They will also notify the ERC when the work is complete.

7.0 **RESPONSIBILITIES – CONSTRUCTION** (Continued)

★ 7.2 Prior to excavation, a representative from Construction must meet with the excavator at the field site to explain the physical attributes of the pipeline(s) such as size, operating pressure, depth of cover, presence of special facilities or appurtenances (regulators, drips, etc.). They must also discuss limits of excavation and methods and procedures for supporting and protecting the pipeline and facilities.

★ 7.3 Construction must make and document a daily visual inspection of all excavation work within 25 feet of the pipeline and ensure the contractors are renewing markings as required.

★ 7.4 Anytime an excavation is made within 15 feet (see Figure 1) of the gas transmission main centerline, Construction shall assign a full time inspector to the location. For guidance related to this section and for special circumstances which may not require full coverage contact Gas Engineering – Pipeline Integrity or Major Projects (see Appendix C).

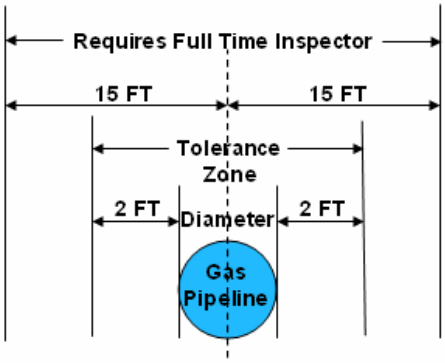


Figure 1

★ 7.5 As required by Code Rule 753, hand excavation must be performed until the exact location of the gas pipeline is determined before powered equipment can be used within the tolerance zone (one half of the pipe diameter plus two feet). Maintain minimum 4" clearance from pipeline after verifying location.

7.0 **RESPONSIBILITIES – CONSTRUCTION** (Continued)

★ 7.6 If the pipeline is exposed, Construction will arrange for an inspection by Corrosion Control (see Section 9.0) and notify the ERC.

★ 7.7 Construction must witness and report to ERC on backfilling activities to assure adequate support and to prevent large rocks or other injurious debris (e.g. wood, asphalt, rags, etc.) from being placed in contact with the pipeline.

★ 7.8 Construction will assign inspection of: A) confirmed water leaks that are within 5 feet of the transmission pipe; B) confirmed water leaks that are within 5 to 15 feet of the transmission pipe in which a gas leak is detected in the water leak area, upon notification from the ERC.

The ERC shall also be notified of any known locations where a third party water service crossing a pipeline operating at 125 psig and above was installed using trenchless technology.

7.9 Notify the ERC when the coating and/or pipeline is damaged.

★ 7.10 When crews are standing by valves, Construction must maintain a full time inspector who will maintain communication with the ERC. ERC will direct gas field crews as required.

★ 7.11 Construction will communicate with ERC via phone and/or email to update the status of known excavations and work within 25 feet of a transmission main. Completion of such activities shall be communicated to ERC so the contingency and activity can be placed on the completed work list. See Appendix C.

★ 8.0 **RESPONSIBILITIES - GAS ENGINEERING AND CONSTRUCTION**

For excavations parallel to and within 5 to 15 feet of a gas pipeline operating at 125 psig and above and within the angle of repose of the transmission main, Construction will contact the ERC, who will advise Gas Engineering – Pipeline Integrity or Major Projects. If the pipeline is within the angle of repose and the excavation is longer than shown in the table below, Gas Engineering will discuss the project with Construction to evaluate sheeting being used, type of soil, method of excavation and other field

★ 8.0 **RESPONSIBILITIES - GAS ENGINEERING AND CONSTRUCTION** (Continued)

conditions. When warranted, field visits will also be made by Gas Engineering with Construction.

The need for follow up visits by Construction will be jointly determined after the discussion and/or field visit.

Pipe Size	Length of Excavation
8" or less	20 feet
12"	30 feet
16"	35 feet
20" or larger	40 feet

9.0 **RESPONSIBILITIES – CORROSION CONTROL**

9.1 Corrosion Control will use the tracking system established by the ERC during patrol of the pipelines.

9.2 Corrosion Control will patrol the routes of all of the pipelines operating at 125 psig and above on a weekly basis not to exceed 12 calendar days as follows:

A) The patrol (visual survey) is conducted in all four-gas operating areas to observe the conditions along the route of the pipelines as listed in Tables II and IV of Specification G-11810. Their observations shall be recorded on the electronic form in Appendix A. The patroller must possess up-to-date M&S Plates (hard copy or electronic) in their possession for the pipeline being patrolled. The patroller must also immediately notify the ERC, who will notify the DEP and municipalities, regarding any suspected water leaks (See Sec. 9.2 B). Corrosion Control shall retain copies of all reports for 5 years.

B) The patrol shall include a visual inspection for:

- Construction activity and other factors that would affect the pipeline integrity or operation.
- The presence of any new patches, cuts, excavations, or steel plates over the pipeline not previously reported and listed in their tracking system.

9.0 **RESPONSIBILITIES – CORROSION CONTROL** (Continued)

- The presence and condition of pipeline markers including signs at submarine crossings.
- The presence of suspected water leaks, which may include sunken depressions and visible water at street surface.
- Location of roadway or sidewalk depressions, cave-in over or within 5 feet of the pipeline.
- The presence of bubbles at any submarine crossings that might indicate a gas leak.

9.3 If a leak or some other situation that presents an immediate danger to the pipeline is discovered, the patroller shall immediately notify the Emergency Response Center (ERC) and standby for further instructions.

★ 9.4 If any unknown (not already covered by Construction or Gas Operations) contractor activity is discovered, the patroller shall immediately notify the ERC, who shall arrange for immediate coverage by Construction as per section 5.1.

★ 9.5 If a recent patch or plate is found over or within 5 feet of a pipeline that was not previously identified in the patrols tracking system, the patroller shall notify the ERC, who shall request a review by Construction. Construction shall provide an update to the ERC. If Construction determines an excavation was performed and not covered by Con Edison personnel, the ERC will notify Gas Engineering - Pipeline Integrity or Major Projects for further investigation.

★ 9.6 Corrosion Control will monitor the accuracy of the mark-outs completed by Con Edison's Code Rule 753 vendor(s) for any excavation activity within 25 feet of a pipeline operating at 125 psig and above. A minimum of 15% of planned mark-outs will be monitored for accuracy. A planned mark-out is defined when notification is received at least 48 hours prior to the commencement of excavation activity. The monitoring can be performed before, during or after excavation as long as the mark-outs are still visible. . If a discrepancy (more than 2 feet) is found, Corrosion will immediately notify Construction and Gas

9.0 **RESPONSIBILITIES – CORROSION CONTROL** (Continued)

Engineering - Maps and Records for a resolution. Maps and Records will correct any confirmed mapping errors. Corrosion Control shall maintain records of all locations verified for 5 years.

9.7 Corrosion Control during their normal operations shall verify the accuracy of our Gas M&S Plates for all pipelines operating at 125 psig and above. Any discrepancies (greater than 2 feet) found shall be immediately reported to Gas Engineering – Maps and Records and Gas Engineering – Pipeline Integrity.

★ 9.8 If a main is partially (less than ½ the circumference) exposed, Corrosion Control will inspect the coating on the exposed pipe and any damage evident as a result of excavation activities and determine if the entire circumference of the pipe should be excavated and inspected. If no damage is discovered and the exposed coating is in acceptable condition full excavation may not be deemed necessary.

★ 9.9 If a pipeline is partially or fully exposed, regardless of the reason, Corrosion Control will inspect the coating on the pipe and any steel that might be exposed and determine the need for complete abatement of the coating to inspect the entire surface of the steel main. The as-found conditions of the main and any pipe anomalies (e.g. corrosion, dents gouges, etc.) discovered will be documented in accordance with Spec G-11814 and Con Edison's Integrity Management Plan (Chapters 7 & 10).The follow-up activities include, but are not limited to, the following:

A) If no pipe anomalies are found, Corrosion Control will arrange for the coating to be replaced or repaired.

B) If pipe anomalies are found, after documenting the as-found conditions, Corrosion Control will arrange to have the pipe cleaned to bare metal to inspect the severity of each anomaly.

C) Corrosion Control will prepare reports on all inspections they make and send a copy of the Direct Examination Data Collection Form to Gas Engineering – Pipeline Integrity.

D) Contact Gas Engineering - Pipeline Integrity when additional remedial action is required so a repair plan can be developed.

10.0 RESPONSIBILITIES - LOCAL GAS OPERATIONS AREAS

Upon notification of a plan to excavate, the Local Gas Operations Area shall verify the locations and accessibility (except ROVs) of the isolation valves.

★11.0 INSPECTION & MAINTENANCE PROCESS FLOW

Inspection and maintenance process flow diagrams are included in Appendix D of this procedure. These diagrams shall be used as an aid to assist in handling various typical types of excavations and work within 25 feet of gas transmission pipelines. The three (3) representative cases covered in the flow diagrams:

- **Unregistered excavations within 25 feet of a pipeline** – excavations or work which was **not** reported to the ERC.
- **Registered excavation activity** - excavations or work which was reported to the ERC.
- **Water leaks within 25 feet of a pipeline** – Water main in the vicinity of the transmission main.

Note: The diagrams in Appendix D are aids for the handling of typical types of excavations described herein. Other non-typical excavations, work and situations in the vicinity of the transmission main shall be handle as specified herein or as directed by Gas Engineering.

★12.0 REFERENCE SPECIFICATIONS

G-11810 - Procedure for Inspection and Maintenance of Gas Transmission Pipelines and Distribution Mains Operating at 125 psig or more

★ G-11814 - Procedure for Determining the Soundness of Steel Gas Transmission and Distribution Piping

G-8005 - General Specification For the Installation Of Gas Distribution Mains

G-11854 - Installation And Maintenance Of Line Markers And Signs For Gas Transmission And Distribution Mains

APPENDIX A

conEdison

Weekly Transmission Main Patrol Report

Inspecting Gas Organization: Corrosion Date _____ Time _____ AM/PM

Borough: _____ Pipeline Section: _____ Patrolled By: _____
(Employee Name, #)

Location (Start): _____

Location (End): _____

Location:

_____

_____

Findings	Findings Yes/No/NA
Excavation within 25' of main	
Street marked out within 25' of main	
Excavation within 5' of main	
Transmission main exposed	
Distribution main (125 psig or more) exposed	
Steel plates over transmission main	
Depression or cave-in within 5' or over transmission main	
Excavation near regulator station	
Damaged or missing Pipeline markers or Signs (at Submarine Crossings)	
Presence of bubbles at Submarine Crossings	
Other (Describe) _____	

Remarks:

ERC Notification:

Via Telephone _____ Nextel _____ Other (Explain) _____

ERC Representative: _____ Date: _____ Time: _____

APPENDIX B

DAMAGE PREVENTION CHECKLIST FOR CONSTRUCTION AND ERC FOR EXCAVATIONS WITHIN 25' OF TM

The ERC shall document the following information for each known excavation within 25' of a gas transmission main:

- **Location**
- **Work Description**
  - **Excavation Type (Hand/Machine)**
  - **M&S Plate Number**
  - **Facility Main Size**
  - **Called In By:**
- **Code 753 Ticket Number**
- **Transmission Contingency Case Number**
  - **Valve Number/Location**
  - **Is manning of valves required?**
- **Contractor's Name**
- **Contractor's Contact Info**
- **Project Start Date**
- **Project Completion Date**
- **Inspector's Name**

When applicable, the following items must be addressed by either Construction, Gas Operations, etc., for each known excavation within 25' of a gas transmission main:

- **The location is monitored daily by Construction and markouts are renewed as required until start of excavation;**
- **The physical attributes (size, pressure, cover, etc.) of the main we are protecting from damage is communicated by Construction to the excavator;**
- **The methods and means for supporting and protecting the main is reviewed with the excavator by Construction;**
- **That, if the excavation is within 15' of the pipe centerline, Construction assigns a fulltime inspector to the location throughout the excavation or other heavy mechanical construction work (see Section 5.2);**
- **That, if the excavation or other heavy mechanical construction work (see Section 5.2) is within 5' of the pipe centerline, Gas Operations will standby the valves during excavation;**
- **That, if the pipe is/was exposed, Corrosion Control is notified to inspect the pipe;**
- **That, if the pipe was exposed and following inspection, Construction documents any damage to the pipe and/or coating by the excavator;**
- **That, if the pipe was exposed and following inspection, Construction inspector witness the backfilling operation to insure no large rocks or other injurious material are placed against the pipe.**

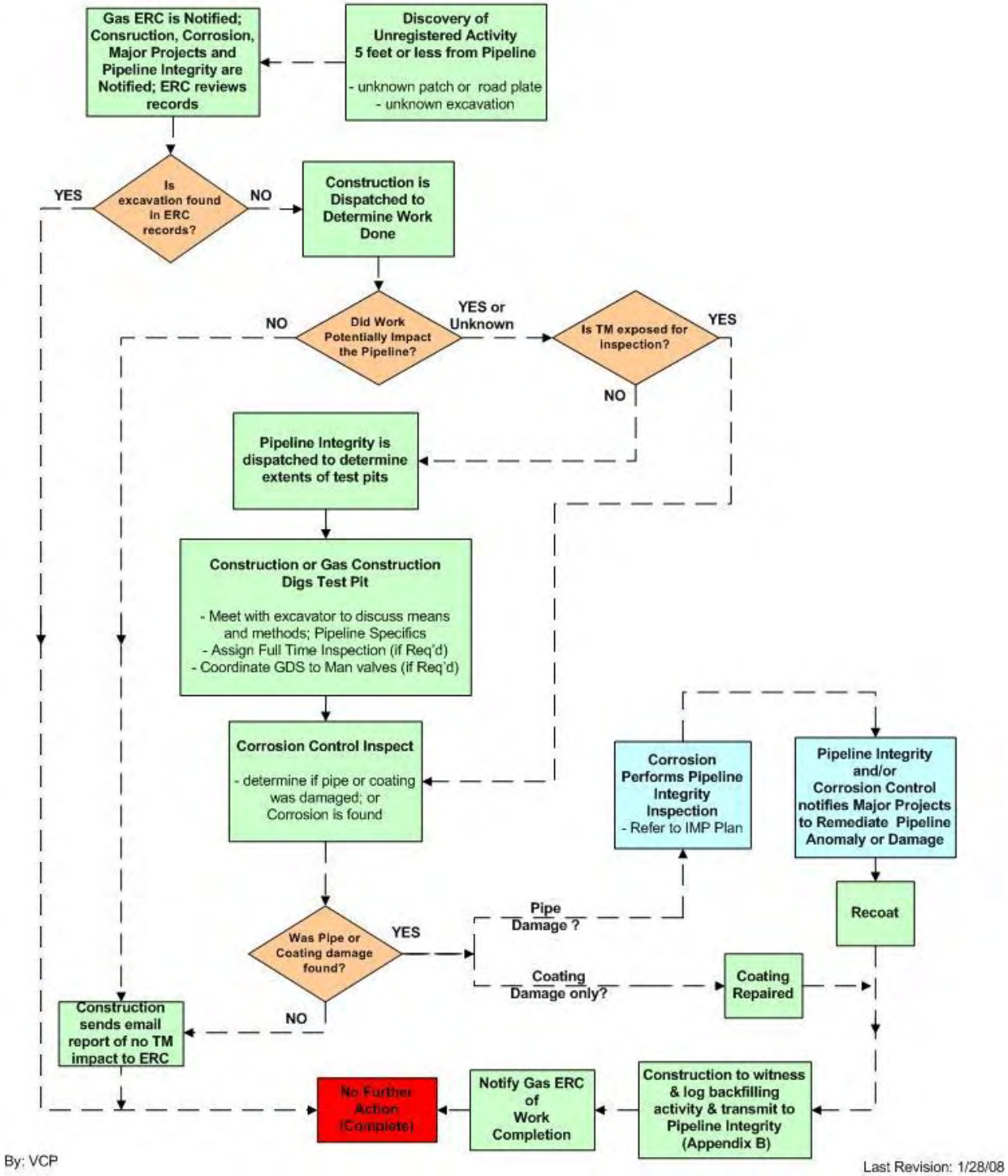
APPENDIX C

TELEPHONE NUMBERS – GAS OPERATIONS

Section	Phone Number
Gas Engineering – Major Projects	718-319-5461
Gas Engineering – Pipeline Integrity	718-319-2335 or email to PipelineIntegrity@coned.com
Fax Number for Appendix B Forms	718-923-7052
Corrosion Control	718-579-1233
Leakage Survey	718-579-1225
Emergency Response Center	718-319-2343

PROCESS FLOW DIAGRAMS

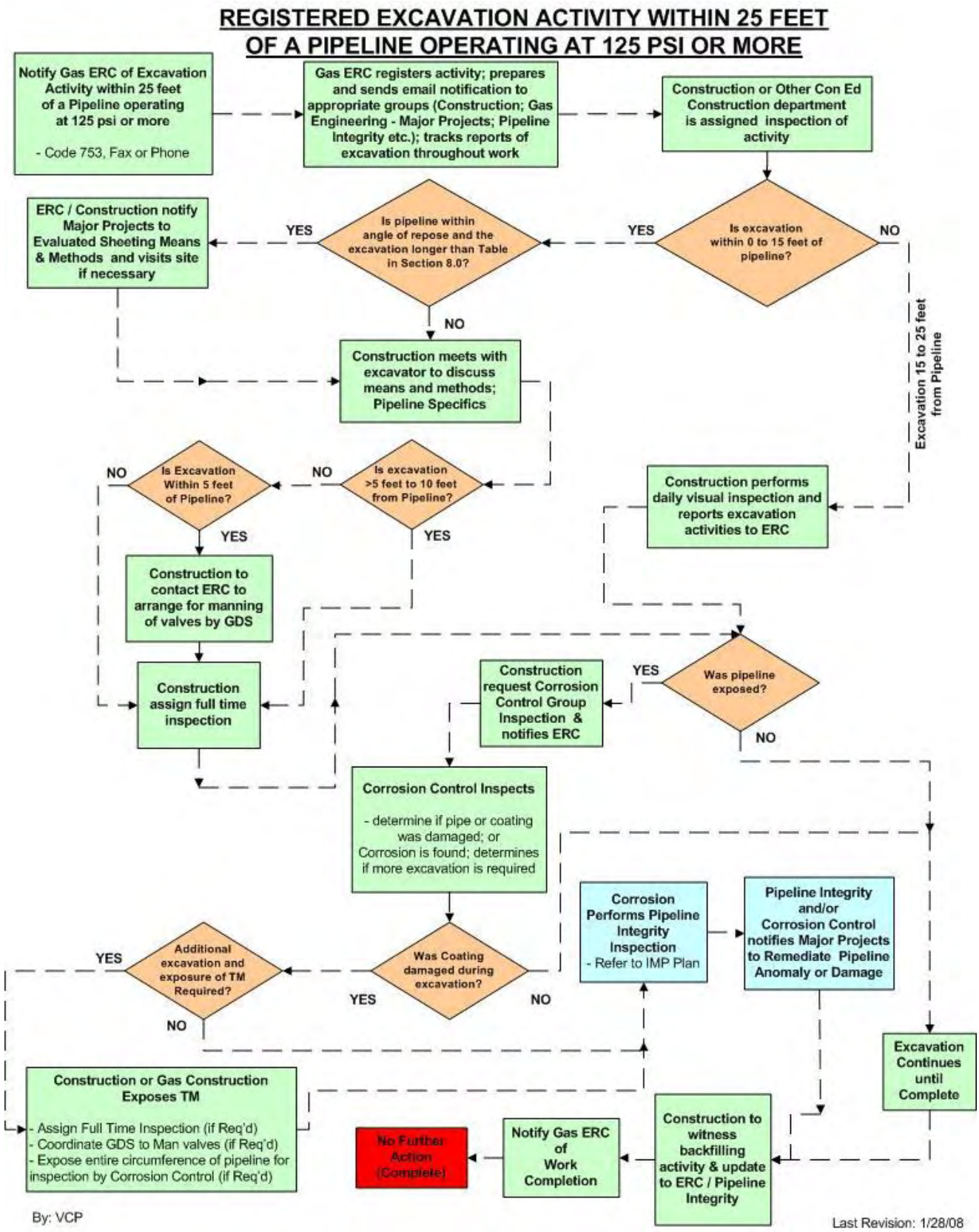
UNREGISTERED EXCAVATION ACTIVITY WITHIN 25 FEET OF PIPELINE OPERATING AT 125 PSIG OR MORE



By: VCP

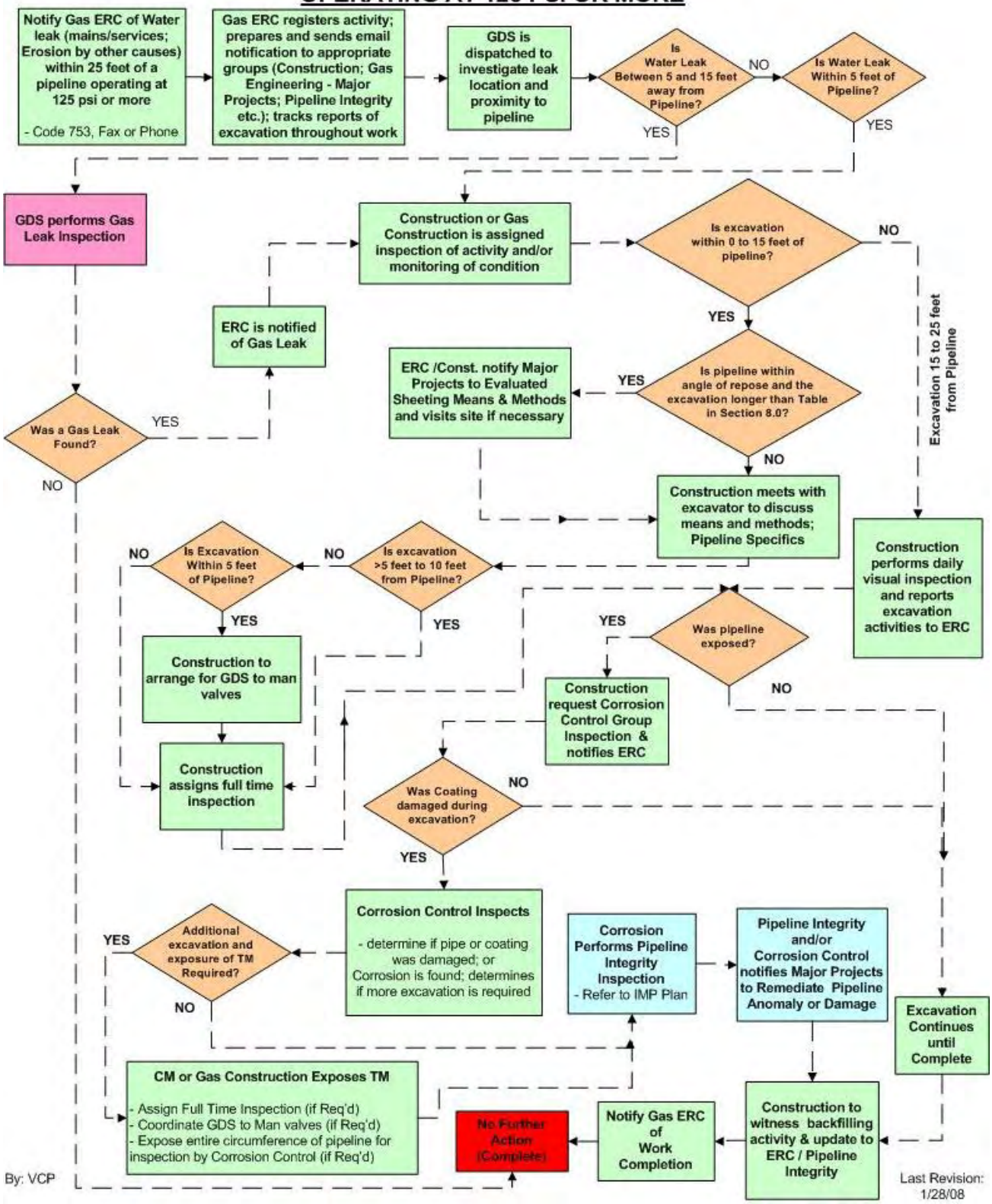
Last Revision: 1/28/08

PROCESS FLOW DIAGRAMS



PROCESS FLOW DIAGRAMS

WATER LEAKS WITHIN 25 FEET OF PIPELINE OPERATING AT 125 PSI OR MORE



ATTACHMENT C

ACTIVITY HAZARD ANALYSIS

PARSONS

Activity Hazards Analysis

Activities- Field

AHA No. 001

Project Name & Number: Con Edison Former Greenburgh Holder Site Site Characterization 443562	**AHA No.** 001	**Date:** March 7, 2007	**New:** Yes
Location: Greenburgh, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D - Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Chmura	**Date:** March 7, 2007
	Superintendent/Competent Person	**Reviewed by:**	**Date:**
Work Operation: Field Activities		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor, Physical Activity	Heat Stress ▪ Prickly Heat (Heat rash) ▪ Heat Cramps ▪ Heat Exhaustion ▪ Heat Fatigue ▪ Heat Collapse ▪ Heat Stroke	▪ Adjust work schedules. ▪ Mandate work slowdowns as needed. ▪ Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided. ▪ Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. ▪ Maintain worker's body fluids at normal levels. ▪ Train workers to recognize the symptoms of heat related illness	▪ Monitor workers physical conditions ▪ Monitor outside temperature versus worker activity.
Outdoor activities	Cold Related Injuries Frostbite Hypothermia	▪ Educate workers to recognize the symptoms of frostbite and hypothermia. ▪ Identify and limit known risk factors. ▪ Warm clothes and boots. ▪ Assure the availability of enclosed, heated environment on or adjacent to the site. ▪ Assure the availability of dry changes of clothing. ▪ Assure the availability of warm drinks. ▪ Educate workers concerning restricted visibility associated with winter clothing (e.g., hoods restricting peripheral vision).	▪ Monitor workers physical conditions ▪ Monitor outside temperature versus worker activity. Start (oral) temperature recording at the job site: ▪ At the Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status. ▪ At a worker's request. ▪ As a screening measure whenever any one worker on the site develops hypothermia.

	Rain	▪ Have proper PPE (i.e. rain gear, footwear, etc) available. Be aware of slip hazards, puddles, etc.	
	Sunshine	▪ Have sunscreen available for ultraviolet protection. Have water for dehydration.	
	Snow	▪ Have warm clothes available for cold temperatures.	
	Lightning	▪ Do not begin or continue work until lightning subsides for 20 minutes.	
	High winds, dust storm	▪ Wear goggles if dust/debris is visible.	
	Pollen	▪ Take medication (i.e. anti-histamine), in consultation with doctor, to minimize allergic reaction to pollen. Wear dust mask, if necessary.	
	Icy Conditions	▪ Salt/sand icy surfaces as appropriate. ▪ Workers will be aware of potentially slippery surfaces and wear proper footwear.	
	Slips, Trips, Falls	▪ Workers will be aware of potentially slippery surfaces and tripping hazards. ▪ Work slowly during transit. Jumping, running, and horseplay are prohibited. ▪ Workers will keep all areas clean and free of debris to deter any unnecessary trips and falls. ▪ Clean up all spills immediately. ▪ Personnel will notify the SSO of any unsafe conditions	
	Worker injury (slips, trips, and falls) due to uneven site surface	▪ Worker visual inspection (attention) to walking/working surface. ▪ Wearing appropriate safety footwear properly (such as boots with ankle support, laces tied, proper soles,etc.).	
	Biological Hazards (ticks, bees, mosquitoes, snakes, etc.)	▪ Personnel will be aware of potential exposure to biological hazards. ▪ Wear appropriate clothing (hat, long-sleeve shirt, long pants, gloves, boots etc.) and insect repellant.	

	Site Hazards Material Exposure	▪ Training and safety awareness of potential exposure to contaminates at the site. ▪ Training of all personnel decontamination procedures (if appropriate to visit). ▪ Appropriate PPE will be worn dependent on site conditions and actions levels. (if appropriate to visit) ▪ Must sign off on health and safety plan. ▪ Visitor will be escorted around site by a 40 hour trained individual unless cleared with the SSO.	
	Insects, rodents, animals, etc.	▪ Wear Tyvek coveralls. Apply bug repellant spray or lotion to exposed skin.	
	Vegetation	▪ Create a clear path or route with mechanical equipment, whenever possible. Wear appropriate PPE for the vegetation (i.e. leather gloves, Carhart coveralls and face shield for vegetation that could cause cuts/punctures and/or is higher than waist level.	

Training Requirements:

Visitors will report to the Site Safety Officer who will give a short health and safety orientation and require sign off on the PSP. The SSO will determine if the visitor can access the site based on verification of 40-hour training or 8 hour Supervisor training or if the visitor(s) will need to be escorted by a 40-hour trained individual onsite.

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical qualification, training and fit testing must be received on an annual basis for individuals that wear a respirator. If an individual wears a respirator more than 30 days per year, or they are exposed at or above the Permissible Exposure Limit (PEL) of chemical for more than 30 days in a year, then they must participate in a Medical Surveillance Program as required by 29 CFR 1910.120 (f).

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Site Visit or Site Walk

AHA No. 002

Project Name & Number: Con Edison Greenburgh Former Holder Site, Site Characterization 443562	**AHA No.** 002	**Date:** March 8, 2007	**New:** Yes
Location: Greenburgh, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Chmura	**Date:** March 8, 2007
	Superintendent/Competent Person	**Reviewed by:**	**Date:**
Work Operation: Site Visit or Site Walk		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Site visit/walk	Slips, Trips, Falls	▪ Workers will be aware of potentially slippery surfaces and tripping hazards. ▪ Work slowly during transit. Jumping, running, and horseplay are prohibited. ▪ Workers will keep all areas clean and free of debris to deter any unnecessary trips and falls. ▪ Clean up all spills immediately. ▪ Personnel will notify the SSO of any unsafe conditions	▪ Inspect job site and staging area and identify any concerns. ▪ Inspect job site daily.
	Rain	▪ Have proper PPE (i.e. rain gear, footwear, etc) available. Be aware of slip hazards, puddles, etc.	
	Sunshine	▪ Have sunscreen available for ultraviolet protection. Have water for dehydration.	
	Snow	▪ Have warm clothes available for cold temperatures.	
	Lightning	▪ Do not begin or continue work until lightning subsides for 20 minutes.	
	High winds, dust storm	▪ Wear goggles if dust/debris is visible.	
	Icy Conditions	▪ Salt/sand icy surfaces as appropriate. ▪ Workers will be aware of potentially slippery surfaces and wear proper footwear.	

	Site Traffic	▪ Be aware of moving equipment/vehicles onsite. ▪ Make eye contact with equipment/vehicle operators prior to moving into their path or reach of moving parts.	
	Cold and Heat Stress	▪ Visitors will dress accordingly to prevent injuries from extreme heat, or cold. ▪ SSO will monitor for cold/heat stress symptoms.	
	Biological Hazards (ticks, bees, mosquitoes, snakes, etc.)	▪ Personnel will be aware of potential exposure to biological hazards. ▪ Wear appropriate clothing (hat, long-sleeve shirt, long pants, gloves, boots etc.) and insect repellant.	
	Site Hazards Material Exposure	▪ Training and safety awareness of potential exposure to contaminates at the site. ▪ Training of all personnel decontamination procedures (if appropriate to visit). ▪ Appropriate PPE will be worn dependent on site conditions and actions levels. (if appropriate to visit) ▪ Must sign off on health and safety plan. ▪ Visitor will be escorted around site by a 40 hour trained individual unless cleared with the SSO.	

Training Requirements:

Visitors will report to the Site Safety Officer who will give a short health and safety orientation and require sign off on the PSP. The SSO will determine if the visitor can access the site based on verification of 40-hour training or 8 hour Supervisor training or if the visitor(s) will need to be escorted by a 40-hour trained individual onsite.

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical qualification, training and fit testing must be received on an annual basis for individuals that wear a respirator. If an individual wears a respirator more than 30 days per year, or they are exposed at or above the Permissible Exposure Limit (PEL) of chemical for more than 30 days in a year, then they must participate in a Medical Surveillance Program as required by 29 CFR 1910.120 (f).

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Operation- Motor Vehicle

AHA No. 003

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 443562	**AHA No.** 003	**Date:** March 8, 2007	**New:** Yes
Location: Greenburgh, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Chmura	**Date:** March 8, 2007
	Superintendent/Competent Person	**Reviewed by:**	**Date:**
Work Operation: Operation of Motor Vehicle		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Driving to and from the job site	Vehicle Accident	▪ All Parsons' employees shall complete the ParsonsU safety module on Defensive Driving. ▪ Plan your travel route and check maps for directions or discuss with colleagues. ▪ Complete a Vehicle Inspection Report before driving and check for proper equipment/supplies. ▪ Clean windows and mirrors as needed throughout the trip. ▪ Have sun glasses available to reduce sun glare and wear as needed. ▪ Follow vehicle maintenance schedule to reduce possibilities of breakdown while driving.	▪ Inspect all fluid level, air pressure in tires, adjust mirrors and seat positions appropriately, watch fuel level and fill up when level is low.
	Distraction while driving	▪ Stop driving a vehicle, regardless of the speed (i.e. even 5 mph) or location (i.e. private road), when the potential of being distracted by conversation exists. ▪ Drivers are prohibited from using communication devices (e.g., cell phones) while operating any motor vehicle.	

	Fatigue/Falling asleep	▪ Get adequate rest prior to driving. ▪ Pull over and rest if experiencing drowsiness ▪ Change seat position, stretch, open the window, adjust radio if experiencing drowsiness.	
	Weather /Road conditions	▪ Check road and weather conditions prior to driving. ▪ Be prepared to adjust driving if conditions change. ▪ Travel in daylight hours if possible. ▪ Give yourself plenty of time to allow for slow downs due to construction, accidents, or other unforeseen circumstances. ▪ Use lights at night and lights/wipers during inclement weather.	
	Theft/Crime of parked vehicle	▪ Lock the vehicle when driving and when parked. ▪ Use ant-theft deterrents (e.g., the club, visible alarm indicators, etc.) ▪ Park in well lit areas. ▪ Hide valuables	

Training Requirements:

All drivers are required to have a current valid driver's license and all vehicles must have the required State vehicle registration and/or inspection documentation. It is company policy that all wireless device use, whether "hand-held" or "hands free", ***is prohibited*** while driving any vehicle at any time as follows: for business use *at any time*; or for *personal use* during business hours; and as defined by law.

All employees operating a Company vehicle are required to familiarize themselves with the contents of the AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Operation- Heavy Equipment or Machinery

AHA 004

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 004	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
Work Operation: Operation of Heavy Equipment or Machinery	**Superintendent/Competent Person:** TBD	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
		Approved by:	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Motorized Equipment Operation	Equipment Maintenance	▪ The equipment must be maintained in a proper functioning condition. ▪ All motors must be shut off and electrical, mechanical and hydraulic components locked when making repairs. ▪ Safety shut off system must be tested daily and not disabled. ▪ Bleed off pressure on hydraulic lines before undoing fittings. ▪ Do not leave tools or parts loose on the equipment after maintenance has been performed.	▪ Follow the maintenance manual recommended procedures for each piece of equipment.
	General Use	▪ All equipment must be inspected daily prior to use. ▪ Equipment must be operated and maintained in accordance to manufacturer's guidelines. ▪ Any equipment that is unattended must be immobilized and secured against accidental movement. ▪ All heavy equipment will have a back up alarm ▪ Drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and geologists must be aware of the	

		location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller and helper shall not simultaneously handle augers unless there is a standby person to activate the emergency stop; ▪ The driller must never leave the controls while the tools are rotating unless all personnel are kept clear of rotating equipment; ▪ A remote sampling device must be used to sample drill cuttings if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment; ▪ Drillers, helpers and geologists must secure all loose clothing when in the vicinity of drilling operations; ▪ Only equipment that has been approved by the manufacturer may be used in conjunction with site equipment and specifically to attach sections of drilling tools together. Pins that protrude excessively from augers shall not be allowed; ▪ No person shall climb the drill mast while tools are rotating; and ▪ No person shall climb the drill mast without the use of ANSI-approved fall protection (approved belts, lanyards and a fall protection slide rail) or portable ladder that meets the requirements of OSHA standards.	
	Fire Hazard	▪ All motors must be shut off during refueling. • Smoking in the vicinity of the drilling rig is not permitted. • An A-B-C fire extinguisher must be maintained on the drilling rig and associated motorized equipment. • Fuel containers will not be stored within 10' of the drilling rig motor. • Fuel will be stored in UL approved safety containers with contents clearly label.	
	Operation of Motorized Equipment	▪ Operators of motorized equipment will be trained in the	

		proper operation of that apparatus.	
	Tip Over	▪ Equipment will be shut off and stabilized accordingly. ▪ Visual inspection of access route to sampling areas for soft spots, holes, rocks, etc. ▪ Operator Training ▪ Rollover protection (cab or equivalent)	
	Struck By Pinch Points	▪ All personnel will be aware of moving machinery and parts and wear appropriate PPE when near machinery (e.g., hard hat, safety glasses, gloves etc.). ▪ Keep observers back from active operations. Get operator's attention before approaching.	
	Noise Exposure	▪ Hearing protection will be worn in hazardous noise areas or working around heavy machinery or equipment. ▪ Wear earplugs when noise level from equipment exceeds 85 decibels (dBA) averaged over an eight-hour day.	

Training Requirements:

All personnel engaged in the operation of heavy equipment and machinery will have knowledge and experience in working with and operating the equipment. All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Fueling-Motor Vehicle

AHA No. 005

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 005	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
	Superintendent/Competent Person	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
Work Operation: Fueling of motor vehicle		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Fueling the vehicle	Overflow/Spills of fuel on to pavement.	▪ Ensure that fuel pumps have a UL listed automatic closing valve. ▪ Follow distributors instructions on pump. ▪ Use approved safety containers. ▪ Be aware of capacity of fuel tank/container. ▪ Do not "squeeze in" extra gasoline to fill up tank. ▪ Inform gas station attendant of fuel spill.	▪ Follow operations manual maintenance and inspection procedures for each piece of equipment used on site.
	Explosion	▪ Follow distributors instructions on pump. ▪ Ensure that all fuel is in approved safety containers. ▪ No smoking or open flame with in 50 feet. ▪ Equipment/Motors that use flammable fuel shall be shut down during fueling, servicing, or maintenance. ▪ Turn cell phones off during fueling of vehicle.	
	Spill on clothing	▪ Workers should be aware of capacity of fuel tank. ▪ Wear gloves while fueling. ▪ Change clothing if saturated with fuel.	

Training Requirements:

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Fueling-Heavy Equipment and Machinery

AHA No. 006

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 006	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
	Superintendent/Competent Person	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
Work Operation: Fueling of equipment and machinery		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Fueling the equipment	Overflow/Spills of fuel on to pavement	▪ Ensure that fuel pumps have a UL listed automatic closing valve. ▪ Be aware of capacity of fuel tank. ▪ Do not "squeeze in" extra fuel to fill up tank. ▪ Have berms or absorbent pads available. ▪ All fluid containing vehicles and equipment involved on the project site (except for properly parked personal vehicles) spotted on non-impervious surfaces (e.g., soil, bluestone, etc) will be parked over full length/width of vehicle equipment polyethylene sheeting	▪ Follow operations manual maintenance and inspection procedures for each piece of equipment used on site.
	Explosion	▪ Ensure that all fuel is in approved safety containers. ▪ No smoking or open flame with in 50 feet. ▪ Equipment/Motors that use flammable fuel shall be shut down during fueling, servicing, or maintenance. ▪ Turn cell phones off during refueling vehicle. ▪ Ensure that all heavy equipment has a fire extinguisher and that the fire extinguisher is readily accessible.	▪ The fire extinguishers must be inspected and approved at specific intervals.

	Spill on clothing	▪ Workers should be aware of capacity of fuel tank. ▪ Wear gloves while fueling. ▪ Change clothing if saturated with fuel.	
	Site Location	▪ Provide refueling driver with directions to site and accessible route to equipment/machinery. ▪ Ensure that there is road (gravel, mats) for refueling truck to drive/park on.	
	Hazardous Site contamination	▪ Decontaminate equipment/machinery prior to refueling and remove from exclusion zone. ▪ Decontaminate refueling truck if contact with potential contaminated material. ▪ Provide training/awareness to driver, escort on site if need be.	

Training Requirements:

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Sampling- Soil

AHA 007

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 007	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
Work Operation: Soil Sampling- (e.g., split spoon drilling etc.)	**Superintendent/Competent Person:** TBD	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
		Approved by:	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Soil Sampling	▪ Inhalation of contaminated dust ▪ Inhalation of volatile contaminants ▪ Ingestion of contaminants ▪ Skin/eye contact with contaminated materials	▪ If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. ▪ Wash eyes with large amounts of water. ▪ If a person breathes in a large amount of organic vapor, move the exposed person to fresh air. Perform artificial respiration if breathing stops. ▪ Obtain medical treatment for all of these situations as required. ▪ Wear appropriate safety equipment (i.e., goggles, gloves, and boots) as appropriate for reducing risk of contamination.	
	Pinch Points/Overhead equipment	▪ All personnel will be aware of moving machinery and parts and wear appropriate PPE when near machinery (e.g., hard hat, safety glasses, gloves etc.). ▪ Keep observers back from active operations. Get operator's attention before approaching.	

	Noise Exposure	▪ Hearing protection will be worn in hazardous noise areas or working around heavy machinery or equipment. ▪ Wear earplugs when noise level from equipment exceeds 85 decibels (dBA) averaged over an eight-hour day.	
General Chemical Exposure	Chemical exposure to chlorinated hydrocarbons, petroleum hydrocarbons	▪ Monitoring to determine exposure and action levels	
		▪ Dust control measures such as wetting down of soil	
		▪ Wear proper PPE – inner glove and nitrile outer glove, Tyvek, and respirator (if necessary)	
		▪ Follow proper decontamination procedures when leaving the "exclusion zone"	
		▪ Practice good personal hygiene; wash up before eating, eat or drink in designated clean areas	
		▪ Eyewash bottle or station to treat eye irritation	
		▪ Training	
General Worker Activities	Worker injury (slips, trips, and falls) due to uneven site surface	▪ Worker visual inspection (attention) to walking/working surface	
		▪ Wearing appropriate safety footwear properly (such as boots with ankle support, laces ties, proper soles, etc.)	
		▪ Training	
Mobilization of drill rig or excavator	Vehicle equipment accidents (rollover) due to uneven site surface	▪ Visual inspection of access route to sampling areas for soft spots, holes, rocks, etc.	
		▪ Operator training	
		▪ Rollover protection (cab or equivalent)	
	Vehicle equipment accidents due to overhead power lines and structures	▪ Visual inspection of access route	

		▪ Operator training	
	Open Holes from excavation	▪ Use barricades around excavation (as required)	
	Underground utilities	▪ Call Dig Safely New York One Call Center to have utility companies check site.	
	Pinch hazards of equipment	▪ Review Standard Operating Procedures (SOP) for equipment	
		▪ No loose clothing or jewelry while operating equipment	
	Flying objects	▪ Wear appropriate PPE (such as safety glasses and hard hats. Goggles if a splash hazard. Face shield for more severe exposure.	
Procuring sample from excavator bucket and placing in sample container	Struck by overhead hazards	▪ Wear hard hat	
		▪ Pay attention to equipment operator (equipment operator must pay attention to you too!)	
		▪ Do not position your body between equipment and a fixed point if possible	
		▪ Be in communication with each other (radio, hand signals or verbal communication)	
Field Testing	Exposure to analytical chemicals	▪ Follow SOP with field kit or field instrument for handling analytical chemicals or instrument	
Packing samples for off-site shipment to lab	Accidental breakage of glass bottles	▪ Wear cut-resistant gloved during packaging of glass bottles	
		▪ Training	
	Chemical Exposure	▪ Wear necessary PPE (see potential chemical exposure section above and/or field kit SOP)	
		▪ Immediate clean-up of spills	
Backfilling Excavation	Worker engulfment (when hole is large enough to enter)	▪ Check excavation prior to backfilling	

De-mobilization of drill rig	Uneven site surface (rollover)	▪ Visual inspection of access route to sampling areas for soft spots, holes, rocks, etc.	
		▪ Operator training	
		▪ Rollover protection (cab or equivalent)	
	Vehicle equipment accidents due to overhead power lines and structures	▪ Visual inspection of access route	
		▪ Operator training	
	Equipment Contamination	▪ Decontamination (see HASP)	
		▪	

Training Requirements:

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical qualification, training and fit testing must be received on an annual basis for individuals that wear a respirator. If an individual wears a respirator more than 30 days per year, or they are exposed at or above the Permissible Exposure Limit (PEL) of chemical for more than 30 days in a year, then them must participate in a Medical Surveillance Program as required by 29 CFR 1910.120 (f).

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Sampling- Processing

AHA 08

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 08	**Date:** December 5, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** T. Drachenberg	**Date:** December 5, 2005
Work Operation: Sediment Sampling- (e.g., split spoon drilling etc.)	**Superintendent/Competent Person:** TBD	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
		Approved by:	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Packing sample for off-site shipment to lab	Accidental breakage of glass bottles	▪ Wear cut-resistant gloves during packaging of glass bottles. ▪ Immediate clean-up of spills.	
	Back Injury, muscle strain/stress	▪ Personnel will utilize proper lifting techniques or ask for help with moving/lifting objects.	
	Hazardous Material Exposure	▪ Training and safety awareness of potential exposure to contaminates at the site and decontamination procedure. ▪ Appropriate PPE will be worn (e.g., safety glasses, gloves, etc.). ▪ Personnel will follow decontamination procedure. ▪ Screen for COCs with PID and mercury meter analyzer over samples and in workers breathing zone. ▪ Ventilate work area with fans or vents	

	Slips, Trips, Falls	▪ Workers will be aware of potentially slippery surfaces and tripping hazards. ▪ Workers will keep all areas clean and free of debris to deter any unnecessary trips and falls. ▪ Personnel will clean up all spills immediately. ▪ Personnel will notify the SSO of any unsafe conditions	
	Heat and Cold Stress	▪ The SSO will implement the cold/heat stress control program as appropriate to conditions. ▪ SSO will monitor workers for heat/cold stress symptoms.	
	Eye Injury	▪ PPE (safety glasses, etc.) will be worn.	

Training Requirements:

All personnel shipping hazardous materials will have appropriate DOT training.

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical qualification, training and fit testing must be received on an annual basis for individuals that wear a respirator. If an individual wears a respirator more than 30 days per year, or they are exposed at or above the Permissible Exposure Limit (PEL) of chemical for more than 30 days in a year, then them must participate in a Medical Surveillance Program as required by 29 CFR 1910.120 (f).

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Decontamination- Large Equipment

AHA 09

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 09	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
Work Operation: Equipment Decontamination	**Superintendent/Competent Person:** TBD	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
		Approved by:	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Process items through decontamination in accordance with the PSP	Site Hazardous Material Exposure	▪ Training and safety awareness of potential exposure to contaminates at the site and decontamination procedure. ▪ Appropriate PPE will be worn. ▪ Personnel will follow decontamination procedure ▪ All equipment brought on site will come to the site free of contamination. Decontamination of previously (off-site) contaminated equipment on site is prohibited.	
	Slips, Trips, Falls	▪ Workers will be aware of potentially slippery surfaces and tripping hazards. ▪ Workers will keep all areas clean and free of debris to deter any unnecessary trips and falls. ▪ Personnel will clean up all spills immediately. ▪ Personnel will notify the SSO of any unsafe conditions.	
	Heat and Cold Stress	▪ The SSO will implement the cold/heat stress control program as appropriate to conditions.	
	Eye Injury	▪ PPE (safety glasses, etc.) will be worn.	

Hot Water High Pressure Spray/Steam Clean	Hot Water Burns	▪ Prior to decontamination of large equipment, personnel will ensure that all other workers are outside of the decontamination areas. ▪ Personnel will wear appropriate PPE (e.g. gloves, tyvek, splash goggles, etc.). ▪ Face shield is required when using a pressure washer	
	Icing of Equipment	▪ Visually inspect equipment following decontamination to identify ice building that may be present in joints/moving parts of the equipment.	
	Icy Conditions	▪ Salt/sand icy surfaces that may be created in and around the decontamination areas as appropriate.	
	Spill/Leak of contaminated Water	▪ Decontamination area will be designed to collect all contaminated wash/rinse water and to prevent the spread of run off. ▪ Berms and absorbent pads will be available for use in controlling spills.	

Training Requirements:

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical qualification, training and fit testing must be received on an annual basis for individuals that wear a respirator. If an individual wears a respirator more than 30 days per year, or they are exposed at or above the Permissible Exposure Limit (PEL) of chemical for more than 30 days in a year, then them must participate in a Medical Surveillance Program as required by 29 CFR 1910.120 (f).

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Decontamination- Personnel

AHA 010

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 010	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
Work Operation: Personnel Decontamination	**Superintendent/Competent Person:** TBD	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
		Approved by:	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontaminate personnel exiting from the Exclusion zone	General	▪ Personnel should dress in suitable safety equipment to reduce exposure. ▪ Personnel will follow decontamination procedure ▪ Collect rinse water and dispose of per appropriate standard operating procedures. ▪ Follow decontamination procedures.	
	Site Hazardous Material Exposure	▪ Training and safety awareness of potential exposure to chemicals of concern at the site and decontamination procedure. Review chemicals of concern. ▪ Appropriate PPE will be worn (e.g. tyvek, nitrile gloves, safety glass, etc.).	
	Slips, Trips, Falls	▪ Chairs or stools will be available for sitting/balancing while removing PPE. ▪ Workers will be aware of potentially slippery surfaces and tripping hazards. ▪ Workers will keep all areas clean and free of debris to deter any unnecessary trips and falls.	

		▪ Clean up all spills immediately. ▪ Personnel will notify the SSO of any unsafe conditions.	
	Heat and Cold Stress	▪ The SSO will implement the cold/heat stress control program as appropriate to conditions.	
	Icy Conditions	▪ Salt/sand icy surfaces that may be created in and around the decontamination areas as appropriate.	
	Eye Injury	▪ PPE (safety glasses, splash goggles) will be worn.	

Training Requirements:

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to, initial 40-hour, 8-hour Supervisor and annual 8-hour refresher.

Medical qualification, training and fit-testing must be received on an annual basis for individuals that wear a respirator. If an individual wears a respirator more than 30 days per year, or they are exposed at or above the Permissible Exposure Limit (PEL) of a chemical for more than 30 days in a year, then they must participate in a Medical Surveillance Program as required by 29 CFR 1910.120(f)

All assigned employees working at potentially contaminated sites are required to familiarize themselves with this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Decontamination- Portable Tools

AHA 011

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 011	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
Work Operation: Tool Decontamination	**Superintendent/Competent Person:** TBD	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
		Approved by:	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
General	Site Hazardous Material Exposure	▪ Training and safety awareness of potential exposure to contaminates at the site and decontamination procedures. ▪ Appropriate PPE will be worn (e.g., gloves, splash goggles, Tyvek, etc.). ▪ Personnel will follow decontamination procedures. ▪ All tools brought on site will come to the site free of contamination. Decontamination of previously (off-site) contaminated equipment on site is prohibited.	
	Eye Injury	▪ PPE (safety glass, etc.) will be worn.	
	Slips, Trips, Falls	▪ Workers will be aware of potentially slippery surfaces and tripping hazards. ▪ Workers will keep all areas clean and free of debris to deter any unnecessary trips and falls. ▪ Personnel will clean up all spills immediately. ▪ Personnel will notify the SSO of any unsafe conditions.	
Remove gross contamination with brush.	Damaging equipment or tools	▪ To clean instrumentation: follow manufacturer's instructions.	

Place in decontamination bucket or rinse with decontamination solution	Spill/leakage	▪ Workers will have berms or spill absorbent pads nearby to prevent the spread of contaminated water. ▪ Decontamination area will be designed to minimize exposure and maintain spill containment.	
Clean with wash solution	Chemical reaction with wash solution	▪ A fire extinguisher will be located in an accessible location on site. ▪ Review the chemicals of concern and use appropriate wash solution.	
Rinse with water	Contamination remains	▪ Personnel will repeat proper decontamination procedure.	
	Icy Conditions	▪ Salt/sand icy surfaces that may be created in and around the decontamination areas as appropriate.	
	Icing of Equipment	▪ Visually inspect equipment following decontamination to identify ice building that may be present in joints/moving parts of the equipment.	

Training Requirements:

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8-hour Supervisor and annual 8-hour refresher training.

Medical qualification, training and fit testing must be received on an annual basis for individuals that wear a respirator. If an individual wears a respirator more than 30 days per year, or they are exposed at or above the Permissible Exposure Limit (PEL) of chemical for more than 30 days in a year, then them must participate in a Medical Surveillance Program as required by 29 CFR 1910.120 (f).

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Hot Work

AHA 012

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 012	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
	Superintendent/Competent Person	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
Work Operation: Hot Work		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Hot Work (welding, open flame)	Burns, eye injuries	▪ Wear appropriate PPE (e.g., think leather welding gloves, welding shield/ goggles with appropriate filtered lenses; long sleeves and pants, etc.). ▪ During welding operations all employees not performing the work or providing assistance will remain back from the work zone. ▪ Utilize welding curtains to protect co-workers or the public from welding flash.	
	Fire/ Explosion	▪ Complete Hot Work Permit ▪ Have adequate fire suppression available in immediate work area. ▪ Inspect all torches, tanks, hoses prior to starting. ▪ Remove all flammable material around the work area. ▪ Provide a firewatcher. ▪ Ensure that all fuel valves and torch supply valves are shut off when not in use. ▪ Ensure that all cylinders are properly marked and kept away from heat sources.	

	Rain	▪ Be aware of work conditions and do not work in wet areas.	
	Slips, Trips, Falls	▪ Workers will be aware of potentially slippery surfaces and tripping hazards. ▪ Workers will keep all areas clean and free of debris to deter any unnecessary trips and falls. ▪ Personnel will notify the SSO of any unsafe conditions.	
	Injury from Power Tool Operation	▪ All tools will be in good working order and properly grounded. ▪ No damaged equipment will be issued until repaired or replaced. ▪ When power operated tools are designed to accommodate guards, the guard must be in place on the tool.	▪ Follow operations and maintenance procedures for each piece of equipment used on site.
	Lack of Communication	▪ Prior to commencement of daily activities, the methods of communication will be discussed. ▪ Personnel will have access to a cell phone or other means of communication. ▪ The activities for the day will be discussed and understood prior to daily start up with review of safety issues. ▪ Batteries will be checked and recharged prior to start of days work.	

Training Requirements: All personnel engaged in the hot work will have knowledge and experience working with welding equipment, torches and other necessary equipment. All necessary certification and permits will be provided prior to start of work. All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Lifting/Hoisting

AHA 014

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 013	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
	Superintendent/Competent Person	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
Work Operation: Trench Excavation		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Site Area Preparation	Vehicle and heavy equipment traffic in work area	▪ Operation of heavy equipment in accordance with the Project Safety Plan. ▪ Be alert when working around heavy equipment. ▪ No heavy equipment will be operated without a ground guide (someone on the ground guiding the equipment operator). ▪ Barriers, warning signs, designated walkways or other safeguards must be provided where pedestrians are exposed to the risk of collision.	Follow operations manual maintenance and inspection procedures for each piece of equipment used on site.
Excavation	Contact with underground or overhead utilities	▪ Verify utilities and other hazards above and below ground have been cleared. Contact the UFPO to clear underground utilities. ▪ The excavation equipment cannot be operated within 10 feet of power lines up to 50kV. Additional distances for excavations in the vicinity if higher voltage power lines are required	Have a competent person on site during excavation. Complete the appropriate excavation work permits.
	Excavation collapse	▪ Verify proper engineering controls are implemented (sloping, benching or protective devices) are being initiated. ▪ Keep stockpiled material at least 2 feet from the edge of the trench. ▪ Have appropriate stairs, ladders or ramps every 25 feet if	Competent person will verify that engineering controls are appropriate for site conditions and stability of soil.

		trench is deeper than 4 feet and personnel are entering trench. ▪ Competent person to verify stability of soil on each day, after change in weather ▪ Backfill trench as soon as possible after work is complete to prevent potential safety issues. Trenches will not remain open overnight.	
	Slips, Trips, Falls	▪ Have appropriate signs and barriers with in the excavation area. ▪ Keep observers away from excavation ▪ Place a fence or barricade around trench if leaving it open after work hours.	
	Pinch Points	▪ Maintain awareness of procedures underway and be attentive of work operations. ▪ Wear hard hats when around machinery and equipment. ▪ Keep observers back from active operations. Get operators attention before approaching.	

Training Requirements:

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8-hour Supervisor and annual 8-hour refresher training.

Medical qualification, training and fit testing must be received on an annual basis for individuals that wear a respirator. If an individual wears a respirator more than 30 days per year, or they are exposed at or above the Permissible Exposure Limit (PEL) of chemical for more than 30 days in a year, then them must participate in a Medical Surveillance Program as required by 29 CFR 1910.120 (f).

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

PARSONS

Activity Hazards Analysis

Lifting/Hoisting

AHA 014

Project Name & Number: Con Edison Greenburgh Former Holder Site Site Characterization 441635	**AHA No.** 018	**Date:** December 7, 2005	**New:** Yes
Location: New Rochelle, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Level D- Long pants, safety glasses, hard hat, steel-toed boots, gloves (task dependent)	**Analysis by:** S. Blauvelt	**Date:** December 7, 2005
	Superintendent/Competent Person	**Reviewed by:** J. O'Loughlin	**Date:** December 8, 2005
Work Operation: Material Handling		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Lifting	Crane Lifting	▪ Lifting devices will be appropriate for the lifting or moving task and will only be operated by trained and authorized personnel. ▪ Objects that require special handling or rigging will only be moved under the guidance of a person who has specifically been trained to move such objects ▪ Lifting devices (including equipment, slings, ropes, chains, and straps) will be inspected, certified, and labeled to confirm their weight capacities. Defective equipment will be taken out of service immediately and repaired or destroyed. ▪ The wheels of any trucks being loaded or unloaded will be chocked to prevent movement. Outriggers will be extended on a flat, firm surface during operation. ▪ The lift and swing path of a crane/equipment will be watched and maintained clear of obstructions. ▪ Personnel will not pass under a raised load, nor will a suspended load be left unattended. ▪ Personnel will not be carried on lifting equipment, unless it is specifically designed to carry passengers.	▪ Documentation must be provided to the SSO demonstrating the authorization of the crane operator (i.e., Operator's license) ▪ Lifting & Hoisting permit must be completed by the Crane Operator

		▪ All reciprocating, rotating, or other moving parts will be guarded at all times. ▪ Accessible fire extinguishers will be available in all mechanical lifting devices. ▪ All material must be stored in tiers, racked, blocked, or otherwise secure to prevent sliding, falling, or collapse. ▪ Verify all loads/material are secure before transportation.	
	Personal Injury	▪ Whenever possible, lift heavy objects by mechanical devices rather than by manual effort	

Training Requirements:

All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity and review it with their Supervisor during their Daily Safety Huddle.

Notes:

Materials handling tasks that are unusual or require specific guidance will need a written addendum to this Project Safety Plan (PSP). The addendum must identify the lifting protocols and must be submitted to Con Edison for their approval, before the tasks are performed. Upon approval, the plan must be reviewed with all affected employees and documented. Any deviation from a written plan will require approval by contractor management and Con Edison.

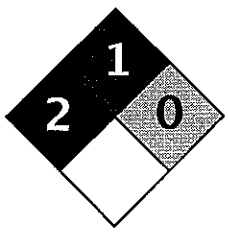
ATTACHMENT D

MATERIAL SAFETY DATA SHEET

ATTACHMENT D

MATERIAL SAFETY DATA SHEETS

ScienceLab.com
Chemicals & Laboratory Equipment



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Acenaphthene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acenaphthene

Catalog Codes: SLA2332

CAS#: 83-32-9

RTECS: AB1000000

TSCA: TSCA 8(b) inventory: Acenaphthene

CI#: Not applicable.

Synonym: Ethylenenaphthalene

Chemical Name: 1,8-Dehydroacenaphthalene

Chemical Formula: C10H6(CH2)2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acenaphthene	83-32-9	100

Toxicological Data on Ingredients: Acenaphthene LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at

least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Flammable in presence of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Combustible.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid needles.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 154.21 g/mole

Color: White.

pH (1% soln/water): Not applicable.

Boiling Point: 277.5°C (531.5°F)

Melting Point: 93.6 (200.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.02 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol.

Solubility:
Partially soluble in methanol.
Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: Acenaphthene
Massachusetts RTK: Acenaphthene
New Jersey: Acenaphthene
TSCA 8(b) inventory: Acenaphthene
CERCLA: Hazardous substances.: Acenaphthene

Other Regulations: Not available.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC): R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent.
Splash goggles.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.

Other Special Considerations: Not available.

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Last Updated: 10/09/2005 03:35 PM

HIGH-PURITY STANDARDS -- ARSENIC
MATERIAL SAFETY DATA SHEET
NSN: 681000N065017
Manufacturer's CAGE: 0YZE5
Part No. Indicator: A
Part Number/Trade Name: ARSENIC

General Information

Company's Name: HIGH-PURITY STANDARDS
Company's P. O. Box: 30188
Company's City: CHARLESTON
Company's State: SC
Company's Country: US
Company's Zip Code: 29417
Company's Emerg Ph #: 803-556-3411
Company's Info Ph #: 803-556-3411
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 01MAR95
Safety Data Review Date: 16OCT95
MSDS Serial Number: BZRFZ

Ingredients/Identity Information

Proprietary: NO
Ingredient: ARSENIC; (AS) (SARA 313) (CERCLA)
Ingredient Sequence Number: 01
Percent: 0.1
NIOSH (RTECS) Number: CG0525000
CAS Number: 7440-38-2
OSHA PEL: SEE 1910.1018
ACGIH TLV: 0.01 MG/M3, A1

Proprietary: NO
Ingredient: NITRIC ACID;(HNO*3) (SARA 302/313) (CERCLA)
Ingredient Sequence Number: 02
Percent: 2
NIOSH (RTECS) Number: QU5775000
CAS Number: 7697-37-2
OSHA PEL: 2 PPM
ACGIH TLV: 2 PPM/4 STEL

Proprietary: NO
Ingredient: SUP DAT: SUFFICIENT CONC CAUSES CYANOSIS. ONSET OF THIS CNDTN MAY BE DELAYED 2-4 HRS/EVEN LONGER. ARSENIC & ITS(ING 4)
Ingredient Sequence Number: 03
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 3: CMPDS CAUSE SYMP CHARACT BY CONSTRICTION OF THROAT FOLLOWED BY DYSPHAGIA, EPIGASTRIC PAIN, VOMIT & WATERY (ING 5)
Ingredient Sequence Number: 04
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 4: DIARR. BLOOD MAY APPEAR IN VOMITUS & STOOL. IF AMT INGESTED IS SUFFICIENTLY HIGH, SHOCK MAY DEVELOP DUE (ING 6)

Ingredient Sequence Number: 05
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 5: TO SEV FLUID LOSS. CONTINUED POIS BY INGEST CAN CAUSE WT LOSS, NAUS, DIARR ALTERNATING W/CONSTIPATION, (ING 7)
Ingredient Sequence Number: 06
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 6: PIGMENTATION & ERUPTION OF SKIN, LOSS OF HAIR, & PERIPHERAL NEURITIS. POLYNEURITIS MAY ALSO RESULT. (ING 8)
Ingredient Sequence Number: 07
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 7: HORIZONTAL WHITE LINES (STRIATIONS) ON FINGERNAILS & TOENAILS ARE COMMONLY SEEN W/CHRONIC EXPOS & ARE (ING 9)
Ingredient Sequence Number: 08
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 8: CONSIDERED TO BE DIAGNOSTIC ACCOMPANIMENT OF ARSENICAL POLYNEURITIS. IF ARSENIC POIS OCCURS DUE TO (ING 10)
Ingredient Sequence Number: 09
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 9: INHAL, COUGH, CHEST PAIN, DYSPNEA, HDCH & EXTREME GEN WEAK PRECEDE GI SYMP. ACUTE POIS DUE TO INHAL IS (ING 11)
Ingredient Sequence Number: 10
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 10: RARE IN INDUS, BUT CHRONIC BRTHG OF INORG ARSENIC CMPDS IS THE MOST COMMON CAUSE OF HAZ IN WORK PLACE. (ING 12)
Ingredient Sequence Number: 11
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 11: THIS CNDTN IS DIVIDED INTO 3 PHASES BASED ON DISTRESS SIGNS & SYMP: PHASE I: VICTIM DEVELOPS WEAK, LOSS (ING 13)
Ingredient Sequence Number: 12
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 12: OF APPETITE, NAUS, OCCAS VOMIT, STOM DISCOMFORT & SOME DIARR. PHASE II: CONJUNC & CATARRHAL STATE OF (ING 14)

Ingredient Sequence Number: 13
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 13: MUC MEMB OF NOSE, LARYNX & RESP PASSAGES DEVELOPS. CORYZA, HOARSENESS, & MILD TRACHEOBRONCHITIS MAY (ING 15)
Ingredient Sequence Number: 14
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 14: OCCUR. PERFORATION OF NASAL SEPTUM IS COMMON, & PROBABLY THE MOST TYPICAL LESION OF UPPER RESP TRACT IN (ING 16)
Ingredient Sequence Number: 15
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 15: OCCUP EXPOS TO ARSENIC DUST. SKIN LESIONS, ECZEMATOID & ALLERGIC IN TYPE, ARE COMMON. PHASE III: SYMPS (ING 17)
Ingredient Sequence Number: 16
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 16: OF PERIPHERAL NEURITIS, INITIALLY IN HANDS & FEET, WHICH IS ESSENTIALLY SENSORY, WILL DEVELOP. IN MORE (ING 18)
Ingredient Sequence Number: 17
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 17: SEV CASES, MOTOR PARAL WILL OCCUR. FIRST MUSCLES AFFECTED BY THIS ARE USUALLY TOE EXTENSORS & PERONEI. (ING 19)
Ingredient Sequence Number: 18
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 18: IN ONLY MOST SEV CASES WILL PARAL OF FLEXOR MUSCLES OF FEET/OF EXTENSOR MUSCLES OF HANDS OCCUR. (ING 20)
Ingredient Sequence Number: 19
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 19: ARSENIC IS ALSO CONSIDERED TO BE A MUTAGEN.
Ingredient Sequence Number: 20
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS ODORLESS SOLUTION
Boiling Point: 212F,100C

Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: 1 (H*2O=1)
Solubility In Water: COMPLETE

Fire and Explosion Hazard Data

Flash Point: N/A
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: USE MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: TOXIC GASES PRODUCED: NO, NO*2.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): METALS, HYDROXIDES, CARBONATES, CYANIDES.
Materials To Avoid: STRONG REDUCING AGENTS.
Hazardous Decomp Products: NO, NO*2.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE: ARSENIC & ITS CMPDS CAN BE FATAL IF INHALED, SWALLOWED/ABSORBED THRU SKIN. PRLNG CONT RSLTS IN LOC HYPEREMIA & LATER VESICULAR/PUSTULAR ERUPTION. MOIST MUC MEMB ARE MOST SENSITIVE TO IRRITANT ACTION. CONJUNCTIVA, MOIST & MACERATED AREAS OF SKIN, EYELIDS, ANGLES OF EARS, NOSE, MOUTH & RESP (EFTS OF OVEREXP)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: ARSENIC: IARC MONO, SUPP, VOL 7, PG 100, 1987: GROUP 1. NTP 7TH ANNUAL REPORT ON CARCINS, 1994: KNOWN TO BE (SUP DAT)
Signs/Symptoms Of Overexp: HLTH HAZ: MUCOSA ARE ALSO VULNERABLE TO IRRITANT EFTS. WRISTS ARE COMMON SITE OF DERM. ARSENIC IS ALSO CAPABLE OF PRODUCING KERATOSES, ESPECIALLY TO PALMS & SOLES. THERE IS SUFFICIENT EVIDENCE THAT SUPPORTS FACT THAT SKIN CANCER IN HUMANS IS ASSOC W/EXPOS TO INORG ARSENIC CMPDS IN DRUGS, DRINKING WATER & IN (SUP DAT)
Med Cond Aggravated By Exp: BURNS, DERMATITIS, LARYNGEAL SPASM, PULMONARY EDEMA CAN BE AGGRAVATED BY HNO*3.
Emergency/First Aid Proc: CALL MD. INGESTION: DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE WATER, MILK. EYES/SKIN: FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. INHALATION: REMOVE TO FRESH AIR. SUPPORT BREATHING (GIVE OXYGEN OR ARTIFICIAL RESPIRATION) (FP N).

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE SOURCE OF IGNITION IF HYDROGEN IS A HAZARD. PROVIDE OPTIMUM VENTILATION. FLUSH TO HOLDING AREA FOR NEUTRALIZATION.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: FOLLOW FEDERAL, STATE, AND LOCAL REGULATIONS FOR ACID WASTE. EPA HAZARDOUS WASTE #: P010.
Precautions-Handling/Storing: KEEP CONTAINER TIGHTLY CLOSED.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation: LOCAL EXHAUST.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPRVD CHEM WORKERS GOGGS (FP N).
Other Protective Equipment: LAB COAT/APRON: VENT HOOD. EMERGENCY EYEWASH & DELUGE SHOWER MEETING ANSI DESIGN CRITERIA (FP N).
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: CARCIN EXPLAN: CARCIN. OSHA REGULATED: CFR 29 1910.1018. EFTS OF OVEREXP: OCCUP ENVIRON. THERE ARE ALSO CASE REPORTS THAT SUGGEST THAT THERE IS AN ASSOC BETWEEN EXPOS TO ARSENIC CMPDS & BLOOD DYSCRASIAS & LIVER TUMORS. IT MAY CAUSE IRRIT & ABSORPTION INTO BODY WHICH LEADS TO FORMATION OF METHEMOGLOBIN WHICH IN (ING 3)

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 16OCT95
Label Date: 16OCT95
Label Status: G
Common Name: ARSENIC
Chronic Hazard: YES
Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Severe: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: POISON. ACUTE: ARSENIC & ITS COMPOUNDS CAN BE FATAL IF INHALED, SWALLOWED OR ABSORBED THROUGH SKIN. PROLONGED CONTACT RESULTS IN LOC HYPEREMIA AND LATER VESICULAR OR PUSTULAR ERUPTION. MOIST MUCOUS MEMBRANES ARE MOST SENSITIVE TO IRRITANT ACTION. CONJUNCTIVA, MOIST AND MACERATED AREAS OF SKIN, EYELIDS, ANGLES OF EARS, NOSE, MOUTH & RESP MUCOSA ARE ALSO VULNERABLE TO THE IRRITANT EFFECTS. DERMATITIS MAY OCCUR ON WRISTS. CHRONIC: CANCER HAZARD. ARSENIC IS LISTED AS A HUMAN SKIN AND LIVER CARCINGEN(FP N).
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: HIGH-PURITY STANDARDS
Label P.O. Box: 30188
Label City: CHARLESTON
Label State: SC
Label Zip Code: 29417
Label Country: US
Label Emergency Number: 803-556-3411

MSDS - Bentonite Granular

January 15, 2001

A. Product Information
Trade Name: Bentonite Granular
Product Use: Feed Ingredients
Emmergency Phone No: (613) 996-6666 (Canutec)

B. Preparation Information
Date Prepared: January 1996

C. Toxicological Properties
Inhalation: Lung irritation
Ingestion: Not Identified
Eyes: Eye irritation
Acute Toxicity: Not Identified
Chronic Toxicity: Not Identified
Exposure Limits: No Data
Other: Not Identified

D. Physical Data
Material: Solid *Appearance/Color:* Odorless, buff to gray powder, granules or nuggets
Odor Threshold: N/A *Boiling Point:* N/A *Freezing Point:* N/A *Melting Point:* N/I
Solubility in Water: N/I *Evaporation Rate:* N/A *Vapor Density:* N/A *Vapor Pressure:* N/A
Specific Gravity: (H20=1): 2-3 *pH:* 9 *%Volatiles by Volume:* N/I

E. Reactivity Data
Stability: Stable Incompatibility: N/A Hazardous Decomposition: N/A

F. Fire or Explosion Hazard
Conditions of Flammability: Not Flammable Hazardous Combustion Products: N/A
Upper Flammability Limit: N/A Lower Flammability: N/A Sensitivity to Mechanical Impact: N/A
Sensitivity to Static Discharge: N/A Flashpoint Method: N/A Explosion Hazard: N/A

G. Hazardous Ingredients (Mixtures Only)
Free Silica/14808-60-7 2-4.5% Concentration
Hazard Data: TLV/TWA=<0.1 mg/m3 LD50: No Data LC50: No Data

H. Preventive Measures
Personal Protective Equipment
Prespiratory Protective Equipment: Mask or approved respirator rated for free silica
Eyes/Face: High dust conditions use monogoggle. Low dust conditions use safety glasses with side and top shields
Hands/Arms/Body: Dust resistant gloves, footwear and clothing
Storage: Store in dry place
Normal Handling: Personal protective equipment as above. Keep dust minimal

Engineering Controls
Ventilation and filtration systems to keep dust to a minimum
Environmental
Degradability: Not identified Aquatic Toxicity: Not identified
Spill or Leak (Always wear personal protective equipment) - shovel into containers with WHMIS workplace label; hose away residual dust. Caution: Slippery when wet.
Waste Disposal: Bury in landfill

I. First Aid Measures
Inhalation: Remove personnel from dusty area to area with clean air. Give artificial respiration if not

breathing. Seek medical attention
Ingestion: Not identified
Skin: Wash skin with soap and water. Seek medical attention
Eyes: Remove personnel from dusty area with clean air. Immediately flush eyes with gently flowing lukewarm water for 15 minutes (timed) holding eyelids open. Seek medical attention

Disclaimer:

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BENZ(a)ANTHRACENE**

CAS Number: 56-55-3
DOT Number: None

RTK Substance number: 0193
Date: September 1998

HAZARD SUMMARY

* **Benz(a)Anthracene** can affect you when breathed in.
* **Benz(a)Anthracene** should be handled as a CARCINOGEN--WITH EXTREME CAUTION.
* *CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEET ON COAL TAR.*

IDENTIFICATION

Benz(a)Anthracene is a colorless plate-like material which is recrystallized from glacial *Acetic Acid* or a light yellow to tan powder. It is not produced commercially but occurs as an intermediate during chemical manufacturing. It is also found in *Coal Tar*.

REASON FOR CITATION

* **Benz(a)Anthracene** is on the Hazardous Substance List because it is cited by ACGIH, NTP, IARC, HHAG and EPA.
* This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN** and **MUTAGEN.**
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Benz(a)Anthracene.** This does not mean that this substance is not harmful. Safe work practices should always be followed.

ACGIH: Recommends that exposure by all routes be controlled to levels as low as possible.

* **Benz(a)Anthracene** may be a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE

* Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* A regulated, marked area should be established where **Benz(a)Anthracene** is handled, used, or stored.
* Wear protective work clothing.
* When using small quantities of **Benz(a)Anthracene** use in a glove box.
* Wash thoroughly immediately after exposure to **Benz(a) Anthracene** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Benz(a)Anthracene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Benz(a)Anthracene**:

* No acute (short-term) health effects are known at this time.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Benz(a)Anthracene** and can last for months or years:

Cancer Hazard

* **Benz(a)Anthracene** may be a CARCINOGEN in humans since it has been shown to cause bladder and skin cancer in animals.
* Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Benz(a)Anthracene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* No chronic (long-term) health effects are known at this time.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* A Class I, Type B, biological safety hood should be used when mixing, handling, or preparing **Benz(a)Anthracene**.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Benz(a)Anthracene** should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Benz(a)Anthracene**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Benz(a)Anthracene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Benz(a)Anthracene**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Benz(a)Anthracene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* When vacuuming, a high efficiency particulate air (HEPA) filter should be used, not a standard shop vacuum.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Benz(a)Anthracene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* Eye protection is included in the recommended respiratory protection.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Engineering controls must be effective to ensure that exposure to **Benz(a)Anthracene** does not occur.
* At <u>any</u> exposure level, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?

A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?

A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include <u>dust releasing operations</u> (grinding, mixing, blasting, dumping, etc.), <u>other physical and mechanical processes</u> (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and <u>"confined space" exposures</u> (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: Don't all chemicals cause cancer?

A: No. Most chemicals tested by scientists are not cancer-causing.

Q: Should I be concerned if a chemical causes cancer in animals?

A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.

Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?

A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Disease and Injury Services
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Disease and Injury Services, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>>EMERGENCY INFORMATION<<<<<<<<<<<<<<<<<

Common Name: **BENZ(A)ANTHRACENE**
DOT Number: **None**
NAERG Code: **No Citation**
CAS Number: **56-55-3**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	Not Found	Not Rated
REACTIVITY	Not Found	Not Rated
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* **Benz(a)Anthracene** may burn, but does not readily ignite.
* Use dry chemical, CO_2, water spray, or foam extinguishers.
* POISONOUS GASES ARE PRODUCED IN FIRE.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Benz(a)Anthracene** is spilled, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* Ventilate the area of spill after clean-up is complete.
* It may be necessary to contain and dispose of **Benz(a) Anthracene** as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172

HANDLING AND STORAGE

* Prior to working with **Benz(a)Anthracene** you should be trained on its proper handling and storage.
* A regulated, marked area should be established where **Benz(a)Anthracene** is handled, used, or stored.
* **Benz(a)Anthracene** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
* Store in tightly closed containers in a cool, dry, well-ventilated area.

FIRST AID

In NJ, POISON INFORMATION 1-800-764-7661

Eye Contact
* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact
* Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing
* Remove the person from exposure.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 2.2×10^{-8} mm Hg at 68°F (20°C)
Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:
1,2-Benz(a)Anthracene
Other Names:
1,2-Benzanthracene; Benzo(a)Anthracene; Tetraphene

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

Material Safety Data Sheet

From Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 316

BENZENE
(Revision D)
Issued: November 1978
Revised: April 1988

SECTION 1. MATERIAL IDENTIFICATION

25

Material Name: BENZENE

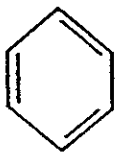
Description (Origin/Uses): Used in the manufacture of medicinal chemicals, dyes, linoleum, airplane dopes, varnishes, and lacquers; and as a solvent for waxes, resins, and oils.

Other Designations: Benzol; Phene; Phenylhydride; C_6H_6; NIOSH *RTECS* No. CY1400000; CAS No. 0071-43-2

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

HMIS	
H 2	
F 3	R 1
R 0	I 4
PPG*	S 2
*See sect. 8	K 4

SECTION 2. INGREDIENTS AND HAZARDS

Benzene, CAS No. 0071-43-2	%	EXPOSURE LIMITS
	Ca 100	**OSHA PEL** 8-Hr TWA: 1 ppm 15-Min Ceiling: 5 ppm Action Level: 0.5 ppm **ACGIH TLV, 1987-88** TLV-TWA: 10 ppm, 30 mg/m³ **Toxicity Data*** Human, Inhalation, LC_{Lo}: 2000 ppm/5 Min Human, Oral, TD_{Lo}: 130 mg/kg Human, Inhalation, TC_{Lo}: 210 ppm

*See NIOSH, *RTECS*, for additional data with references to irritative, mutagenic, tumorigenic, and reproductive effects.

SECTION 3. PHYSICAL DATA

Boiling Point: 176°F (80°C)
Melting Point: 42°F (5.5°C)
Vapor Pressure: 75 Torrs at 68°F (20°C)
Vapor Density (Air = 1): >1

Water Solubility (%): Slight
% Volatile by Volume: 100
Molecular Weight: 78 Grams/Mole
Specific Gravity (H_2O = 1): 0.87865 at 68°F (20°C)

Appearance and Odor: A colorless liquid; characteristic aromatic odor.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air	LOWER	UPPER
12°F (-11.1°C) CC	928°F (498°C)	% by Volume	1.3%	7.1%

Extinguishing Media: Use dry chemical, foam, or carbon dioxide to put out benzene fires. Water may be ineffective as an extinguishing agent because it can scatter and spread the fire. Use water to cool fire-exposed containers, flush spills away from exposures, disperse benzene vapor, and protect personnel attempting to stop an unignited benzene leak.

Unusual Fire or Explosion Hazards: Benzene vapor is heavier than air and can collect in low-lying areas such as sumps or wells. Eliminate all sources of ignition there to prevent a dangerous flashback to the original liquid benzene. **Danger:** Explosive and flammable benzene vapor-air mixtures can easily form at room temperature; always use this material in a way that minimizes dispersion of its vapor into general work areas.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Benzene is stable in closed containers during routine operations. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Hazardous chemical reactions involving benzene and the following materials are reported in Genium reference 84: bromine pentafluoride, chlorine, chlorine trifluoride, chromic anhydride, nitryl perchlorate, oxygen, ozone, perchlorates, perchloryl fluoride and aluminum chloride, permanganates and sulfuric acid, potassium peroxide, silver perchlorate, and sodium peroxide.

Conditions to Avoid: Avoid all exposure to sources of ignition and to incompatible chemicals.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide (CO) may be produced during benzene fires.

SECTION 6. HEALTH HAZARD INFORMATION

Benzene is listed as a suspected human carcinogen by the ACGIH.

Summary of Risks: Prolonged skin contact with benzene or excessive inhalation of its vapor may cause headache, weakness, loss of appetite, and lassitude. Continued exposure can cause collapse, bronchitis, and pneumonia. The most important health hazards are cancer (leukemia), bone marrow effects, and injuries to the blood-forming tissue from chronic low-level exposure.

Medical Conditions Aggravated by Long-Term Exposure: Ailments of the heart, lungs, liver, kidneys, blood, and central nervous system (CNS) may be worsened by exposure. Administer preplacement and periodic medical exams emphasizing these organs' functions and reassign workers who test positive. **Target Organs:** Blood, CNS, bone marrow, eyes, and upper respiratory tract (URT). **Primary Entry:** Skin contact, inhalation. **Acute Effects:** Dizziness, mental dullness, nausea, headache, fatigue, and giddiness. **Chronic Effects:** Possible cancer (leukemia).

FIRST AID

Eyes: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes.
Skin: Immediately wash the affected area with soap and water.
Inhalation: Remove the exposed person to fresh air; restore and/or support his or her breathing as needed.
Ingestion: Never give anything by mouth to someone who is unconscious or convulsing. Do not induce vomiting because of the possibility of aspiration.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.
Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations for disposal. Follow Federal, state, and local regulations.

OSHA Designations
Air Contaminant (29 CFR 1910.1000 Subpart Z)
EPA Designations (40 CFR 302.4)
RCRA Hazardous Waste, No. U019
CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow the eye- and face-protection guidelines in 29 CFR 1910.133. **Respirator:** Wear a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow the respirator guidelines in 29 CFR 1910.134. For emergency or nonroutine use (e.g., cleaning reactor vessels or storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., to prevent any possibility of skin contact with this suspected human carcinogen. **Ventilation:** Install and operate general and local ventilation systems powerful enough to maintain airborne levels of benzene below the OSHA PEL standard cited in section 2.
Safety Stations: Make eyewash stations, washing facilities, and safety showers available in use and handling areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale benzene vapor!

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store benzene in a cool, dry, well-ventilated area away from sources of ignition and incompatible chemicals.
Special Handling/Storage: Protect containers from physical damage. Electrically ground and bond all metal containers used in shipping or transferring operations. Follow all parts of 29 CFR 1910.1028.
Engineering Controls: All engineering systems (production, transportation, etc.) must be of maximum explosion-proof design (non-sparking, electrically grounded and bonded, etc.)
Comments: If possible, substitute less toxic solvents for benzene; use this material with extreme caution and only if it is absolutely essential.

Transportation Data (49 CFR 172.101-2)
DOT Shipping Name: Benzene
DOT Class: Flammable Liquid
DOT Label: Flammable Liquid
DOT ID No. UN1114
IMO Label: Flammable Liquid
IMO Class: 3.2

References: 1, 2, 12, 73, 84-94, 100, 103.

Prepared by PJ Igoe, BS
Industrial Hygiene Review: DJ Wilson, CIH
Medical Review: MJ Hardies, MD

ALDRICH CHEMICAL -- BENZO (A) PYRENE, 98%, B1008-0
MATERIAL SAFETY DATA SHEET
NSN: 681000N065303
Manufacturer's CAGE: 60928
Part No. Indicator: A
Part Number/Trade Name: BENZO (A) PYRENE, 98%, B1008-0

General Information

Company's Name: ALDRICH CHEMICAL CO INC
Company's P. O. Box: 355
Company's City: MILWAUKEE
Company's State: WI
Company's Country: US
Company's Zip Code: 53201
Company's Emerg Ph #: 414-273-3850
Company's Info Ph #: 414-273-3850
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 05JAN95
Safety Data Review Date: 23OCT95
MSDS Serial Number: BZRGR

Ingredients/Identity Information

Proprietary: NO
Ingredient: BENZO(A)PYRENE (CERCLA)
Ingredient Sequence Number: 01
Percent: 98
NIOSH (RTECS) Number: DJ3675000
CAS Number: 50-32-8
OSHA PEL: 0.2 MG/M3
ACGIH TLV: A2

Physical/Chemical Characteristics

Appearance And Odor: YELLOW GREEN POWDER.
Boiling Point: 923F,495C
Melting Point: >351F,>177C

Fire and Explosion Hazard Data

Extinguishing Media: WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: OXIDIZING AGENTS.
Hazardous Decomp Products: CARBON MONOXIDE, CARBON DIOXIDE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE:HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE EYE IRRITATION. MAY CAUSE SKIN IRRITATION. SKIN LUNGS. TO THE BEST OF MANUFACTURER'S KNOWLEDGE, THE CHEMICAL, PHYSICAL & TOX PROPERTIES HAVE NOT BEEN THORO INVESTIGATED.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: BENZO (A) PYRENE:IARC MONO, SUPP, VOL 7, PG 56, 1987:GROUP 2A. NTP 7TH ANNUAL RPT ON CARCINS. 1994:ANTIC TO BE (SUP DAT)
Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES:FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. SKIN:FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. INGESTION:WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN IMMEDIATELY.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUTE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS AND HEAVY RUBBER GLOVES. WEAR DISPOSABLE COVERALLS AND DISCARD THEM AFTER USE. SWEEP UP, PLACE IN BAG & HOLD FOR WASTE DISP. VENT AREA & WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.
Precautions-Handling/Storing: DO NOT BREATHE DUST. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. CARCINOGEN. MUTAGEN. TERATOGEN. KEEP TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation: USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves: CHEMICAL-RESISTANT GLOVES.
Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).
Other Protective Equipment: ANSI APPROVED EMERGENCY EYE WASH AND DELUGE SHOWER (FP N). OTHER PROTECTIVE CLOTHING.
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: EXPLAN OF CARCIN: CARCINOGEN. ANIMAL:SKIN, LUNG, LIVER.

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 23OCT95
Label Status: G
Common Name: BENZO (A) PYRENE, 98%, B1008-0
Chronic Hazard: YES
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-Slight: X

Reactivity Hazard-None: X
Special Hazard Precautions: TOXIC. ACUTE:HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE EYE IRRITATION. MAY CAUSE SKIN IRRITATION. CHRONIC:CANCER HAZARD. CONTAINS BENZO(A)PYRENE WHICH IS LISTED AS AN ANIMAL LUNG, SKIN AND LIVER CARCINOGEN (FP N). MAY ALTER GENETIC MATERIAL. TERATOGEN. TARGET ORGAN(S):SKIN, LUNGS. TO THE BEST OF MANUFACTURER'S KNOWLEDGE, THE CHEMICAL, PHYSICAL & TOX PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: ALDRICH CHEMICAL CO INC
Label P.O. Box: 355
Label City: MILWAUKEE
Label State: WI
Label Zip Code: 53201
Label Country: US
Label Emergency Number: 414-273-3850

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **CHRYSENE**

CAS Number: 218-01-9
DOT Number: None

RTK Substance number: 0441
Date: April 1994 Revision: December 1999

HAZARD SUMMARY

* **Chrysene** can affect you when breathed in and by passing through your skin.
* If skin contaminated with **Chrysene** is exposed to sunlight, a rash or sunburn effect and permanent changes in skin pigment can occur.
* **Chrysene** is almost always found in *Coal Tar Pitch, Coal Tar Creosote*, or other coal tar products. If you work with coal, tar, soot, pitch, asphalt, etc., you may be exposed to **Chrysene**.
* *CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEETS ON COAL TAR PITCH AND COAL TAR CREOSOTE.*

IDENTIFICATION

Pure **Chrysene** is a colorless to off-white flake which is used in laboratories and dye manufacturing. **Chrysene** is most often found in black or brown tars and pitches.

REASON FOR CITATION

* **Chrysene** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, HHAG and EPA.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

The following exposure limits are for *Coal Tar Pitch Volatiles*:

OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m^3** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **0.1 mg/m^3** averaged over a 10-hour workshift.

ACGIH: An exposure limit has not been determined for this suspected carcinogen. Worker exposure by all routes should be carefully controlled to the lowest possible level.

* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Chrysene** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Chrysene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chrysene**:

* If skin contaminated with **Chrysene** is exposed to sunlight, a rash or sunburn effect can occur, sometimes with blisters.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Chrysene** and can last for months or years:

Cancer Hazard

* There is limited evidence that **Chrysene** causes cancer in animals. It may cause skin cancer.
* Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Chrysene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

* Permanent changes in skin pigment can occur if contaminated skin is exposed to sunlight.

MEDICAL

Medical Testing

* There is no special test for this chemical. However, monthly, carefully look at any skin areas that have been exposed. Any growth (like a mole) that increases in size or shows changes in color should be examined by a physician. Skin cancer is curable when detected early.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

* Sunlight exposure on skin contaminated with *Coal Tar* chemicals can cause rash and later, pigment changes. Persons who smoke cigarettes may be at increased risk for lung cancer with his chemical. This can be significantly reduced by stopping smoking as well as by reducing exposures.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically transfer pure **Chrysene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Chrysene** should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Chrysene**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Chrysene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Chrysene**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Chrysene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
* For pure **Chrysene** use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Chrysene**. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

* For pure **Chrysene** wear impact resistant eye protection with side shields or goggles.
* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential exists for exposure over **0.1 mg/m^3**, (as *Coal Tar Pitch Volatiles*) use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
* Exposure to **80 mg/m^3** (as *Coal Tar Pitch Volatiles*) is immediately dangerous to life and health. If the possibility of exposure above **80 mg/m^3** (as *Coal Tar Pitch Volatiles*) exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: Don't all chemicals cause cancer?
A: No. Most chemicals tested by scientists are not cancer-causing.

Q: Should I be concerned if a chemical causes cancer in animals?
A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.

Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information
Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation
If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations
Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources
The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<

Common Name: **CHRYSENE**
DOT Number: **None**
NAERG Code: **No Citation**
CAS Number: **218-01-9**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	0	Not Rated
REACTIVITY	Not Found	Not Rated
POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* **Chrysene** is a noncombustible solid.
* Use dry chemical, CO_2, water spray, alcohol or polymer foam extinguishers.
* POISONOUS GASES ARE PRODUCED IN FIRE.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If pure **Chrysene** is spilled, take the following steps:

* Evacuate persons not wearing protective equipment from area of spill until clean-up is complete.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* Ventilate and wash area after clean-up is complete.
* It may be necessary to contain and dispose of **Chrysene** as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

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FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: (609) 292-7172

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HANDLING AND STORAGE

* Prior to working with **Chrysene** you should be trained on its proper handling and storage.
* **Chrysene** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE).
* Store in tightly closed containers in a cool, well-ventilated area.

FIRST AID

In N.J. for POISON INFORMATION call 1-800-764-7661

Eye Contact

* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

* Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing

* Remove the person from exposure.

PHYSICAL DATA

Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:
1,2,5,6-Dibenzonaphthalene
Other Names:
1,2-Benzophenanthrene; Benzo[a]phenanthrene

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

HIGH-PURITY STANDARDS -- CYANIDE
MATERIAL SAFETY DATA SHEET
NSN: 681000N063132
Manufacturer's CAGE: 0YZE4
Part No. Indicator: A
Part Number/Trade Name: CYANIDE

General Information

Company's Name: HIGH-PURITY STANDARDS
Company's P. O. Box: 30188
Company's City: CHARLESTON
Company's State: SC
Company's Country: US
Company's Zip Code: 29417
Company's Emerg Ph #: 803-556-3411
Company's Info Ph #: 803-556-3411
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 002
Status: SMJ
Date MSDS Prepared: 16SEP92
Safety Data Review Date: 08SEP95
MSDS Serial Number: BYWMT

Ingredients/Identity Information

Proprietary: NO
Ingredient: CYANIDE
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: GS7175000
CAS Number: 57-12-5
OSHA PEL: 5 MG/M3 (MFR)
ACGIH TLV: 5 MG/M3 (MFR)

Proprietary: NO
Ingredient: POTASSIUM CYANIDE; (KCN)
Ingredient Sequence Number: 02
Percent: 0.1
NIOSH (RTECS) Number: TS8750000
CAS Number: 151-50-8
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: POTASSIUM HYDROXIDE; (KOH)
Ingredient Sequence Number: 03
Percent: 0.5
NIOSH (RTECS) Number: TT2100000
CAS Number: 1310-58-3
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS, ODORLESS SOLUTION.
Boiling Point: 212F,100C
Melting Point: N/A
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: 1 (H*2O=1)
Decomposition Temperature: N/A
Solubility In Water: COMPLETE

Fire and Explosion Hazard Data

Flash Point: NOT APPLICABLE
Lower Explosive Limit: N/A
Extinguishing Media: USE APPROPRIATE: DO NOT USE CARBON DIOXIDE EXTINGUISHER.
Special Fire Fighting Proc: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NOT APPLICABLE

Reactivity Data

Stability: YES
Cond To Avoid (Stability): THERMAL DECOMPOSITION INCOMPATIBLE.
Materials To Avoid: ACIDS, OXIDIZING AGENTS, ALKALOIDS, IODINE, AMMONIA, CO*2, CHLORAL HYDRATE.

Health Hazard Data

Precautions for Safe Handling and Use

Control Measures

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 08SEP95
Label Date: 31AUG95
Label Status: G
Common Name: CYANIDE
Chronic Hazard: YES
Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Severe: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: CORROSIVE POISON. ACUTE:INGESTION:CORROSIVE TO GASTROINTESTINAL TRACT. IN ADDITION TO PAINFUL SWALLOWING, SYMPTOMS ARE SIMILAR TO THOSE OF ACUTE INHALATION. SKIN CONTACT:CORROSIVE. READILY ABSORBED THROUGH SKIN. ABSORPTION MAY CAUSE SYMPTOMS SIMILAR TO THOSE OF ACUTE INHALATION. EYE CONTACT:CORROSIVE. REDNESS, PAIN AND BLURRED VISON MAY OCCUR. INHALATION:CORROSIVE TO RESPIRATORY TRACT. INHIBITS CELLULAR RESPIRATION. OVEREXPOSURE MAY CAUSE HEADACHE, WEAKNESS, DIZZINESS, LABORED BREATHING AND NAUSEA FOLLOWED BY WEAK AND IRREGULAR HEARTBEAT, UNCONSCIOUSNESS, CONVULSIONS, COMA & DEATH. CHRONIC:REPEATED MINOR SKIN CONTACT CAUSES A "CYANIDE" RASH.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: HIGH-PURITY STANDARDS
Label P.O. Box: 30188
Label City: CHARLESTON
Label State: SC
Label Zip Code: 29417
Label Country: US

Label Emergency Number: 803-556-3411

MSDS Number: OR155 --- Effective Date: 12/08/96

MSDS Material Safety Data Sheet

om: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

MALLINCKRODT

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response In Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

ETHYL BENZENE

MSDS Number: OR155 --- *Effective Date: 12/08/96*

1. Product Identification

Synonyms: Benzene, ethyl; ethylbenzen 99%; ethyl benzol
CAS No.: 100-41-4
Molecular Weight: 106.17
Chemical Formula: C8H10
Product Codes: 2427

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethyl Benzene	100-41-4	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! FLAMMABLE LIQUID. HARMFUL IF SWALLOWED OR INHALED. VAPOR OR MIST IS IRRITATING TO THE EYES AND UPPER RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

Potential Health Effects

Inhalation:
Vapors irritate the mucous membranes and respiratory tract. May cause coughing, headache, Labored breathing, dizziness and unconsciousness. May affect blood circulation.

Ingestion:
Harmful if swallowed. Aspiration into the lungs may cause pneumonia. Abdominal pain, nausea, vomiting may occur. May affect central nervous system.

Skin Contact:
Causes irritation with redness and pain. Prolonged contact may cause dermatitis.

Eye Contact:
Vapors irritate the eyes, causing redness, pain, blurred vision.

Chronic Exposure:
No information found.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:
Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Flash point: 15C (59F) CC Autoignition temperature: 432C (810F) Flammable limits in air % by volume: lel: 1.0; uel: 7.8

Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above.

Fire Extinguishing Media:
Dry chemical, alcohol foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL): 100 ppm (TWA), 125 ppm (STEL) -ACGIH Threshold Limit Value (TLV): 100 ppm (TWA), 125 ppm (STEL)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices* , most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the TLV is exceeded a full facepiece chemical cartridge respirator may be worn up to the maximum use concentration specified by the respirator supplier. Alternatively, a supplied air full facepiece respirator or airlined hood may be worn.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.

Odor:
Aromatic odor.

Solubility:
Insoluble in water.

Specific Gravity:
0.867

pH:
No information found.

% Volatiles by volume @ 21C (70F):
No information found.

Boiling Point:
136C (277F)

Melting Point:
-95C (-139F)

Vapor Density (Air=1):
3.66

Vapor Pressure (mm Hg):
7.1 @ 20C (68F)

Evaporation Rate (BuAc=1):
< 1

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Contact with strong oxidizing agents may cause fires and explosions. Attacks many plastics.

Conditions to Avoid:
No information found.

11. Toxicological Information

Oral rat LD50: 3500 mg/Kg Skin rabbit LD50: 17800 mg/Kg Mutation reference cited reproduction effect cited.

--------\Cancer Lists\----------

Ingredient	NTP Carcinogen: Known	NTP Carcinogen: Anticipated	IARC Category

Ethyl Benzene (100-41-4)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.

Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN/NA: UN1175
Packing Group: II
Information reported for product/size: 3KG

International (Water, I.M.O.)

Proper Shipping Name: ETHYLBENZENE
Hazard Class: 3.2
UN/NA: UN1175
Packing Group: II
Information reported for product/size: 3KG

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	Canada DSL	Canada NDSL	Canada Phil.
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	SARA 302 RQ	SARA 302 TPQ	SARA 313 List	SARA 313 Chemical Catg
Ethyl Benzene (100-41-4)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	RCRA 261.33	TSCA 8(d)
Ethyl Benzene (100-41-4)	1000	No	Yes

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

Australian Hazchem Code: 3[Y]E
Poison Schedule: No information found.

WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 3 Reactivity: 0

Label Hazard Warning:
WARNING! FLAMMABLE LIQUID. HARMFUL IF SWALLOWED OR INHALED. VAPOR OR MIST IS IRRITATING TO THE EYES AND UPPER RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

Label Precautions:
Do not breathe vapor. Avoid contact with eyes, skin and clothing. Keep container closed. Use with adequate ventilation. Wash ,thoroughly after handling. Keep away from heat, sparks and flame.

Label First Aid:
In all cases call a physician immediately. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes.

Product Use:
Laboratory Reagent.

Revision Information:
Pure. New 16 section MSDS format, all sections have been revised.

Disclaimer:

****

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

Alfa Aesar/Avocado Organics - Material Safety Data Sheet A17230

1. IDENTIFICATION OF SUBSTANCE AND SUPPLIER

Name On Label : Fluoranthene
Product Number : A17230
Supplier :
Johnson Matthey Catalog Company Inc.
30 Bond Street, Ward Hill, Massachusetts, 01835-8099
Emergency Telephone Number: (978) 521-6300; CHEMTREC: (800) 424-9300
Alternative Names : None in common use.

2. COMPOSITION AND INFORMATION ON COMPONENTS

Name : Fluoranthene
MinorImpurities : Not determined
CAS Number : 206-44-0
EINECS Number : 2059124
EEC Number :

3. HAZARDS IDENTIFICATION

Designation :
HARMFUL
Risk Phrases
R20/21/22 Harmful by inhalation, in contact with skin and if swallowed.
R40 Possible risk of irreversible effects.

4. FIRST AID MEASURES

Inhalation
Remove to fresh air. Seek medical advice if symptoms persist.

Eye Contact
Flush with copious amounts of water for at least 15 minutes. If symptoms arise, seek medical advice.

Skin Contact

Remove contaminated clothing. Wash affected area with soap and water. Rinse thoroughly. If unusual symptoms are observed, seek medical advice. Show the physician the container details.

Ingestion
Rinse out mouth and drink lots of water. In case of unusual symptoms, seek medical attention and show physician the container details.

---

5. FIRE FIGHTING MEASURES

Extiguishing Medium
Use fire fighting measures which suit the environment and take into account other materials which may be involved. In general, water-based extinguishers should not be used for fires involving organic materials. Use carbon dioxide or dry powder.

Protective Equipment
Wear self-contained breathing apparatus and protective clothing.

Hazardous Products of Combustion May Include:
carbon monoxide, carbon dioxide.

---

6. ACCIDENTAL RELEASE MEASURES

Personal Protection
Avoid inhalation or contact of spilled material with skin or clothing. Wear protective equipment including rubber gloves, and eye protection. Keep unprotected persons away.

Environmental Protection
Take precautions to ensure product does not contaminate the ground or enter the drainage system.

Collection
Mix with vermiculite or proprietary absorbent material and transfer to sealed containers for disposal.

---

7. HANDLING AND STORAGE

Handling
Chemicals should be used only by those trained in handling potentially hazardous materials. Rubber gloves, eye protection and protective clothing should be worn. Operations should be carried out in an efficient fume hood or equivalent system.

Storage
Store in tightly sealed containers in a cool place.
Protect from moisture.

---

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Respiratory
Avoid inhalation of product. Handle in an efficient fume hood or equivalent system.

Eye
Avoid eye contact. Wear safety spectacles or goggles.

Hands and Body
Avoid skin contact. Wear rubber gloves and protective clothing.

---

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Yellow crystals
Physical Constants: m.p. 107-110Ê
Molecular Formula : C16H10
Formula Weight : 202.26
Water Solubility : Insol
Density : Not available
Flash Point : Not available

---

10. STABILITY AND REACTIVITY

Specific Hazard
Incompatibilities
Strong oxidising agents.

Decomposition
Hazardous products of decomposition may include:
carbon monoxide, carbon dioxide.

---

11. TOXICOLOGICAL INFORMATION

RTECS Number : LL4025000
Acute Toxicity
LD50 : ORL-RAT 2000mg/kg; SKN-RBT 3180mg/kg
Harmful by inhalation, in contact with skin and if swallowed. Possible risk of irreversible effects.

Chronic Toxicity
Possible mutagen.

---

12. ECOLOGICAL EFFECTS

General
Take care to prevent chemicals from entering the ground, water courses or drainage systems.

---

13. DISPOSAL CONSIDERATIONS

Disposal
Disposal should be via an approved contractor and should take full account of local regulations.

---

14. TRANSPORT INFORMATION

UN Number : 2811
Land Transport
ADR/RIC Code/Class: 6.1 /Packing Group III
Maritime Transport IMDG Code/Class : 6.1 /Packing Group III
Air Transport IATA Code/Class : 6.1 /Packing Group III

---

15. REGULATORY INFORMATION

CAS Number : 206-44-0
EINECS Number : 2059124
EEC Number :
UN Number : 2811
RTECS Number : LL4025000
Hazard Indication :

HARMFUL

Risk and Safety Phrases
Harmful by inhalation, in contact with skin and if swallowed.
Possible risk of irreversible effects.
Keep container tightly closed.
Do not breathe dust.
Wear suitable protective clothing.
If you feel unwell, seek medical advice (show the label where possible).

TSCA: Listed substance.

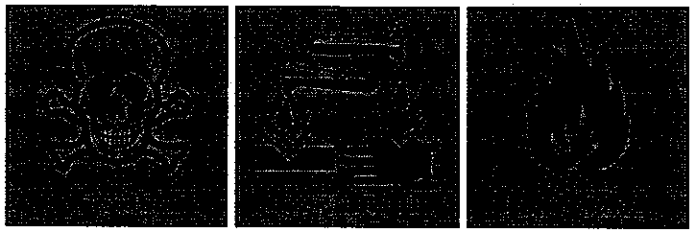
---

16. OTHER INFORMATION

It must be recognised that the physical and chemical properties of any product may not be fully understood and that new, possibly hazardous products may arise from reactions between chemicals. The information given in this data sheet is based on our present knowledge and shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Date of Last Review: 3rd August 1998
Date Printed : 18th September 1998

Safety (MSDS) data for hydrogen sulfide



Click here for data on hydrogen sulfide in student-friendly format, from the HSci project

General

Synonyms: hydrogen sulphide, hepatic acid, sewer gas, sulfur hydride, dihydrogen monosulfide, dihydrogen monosulphide, sulphur hydride, stink damp, sulfureted hydrogen
Molecular formula: H_2S

CAS No: 7783-06-4
EC No: 231-977-3

Physical data

Appearance: colourless gas with strong odour of rotten eggs (odour threshold ca 0.2 ppt)
Melting point: -85 C
Boiling point: -60 C
Vapour density: 1.19
Vapour pressure: [Typical cylinder pressure ca. 17 bar)
Critical pressure: 88 atm
Specific gravity: 0.993 g/ml (liquid at BP), 1.539 g/l at 0C, 760 mm Hg (gas)
Flash point: -82 C
Explosion limits: 4.3 % - 46 %
Autoignition temperature: 260 C

Stability

Stable. **Highly flammable. May form explosive mixture with air. Note wide explosive limits.** Incompatible with strong oxidizing agents, many metals. May react violently with metal oxides, copper, fluorine, sodium, ethanal.

Toxicology

Highly toxic - may be fatal if inhaled. Inhalation of a single breath at a concentration of 1000 ppm (0.1%) may cause coma. Corrosive when moist. Skin contact may cause burns. **There is a rapid loss of sense of smell on exposure to gas concentrations above 150 ppm, and this means that the extent of exposure may be underestimated.** Perception threshold ranges from 0.5 ppt to 0.1 ppm. Irritant. Asphyxiant.

Toxicity data
(The meaning of any abbreviations which appear in this section is given here.)
IHL-RAT LC50 444 ppm.
IHL-HMN LC50 800 ppm (5 min).
IHL-MUS LC50 634 ppm/1h.
IHL-GPG LCLO 1 mg/m3/8h

Risk phrases
(The meaning of any risk phrases which appear in this section is given here.)
R12 R26.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
UN No 1053. Hazard class 2. Subsidiary risks 6.1, 3.

Personal protection

Safety glasses, rubber gloves, good ventilation. Remove all sources of ignition from the working area.

Safety phrases
(The meaning of any safety phrases which appear in this section is given here.)
S7 S9 S16 S45.

[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

Material Safety Data Sheet

From Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 624

NAPHTHALENE

Issued: November 1987

SECTION 1. MATERIAL IDENTIFICATION

24

Material Name: NAPHTHALENE

Description (Origin/Uses): Used as a moth repellant and in many industrial processes.

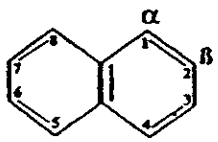
Other Designations: Naphthalin; Naphthene; Tar Camphor; $C_{10}H_8$; NIOSH *RTECS* No. QJ0525000; CAS No. 0091-20-3

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyer's Guide* (Genium ref. 73) for a list of suppliers.

HMIS			
H	2		
F	2	R	1
R	0	I	4
PPG*		S	1
*See sect. 8		K	2

SECTION 2. INGREDIENTS AND HAZARDS

	%	EXPOSURE LIMITS
Naphthalene, CAS No. 0091-20-3	ca 100	IDLH* Level: 500 ppm



ACGIH TLVs, 1987-88
TLV-TWA: 10 ppm, 50 mg/m³
OSHA PEL
8-Hr TWA: 10 ppm, 50 mg/m³
Toxicity Data**
Child, Oral, LD_{Lo}: 100 mg/kg
Man, Unknown, LD_{Lo}: 74 mg/kg
Rat, Oral, LD_{50}: 1250 mg/kg

*Immediately dangerous to life and health
**See NIOSH *RTECS* for additional data with references to irritative, mutagenic, reproductive, and tumorigenic effects.

SECTION 3. PHYSICAL DATA

Boiling Point: 424°F (218°C)
Vapor Density (Air = 1): 4.4
Vapor Pressure: 0.087 Torr at 77°F (25°C)
Water Solubility: Insoluble

Specific Gravity (H_2O = 1): 1.162 at 68°F (20°C)
Melting Point: 176°F (80°C)
Molecular Weight: 128 Grams/Mole
% Volatile by Volume: ca 100

Appearance and Odor: White crystalline flakes; strong coal tar odor.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air	LOWER	UPPER
174°F (79°C) OC; 190°F (88°C) CC	979°F (526°C)	% by Volume	0.9	5.9

Extinguishing Media: Use water spray, dry chemical, or carbon dioxide to fight fires involving naphthalene. **Caution:** Foam or direct water spray applied to molten naphthalene may cause extensive foaming.

Unusual Fire or Explosion Hazards: Naphthalene is a volatile solid that gives off flammable vapor when heated (as in fire situations). This vapor is much denser than air and will collect in enclosed or low-lying areas like sumps. In these areas an explosive air-vapor mixture may form, and extra caution is required to prevent any ignition sources from starting an explosion or fire.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Naphthalene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Naphthalene is incompatible with strong oxidizing agents, chromic anhydride, and mixtures of aluminum trichloride and benzoyl chloride.

Conditions to Avoid: Ignition sources like open flame, unprotected heaters, excessive heat, lighted tobacco products, and electric sparks must not occur in work areas where naphthalene vapor may become concentrated.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide are produced during fire conditions. Irritating, flammable vapor forms below the melting point because even solid naphthalene has a significant vapor pressure.

SECTION 6. HEALTH HAZARD INFORMATION

Naphthalene is not listed as a carcinogen by the NTP, IARC, or OSHA.
Summary of Risks: Renal shutdown (kidney failure), hemolytic effects (breakdown of red blood cells), hematuria (blood in the urine), oliguria (low volume of urine), jaundice, eye damage, and depression of the central nervous system (CNS) are the primary health concerns associated with exposure to naphthalene. The ACGIH TLVs in section 2 are set to prevent eye damage. These recommended exposure limits may not be low enough to prevent blood changes in genetically hypersensitive individuals.
Medical Conditions Aggravated by Long-Term Exposure: Diseases of the blood, liver, and kidneys. Administer medical exams emphasizing these organs. **Target Organs:** Eyes, skin, kidneys, liver, blood (red blood cell effects), and CNS.
Primary Entry: Inhalation, skin contact. **Acute Effects:** Inhalation of naphthalene vapor causes excitement, confusion, headache, nausea, and loss of appetite. **Chronic Effects:** Increased incidence of cataracts.
FIRST AID
Eye Contact: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes to remove particles.
Skin Contact: Immediately wash the affected area with soap and water.
Inhalation: Remove victim to fresh air; restore and/or support his breathing as needed.
Ingestion: Call a poison control center. Never give anything by mouth to someone who is unconscious or convulsing. Administer a gastric lavage followed by saline catharsis. Monitor blood and electrolytic balance. Other sources recommend giving the victim several glasses of water to drink.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all ignition sources immediately. Cleanup personnel need protection against contact and inhalation of vapor (see sect. 8). Contain large spills and collect waste. Use nonsparking tools to place naphthalene into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.
Waste Disposal: Consider reclamation, recycling, or destruction rather than disposal in a landfill. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations
Air Contaminant (29 CFR 1910.1000, Subpart Z)
EPA Designations (40 CFR 302.4)
RCRA Hazardous Waste, No. U165
CERCLA Hazardous Substance, Reportable Quantity: 100 lbs (45.4 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Follow the eye- and face-protection guidelines of 29 CFR 1910.133. **Respirator:** Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* (Genium ref. 88) for the maximum-use concentrations and/or the exposure limits cited in section 2. Respirator usage must be in accordance with the OSHA regulations of 29 CFR 1910.134. IDLH or unknown concentrations require an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres.
Other Equipment: Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specific work environment to prevent skin contact. **Ventilation:** Install and operate general and local maximum explosion-proof ventilation systems of sufficient power to maintain airborne levels of naphthalene below the OSHA PEL standard cited in section 2. **Safety Stations:** Make eyewash stations, washing facilities, and safety showers available in areas of use and handling. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove and launder contaminated clothing before wearing it again; clean this material from shoes and equipment.
Comments: Practice good personal hygiene; always wash thoroughly after using this material. Keep this material off of your clothing and equipment. Avoid transferring this material from hands to mouth while eating, drinking, or smoking. Do *not* smoke, eat, or drink in any immediate work area. Avoid inhalation of vapor!

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage Segregation: Store naphthalene in a cool, dry, well-ventilated area away from chemical incompatibles (see sect. 5).
Special Handling/Storage: Protect containers from physical damage. All bulk storage facilities must be built with an explosion-proof design. All containers used in shipping/transferring operations must be electrically grounded to prevent static sparks. Use monitoring equipment to measure the extent of vapor present in any storage facility containing naphthalene because of potential fire and explosion hazards.
Comments: All operations with naphthalene must be done carefully to prevent accidental ignition of its flammable/explosive vapor. If the weather is warm, more naphthalene vapor forms and the potential for explosion increases. Do *not* smoke in any use or storage area!
Transportation Data (49 CFR 172.101-2)
DOT Shipping Name: Naphthalene
DOT Hazard Class: ORM-A
IMO Class: 4.1
DOT ID No. UN1334
IMO Label: Flammable Solid
DOT Label: None

References: 1, 2, 12, 73, 84-94, 103. PJI

Approvals
Indust. Hygiene/Safety
Medical Review

MONSANTO PRODUCT NAME

Polychlorinated Biphenyls (PCBs)

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167

Emergency Phone No.
(Call Collect)
314-694-1000

Date: 10/88

PRODUCT IDENTIFICATION

Synonyms: PCBs
Chlorodiphenyl (__% Cl)
Chlorinated biphenyl
Polychlorinated biphenyl
Chlorinated biphenyls
(approx. __% Cl)

Trade Names/ Common Names: Aroclor®[1] Series 1016, 1221, 1232, 1242, 1248, 1254, 1260
Therminol®[1] FR Series

PYRANOL®[2] and INERTEEN®[3] are trademarks for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL - Generic name for a broad class of fire-resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30-70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

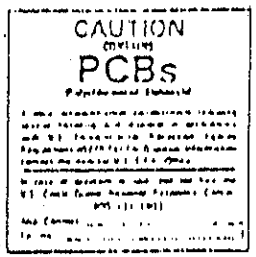
This list of trade names is representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Japanese companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

[1] Registered trademark of Monsanto Company
[2] Registered trademark of General Electric Company
[3] Registered trademark of Westinghouse Electric Corporation

CAS No.'s: 001336363, 053469219, 021672296, 011097691, 011096825 and others

WARNING STATEMENTS

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked. (check regulations, 40 CFR 761, for details)



PRECAUTIONARY MEASURES

Care should be taken to prevent entry into the environment through spills, leakage, use, vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

EMERGENCY AND FIRST AID PROCEDURES

Ingestion: Consult a physician. Do not induce vomiting or give any oily laxatives. NOTE TO PHYSICIAN—If large amounts are ingested, gastric lavage is suggested.

Skin: If liquid or solid PCBs are splashed or spilled on skin, contaminated clothing should be removed and the skin washed thoroughly with soap and water. NOTE TO PHYSICIAN—Hot PCBs may cause thermal burns.

Eyes: Eyes should be irrigated immediately with copious quantities of running water for at least 15 minutes if liquid or solid PCBs get into them. A petrolatum-based opthalmic ointment may be applied to the eye to relieve the irritating effects of PCBs.

Inhalation: Remove to fresh air. If skin rash or respiratory irritation persists, consult a physician. NOTE TO PHYSICIAN—If electrical equipment arcs over, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce HCl, hydrochloric acid, a respiratory irritant.

OCCUPATIONAL CONTROL PROCEDURES

Eye Protection: Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

Skin Protection: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged contact may cause chloracne in some people.

Respiratory Protection: Avoid breathing vapor or mist. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

Ventilation: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Airborne Exposure Limits: Chlorinated biphenyl (approximately 42% chlorine)

OSHA PEL: 1 mg/m³ 8-hour time-weighted average - Skin*
ACGIH TLV: 1 mg/m³ 8-hour time-weighted average - Skin*
2 mg/m³ short-term exposure limit - Skin*

*Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.

(OCCUPATIONAL CONTROL PROCEDURES continued on page 3)

MATERIAL SAFETY DATA Polychlorinated Biphenyls (PCBs)

OCCUPATIONAL CONTROL PROCEDURES (continued)

Airborne Exposure Limits (Continued):

Chlorinated biphenyl (approximately 54% chlorine)
OSHA PEL: 0.5 mg/m³ 8-hour time-weighted average - Skin*
ACGIH TLV: 0.5 mg/m³ 8-hour time-weighted average - Skin*
1 mg/m³ short-term exposure limit - Skin*

*Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.

FIRE PROTECTION INFORMATION

Fire and Explosion:

PCBs are fire-resistant compounds. They may decompose to form CO, CO_2, HCl, phenolics, aldehydes and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

At temperatures in the range of 600-650°C in the presence of excess of oxygen PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

PCBs in electrical equipment have been reported to produce both chlorinated dioxins (PCDDs) and furans (PCDFs) during fire situations. These combustion products may result all, or in part, from non-PCB components of the dielectric fluids or other combusted materials. Consult the equipment manufacturer for information regarding composition of the dielectric fluids in electrical apparatus.

Standard fire fighting wearing apparel and self-contained breathing apparatus should be worn when fighting fires that involve possible exposure to chemical combustion products. Fire fighting equipment should be thoroughly cleaned and decontaminated after use.

Federal regulations require all PCB transformers to be registered with fire response personnel.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state, and local regulations.

REACTIVITY DATA

PCBs are very stable, fire-resistant compounds.

HEALTH EFFECTS SUMMARY

Skin Contact: PCBs can be absorbed through intact skin. Local action on skin is similar to that of common organic solvents where contact leads to removal of natural fats and oils with subsequent drying and cracking of the skin. A potential exists for contracting chloracne.

Eye Contact: The liquid products and their vapors are moderately irritating to eye tissues.

Ingestion: The acute oral toxicities of the undiluted compounds are: LD_{50} rats—8.65 gm/kg for 42% chlorinated, and 11.9 gm/kg for 54% chlorinated—"slightly toxic."

Inhalation: Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

(HEALTH EFFECTS SUMMARY continued on page 4)

MATERIAL SAFETY DATA Polychlorinated Biphenyls (PCBs)

HEALTH EFFECTS SUMMARY (continued)

Other:

There are literature reports that PCBs can impair reproductive functions in monkeys. The National Cancer Institute performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254, was not carcinogenic under the conditions of their bioassay. There is sufficient evidence in the scientific literature to conclude that Aroclor 1260 can cause liver cancer when fed to rodents at high doses. Similar experiments with less chlorinated PCB products have produced negative or equivocal results.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and non-worker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposures and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs can cause dermatological symptoms; however, these are reversible upon removal of exposure source.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Fourth).

PHYSICAL DATA

PROPERTIES OF SELECTED AROCLORS*							
PROPERTY	1016	1221	1232	1242	1248	1254	1260
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	178	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-198	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1600-2500 390-540	— —

NA—Not Available

SPILL, LEAK & DISPOSAL INFORMATION

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any disposal of PCBs, PCB items, or PCB-contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All non-essential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. See Occupational Control Procedures section of this MSDS.

Personnel trained in the emergency procedures and protected against the attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks and fight fires in PCB areas.

All wastes and residues containing PCBs (e.g., wiping cloths, absorbent material, used disposable protective gloves, clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

Various federal, state and local regulations may require immediate reporting of PCB spills and may also define spill clean-up levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill clean-up.

ENVIRONMENTAL INFORMATION

Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquids or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

ADDITIONAL COMMENTS

Polychlorinated Biphenyls

For regulatory purposes, under the Toxic Substances Control Act the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such substance (40 CFR Part 761).

Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids and hard non-crystalline resins. Technical products vary in composition, in the degree of chlorination and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per molecule (54% chlorine). They are used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic and other industrial fluids, plasticizers, carbonless paper, paints, inks and adhesives.

In 1972 Monsanto restricted sales of PCBs to applications involving only closed electrical systems (transformers and capacitors). In 1977 all manufacturing and sales were voluntarily terminated. In 1979 EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

MATERIAL SAFETY DATA Polychlorinated Biphenyls (PCBs)

DATE: 10/1/88 SUPERSEDES: All prior to 10/1/88

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

John H. Craddock
Product & Environmental Safety Director

Paul R. Michael
Product & Environmental Safety Manager

Environmental Policy Staff
Monsanto Company
800 North Lindbergh Boulevard
St. Louis, Missouri 63167
(314) 694-4764

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 711
Pyrene

Issued: 4/90

Section 1. Material Identification

Pyrene Description: A condensed ring, polyaromatic hydrocarbon compound derived from coal tar. Also synthesized from o,o'-ditolyl. Used in biochemical research and as starting material for synthesizing benzo(a)pyrene. An ingredient of smoked and broiled meat, tobacco smoke, and air pollution.
Other Designations: CAS No. 0129-00-0; $C_{16}H_{10}$; beta-pyrene; benzo(d,e,f)phenanthrene; benzo(d,e,f)phenathrene.
Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*[73] for a suppliers list.

R 1
I 3
S 2*
K -
* Skin absorption

Genium

HMIS
H 2
F 1
R 0
PPG†
† Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Pyrene, ca 100%

OSHA PEL	ACGIH TLV, 1989-90	NIOSH REL, 1987	Toxicity Data*
8-hr TWA: 0.2 mg/m³	None established	None established	Rat, oral, LD_{50}: 2700 mg/kg ingested produces conjunctiva irritation, excitement, and muscle contraction Rat, inhalation, LC_{50}: 170 mg/m³ inhaled produces conjunctiva irritation, excitement, and muscle contraction Gene mutation in mammalian cells; human cell types: 12 µmol/l

* See NIOSH, *RTECS* (UR2450000), for additional mutative, tumorigenic, and toxicity data.

Section 3. Physical Data

Boiling Point: 759 °F/404 °C
Melting Point: 313 °F/156 °C
Vapor Pressure: 6.85 x 10^{-7} torr at 68 °F/20 °C
Molecular Weight: 202.26 g/mol
Specific Gravity (H_2O = 1 at 39 °F/4 °C): 1.271 at 73 °F/23 °C
Water Solubility: Insoluble (0.135 mg/l)

Appearance and Odor: Colorless solid or a slight blue florescent solution. Tetracene impurities give pyrene a yellow color.

Section 4. Fire and Explosion Data

Flash Point: None reported	Autoignition Temperature: None reported	LEL: None reported	UEL: None reported

Extinguishing Media: Use foam, dry chemical, and CO_2 to extinguish fire.
Unusual Fire or Explosion Hazards: Pyrene is a flammable and combustible material that heat and ignition sources may ignite. It burns rapidly with a flare-like effect.
Special Fire-fighting Procedures: Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode. Avoid skin contact. Be aware of runoff from fire control methods. Do not release to ...wers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Pyrene is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Hazardous Products of Decomposition: Thermal oxidative decomposition of pyrene can emit irritating fumes and acrid smoke.

Section 6. Health Hazard Data

Carcinogenicity: Neither the NTP, IARC, nor OSHA lists pyrene as a carcinogen.
Summary of Risks: Pyrene is irritating to exposed skin and eyes, moderately toxic by ingestion and intraperitoneal routes, and a poison by inhalation. Experimental studies show pyrene is a tumorigen in animals and a mutagen in humans. Workers exposed to concentrations between 3 and 5 mg/m^3 showed some unspecified teratogenic effects. In general, human exposure occurs mainly through inhalation of tobacco smoke and polluted air. Although ingesting smoked and broiled meats may expose humans to pyrene, there is little indication of serious health effects.
Medical Conditions Aggravated by Long-Term Exposure: None reported.
Target Organs: Skin, eyes, respiratory tract.
Primary Entry Routes: Inhalation, ingestion, skin contact.
Acute Effects: Vapor inhalation may irritate the nose mucosa and respiratory tract. Vapors may also cause conjunctival irritation. Pyrene is absorbed through intact skin and causes dermal irritation. Ingestion may irritate and burn the esophagus and gastrointestinal tract.
Chronic Effects: None reported.
FIRST AID
Eyes: Flush immediately, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 min.
Skin: *Quickly* remove contaminated clothing. After rinsing affected skin with flooding amounts of water, wash it with soap and water.
Inhalation: Remove exposed person to fresh air and support breathing as needed.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have a *conscious* person drink 1 to 2 glasses of milk or water. Do not induce vomiting.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Physician's Note: Observe patients with dermal exposure for systemic poisoning since pyrene is absorbed through intact skin.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate all unnecessary personnel, and remove all heat and ignition sources. Cleanup personnel should protect against vapor inhalation and skin and eye contact. Scoop spilled material into appropriate disposal containers. Absorb liquid with inert, noncombustible material and place waste in appropriate disposal containers. Follow applicable OSHA regulations (29 CFR 1910.120).
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
EPA Designations
RCRA Hazardous Waste (40 CFR 261.33): Not listed
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4), Reportable Quantity (RQ): 5000 lb (2270 kg) [* per Clean Water Act, Sec. 307(a)]
Listed as SARA Extremely Hazardous Substance (40 CFR 355), Reportable Quantity: 5000 lb, Threshold Planning Quantity (TPQ): 1000/10,000 lb
SARA Toxic Chemical (40 CFR 372.65): Not listed
OSHA Designations
Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).
Respirator: Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.
Warning: Air-purifying respirators do *not* protect workers in oxygen-deficient atmospheres.
Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact.
Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations below the OSHA PEL (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.[107]
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.
Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in closed containers in a cool, well-ventilated area. Protect containers from physical damage.
Engineering Controls: Avoid vapor inhalation and skin contact. Practice good personal hygiene and housekeeping procedures. To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations in production and storage areas. Provide preplacement and periodic medical examinations, including comprehensive medical histories with emphasis on the oral cavity, respiratory tract, bladder, and kidneys. Examine the skin for premalignant and malignant lesions.
Transportation Data (49 CFR 172.101, .102): Not listed

MSDS Collection **References:** 7, 73, 87, 103, 123, 124, 126, 127, 136
Prepared by: MJ Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** MJ Hardies, MD

Material Safety Data Sheet

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 317
TOLUENE
(Revision D)

Issued: August 1979
Revised: April 1986

SECTION 1. MATERIAL IDENTIFICATION 20

MATERIAL NAME: TOLUENE

OTHER DESIGNATIONS: Methyl Benzene, Methyl Benzol, Phenylmethane, Toluol, C_7H_8, CAS #0108-88-3

MANUFACTURER/SUPPLIER: Available from many suppliers, including:
Allied Corp., PO Box 2064R, Morristown, NJ 07960; Telephone: (201) 455-4400
Ashland Chemical Co., Industrial Chemicals & Solvents Div., PO Box 2219, Columbus, OH; Telephone: (614) 889-3844

HMIS
H: 2
F: 3
R: 0
PPE*
*See sect. 8

R 1
I 3
S 2
K 4

SECTION 2. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Toluene 	ca 100	8-hr TLV: 100 ppm, or 375 mg/m^3* (Skin)** Man, Inhalation, TCLo: 100 ppm: Psychotropic*** Rat, Oral, LD_{50}: 5000 mg/kg Rat, Inhalation, LCLo: 4000 ppm/4 hrs. Rabbit, Skin, LD_{50}: 14 gm/kg Human, Eye: 300 ppm

* Current (1985-86) ACGIH TLV. The OSHA PEL is 200 ppm with an acceptable ceiling concentration of 300 ppm and an acceptable maximum peak of 500 ppm/10 minutes.

** Skin designation indicates that toluene can be absorbed through intact skin and contribute to overall exposure.

*** Affects the mind.

SECTION 3. PHYSICAL DATA

Boiling Point ... 231°F (111°C)
Vapor Pressure @ 20°C, mm Hg ... 22
Water Solubility @ 20°C, wt. % ... 0.05
Vapor Density (Air = 1) ... 3.14
Evaporation Rate (BuAc = 1) ... 2.24
Specific Gravity (H_2O = 1) ... 0.866
Melting Point ... -139°F (-95°C)
Percent Volatile by Volume ... ca 100
Molecular Weight ... 92.15

Appearance and odor: Clear, colorless liquid with a characteristic aromatic odor. The odor is detectable to most individuals in the range of 10 to 15 ppm. Because olfactory fatigue occurs rapidly upon exposure to toluene, odor is not a good warning property.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air % by Volume	LOWER	UPPER
40°F (4°C) CC	896°F (480°C)		1.27	7.1

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, alcohol foam. Do not use a solid stream of water because the stream will scatter and spread the fire. Use water spray to cool tanks/containers that are exposed to fire and to disperse vapors.

UNUSUAL FIRE/EXPLOSION HAZARDS: This OSHA class IB flammable liquid is a dangerous fire hazard. It is a moderate fire hazard when exposed to oxidizers, heat, sparks, or open flame. Vapors are heavier than air and may travel a considerable distance to an ignition source and flash back.

SPECIAL FIRE-FIGHTING PROCEDURES: Fire fighters should wear self-contained breathing apparatus with full facepiece operated in a positive-pressure mode when fighting fires involving toluene.

SECTION 5. REACTIVITY DATA

CHEMICAL INCOMPATIBILITIES: Toluene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. This material is incompatible with strong oxidizing agents, dinitrogen tetraoxide, silver perchlorate, tetranitromethane, and uranium hexafluoride. Contact with these materials may cause fire or explosion. Nitric acid and toluene, especially in the presence of sulfuric acid, will produce nitrated compounds that are dangerously explosive.

CONDITIONS TO AVOID: Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition. Toluene will attack some forms of plastics, rubber, and coatings. Thermal decomposition or burning produces carbon dioxide and/or carbon monoxide.

No. 317 4/86 TOLUENE

SECTION 6. HEALTH HAZARD INFORMATION | TLV

Toluene is not considered a carcinogen by the NTP, IARC, or OSHA. SUMMARY OF RISKS: Vapors of toluene may cause irritation of the eyes, nose, upper respiratory tract, and skin. Exposure to 200 ppm for 8 hours causes mild fatigue, weakness, confusion, lacrimation (tearing) and paresthesia (a sensation of prickling, tingling, or creeping on the skin that has no objective cause). Exposure to higher concentrations may cause headache, nausea, dizziness, dilated pupils, and euphoria, and, in severe cases, may cause unconsciousness and death. The liquid is irritating to the eyes and skin. Contact with the eyes may cause transient corneal damage, conjunctival irritation, and burns if not promptly removed. Repeated and/or prolonged contact with the skin may cause drying and cracking. It may be absorbed through the skin in toxic amounts. Ingestion causes irritation of the gastrointestinal tract. It may cause effects resembling those from inhalation of the vapor. Chronic overexposure to toluene may cause reversible kidney and liver injury. FIRST AID: EYE CONTACT: Immediately flush eyes, including under eyelids, with running water for at least 15 minutes. Get medical attention if irritation persists.* SKIN CONTACT: Immediately flush skin (for at least 15 minutes) while removing contaminated shoes and clothing. Wash exposed area with soap and water. Get medical attention if irritation persists or if a large area has been exposed.* INHALATION: Remove victim to fresh air. Restore and/or support breathing as required. Keep victim warm and quiet. Get medical help.* INGESTION: Give victim 1 to 2 glasses of water or milk. Contact a poison control center. Do not induce vomiting unless directed to do so. Transport victim to a medical facility. Never give anything by mouth to a person who is unconscious or convulsing. * GET MEDICAL ASSISTANCE = In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid, if indicated.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL/LEAK: Notify safety personnel of large spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Limit access to spill area to necessary personnel only. Remove leaking containers to safe place if feasible. Cleanup personnel need protection against contact with liquid and inhalation of vapor (see sect. 8). WASTE DISPOSAL: Absorb small spills with paper towel or vermiculite. Contain large spills and collect if feasible, or absorb with vermiculite or sand. Place waste solvent or absorbent into closed containers for disposal using nonsparking tools. Liquid can be flushed with water to an open holding area for handling. Do not flush to sewer, watershed, or waterway. COMMENTS: Place in suitable container for disposal by a licensed contractor or burn in an approved incinerator. Consider reclaiming by distillation. Contaminated absorbent can be burned in a sanitary landfill. Follow all Federal, state, and local regulations. TLm 96: 100-10 ppm. Toluene is designated as a hazardous waste by the EPA. The EPA (RCRA) HW No. is U220 (40 CFR 261). The reportable quantity (RQ) is 1000 lbs/454 kg (40 CFR 117).

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Ventilation fans and other electrical service must be nonsparking and have an explosion-proof design. Exhaust hoods should have a face velocity of at least 100 lfm (linear feet per minute) and be designed to capture heavy vapor. For emergency or nonroutine exposures where the TLV may be exceeded, use an organic chemical cartridge respirator if concentration is less than 200 ppm and an approved canister gas mask or self-contained breathing apparatus with full facepiece if concentration is greater than 200 ppm.

Safety glasses or splash goggles should be worn in all work areas. Neoprene gloves, apron, face shield, boots, and other appropriate protective clothing and equipment should be available and worn as necessary to prevent skin and eye contact. Remove contaminated clothing immediately and do not wear it until it has been properly laundered.

Eyewash stations and safety showers should be readily available in use and handling areas.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

STORAGE SEGREGATION: Store in a cool, dry, well-ventilated area away from oxidizing agents, heat, sparks, or open flame. Storage areas must meet OSHA requirements for class IB flammable liquids. Use approved safety cans for handling small amounts. Protect containers from physical damage. Use only with adequate ventilation. Avoid contact with eyes, skin, or clothing. Do not inhale or ingest. Use caution when handling this compound because it can be absorbed through intact skin in toxic amounts. SPECIAL HANDLING/STORAGE: Ground and bond metal containers and equipment to prevent static sparks when making transfers. Do not smoke in use or storage areas. Use nonsparking tools. ENGINEERING CONTROL: Preplacement and periodic medical exams emphasizing the liver, kidneys, nervous system, lungs, heart, and blood should be provided. Workers exposed to concentrations greater than the action level (50 ppm) should be examined at least once a year. Use of alcohol can aggravate the toxic effects of toluene.

COMMENTS: Emptied containers contain product residues. Handle accordingly!

Toluene is designated as a hazardous substance by the EPA (40 CFR 116). DOT Classification: Flammable liquid. UN1294.

Data Source(s) Code: 1-9, 12, 16, 20, 21, 24, 26, 31, 82. CR

Approvals J.O. Accascio, 11/86.

Indust. Hygiene/Safety DW 10-86

Medical Review Oct 86

MSDS Material Safety Data Sheet

n: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

MALLINCKRODT J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response In Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

XYLENES

MSDS Number: X2000 --- *Effective Date: 03/05/97*

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene
CAS No.: 1330-20-7
Molecular Weight: 106.17
Chemical Formula: C6H4(CH3)2
Product Codes: J.T. Baker: 5377, 5810, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516 Mallinckrodt: 8664, 8668, 8671, 8672, 8685, 8802

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
p-Xylene	106-42-3	< 20%	No
Ethyl Benzene	100-41-4	15 - 25%	Yes
m-Xylene	108-38-3	40 - 65%	No
o-Xylene	95-47-6	15 - 20%	No

3. Hazards Identification

Emergency Overview

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

J.T. Baker SAF-T-DATA (tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.

Ingestion:
Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.

Skin Contact:
Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.

Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

Chronic Exposure:
Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.

Ingestion:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.

Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Flash point: 29C (84F) CC Autoignition temperature: 464C (867F) Flammable limits in air % by volume: lel: 1.0; uel: 7.0

Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.

Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802. J. T. Baker SOLUSORB(tm) solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL): 100 ppm (TWA) xylene 100 ppm (TWA) ethylbenzene -ACGIH Threshold Limit Value (TLV): 100 ppm (TWA) 150 ppm (STEL) xylene Carcinogen Category (xylene): A4 100 ppm (TWA) 125 ppm (STEL) ethyl benzene

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it

into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices* , most recent edition, for details. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face organic vapor respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

The following physical data is for xylene.
Appearance:
Clear, colorless liquid.

Odor:
Characteristic odor.

Solubility:
Insoluble in water.

Specific Gravity:
0.86 @ 20C/4C

pH:
Not applicable.

% Volatiles by volume @ 21C (70F):
100

Boiling Point:
137 - 140C (279 - 284F)

Melting Point:
-25C (-13F)

Vapor Density (Air=1):
3.7

Vapor Pressure (mm Hg):
8 @ 20C (68F)

Evaporation Rate (BuAc=1):
0.7

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
Involvement in a fire causes formation of carbon monoxide and unidentified organic components.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Strong oxidizing agents and strong acids.

Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector. Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:
May cause teratogenic effects.

--------\Cancer Lists\----------
---NTP Carcinogen---

Ingredient	Known	Anticipated	IARC Category
Ethyl Benzene (100-41-4)	No	No	None
p-Xylene (106-42-3)	No	No	3
m-Xylene (108-38-3)	No	No	3
o-Xylene (95-47-6)	No	No	3

12. Ecological Information

Environmental Fate:
Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)

Environmental Toxicity:
For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3.3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes
p-Xylene (106-42-3)	Yes	Yes	Yes	Yes
m-Xylene (108-38-3)	Yes	Yes	Yes	Yes
o-Xylene (95-47-6)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

--Canada--

Ingredient	Korea	DSL	NDSL	Phil.
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes
p-Xylene (106-42-3)	Yes	Yes	No	Yes
m-Xylene (108-38-3)	Yes	Yes	No	Yes
o-Xylene (95-47-6)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

-SARA 302- ------SARA 313------

Ingredient	RQ	TPQ	List	Chemical Catg.
Ethyl Benzene (100-41-4)	No	No	Yes	No
p-Xylene (106-42-3)	No	No	Yes	No
m-Xylene (108-38-3)	No	No	Yes	No
o-Xylene (95-47-6)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

-RCRA- -TSCA-

Ingredient	CERCLA	261.33	8(d)
Ethyl Benzene (100-41-4)	1000	No	Yes
p-Xylene (106-42-3)	100	No	Yes
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 3[Y]
Poison Schedule: No information found.

WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 3 Reactivity: 0

Label Hazard Warning:
DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

Label Precautions:
Keep away from heat, sparks and flame. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Avoid breathing vapor. Wash thoroughly after handling.

Label First Aid:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:
Mixture. New 16 section MSDS format, all sections have been revised.

Disclaimer:

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)