SITE CHARACTERIZATION WORK PLAN FOR THE FORMER HUNTS POINT GAS WORKS MEAT MARKET PARCEL

Bronx, New York

Prepared For:

Consolidated Edison Company of New York, Inc.

31-01 20th Avenue

Long Island City, NY 11105

Prepared By:

PARSONS

301 Plainfield Road, Suite 350
Syracuse, New York 13212
Phone: (315) 451-9560
Fax: (315) 451-9570

MARCH 2015

TABLE OF CONTENTS

Page

LIST OF ABBREVIATIONS AND ACRONYMS iii

SECTION 1 INTRODUCTION 1-1

1.1 PROJECT BACKGROUND 1-1

1.2 PROJECT OBJECTIVES 1-1

SECTION 2 SITE BACKGROUND 2-1

2.1 SITE DESCRIPTION 2-1

2.2 ADJOINING PROPERTY DESCRIPTION 2-1

2.3 SITE HISTORY 2-1

2.4 PREVIOUS Site INVESTIGATIONS 2-1

2.5 SITE SETTING 2-2
2.5.1 Physical Setting and Regional Hydrogeology 2-2

SECTION 3 SCOPE OF WORK 3-1

3.1 SITE INSPECTION AND PRELIMINARY INVESTIGATION ACTIVITIES 3-1

3.2 UNDERGROUND UTILITY CLEARANCE 3-1

3.3 AIR MONITORING 3-2
3.3.1 Worker Air Monitoring 3-2
3.3.2 Community Air Monitoring 3-2

3.4 SOIL BORINGS 3-4

3.5 MONITORING WELL INSTALLATION 3-5

3.6 SITE SURVEY 3-5

3.7 GROUNDWATER LEVEL MEASUREMENTS 3-6

3.8 GROUNDWATER SAMPLING AND ANALYSIS 3-6

3.9 WASTE MANAGEMENT 3-6

TABLE OF CONTENTS
(continued)

Page

3.10 LABORATORY ANALYSIS AND DATA VALIDATION..... 3-6

3.11 SITE CHARACTERIZATION REPORT 3-7

SECTION 4 PROJECT MANAGEMENT..... 4-1

4.1 ORGANIZATION AND STAFFING 4-1

4.2 PROJECT SCHEDULE..... 4-2

SECTION 5 REFERENCES..... 5-1

LIST OF TABLES

Table 1 Sampling Rationale

Table 2 Summary of Samples and Analyses

LIST OF FIGURES

Figure 1 Site Vicinity Map

Figure 2 Site Location Map

Figure 3 Sample Location Map

Figure 4 Anticipated Project Schedule

LIST OF APPENDICES

APPENDIX A FIELD SAMPLING PLAN

APPENDIX B QUALITY ASSURANCE PROJECT PLAN

APPENDIX C PROJECT SAFETY, HEALTH, AND ENVIRONMENTAL PLAN

LIST OF ABBREVIATIONS AND ACRONYMS

ASP	Analytical Services Protocol
bgs	below ground surface
Con Edison	Consolidated Edison Company of New York, Inc.
DOT	Department of Transportation
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Analysis Program
FSP	Field Sampling Plan
Gas Works	Hunts Point Gas Works
HSA	hollow-stem auger
IDW	Investigation-derived wastes
LMS	Lawler, Matusky, and Skelly Engineers LLP
LNAPL	light non-aqueous phase liquid
MGP	manufactured gas plant
MTS	Marine Transfer Station
NAPL	non-aqueous phase liquid
NTU	Nephelometric Turbidity Units
NYCEDC	New York City Economic Development Corporation
NYSDEC	New York State Department of Environmental Conservation
NYSDOC	New York State Department of Corrections
NYSDOH	New York State Department of Health
NYSEDC	New York City Economic Development Corporation
PCB	Poly Chlorinated Biphenol
ppm	parts per million
PSHEP	Project Safety, Health, and Environmental Plan
QAPP	Quality Assurance Project Plan
QA/QC	Quality assurance/quality control
QC	quality control
SCR	Site Characterization Report
SCWP	Site Characterization Work Plan
Site	former Hunts Point Gas Works

LIST OF ABBREVIATIONS AND ACRONYMS (continued)

SOPs	standard operating procedures
SVOCs	semivolatile organic compounds
TAL	target analyte list
TCL	target compound list
$\mu g/m^3$	micrograms per cubic meter
USEPA	United Stated Environmental Protection Agency
USGS	United States Geological Survey
VCA	Voluntary Cleanup Agreement
VOCs	volatile organics

SECTION 1

INTRODUCTION

1.1 PROJECT BACKGROUND

The Consolidated Edison Company of New York, Inc. (Con Edison) has entered into a Voluntary Cleanup Agreement (VCA) 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 properties is the former Hunts Point Gas Works (VCA Index No. D2-0003-02-08), located in the Bronx, New York (Figure 1). The former Hunts Point Gas Works (Gas Works) was a MGP operated by Con Edison between 1926 and 1962.

Historical research conducted for the former Hunts Point Gas Works is further described in Section 2.3. Results of that effort are documented in the *Hunts Point Offsite Manufactured Gas Plant Site History Report, Bronx, New York* (Parsons, 2003). Portions of the former Hunts Point MGP Site were previously investigated and/or remediated. One portion of the former Hunts Point Gas Works is the Meat Market Parcel, located on a portion of Block 2781, Lot 500. The majority of the facilities associated with the former Hunts Point Gas Works were located within the Meat Market Parcel (Figure 2).

This Site Characterization Work Plan (SCWP) is for the Meat Market Parcel of the former Hunts Point Gas Works (Site). A Site Characterization of the Site will be conducted to (1) assess the potential presence of MGP-related impacts; and (2) to ascertain the potential need for further investigation or remediation. This SCWP 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 within the Site 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 on-site 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 the center of Hunts Point, a commercial area of the Bronx, on Food Center Drive. The Site includes approximately 48 acres and is currently occupied by multiple commercial buildings, including the Hunts Point Meat Market (Figure 2). The Site is owned by the City of New York and managed by the New York City Economic Development Corporation (NYCEDC). The buildings presently located on the Meat Market Parcel were constructed in the 1970s.

2.2 ADJOINING PROPERTY DESCRIPTION

The Site is bound by Food Center Drive to the south and east, beyond which the Fulton Fish Market, Marine Transfer Station (MTS), Sultana Citarella, and Parcel F sites are found. The Site is bound to the north by Baldor Specialty Foods and Parcel E OU-1/OU-3 and bound to the west by Parcel A OU-1. The adjacent properties are currently owned by the City of New York and are managed by the NYCEDC.

2.3 SITE HISTORY

Research for the entire Hunts Point Gas Works property was previously conducted and documented in the *Hunts Point Offsite Manufactured Gas Plant Site History Report, Bronx, New York* (Parsons, 2003). Based on this report, the Gas Works was owned and/or operated as an MGP and gas holder station by Con Edison between 1926 and 1962. The City of New York acquired the majority of the former Hunts Point Gas Works property in the late 1960s. The majority of the Gas Works property was then transitioned into warehouse space for use as a wholesale food cooperative.

Reviews of historical aerial photographs indicate that the Meat Market Parcel contained the majority of structures related to the Gas Works. Water gas generators, purifying boxes, coal handling equipment, coke ovens, a producer gas generator house, an oven/producer cooler, tar extractors, and scrubbers were present within the Site (Figure 2). Portions of the MGP Site began to be taken out of service in the 1950s, with the final MGP component being removed in 1962.

New York City assumed ownership of the Site through multiple deed transactions between 1966 and 1972. In the 1970s, three long buildings were constructed in the center of the Site to later be used at the cooperative market, along with multiple surrounding buildings.

2.4 PREVIOUS SITE INVESTIGATIONS

Based on a record search, previous investigations have been conducted at the Site. Investigations have been conducted at several of the other parcels within the overall Hunts Point Gas Works property. Impacts associated with former MGP operations have been identified during several of these investigations, and are summarized in reports specific to those parcels.

2.5 SITE SETTING

2.5.1 Physical Setting and Regional Hydrogeology

The 182 acre Former Hunts Point Gas Works is located on a peninsula at the confluence of the Bronx and East Rivers. Hunts Point is a generally flat area near mean sea level, with little topographic relief. The Site is an approximately 48 acre area, located within the central portion of the Former Hunts Point Gas Works.

The geology and subsurface conditions of the Hunts Point peninsula vary depending upon the history of localized development. Prior to significant construction and development, Hunts Point was drained by small creeks which emptied to into the Bronx and East Rivers. Subsequent development filled and/or covered the creeks, however shallow groundwater movement may still be influenced by the former channels. Localized groundwater flow may also be influenced by pre-development stream deposits, sewer lines, and abandoned pipelines. Overall, groundwater flows to the south, towards the confluence of the Bronx and East Rivers (Hygientics, 1997b).

During previous investigations, groundwater was encountered within fill materials on the eastern portion of the Former Gas Works at depths between 2 and 5 feet below ground surface (bgs), whereas groundwater was encountered at 12 to 15 feet bgs on the western portion of the Former Gas Works (Hygienetics, 1997). A perched aquifer within the sand and fill, and above a clay confining layer, may be present. Site characterizations performed by Parsons in 2014 on the western portion (Halleck Street), and the southern portion (MTS), of the former Gas Works observed groundwater at depths ranging from 6 to 12 feet bgs and 7 to 11 feet bgs, respectively (Parsons, 2014; Parsons, 2015).

Previous investigations within Parcel B, to the southwest of the Site, indicate the presence of bedrock or boulders at depths ranging from less than 6 feet bgs in test trenches, to 40 feet bgs in soil borings (LMS, 2001). Site characterizations performed by Parsons in 2014 indicate the presence of a clay confining layer at depths ranging from 10 to 32 feet bgs within the western and southern portions of the former Gas Works (Parsons, 2014; Parsons, 2015).

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 soil borings and monitoring wells. Samples of soil, groundwater, and free product (if present) will be collected for laboratory analysis. Proposed sampling locations are shown on Figure 3. Table 1 provides the rationale for soil boring and monitoring well locations. 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 Project Safety, Health, and Envronmental Plan (PSHEP) is provided as Appendix C.

3.1 SITE INSPECTION AND PRELIMINARY INVESTIGATION ACTIVITIES

A Site 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 New York City Economic Development Corporation (NYSEDC). 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. Modifications, 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, and/or a private utility locating contractor has conducted a geophysical survey of the proposed sampling locations to locate potential underground utilities or obstructions;
- Utility plates for the Site and surrounding area have been provided to Parsons by Con Edison's Construction Management staff, and reviewed;
- Potable water and sewer maps for the Site and the surrounding area have been obtained by Parsons 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 PSHEP (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 the 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 volatile organic compounds (VOCs) in the worker breathing zone, guidelines in the PSHEP (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; alternatively, a MultiRAE 5-Gas Meter equipped with a hydrogen cyanide sensor will be used.

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 parts per million (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 exceedance 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 $\mu g/m^3$ 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 µg/m^3 of the background (upwind) level and in preventing visible dust migration.

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

3.4 SOIL BORINGS

A total of fourteen (14) soil borings (SB-101 through SB-114) will be advanced to characterize subsurface conditions within the Site. Figure 3 depicts the proposed boring locations and Table 1 summarizes the sampling rationale. Boring locations are subject to change based on accessibility, utility clearance, and conditions encountered during the Site inspection and field activities. Additional soil borings may also be added during the course of the field investigation based on subsurface conditions encountered.

Each soil boring location will be cleared for utilities as described above in Sections 3.1 and 3.2. Accessibility of soil boring locations, as well as the subsurface conditions encountered, will govern the drilling techniques used. It is anticipated that soil borings will be advanced using a hollow stem auger (HSA) or Roto-Sonic drill rig.

Soil borings will be advanced to the meadow mat (peat) layer or a confining clay layer as determined by the field geologist. If neither meadow mat nor a confining clay layer is present, the boring will be advanced to bedrock [anticipated to be at depth of 40 feet bgs based on data from nearby Parcel B (LMS, 2001)], or to a maximum depth of 50 feet. If visually impacted materials are observed at the bottom of the boring, the boring will be continued until un-impacted soils are observed, bedrock is encountered, or the limit of the drilling equipment is reached. In the event that impacted materials are encountered at the interface of a confining layer, this layer will be cased off prior to deeper drilling, to help prevent vertical migration of contamination.

Soil samples will be collected continuously to the bottom of the borings utilizing a track-mounted Compact Roto-Sonic Drill Rig, or by using 2-foot long by 2-inch diameter split spoons, depending on the type of drill rig used. 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 poly chlorinated biphenol (PCBs), target compound list (TCL), VOCs and semivolatile organic compounds (SVOCs), cyanide, and target analyte list (TAL) metals. In

addition, if free phase non-aqueous phase liquid (NAPL) is encountered, representative samples may 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. Borings in asphalt or concrete will be repaired and patched. 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 the FSP in Appendix A.

3.5 MONITORING WELL INSTALLATION

Five (5) monitoring wells (MW-101 through MW-105) will be installed at the proposed locations shown on Figure 3. Table 1 summarizes the sampling rationale. Monitoring well borings will be advanced to the meadow mat (peat) layer or a confining clay layer as determined by the field geologist. If neither meadow mat nor a confining clay layer is present, the boring will be advanced to bedrock [anticipated to be at depth of 40 feet bgs based on data from nearby Parcel B (LMS, 2001)], or to a maximum depth of 50 feet. If visually impacted materials are observed at the bottom of the boring, the boring will be continued until un-impacted soils are observed, bedrock is encountered, or the limit of the drilling equipment is reached. In the event that impacted materials are encountered at the interface of a confining layer, this layer will be cased off prior to deeper drilling, to help prevent vertical migration of contamination.

Monitoring well borings will be advanced and sampled consistent with Section 3.4. The data collected from the 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.

The 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, unless NAPL is detected immediately on top of bedrock. 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.

After a minimum of 24 hours, the monitoring wells will be developed until the well is reasonably free of sediment (less than 50 nephelometric turbidity units [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).

3.6 SITE SURVEY

The locations and elevations of the soil borings and monitoring wells will be surveyed by a licensed surveyor. Vertical control of elevations 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.

3.7 GROUNDWATER LEVEL MEASUREMENTS

Following installation of the five monitoring wells proposed herein, groundwater level measurements from each new well will be obtained to facilitate development of a groundwater contour map, showing groundwater flow direction.

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 five monitoring wells (MW-101 through MW-105). 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 PCBs, 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 may be submitted for forensic fingerprinting analysis to a lab specialized in analyzing and determining the origin of NAPL samples.

3.9 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 and 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. Alternatively, materials will be transported off-site daily.

3.10 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 United Stated Environmental Protection Agency (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 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 2013a and 2013b). 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).

3.11 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 description, including site information regarding location, site features, current zoning / use(s), historic use(s) and site geology and hydrogeology;
- 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	Mr. Charles Leary Telephone: (718) 204-4347 Fax: (718) 932-2687 E-mail: learyc@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) 552 - 9675 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	Mr. Zohar Lavy Telephone: (732) 537 - 3506 Fax: (732) 537 - 3502 E-mail: zohar.lavy@parsons.com	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	Mr. Dan Martoccia Telephone: (732) 537 - 3557 Fax: (732) 537 - 3502 E-mail: Daniel.martoccia@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: (908) 887-1973 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.

Anticipated Subcontractors		
Key Position	**Contact Name**	**Responsibilities**
Utility Clearance/ GPR Survey	Diversified Geophysics, Inc.	Conduct GPR survey of Site to detect underground utilities.
Drilling	ADT	Install soil borings and monitoring wells.
Surveyor	Chazen	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

Hygienetics. 1997. *Phase II Investigation Report of Hunts Point Produce Market Complex Parcels "A, B, C, D, and E", Bronx, New York*. Hygienetics Environmental Services, Inc. December 2, 1997.

LMS, 2001. *Investigation Report for Operating Unit Portion of Parcel B, Bronx, NY, Hunts Point Food Distribution Redevelopment Plan*. Lawler Matusky & Skelly Engineers LLP, May 2001.

NYSDOH, 2000. *New York State Department of Health Generic Community Air Monitoring Plan*. New York State Department of Health. Revised June 2000.

Parsons, 2003. *Hunts Point Offsite Manufactured Gas Plant Site History Report, Bronx, New York.* Parsons. February 2003.

Parsons, 2014. *Site Characterization Report for the Former Hunts Point Gas Works Halleck Street Sidewalk Area*. Parsons, July 2014.

Parsons, 2015. *Site Characterization Report for the Former Hunts Point Gas Works Marine Transfer Station (MTS) Parcel*. Parsons, January 2015.

USEPA, 2013a. *USEPA National Functional Guidelines for Superfund Organic Methods Data Review, EPA 540-R-14-002*. U.S. Environmental Protection Agency, Washington, D.C. October 2013.

USEPA, 2013b. *USEPA National Functional Guidelines for Superfund Inorganic Methods Data Review, EPA 540-R-13-001*. U.S. Environmental Protection Agency, Washington, D.C. October 2013.

TABLES

TABLE 1

SAMPLING RATIONALE

Sample Location	Depth	Rationale
Monitoring Wells MW-101 through MW-104	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect groundwater elevation data to assess groundwater flow direction. - Collect soil and groundwater samples from up-gradient and side-gradient portions of the site to determine the presence and the nature and extent of MGP residues, NAPL, or other constituents.
Monitoring Well MW-105	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collected groundwater elevation data to assess groundwater flow direction. - Collect soil and groundwater samples from the down-gradient portion of the site to determine the presence and the nature and extent of MGP residues, NAPL, or other constituents. - Collect soil and groundwater samples from the vicinity of a former MGP structure to determine the presence and the nature and extent of MGP residues, NAPL, or other constituents.
Soil Boring SB-101	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect a soil sample from the up-gradient perimeter of the Site to determine the presence of MGP residues, NAPL, or other constituents.
Soil Borings SB-102 , SB-105, and SB-109	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect soil samples from within, and in the vicinity of, former purifying boxes to determine the presence of MGP residues, NAPL, or other constituents, and confirm the presence and depth of any remaining structures.
Soil Borings SB-103 and SB-104	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect soil samples within the footprints of former tar separator and process tanks to determine the presence of MGP residues, NAPL, or other constituents, and confirm the presence and depth of any remaining structures.
Soil Boring SB-106	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect a soil sample from within the footprint of former condensers to determine the presence of MGP residues, NAPL, or other constituents, and confirm the presence and depth of any remaining structures.

TABLE 1

SAMPLING RATIONALE
(continued)

Sample Location	Depth	Rationale
Soil Borings SB-107 and SB-113	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect soil samples from within 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 Boring SB-108	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect a soil sample from within the footprint of the former water gas generator building to determine the presence of MGP residues, NAPL, or other constituents, and confirm the presence and depth of any remaining structures.
Soil Boring SB-110	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect a soil sample within the footprint of the former laboratory to determine the presence of MGP residues, NAPL, or other constituents, and confirm the present and depth of any remaining structures.
Soil Boring SB-111	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect a soil sample from within the footprint of a former settling basin to determine the presence of MGP residues, NAPL, or other constituents, and confirm the presence and depth of any remaining structures.
Soil Borings SB-112 and SB-114	Meadow mat, clay confining layer, equipment refusal, bedrock refusal, or 50 feet	- Collect soil samples from the vicinity of former ammonia liquor coolers to determine the presence of MGP residues, NAPL, or other constituents.

TABLE 2

SUMMARY OF SAMPLES AND ANALYSES

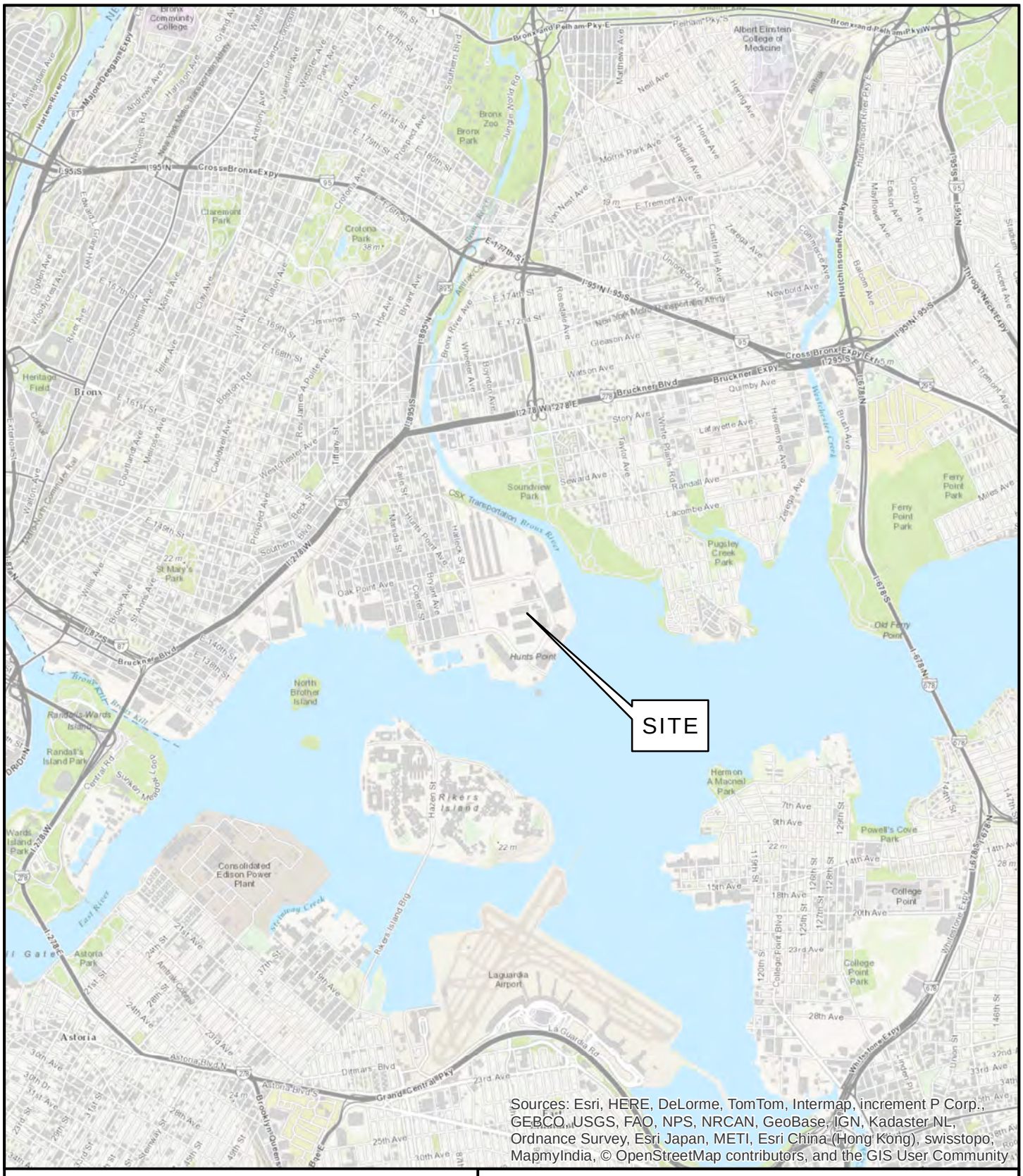
Matrix	Parameter	Analytical Method	Field Samples				QC Blanks	Total
			Field Samples	Field Duplicate	MS/MSD[a] (Total)	Sub-Total	Trip Blank	
Soil Samples	PCBs	EPA SW 8082	38	2	2/2	44	0	44
	TCL VOCs	EPA SW 8260B	38	2	2/2	44	0	44
	TCL SVOCs	EPA SW 8270C	38	2	2/2	44	0	44
	Cyanide	EPA SW 9012A	38	2	2/2	44	0	44
	TAL Metals	EPA SW 6010B/7471A	38	2	2/2	44	0	44
Groundwater Samples	PCBs	EPA SW 8082	5	1	1/1	8	0	8
	TCL VOCs	EPA SW 8260B	5	1	1/1	8	1[b]	9
	TCL SVOCs	EPA SW 8270C	5	1	1/1	8	0	8
	Cyanide (total/free)	EPA E335.2/OIA-1677	5	1	1/1	8	0	8
	TAL Metals	EPA SW 6010B/7470A	5	1	1/1	8	0	8
Free Product Samples	Hydrocarbon Fingerprinting	Modified Method 8100	TBD[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) TBD – To be determined. The number of free product samples collected for analysis (if any) will be determined in the field.

FIGURES



New York Quadrangle

LATITUDE: N40° 48' 33"
LONGITUDE: W73° 52' 48"

N

FIGURE 1

CONSOLIDATED EDISON COMPANY OF NEW YORK
FORMER HUNTS POINT GAS WORKS
MEAT MARKET PARCEL
BRONX, NEW YORK

SITE VICINITY MAP

PARSONS
200 COTTONTAIL LANE SOUTH, SOMERSET, NJ 08873 PHONE: (732) 537-3500

Document Path: Q:\GIS\Projects\ConEd\Meat Market\MXD\Figure 1 - Meat_Market_SLM.mxd

Legend

- Approximate Site Boundary
- Approximate Boundary of Former Gas Works Facilities
- Approximate Boundary of Parcels
- Approximate Location of Former Gas Works Facilities

FIGURE 2

CONSOLIDATED EDISON COMPANY OF NEW YORK
FORMER HUNTS POINT GAS WORKS
MEAT MARKET PARCEL
BRONX, NEW YORK

SITE LOCATION MAP

PARSONS
200 COTTONTAIL LANE SOUTH, SOMERSET, NJ 08873 PHONE: (732) 537-3500

Document Path: Q:\GIS\Projects\ConEd\Meat Market\MXD\Figure 1 - Site_Location_Map_meat parcel.mxd

Legend

- Approximate Site Boundary
- Approximate Boundary of Former Gas Works Facilities
- Approximate Boundary of Parcels
- Approximate Location of Former Gas Works Facilities
- Proposed Boring Location
- Proposed Monitoring Well Location

FIGURE 3

CONSOLIDATED EDISON COMPANY OF NEW YORK
FORMER HUNTS POINT GAS WORKS
MEAT MARKET PARCEL
BRONX, NEW YORK

SAMPLE LOCATION MAP

PARSONS
200 COTTONTAIL LANE SOUTH, SOMERSET, NJ 08873 PHONE: (732) 537-3500

Document Path: Q:\GIS\Projects\ConEd\Meat Market\MXD\Figure 3 - Sample_Location_Meat-Market.mxd

Figure 4
Anticipated Project Schedule
Former Hunts Point Gas Works Site
Meat Market Parcel, Bronx, New York

	Duration (Working Days)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Site Characterization Activities											
Utility Mark-Out/Site Inspection (All Locations)	2										
Vacuum or Hand Excavation of Drilling Locations (to 5' bgs) SB-101 to SB-114; MW-101 to MW-105	13										
Soil Boring Installation SB-101 through SB-114	14										
Monitoring Well Installation and Development MW-101 through MW-105	7										
Groundwater Sampling MW-101 through MW-105	2										
Site Survey	1										

APPENDIX A

FIELD SAMPLING PLAN

APPENDIX A

FIELD SAMPLING PLAN FOR SITE CHARACTERIZATION OF THE FORMER HUNTS POINT GAS WORKS MEAT MARKET PARCEL Bronx, New York

Prepared For:

Consolidated Edison Company of New York, Inc.

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

Prepared By:

PARSONS

301 Plainfield Road, Suite 350
Syracuse, New York 13212
Phone: (315) 451-9560
Fax: (315) 451-9570

MARCH 2015

TABLE OF CONTENTS

Page

SECTION 1 INTRODUCTION..... 1-1

1.1 OVERVIEW OF FIELD ACTIVITIES..... 1-1

SECTION 2 GENERAL FIELD GUIDELINES 2-1

2.1 SITE HAZARDS..... 2-1

2.2 UNDERGROUND UTILITIES..... 2-1

2.3 FIELD LOG BOOKS 2-1

SECTION 3 FIELD EQUIPMENT DECONTAMINATION AND MANAGEMENT OF INVESTIGATION DERIVED WASTES 3-1

3.1 DECONTAMINATION AREA 3-1

3.2 EQUIPMENT DECONTAMINATION..... 3-1
3.2.1 Sampling Equipment Decontamination..... 3-1

3.3 MANAGEMENT OF INVESTIGATION DERIVED WASTES..... 3-2
3.3.1 Decontamination Fluids..... 3-2
3.3.2 Drill Cuttings..... 3-2
3.3.3 Development and Purge Water..... 3-2
3.3.4 Personal Protective Equipment..... 3-2
3.3.5 Dedicated Sampling Equipment..... 3-3

SECTION 4 DRILLING AND SOIL SAMPLING..... 4-1

4.1 INTRODUCTION 4-1

4.2 SOIL BORINGS AND SOIL SAMPLING..... 4-1

4.4 MONITORING WELL INSTALLATION AND DEVELOPMENT 4-3

SECTION 5 GROUNDWATER SAMPLING PROCEDURES..... 5-1

5.1 INTRODUCTION 5-1

5.2 GROUNDWATER SAMPLING..... 5-1

SECTION 6 AIR MONITORING..... 6-1

TABLE OF CONTENTS
(CONTINUED)

Page

6.1 BREATHING ZONE AIR MONITORING DURING EXCAVATION, DRILLING AND SAMPLING 6-1

SECTION 7 FIELD INSTRUMENTS AND CALIBRATION 7-1

7.1 PORTABLE PHOTOIONIZATION DETECTOR 7-1

7.2 MINIRAM 7-1

7.3 MultiRae 7-2

7.4 PH METER 7-2

7.5 SPECIFIC CONDUCTIVITY METER AND TEMPERATURE PROBE 7-2

7.6 TURBIDITY METER 7-2

SECTION 8 FIELD SAMPLE IDENTIFICATION AND CUSTODY 8-1

8.1 SAMPLE LOCATION NUMBERING SYSTEM 8-1

8.2 SAMPLE IDENTIFICATION 8-1

8.3 CHAIN OF CUSTODY 8-1

8.4 SAMPLE DOCUMENTATION 8-2

LIST OF FIGURES

Figure 4.1 Drilling Record 4-6

Figure 4.2 Monitoring Well Cross Section 4-7

Figure 5.1 Groundwater Sampling Record 5-3

Figure 8.1 Chain-of-Custody Form 8-4

SECTION 1

INTRODUCTION

This Field Sampling Plan (FSP) defines the methods and procedures to be used for conducting the Site Characterization at the Former Hunts Point Gas Works, Meat Market Parcel, Bronx, New York.

1.1 OVERVIEW OF FIELD ACTIVITIES

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

- **Geophysical Survey** – Fourteen soil boring locations (SB-101 through SB-114), and five monitoring well locations (MW-101 through MW-105) will be scanned by geophysical methods prior to hand clearing and drilling activities.
- **Soil Borings** – Nineteen soil borings (SB-101 through SB-114 and MW-101 through MW-105) 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 and submitted to the laboratory for PCBs, TCL VOCs, TCL SVOCs, cyanide, and TAL metals.
- **Monitoring Wells** – Monitoring wells (MW-101 through MW-105) will be installed at five 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.
- **Surveying** – The locations of the sampling points will be surveyed.

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 (if any) 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 or plywood in a plastic-lined containment area pending characterization and proper disposal.

3.3.2 Drill Cuttings

Drill cutting containment methods will be implemented during drilling activities which may include the use of a sheet of plywood with a hole cut in the center for the drill stem. 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 or plywood in a plastic-lined containment area pending characterization and proper disposal.

3.3.3 Development and Purge Water

Well installation is proposed for this investigation. 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 or plywood 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 potentially 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

DRILLING AND SOIL SAMPLING

4.1 INTRODUCTION

Investigation activities to be conducted at the Former Hunts Point Gas Works Meat Market Parcel will consist of:

- Soil borings
- Monitoring wells.

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

4.2 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 if necessary, hollow-stem auger drilling methods with split spoon sample collection.

- 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 5 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 4.1, 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 direct push 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° 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)

Monitoring Well Installation

Figure 4.2 shows a cross-section for a typical 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 or 5-inch Sonic casing.
- 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 or casing flights will be withdrawn as sand is poured in a manner that will minimize boring 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 boring 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 or casing flights will be withdrawn in a manner that will minimize boring 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

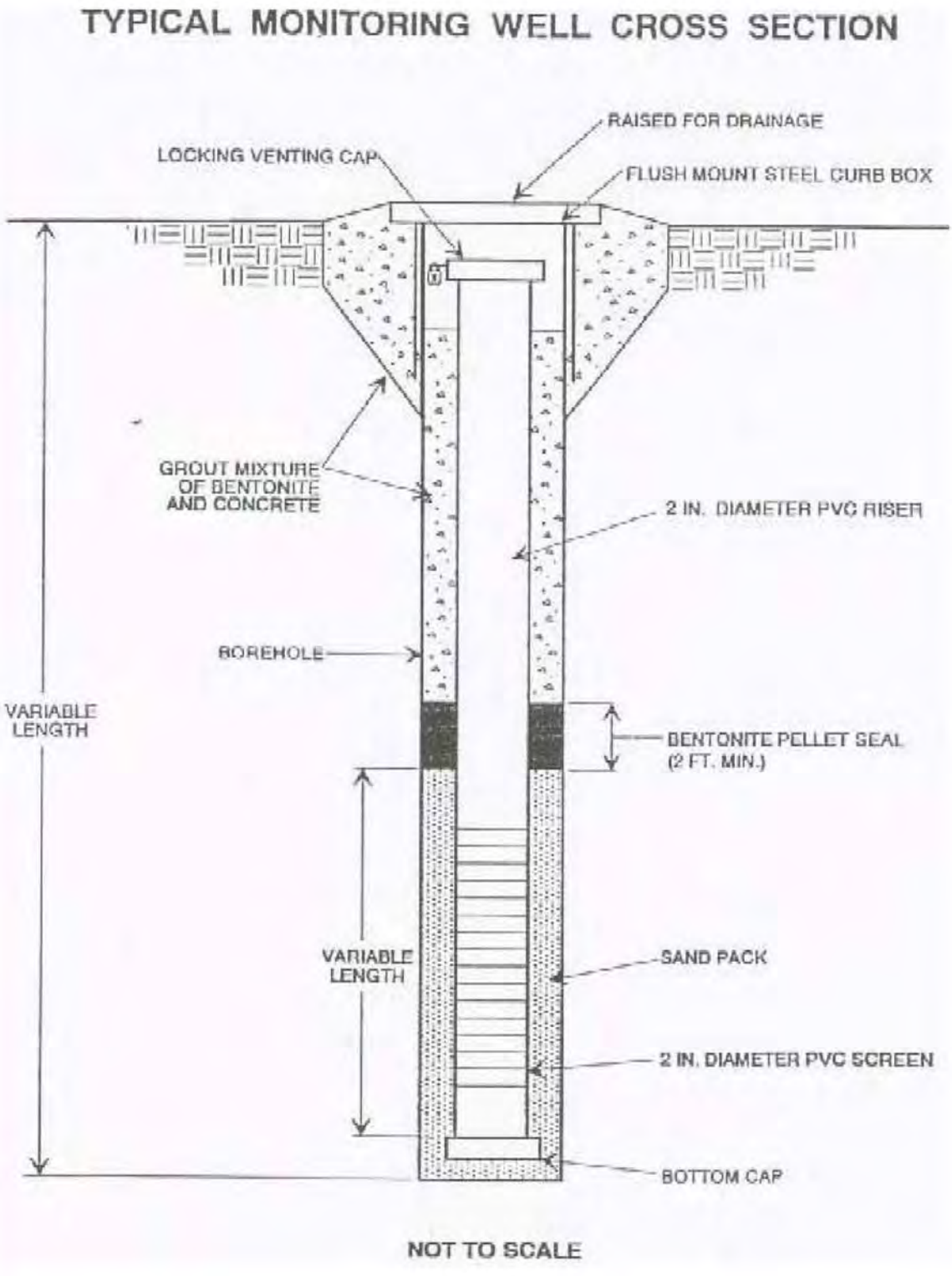
- After approximately 24 hours following completion, the monitoring wells will be developed by surging/bailing, using a centrifugal or peristaltic pump and dedicated polyethylene tubing, a Waterra positive displacement pump (or equivalent) and dedicated polyethylene tubing, or other methods at the discretion 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 14 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 Drilling Record

Figure 4.2 Monitoring Well Cross Section



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.

- Each well will be purged using a submersible pump and low-flow purging techniques to stabilize the following water quality parameters: temperature, conductivity, pH, dissolved oxygen, oxidation reduction potential (ORP), and turbidity; which will be measured approximately every five minutes.
- 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, and then sampled without a second purge.
- Purge water will be managed and disposed of in accordance with procedures described in Section 3.

Sampling

- Once stabilization was achieved, groundwater samples were collected using a low-flow submersible pump with 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 pre-calibrated 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° 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 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 Groundwater Sampling Record

GROUNDWATER SAMPLING RECORD

SITE NAME: _____
PROJECT NUMBER: _____

SAMPLE NUMBER: _____ WEATHER: _____
DATE: _____ TIME: _____

SAMPLERS: _____ of _____
_____ of _____

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.
- A MultiRae with a Hydrogen Cyanide sensor will be utilized in the work zone.
- Additional air monitoring may be required as specified in the Health and 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,
- MultiRae,
- 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 MULTIRAE

- Calibration must be performed at the beginning of each day of use with a standard multi 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.

7.4 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.

7.5 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.

7.6 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

- Subsurface soil borings will be numbered consecutively beginning with SB-101 (soil borings) or MW-101 (monitoring well borings). Individual samples will also be designated with a depth code (see below).
- Monitoring wells will be numbered consecutively beginning with MW-101.

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 air bill 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°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.

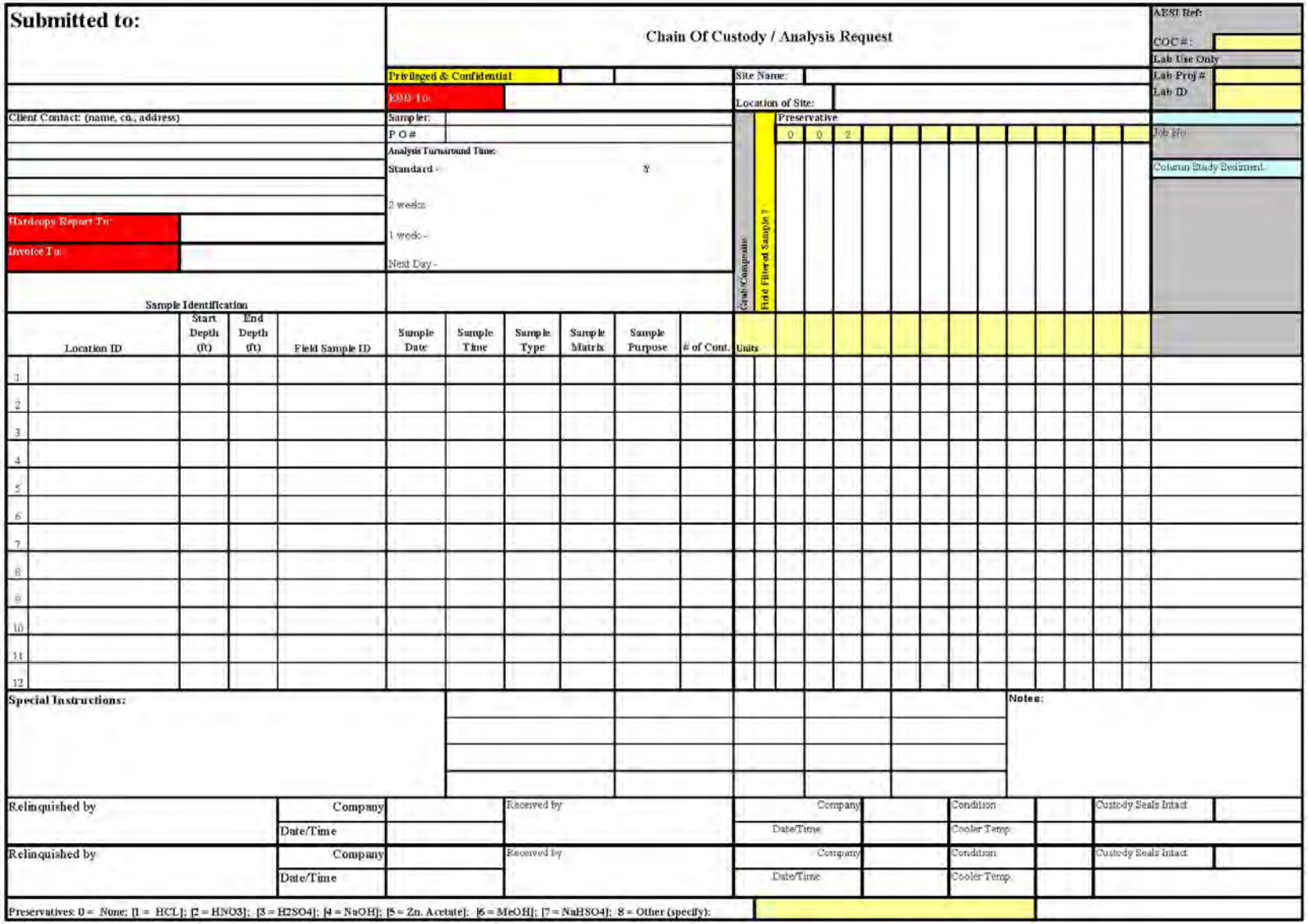
8.4 SAMPLE DOCUMENTATION

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 Form



Submitted to:

Chain Of Custody / Analysis Request

AEST Ref:
COC #:
Lab Use Only
Lab Proj #
Lab ID

Privileged & Confidential
EDD To:
Site Name:
Location of Site:

Client Contact: (name, co., address)
Sampler:
P O #
Analysis Turnaround Time:
Standard -
2 weeks
1 week -
Next Day -
Hardcopy Report To:
Invoice To:

Preservative
Grab/Composite
Field Filtered Sample ?
Job No
Column Study Sediment

Sample Identification

	Location ID	Start Depth (ft)	End Depth (ft)	Field Sample ID	Sample Date	Sample Time	Sample Type	Sample Matrix	Sample Purpose	# of Cont.	Units		0	0	2
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															

Special Instructions:

Notes:

Relinquished by	Company		Received by	Company		Condition		Custody Seals Intact	
	Date/Time			Date/Time		Cooler Temp			
Relinquished by	Company		Received by	Company		Condition		Custody Seals Intact	
	Date/Time			Date/Time		Cooler Temp			

Preservatives: 0 = None; [1 = HCL]; [2 = HNO3]; [3 = H2SO4]; [4 = NaOH]; [5 = Zn. Acetate]; [6 = MeOH]; [7 = NaHSO4]; 8 = Other (specify):

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN FOR THE FORMER HUNTS POINT GAS WORKS MEAT MARKET PARCEL

Bronx, NY

Prepared For:

Consolidated Edison Company of New York, Inc.

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

Prepared By:

PARSONS

301 Plainfield Road, Suite 350
Syracuse, New York 13212
Phone: (315) 451-9560
Fax: (315) 451-9570

March 2015

TABLE OF CONTENTS

Page

LIST OF ACRONYMS vi

SECTION 1 PROJECT DESCRIPTION 1-1

1.1 INTRODUCTION 1-1

1.2 PROJECT OBJECTIVES 1-1

1.3 SCOPE OF WORK 1-1

1.4 DATA QUALITY OBJECTIVES AND PROCESSES 1-1

SECTION 2 PROJECT ORGANIZATION 2-1

2.1 PROJECT AND TEAM ORGANIZATION 2-1
2.1.1 Analytical Services 2-1

2.2 SPECIAL TRAINING/CERTIFICATION 2-1

SECTION 3 QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES FOR MEASUREMENT OF DATA 3-1

3.1 INTRODUCTION 3-1
3.1.1 Data Use Objectives 3-2

3.2 DATA QUALITY OBJECTIVES (PARCCS PARAMETERS) 3-2
3.2.1 Introduction 3-2
3.2.2 PARCCS Parameters (Data Quality Indicators) 3-3
3.2.2.1 Precision 3-3
3.2.2.2 Accuracy 3-3
3.2.2.3 Representativeness 3-5
3.2.2.4 Completeness 3-5
3.2.2.5 Comparability 3-6
3.2.2.6 Sensitivity and Quantitation Limits 3-6

SECTION 4 DATA ACQUISITION 4-1

4.1 SAMPLING METHODS 4-1

4.2 SAMPLE HANDLING AND CUSTODY 4-1
4.2.1 Sample Handling 4-2
4.2.2 Field Sample Custody 4-3
4.2.3 Laboratory Sample Management 4-5
4.2.4 Sample Receipt and Logging 4-5

TABLE OF CONTENTS
(CONTINUED)

Page

4.2.5 Sample Storage Security 4-5
4.2.6 Retention and Disposal of Samples 4-6

4.3 SAMPLE CONTAINER PREPARATION AND SAMPLE PRESERVATION 4-9

4.4 SAMPLE HOLDING TIMES 4-9

4.5 FIELD QC SAMPLES 4-9

SECTION 5 DATA MANAGEMENT 5-1

5.1 INTRODUCTION 5-1

5.2 FIELD DATA MANAGEMENT 5-1

5.3 LABORATORY DATA MANAGEMENT 5-2

SECTION 6 DOCUMENTS AND RECORDS 6-1

6.1 INTRODUCTION 6-1

6.2 FIELD RECORDS 6-1
6.2.1 Field Logbook 6-1
6.2.2 Electronic Field Data Management 6-2
6.2.3 Chain-of-Custody Record 6-2

6.3 LABORATORY RECORDS 6-2
6.3.1 Operational Calibration Records 6-4
6.3.2 Maintenance Records 6-4
6.3.3 Nonconformance Memos 6-4
6.3.4 Corrective Action Request (CAR) Forms 6-5
6.3.5 Analytical Data Reports 6-5

6.4 DATA VALIDATION AND AUDIT RECORDS 6-5
6.4.1 Data Usability Summary Reports 6-5
6.4.2 Audit Reports 6-6

SECTION 7 ANALYTICAL PROCEDURES 7-1

7.1 INTRODUCTION 7-1

7.2 STANDARD OPERATING PROCEDURES 7-1

TABLE OF CONTENTS
(CONTINUED)

Page

SECTION 8 QUALITY CONTROL 8-1

8.1 INTRODUCTION 8-1
8.1.1 Field Quality Control Samples 8-1
8.1.1.1 Equipment Rinse Blanks 8-2
8.1.1.2 Field Duplicates 8-2
8.1.1.3 Trip Blanks 8-2
8.1.1.4 Temperature Blank 8-2
8.1.2 Laboratory Quality Control Samples 8-2
8.1.2.1 Matrix Spike/Matrix Spike Duplicate/ Matrix Duplicates 8-3
8.1.2.2 Laboratory Control Samples 8-4
8.1.2.3 Method and Preparation Blanks 8-4
8.1.2.4 Surrogate Spike Analyses 8-4

8.2 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE 8-4
8.2.1 Field Equipment 8-4
8.2.2 Laboratory Instrumentation 8-5

8.3 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY 8-5
8.3.1 Field Instruments 8-6
8.3.2 Laboratory Instruments 8-6
8.3.3 Calibration System 8-7
8.3.3.1 Calibration Procedures 8-7
MINIMUM CALIBRATION PROCEDURES 8-7
8.3.3.2 Equipment Identification 8-7
8.3.3.3 Calibration Frequency 8-7
8.3.3.4 Calibration Reference Standards 8-7
8.3.4 Operational Calibration 8-8
8.3.4.1 Preparation of a Calibration Curve 8-8
8.3.4.2 Periodic Calibration 8-8

8.4 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES 8-8

SECTION 9 DATA VALIDATION AND USABILITY ELEMENTS 9-1

9.1 DATA REVIEW, VERIFICATION, AND VALIDATION 9-1

9.2 VERIFICATION AND VALIDATION METHODS 9-3
9.2.1 Laboratory 9-3
9.2.2 Analytical Data Validation 9-3

9.3 RECONCILIATION WITH USER REQUIREMENTS 9-6

TABLE OF CONTENTS
(CONTINUED)

Page

SECTION 10 ASSESSMENT AND OVERSIGHT 10-1

10.1 ASSESSMENTS AND RESPONSE ACTIONS 10-1

10.2 PROJECT-SPECIFIC AUDITS 10-1
10.2.1 System Audits 10-1
10.2.2 Performance Audits 10-2
10.2.3 Formal Audits 10-2
10.2.4 Laboratory Audits 10-2
10.2.4.1 Laboratory Performance Audits 10-3
10.2.4.2 Laboratory Internal Audits 10-3
10.2.4.3 Laboratory Data Audits 10-3
10.2.4.4 Laboratory Audit Procedures 10-3
10.2.4.5 Laboratory Documentation 10-4
10.3 CORRECTIVE ACTIONS 10-4

SECTION 11 REPORTS TO MANAGEMENT 11-1

11.1 QA REPORTS 11-1

SECTION 12 REFERENCES 12-1

LIST OF TABLES

Table 3.1 Quality Control Limits for Water Samples 3-9

Table 3.2 Quality Control Limits for Soil Samples 3-10

Table 4.1 Water Sample Containers, Preservation, and Holding Times 4-10

Table 4.2 Soil Sample Containers, Preservation, and Holding Times 4-11

Table 6.1 Summary of Field, Laboratory, and Data Management Records 6-7

Table 8.2 Laboratory Quality Control Sample Frequency 8-11

Table 8.3 Operational Calibration Formulas 8-12

Table 8.4 Periodic Calibration Requirements 8-13

Table 8.5 Sample Concentration Calibration Formulas 8-14

TABLE OF CONTENTS
(CONTINUED)

LIST OF FIGURES

Figure 4.1 Sample Custody Flow Chart..... 4-7

Figure 4.2 Example Chain-of-Custody..... 4-8

Figure 10.1 Corrective Action Request Form..... 10-7

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. The specific objectives of the QAPP are:

- Foster data quality that is sufficient to meet the investigation objectives and to support the decision-making process
- Provide a standard for control and review of measurement data to confirm that the data are scientifically sound, representative, comparable, defensible, and of known quality.

This QAPP has been prepared in accordance with Unites States Environmental Protection Agency (USEPA) guidance (USEPA, 2000a, 2002b).

1.1 INTRODUCTION

Con Edison undertakes investigations 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 manufactured gas plant (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

Samples will be collected from 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). Additional project scope and descriptions of the work assignment are provided in the specific project work plan and Field Sampling Plan (FSP).

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 Quality Control (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 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

2.1 PROJECT AND TEAM ORGANIZATION

The project organization and the function and responsibility of each group affected by the QAPP are presented in the specific work plan for each project. The project organization is designed to promote the exchange of information and for efficient project operation. Key contact information is also summarized in the work plan.

2.1.1 Analytical Services

The analytical laboratory (or laboratories) will analyze environmental samples collected for the specified project. Laboratory operations will be conducted under the supervision of a general manager or laboratory director and a quality assurance manager. A project manager and alternate will be assigned to each project. The project manager will be the primary point of contact and will be responsible for coordination and quality of all laboratory activities associated with the project. The laboratory's project manager will manage project sample receipt, analysis scheduling, and data reporting. In case of temporary absence, the direct supervisor will assume the responsibilities of the absent employee or delegate the responsibility to qualified personnel. Sample Management Staff is responsible for receiving, logging, and maintaining internal custody of samples during the sample's residence in the laboratory. In addition, the laboratory will ensure that project analytical requirements are met; monitor project analytical compliance and immediately notify Parsons if conflict or discrepancies arise; initiate and implement appropriate corrective actions; ensure adequate quality review of deliverables prior to release; and participate in coordination meetings.

2.2 SPECIAL TRAINING/CERTIFICATION

Management and field personnel must review the requirements of this QAPP to make certain that persons assigned to specific tasks have appropriate credentials and experience. The Field Team Leaders will check that all onsite personnel have read and understood the QAPP.

Field personnel will be required to adhere to the generic Health and Safety Plan (HASP) and FSP. They must also follow applicable task-specific health and safety plans that project subcontractors develop before they begin investigation activities.

Laboratories will have trained and experienced staff capable of performing the analyses specified in this QAPP. Laboratories will have New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certification for all analyses pertaining to solid and hazardous waste categories. Additionally, the laboratories must be able to demonstrate that they have analyzed performance-evaluation (PE) or proficiency-testing samples within 12 months of beginning the analyses.

All personnel independent of the laboratory generating the data who are performing data validation and verification must have experience in data validation, quality assurance oversight, and auditing. The data validator must have a Bachelors degree in chemistry or natural sciences with a minimum of 20 credit hours in chemistry; one year experience in the implementation and application of analytical laboratory methodologies; and one year experience evaluating data packages of all matrices (e.g., soil, water, air, tissue) for compliance and usability with respect to the New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) and the USEPA National Functional Guidelines with regional modifications.

SECTION 3

QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES FOR MEASUREMENT OF DATA

3.1 INTRODUCTION

A systematic planning process will develop site-specific data quality objective (DQOs). These DQOs will clarify study objectives, define the appropriate type of data, and specify tolerable levels of potential errors. These parameters, in turn, will be the basis for establishing the quality and quantity of data needed to support the utility of the data. This section was prepared in accordance with USEPA Guidance for the Data Quality Objectives Process (USEPA, August 2000).

Data quality objectives specify the underlying reason for collecting the data and the data type, quality, quantity, and uses needed to make decision, and they provide the basis for designing data collection activities. DQOs and quality assurance objectives are related data quality planning and evaluation tools for all sampling and analysis tools.

The purpose of this QAPP is to provide a standard for control and review of measurement data to ensure they are scientifically sound, representative, comparable, defensible, and of known quality. The data will be used to evaluate the physical and chemical attributes of samples collected. The project objective for analytical testing is to characterize the physical characteristics and chemical constituents and to provide data to support the decision-making process.

The data produced during sampling activities will be compared with the defined Quality Assurance (QA) objectives and criteria for precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) to see that the data reported are representative of actual conditions at the site.

This data assessment activity is an on-going coordinated process with data production and is intended to assure that data produced during the project are acceptable for use in subsequent evaluations. Both statistical and qualitative evaluations will be used to assess the quality of the data. The primary evaluation of the data will be based upon the field quality control samples described in Section 8.1.1 and the laboratory quality control samples described in Section 8.1.2. The “blank” samples (laboratory QC blank samples and field QC blank samples) will be used to evaluate whether or not the laboratory and/or field sample handling represent a possible source of sample contamination. Laboratory duplicate sample results will be used to evaluate analytical precision. Field duplicate sample results will be used to evaluate the overall precision of the sampling and analysis process, as well as sample representativeness and site heterogeneity. Laboratory control samples will be used to evaluate the accuracy of analytical results, as will other analysis-specific criteria, such as surrogate compound recoveries for volatile organic compounds (VOCs), Semivolatile Organic Compound (SVOCs), pesticides, polychlorinated biphenyl (PCBs) and herbicides. Matrix spike/matrix spike duplicate (MS/MSD) analysis of project samples will be used to evaluate potential sample matrix effects on the analytical results

(both of the sample utilized for MS/MSD and of other samples collected from the site). For all sample results, the impact of sample-specific, analysis-specific, and site-specific factors will be evaluated and an assessment will be made as to their impact, if any, on the data. Duplicate sample (field and laboratory QC samples) results will be used to evaluate data precision.

3.1.1 Data Use Objectives

Data use objectives define why analyses are being conducted and how ultimately the data will be used to meet the overall project objectives. For the project activities, these project objectives are stated in the work plan.

3.2 DATA QUALITY OBJECTIVES (PARCCS PARAMETERS)

3.2.1 Introduction

DQOs are based on the premise that different data uses require different levels of data quality. The term *data quality* refers to a degree of uncertainty with respect to PARCCS data quality indicators. Specific objectives are established to develop sampling protocols and identify applicable documentation, sample handling procedures, and measurement system procedures. These DQOs are established by onsite conditions, objectives of the project, and knowledge of available measurement systems. Overall project DQOs are presented and discussed in detail in this QAPP. A wide range of data quality is achieved through the use of various analytical methods. The following data quality levels are widely accepted as descriptions of the different kinds of data that can be generated for various purposes:

- **Level I, Field screening or analysis using portable instruments (e.g., photoionization detector [PID]):** Results are often not compound-specific but results are available in real time. Depending on the analysis being performed and the instrumentation used, the results may be considered qualitative, semi-quantitative, or quantitative.
- **Level II, Field analysis using more sophisticated portable analytical instruments (e.g., on-site mobile laboratory):** There is a wide range in the quality of data that can be generated depending on the use of suitable calibration standards, reference materials, and sample preparation equipment. Results are available in real-time or typically within hours of sample collection.
- **Level III, All analyses performed in an off-site analytical laboratory using methods other than USEPA-approved analytical methods**: These data generally do not include the level of formal documentation required under Level IV and are not subject to formal data validation. These data are typically used for engineering studies (e.g., treatability testing), site investigations and remedial design.
- **Level IV, Data generated using USEPA methods and enhanced by a rigorous QA program, supporting documentation, and data validation procedures:** These data are typically used for engineering studies (e.g., treatability testing), risk assessment, site investigations, and remedial design, and may be suitable for litigation/enforcement activities. Results are both qualitative and quantitative.

3.2.2 PARCCS Parameters (Data Quality Indicators)

3.2.2.1 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), absolute difference (D), range (maximum value minus minimum value), relative range, and RPD are common.

The objectives for precision for each chemical are based on the capabilities of the approved EPA analytical method with respect to laboratory performance. For this project, field-sampling precision will be determined by analyzing coded (blind) duplicate samples for the same parameters, and then, during data validation, calculating the %RPD for duplicate sample results. The laboratory will determine analytical precision by calculating the %RPD or %D, as applicable to the analytical method being used, e.g., pH will be evaluated using %D.

The laboratory will determine analytical precision by calculating the RPD for the results of the analysis of the laboratory duplicates and matrix spike duplicates. The formula for calculating %RPD is as follows:

$$\%RPD = |V1 - V2| / (V1 + V2)/2$$

where:

RPD	=	Relative percent difference
V1, V2	=	Values to be compared
|V1 - V2|	=	Absolute value of the difference between the two values
(V1 + V2)/2	=	Average of the two values

For data evaluation purposes, in instances where both sample concentrations are less than five times (<5x) the Reporting Limit (RL), duplicate precision will be evaluated using the calculated %D result. In this instance, the applicable precision criterion will be two times the RL (2xRL). If a value is not detected, the %RPD criterion will be considered to be not applicable and the %RPD will not be calculated (i.e., precision will not be quantitatively determined). Tables 3.1 and 3.2 present analytical evaluation of precision. For the evaluation of field duplicate precision, soil samples will be evaluated using a 50%RPD QC limit and aqueous samples will be evaluated using a 30%RPD QC limit.

3.2.2.2 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 that is recovered or measured. The recovery of a given analyte depends on 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 that are less than the quantitation 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.

The objectives for accuracy for each chemical are based on the capabilities of the approved USEPA analytical method with respect to laboratory performance. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), the percent recoveries of matrix spike compounds added to selected samples, and the percent recoveries of spike compounds added to laboratory control samples (LCS), or matrix spike blanks (MSB). An LCS (or MSB) will be analyzed to provide additional information on analytical accuracy. 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 laboratory control). The accuracy on a per sample basis will be measured using surrogates for the organics analyses. Positive detects from the PCB analysis will be confirmed using second column confirmation. The laboratory will report the lower of the two values with respect to the dual Gas Chromatography (GC) column analysis performed. When the percent difference (%D) between the results for the two columns exceeds 25%, the laboratory will qualify the reported result with the *P* qualifier. The %R is calculated as follows:

Matrix Spike Recovery:

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

where:

% Recovery	=	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

Surrogate Recovery: % Recovery = $\frac{\text{Concentration (or amount) found}}{\text{Concentration (or amount) spiked}}$ x 100

LCS (or MSB) Recovery: % Recovery = $\frac{\text{Concentration (or amount) found}}{\text{Concentration (or amount) spiked}}$ x 100

Tables 3.1 and 3.2 present analytical accuracy.

3.2.2.3 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 and is most concerned with the proper design of the sampling program (USEPA, 1987). Samples must be representative of the environmental media being sampled. An important factor in the selection of sample locations and sampling procedures will be obtaining representative samples.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree technically possible, that the data derived represents the in-place quality of the material sampled. Care will be exercised to see that chemical compounds are not introduced to the sample from sample containers, handling, and analysis. Field blanks, trip blanks, and laboratory method/prep blanks will be analyzed 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 (blind) field duplicate samples. The analytical laboratory will also follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis such that the reported results are representative of the sample received. Chain-of-custody procedures will be followed to document the possession of sample containers from the time of container preparation through sample collection and receipt back at the laboratory. Field QC samples will be collected and analyzed to provide information to evaluate sample representativeness. Details of field QC sample collection (rinse blanks, trip blanks, temperature blanks, field duplicates) and chain-of-custody procedures are presented in Section 4.2 and Section 8.1.1.

3.2.2.4 Completeness

Completeness is defined as the percentage of measurements that meet the project's data quality objectives (USEPA, 1987). Completeness is calculated for each method (or analyte) and sample matrix for an assigned group of samples. Completeness for a data set represents the results usable for data interpretation and decision making. The completeness objective for the analytical and field data is 90%. Completeness is defined as follows for all sample measurements:

$$\%C = V / T\ (100)$$

where:

%C = Percent completeness

V = Number of measurements judged valid (not rejected during data validation)

T = Total number of measurements

Completeness, which is expressed as a percentage, is calculated by subtracting the number of rejected and unreported results from the total planned results and dividing by the total number of results. Results rejected because of out-of-control analytical conditions, severe matrix effects, broken or spilled samples, or samples that could not be analyzed for any other reason, negatively affect influence completeness and are subtracted from the total number of results to calculate completeness.

3.2.2.5 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 managed by:

- Using identified standard methods (including laboratory standard operating procedures) for both sampling and analysis phases of this project
- Requiring traceability of all analytical standards and/or source materials to the USEPA or National Institute of Standards and Technology (NIST)
- Requiring that 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 data validation on the analytical results, including the use of data qualifiers in all cases where appropriate
- Evaluating the sample collection information and analytical QC sample results
- Requiring that the significance of all validation qualifiers be assessed any time an analytical result is used for any purpose.

By taking these steps during the investigation, future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

3.2.2.6 Sensitivity and Quantitation Limits

When selecting an analytical method during the DQO process, the achievable detection limit (MDL) and method reporting limit (RL) must be evaluated to verify that the method will meet the project quantitation limits necessary to support project decision making requirements. This process ensures that the analytical method sensitivity has been considered and that the methods used can produce data that satisfy users' needs while making the most effective use of resources. The concentration of any one target compound that can be detected and/or quantified is a measure of sensitivity for that compound. Sensitivity is instrument-, compound-, method-, and matrix-specific and achieving the required project quantitation limit (RL) and/or method detection limit (MDL) objectives depends on instrument sensitivity and potential matrix effects. With regard to instrument sensitivity, it is important to monitor the instrument performance to ensure consistent instrument performance at the low end of the calibration range. Instrument

sensitivity will be monitored through the analysis of method/prep blanks, calibration check samples, and low standard evaluations.

Laboratories generally establish limits that are reported with the analytical results; these results may be called reporting limits, detection limits, quantitation limits, or other terms. These laboratory-specific limits, apply undiluted analyses and must be less than or equal to the project RLs. The RL, also known as the practical quantitation limit (PQL), represents the concentration of an analyte that can be routinely measured in the sampled matrix within stated limits and with confidence in both identification and quantitation. Throughout various documents RL and PQL may be interchanged, but they effectively have the same meaning. The RLs are established based on specific knowledge about the analyte, sample matrix, project specific requirements, and regulatory requirements. The RL is typically established by the laboratory at the level of the lowest calibration standard and is generally in the range of two to ten times the MDL.

The MDL is defined as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero" (40 Code of Federal Regulations (CFR) 136 Appendix B). The MDL is the lowest concentration at which a specific analyte in a matrix can be measured and reported with 99% confidence that the analyte concentration is greater than zero. MDLs are experimentally determined and verified for each target analyte of the methods in the sampling program. The laboratory will determine MDLs for each analyte and matrix type prior to analysis of project samples. In addition, when multiple instruments are employed for the analysis of the same method, each individual instrument will maintain a current MDL study. MDLs are based on the results of seven matrix spikes at the estimated MDL, and are statistically calculated in accordance with the Title 40, Code of Federal Regulations Part 136 (40 CFR 136) Appendix B. The standard deviation of the seven replicates is determined and multiplied by 3.14 (i.e., the 99% confidence interval from the one-sided student t-test). If risk-based project objectives are developed, then where practicable, MDLs must be lower than the risk-based criteria determined for the project.

The MDLs to be used are intended to allow that both nondetected and detected target compound results will be usable to the fullest extent possible for the project. An MDL check sample an (interference-free MS with all method target compounds) must be analyzed following the MDL study to determine if reasonable MDL concentrations have been achieved. The MDL check sample should be at a concentration in the range of two to four times the MDL. If any target compound is not recovered, the MDL study must be repeated. In this case, the repeated MDL should be performed with a higher concentration, based on the analyst's judgment, of the target compounds that failed in the MDL check sample. MDLs must be determined annually at a minimum, and verified by analyzing an MDL check sample on each instrument used for the applicable method.

Laboratory RLs and MDLs for all analyses will meet at a minimum the standards criteria specified in the NYSDEC 6 NYCRR Part 375 Soil Cleanup Objectives for Unrestricted Use or the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) “Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations” or the NYSDEC Division of Fish, Wildlife, and Marine Resources, “Screening and Assessment of Contaminated Sediment,” DRAFT 1/24/2013.

All analytical results will be reported to the MDL. Analytical results below the MDL will be flagged with a *U* at the RL for organics and MDL for metals to indicate the data are non-detect. However, the laboratory will flag analytes detected at a level less than the RL but greater than the MDL (or the laboratory's determined minimum reportable concentration) with a *J* to denote an estimated concentration.

When results are corrected for dry weight, the reporting limits are then elevated accordingly. To compensate for the low solids, modifications are made either to increase the initial volume extracted/digested or to reduce the final volume of extract/digestate.

For samples that do not meet the project-specified RLs or MDLs, (taking into consideration elevated detection limits due to percent solids or percent moisture and aliquots used for the designated analysis), the laboratory must make available compelling documentation (e.g., screening data) and a justifiable explanation for its inability to meet the specified limits using the project protocols. It must also provide an appropriate, justifiable explanation of the issues and resolution in the analytical report/data package (dilution factor, interference, etc.). Excessive, unnecessary dilutions on any sample for a project are unacceptable. The laboratory will analyze all samples initially undiluted, unless for Gas Chromatography/Mass Spectroscopy (GC/MS) analyses (i.e., SW8260C and SW8270D), a preliminary GC-screen is performed and indicates that GC/MS instrument damage or compromise may occur if the sample is not analyzed initially at dilution. In this instance, the sample will be analyzed at the lowest possible dilution factor. If multiple extractions/ analyses are performed (such as undiluted and diluted analyses), resulting in several data sets for the same sample, the laboratory will report all data and results from each of the multiple analyses in the data package.

Quantitation limits for all definitive data quality level laboratory analytical methods, compounds, and matrices are presented in the NYSDEC ASP. Individual soil sample RLs and MDLs will be adjusted accordingly based on moisture and aliquots used for analysis.

TABLE 3.1

QUALITY CONTROL LIMITS FOR WATER SAMPLES

Analytical Parameter	Analytical Method (a)	Matrix Spike (MS) Compounds	MS/MSD (b) % Recovery	Duplicate RPD (c)	LCS (d) % Recovery	Surrogate	Surrogate % Recovery
TCL VOCs	8260C	All target VOCs	Laboratory determined QC limits	≤50	Laboratory determined QC limits	Toluene-d8 Bromofluorobenzene 1,2-Dichloroethane-d4	Laboratory determined QC limits
TCL SVOCs	8270D	All target SVOCs	Laboratory determined QC limits	≤50	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
TAL Metals	6010C/7470A	All target metals	75-125	≤20	85-115	NA	NA
PCBs	8082	PCB-1016/1260	50-150 or lab QC limit	0-20 or lab QC limit	Lab QC limits	Tetrachloro-m-xylene Decachlorobiphenyl	35-137 40-135
Cyanide	9010C	Cyanide	75-125	≤20	80-120	NA	NA

(a) Analytical Methods: USEPA SW-846, 3rd edition, revised March 2009; subsequent revisions supersede this information
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
NA - Not Applicable

TABLE 3.2

QUALITY CONTROL LIMITS FOR SOIL SAMPLES

Analytical Parameter	Analytical Method (a)	Matrix Spike (MS) Compounds	MS/MSD (b) % Recovery	Duplicate RPD (c)	LCS (d) % Recovery	Surrogates	Surrogate % Recovery
TCL VOCs	8260C	All target VOCs	Laboratory determined QC limits	≤50	Laboratory determined QC limits	Toluene-d8 Bromofluorobenzene 1,2-Dichloroethane-d4	Laboratory determined QC limits
TCL SVOCs	8270D	All target SVOCs	Laboratory determined QC limits	≤50	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
TAL Metals	6010C/7471B	All target metals	75-125	≤20	85-115	NA	NA
PCBs	8082	PCB-1016/1260	50-150 or lab QC limit	0-30 or lab QC limit	Lab QC limits	Tetrachloro-m-xylene Decachlorobiphenyl	10-166 60-125
Cyanide	9010C	Cyanide	75-125	≤20	80-120	NA	NA

(a) Analytical Methods: USEPA SW-846, 3rd edition, revised March 2009, subsequent revisions supersede this information
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
NA-Not Applicable

SECTION 4

DATA ACQUISITION

4.1 SAMPLING METHODS

Any non-disposable sampling equipment used for chemical sampling will be cleaned and decontaminated prior to use to prevent potential cross-contamination between each use. Additionally, this QAPP describes management, handling, and tracking procedures for investigation-derived waste, including solid and liquid materials, and personal protective equipment.

The special precautions described here will be taken to confirm that each sample collected is representative of the conditions at that location and that the sampling and handling procedures neither alter nor contaminate the sample. If failure in the sampling or measurement system occurs, the procedures specified in Section 10.3 of this QAPP will be followed to identify who is responsible for implementing the appropriate corrective action. This section presents sample container preparation procedures, sample preservation procedures, and sample holding times.

For this program, the laboratory will purchase and distribute certified clean sample containers with chemical preservatives. The sample containers used for chemical analysis must be virgin bottleware, I-Chem^{TM} Series 300 (or equivalent). Vendors are required to provide documentation of analysis for each lot of containers, and the documentation will be kept on file at the laboratory. Alternatively, the laboratory may perform testing to certify that the sample containers are not contaminated. Since the containers supplied by the laboratory will be certified clean, the bottles will not be rinsed in the field prior to use.

Laboratory-supplied sample kits (coolers containing field chain-of-custody forms, custody seals, sample containers, preservatives, and packing material) will be prepared by the laboratory's Sample Management Staff and shipped to the Field Team Leader. The type of containers, required sample volumes, preservation techniques, and holding times for specific analyses are presented in the NYSDEC ASP.

Samples requiring chemical preservation will be collected in sample containers provided by the analytical laboratory that already contain sufficient quantities of the appropriate preservative(s) to ensure that the sample is kept in accordance with the method requirements. The laboratory must provide an adequate amount of pre-preserved bottles with traceable high-purity preservatives, and additional preservative for use if the added amount is not sufficient, based on request by the Field Team Leader and on an as-needed basis if additional bottleware is needed during the field activities. The field team must verify that the preservative has been added appropriately.

4.2 SAMPLE HANDLING AND CUSTODY

This section presents sample handling and custody procedures for both the field and laboratory. Implementation of proper handling and 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 and transfer of samples will be trained as to the purpose and procedures prior to implementation. For transfer of samples within the laboratory, an internal chain of custody will be required.

4.2.1 Sample Handling

Samples to be collected for each work assignment will be specified in the work plan and FSP. After the samples are collected, they will be split as necessary among preserved containers appropriate to the parameters to be analyzed. Each container will be provided with a sample label that will be filled out at the time of collection. The sampler will print label information, specified below, on each label either before or immediately after collecting the sample with an indelible writing instrument. The label will be protected from water and solvents with clear label packing tape.

The following information, at a minimum, is required on each sample label (note: the location ID and the sample ID as described in the Data Management section below inherently identify some of this information, see below):

- Client
- Project name
- Sampling location
- Sample number
- Date and time of sample collection
- Parameters to be analyzed
- Preservative(s) added, if any
- Initials of the sampler.

Following sample collection, excess soil, water, etc., will be wiped from the outside of the sample containers with a paper towel and the lids will be checked to verify they are tightly closed. Each glass container will be wrapped with bubble wrap to minimize breakage during transport. Bottles containing soil and water samples will be placed in separate Ziploc® bags (one bag) and set on ice (ice bath not necessary). Documentation of equipment and methods used in the field for treating the samples will be maintained in the field logbooks, and a chain of custody will be initiated to document transfer of the samples from the field team to the laboratory. In preparation for shipment to the analytical laboratory, the shipment cooler will be packaged as follows:

- Fill a dry shipment cooler with inert cushioning to a depth of 1 inch to prevent bottle breakage.
- Place the bagged samples and the laboratory-provided temperature blank upright in the sample cooler. The temperature blank should be placed in the center (horizontally and vertically) with the samples surrounding.
- Place additional cushioning material around the sample bottles as necessary.

- Place bags of ice in the remaining void space to keep the samples cooled to 4°C.
- Complete the chain-of-custody form (see Section 4.2.2). Place the chain-of-custody form in a polyethylene, sealable bag (such as a 1-gal Ziploc® bag or equivalent) and tape the bag to the interior of the cooler lid. Field personnel retain a copy of the chain-of-custody form; another copy is transmitted to the Quality Assurance Officer (QAO) and the Project Manager specified in the work plan.
- Prior to sealing for shipment, the list of samples will be checked against the container contents to verify the presence of each sample listed on the chain-of-custody record including the temperature blank.
- Affix a custody seal to the cooler.
- Seal the cooler securely with packing tape, taking care not to cover labels if already present.
- Label the cooler appropriately in accordance with the Department of Transportation (DOT) regulations (49 CFR 171 through 179).
- Ship the samples in accordance with the DOT requirements outlined in 49 CFR 171 through 179. Complete the carrier bill of lading, and retain a copy on file.
- Samples will be delivered to the laboratory by the most expedient means to meet holding times. Whenever practicable, samples will be shipped on the day of collection for delivery to the laboratory the morning of the day after collection. The laboratory will be required to adhere to the holding times as stated in the NYSDEC ASP for sample analyses. Laboratory performance requirements for analysis turnaround time will be established using the validated time of sample receipt (VTSR) in accordance to NYSDEC requirements. The field team will carefully coordinate sampling activities with the laboratory to see that holding times are met.

The required holding times must be adhered to for the initial sample preparation/analysis. If subsequent reanalysis or re-extraction becomes necessary because of method requirements or additional requirements stated here, the laboratory will make every effort to perform those re-extractions and/or reanalysis within the primary holding times. Any holding time that is exceeded will be reported immediately to the Project Manager and the QAO by the laboratory QA manager.

4.2.2 Field Sample Custody

The primary objective of sample custody procedures is to create an accurate written record that can be used to trace the possession and handling of samples from the moment of their collection through analysis until their final disposition. A sample (or sample container) will be considered under custody if:

- In a person's possession
- Maintained in view after possession is accepted and documented
- Locked and tagged with custody seals placed on the sample cooler so that no one can tamper with it after having been in physical custody

- In a secured area that is restricted to authorized personnel.

The sample custody flowchart is shown in Figure 4.1.

DATA REQUIRED ON CHAIN-OF-CUSTODY*
Project name and client
Signatures of samplers
Sample number, date and time of collection, and grab or composite sample designation
Signatures of individuals involved in sample transfer
If applicable, the air bill or other shipping number
ADDITIONAL ITEMS THAT SHOULD BE INCLUDED:
Sample matrix
Number of sample containers
Analyses to be performed,
Preservative(s)
Name of the analytical laboratory to which the samples are sent
Method of sample shipment
Project number.
*Required by guidance in SW846 Test Methods for Evaluating Solid Waste, Physical and Chemical (USEPA, 1997)

A chain-of-custody record will accompany the samples from the time the samples leave the original sampler's possession through the sample shipments' receipt at the laboratory. Triplicate copies of the chain-of-custody record must be completed for each sample set collected. See chart for data requirements.

If samples are split and sent to different laboratories, a copy of the chain-of-custody record is sent with each sample.

The REMARKS space on the chain-of-custody form is used to indicate if the sample is a MS/MSD or matrix spike/matrix duplicate (MS/MD), or any other sample information for the laboratory. Since they are not specific to any one-sample point, blanks are indicated on separate rows. Immediately prior to sealing the sample cooler, the sampler will sign the chain-of-custody form and write 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 air bill number on the top of the chain-of-custody form. Mistakes will be crossed out with a single line in ink and initialed by the author.

Sampling personnel will retain one copy of the chain-of-custody form, 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 his or her name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing

tape. Field personnel then relinquish the cooler to personnel responsible for shipment, typically an overnight carrier.

The chain-of-custody seal must be broken to open the sample cooler. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Field Team Leader for direction on whether to proceed with the analyses.

Sampling personnel record the information placed on the chain-of-custody record in the field logbook. They also include in the log book a detailed description of the exact locations from which the samples were collected, any pertinent conditions under which the samples were obtained, and the lot number of the containers used.

4.2.3 Laboratory Sample Management

The laboratory has a designated Sample Management Staff responsible for receiving samples in the laboratory, opening the coolers, checking the sample integrity and custody seals, logging samples into the laboratory information management system (LIMS), and controlling the handling and storage of samples while in the laboratory. The laboratory is a secure facility and only authorized laboratory personnel are allowed to handle active samples. The laboratory maintains an SOP for sample management.

4.2.4 Sample Receipt and Logging

Upon receipt at the laboratory, sample-receiving personnel inspect the samples for integrity of the custody seal, check the shipment against the chain-of-custody form, and note any discrepancies. Specifically, the sample-receiving personnel note any damaged or missing sample containers. At this time, the field chain-of-custody record is completed and signed by the Sample Management Staff.

Using the temperature blank in each cooler, the temperature of each incoming sample cooler is measured and recorded during the sample receipt and log-in procedures before samples are placed in laboratory cold storage. Similarly, the laboratory documents that its cold storage facilities are being maintained through daily (at a minimum) documented temperature measurements using a thermometer.

Upon receipt, Sample Management Staff measure and record on the preservation documentation sheet the pH of acid- or base-preserved aqueous samples. Any problems observed during sample receipt must be communicated to the Field Team Leader and/or the QAO verbally and either by fax transmission or email within 24 hr (preferably 3 hr beginning with the normal business day or immediately following for problems noted during second shifts or weekends) after discovery and before samples are released to the laboratory for analysis. Problems may include but are not limited to broken bottles, errors or ambiguities in paper work, insufficient sample volume or weight, inappropriate pH, and elevated temperature.

When the shipment is inspected and the chain-of-custody record agree, the sample receiving personnel enter the sample and analysis information into the LIMS and assign each sample a unique laboratory number. This number is affixed to each sample bottle.

4.2.5 Sample Storage Security

While in the laboratory, the samples and aliquots that require cold storage will be stored and will be maintained in a secured refrigerator unless they are being used for preparation and/or analysis. All of the refrigerators in the laboratory used for storage of samples have restricted access and are numbered. In addition, dedicated refrigerators are designated for extracts and analytical standards. The sample storage areas are in the laboratory, and access is limited to laboratory personnel. Specific requirements for sample storage are described below:

- Samples will be removed from the shipping container and stored in their original containers unless damaged.
- Damaged samples will be disposed in an appropriate manner, and the disposal will be documented or repacked as necessary and appropriate.
- Samples and extracts will be stored in a secure area designed to comply with the storage method(s) defined in the contract.
- The storage area will be kept secure at all times. The sample custodian or designated personnel will monitor access to the storage area.
- Standards or reagents will not be stored with samples or sample extracts.

The following standard operating procedures for laboratory sample security will be implemented to confirm that the laboratory satisfies sample chain-of-custody requirements:

- Samples will be stored in a secure area.
- Access to the laboratory will be through a monitored area. Other outside access doors to the laboratory will be kept locked.
- Visitors must sign a visitor's log and will be escorted while in the laboratory.
- Refrigerators, freezers, and other sample storage areas will be securely maintained.

Storage blanks will be initiated and analyzed on a weekly basis for each cold storage unit used to hold samples submitted for the analysis of VOCs. Field QC samples must be stored in the same cold storage units as the samples that they are associated with (even if the matrices are different). All soil samples must undergo thorough sample homogenization (stirred within the original sample container) using inert utensils and mixing platforms that will not interfere with the target analytes being requested for analysis with the exception of soil samples submitted for the analysis of VOCs. Samples for VOC determinations will be stored in a secure refrigerator separate from other samples, sample extracts, reagents, and standards.

4.2.6 Retention and Disposal of Samples

The laboratory must retain all excess samples within their original sample bottles for a minimum of 30 days in cold storage (below 4 degrees Celsius) following submission of the validated data to NYSDEC. At that time, the laboratory must contact the Field Team Leader for authorization for responsible disposal or further storage instructions. At the point at which the laboratory is provided authorization to dispose of the samples, the laboratory will be responsible, and will assume all liability for proper characterization and disposal of samples and bottleware in accordance with all local, state, and federal regulations.

FIGURE 4.1

SAMPLE CUSTODY FLOW CHART

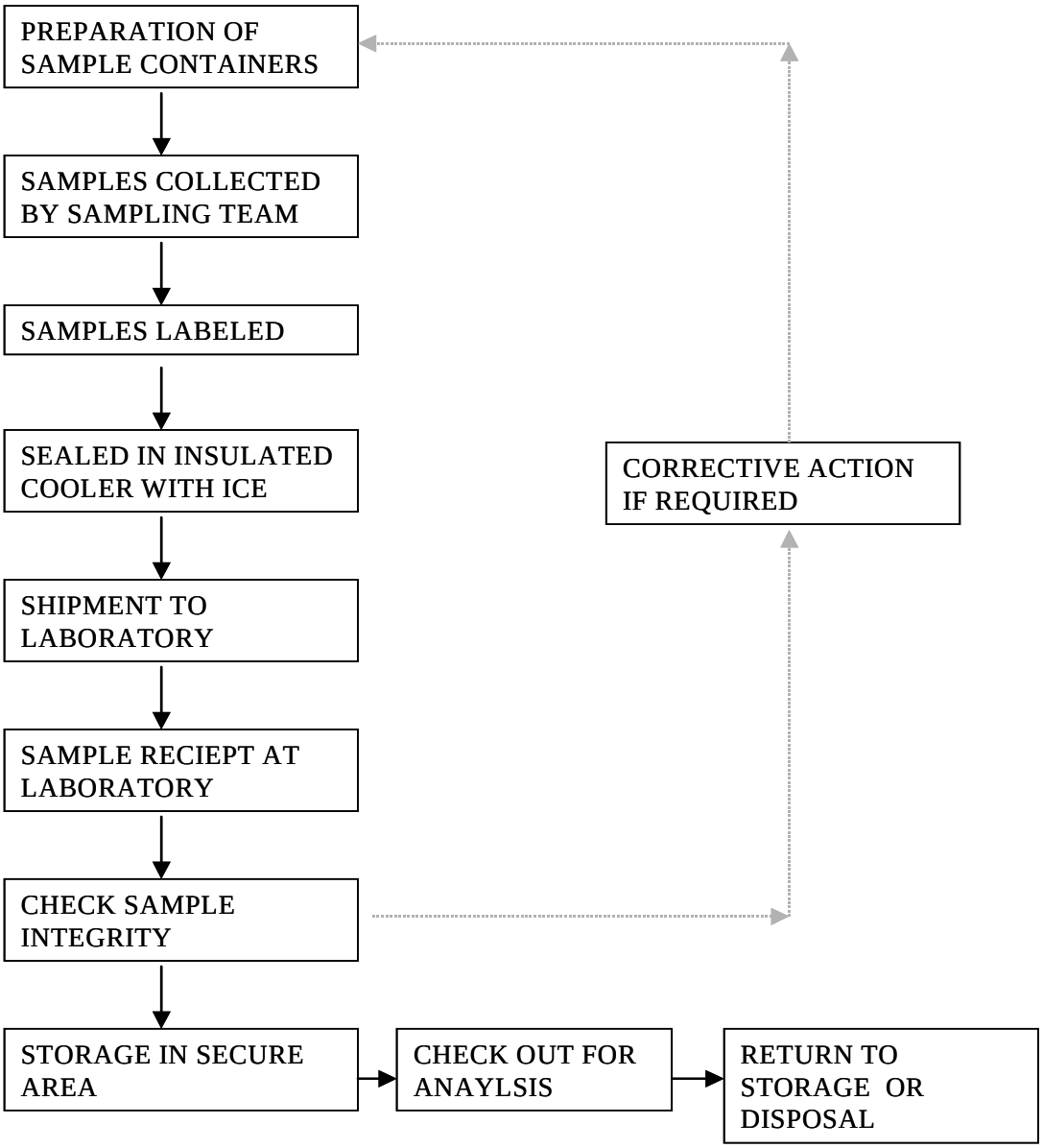
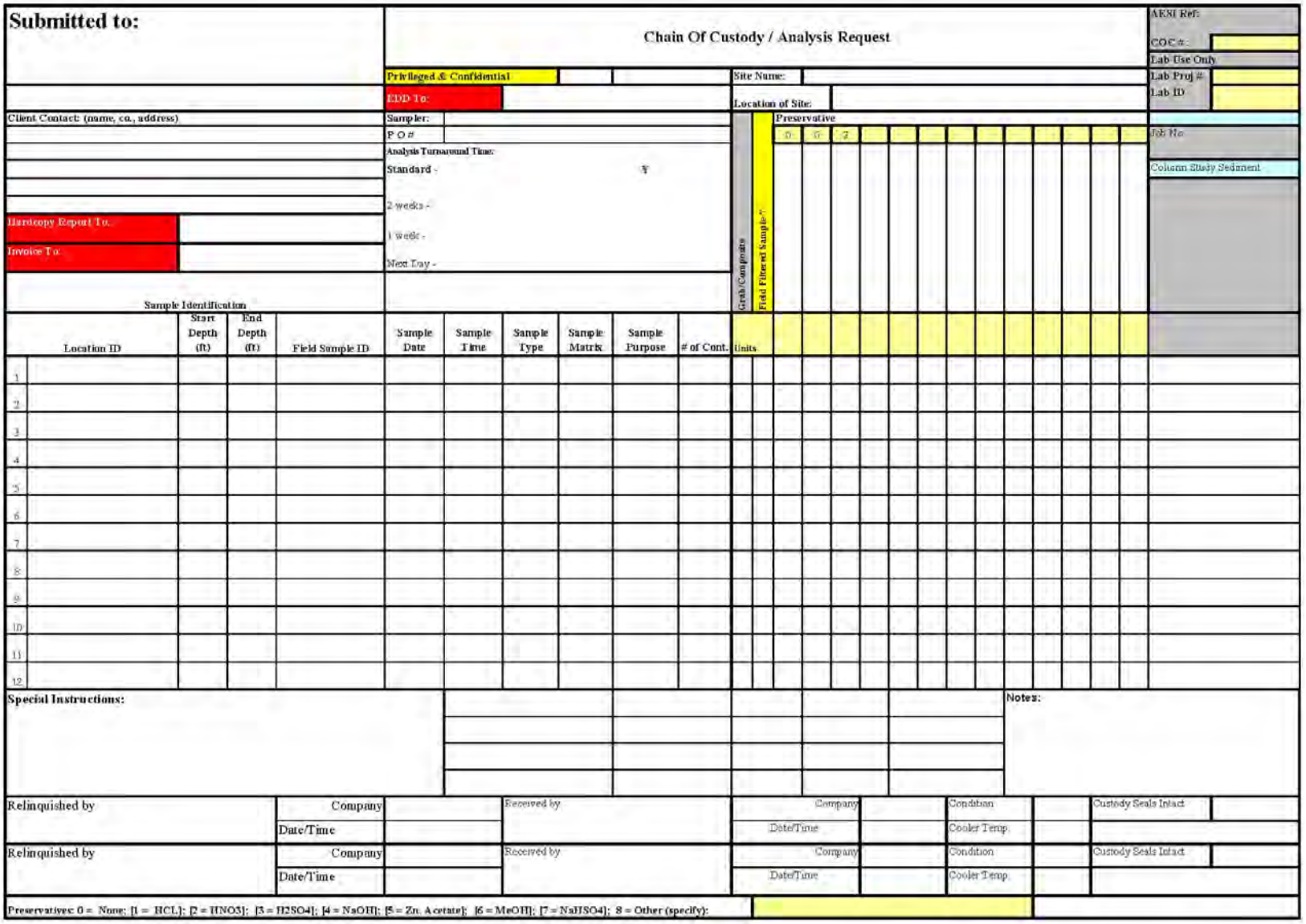


FIGURE 4.2 EXAMPLE CHAIN-OF-CUSTODY RECORD



Submitted to:

Chain Of Custody / Analysis Request

AESI Ref:
COC #:
Lab Use Only
Lab Proj #:
Lab ID:

Privileged & Confidential
EDD To:
Site Name:
Location of Site:

Client Contact: (name, co., address)

Sampler:
P O #
Analysis Turnaround Time:
Standard -
2 weeks -
1 week -
Next Day -

Hardcopy Report To:
Invoice To:

Job No:
Column Study Sediment

Preservative: 0 0 2

Grab/Composite
Field Filtered Sample*

Sample Identification

	Location ID	Start Depth (ft)	End Depth (ft)	Field Sample ID	Sample Date	Sample Time	Sample Type	Sample Matrix	Sample Purpose	# of Cont.	Units
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

Special Instructions:

Notes:

Relinquished by	Company		Received by	Company		Condition		Custody Seals Intact	
	Date/Time			Date/Time		Cooler Temp.			
Relinquished by	Company		Received by	Company		Condition		Custody Seals Intact	
	Date/Time			Date/Time		Cooler Temp.			

Preservatives: 0 = None; [1 = HCL]; [2 = HNO3]; [3 = H2SO4]; [4 = NaOH]; [5 = Zn. Acetate]; [6 = MeOH]; [7 = NaHSO4]; 8 = Other (specify):

4.3 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 SW-846 and NYSDEC ASP. 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 and preservation techniques shall be in accordance with Tables 4.1 and 4.2.

Following sample collection, the sample bottles should be placed in the shipping cooler, cooled to 4°C with ice, and delivered to the laboratory within 24 hours of collection. Every effort will be made, to the extent practical, to ship samples on the day of collection and have the samples delivered to the laboratory in the morning of the day after collection. Samples designated for Saturday delivery may not arrive at the laboratory until Monday.

4.4 SAMPLE HOLDING TIMES

The sample holding times for organic and inorganic parameters are given in Tables 4.1 and 4.2. These holding times must be strictly adhered to by the laboratory. Any holding time exceedances must be reported to the Project Quality Assurance Officer.

4.5 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 MS/MSDs. The blanks will include:

- 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 aqueous 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 access any contamination from sampling and transport, and internal laboratory procedures.
- Field Blanks - Field blanks will be taken at a frequency of one per decontamination event, maximum of one day per sampling equipment type, minimum of one per week. 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, which 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 of the parameters of interest.

The duplicates will consist of:

- Coded Field Duplicate - To determine the representativeness of the sampling methods, coded field duplicates will be collected at a frequency of one per 20 environmental samples per matrix. 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.
- 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 presented in Tables 3.1 and 3.2.

TABLE 4.1

WATER SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation[a]	Holding Time[b]
VOCs	2 40-mL glass vial w/Teflon septum	HCl to pH<2. Cool to 4±2°C	14 days
SVOCs	2 1-Liter amber glass containers with Teflon-lined lid for **each analysis** (an additional 2 1-Liter containers required every 20 samples for MS/MSD for **each analysis**.)	Cool to 4±2°C	7 days for extraction 40 days for analysis
Metals (except Mercury)	1000 ml plastic bottle	Nitric Acid to pH<2. Cool to 4±2°C	6 months
Mercury	1000 ml plastic bottle	Nitric Acid to pH<2. Cool to 4±2°C	28 days
PCBs	1000 ml Glass	0.008% $Na_2S_2O_3$ Cool to 4±2°C	5 days for extraction, 40 days for analysis
Cyanide	500 ml plastic bottle	NaOH to pH>12. Cool to 4±2°C	14 days

[a]All samples to be preserved in ice during collection and transport.

[b]Days from date sampled.

TABLE 4.2

SOIL SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation[a]	Holding Time[b]
VOCs	Encore or TerraCores	Cool to 4±2°C	14 days
SVOCs	Wide-mouth glass container with Teflon-lined lid. (2 additional wide-mouth glass containers every 20 samples for MS/MSD).	Cool to 4±2°C	14 days for extraction 40 days for analysis (Soxhlet extraction must be completed within 14 days from date sampled.)
Metals (except Mercury)	Wide-mouth glass container.	Cool to 4±2°C	6 months
Mercury	Wide-mouth glass container.	Cool to 4±2°C	28 days
PCBs	Wide-mouth glass container.	Cool to 4±2°C	10 days
Cyanide	Wide-mouth glass container.	Cool to 4±2°C	14 days

[a]All samples to be preserved in ice during collection and transport.

[b]Days from date sampled.

SECTION 5

DATA MANAGEMENT

5.1 INTRODUCTION

The electronic data management systems for each work assignment will be implemented to process the information effectively without loss or alteration. As of April 1, 2011, the New York State Division of Environmental Remediation (DER) has implemented an Environmental Information Management System (EIMS). The EIMS uses the database software application EQuIS$_{TM}$ from EarthSoft® Inc. In an effort to improve the management of environmental data and reduce paper quantities, all laboratory analytical data minus instrument raw data must be submitted in the DEC-approved Electronic Data Deliverable (EDD).

Data providers must download and install the EQuIS Data Processor (EDP) to check their properly formatted EDD as well as the NYSDEC DER Format file. The EDP performs a series of formatting checks on the EDD and identifies any errors in the data file prior to submission. All EDDs are to be error free when submitted. It is important that the most recent version of the EDP and NYSDEC format file are employed since the valid values used by EIMS are periodically updated for the EDP.

5.2 FIELD DATA MANAGEMENT

The Field Team Leader will manage data generated in the field. He or his designee will be responsible for recording and documenting sampling activities in the field logbook, on sampling records (as appropriate), and on chain-of-custody forms (when samples are collected) as described in Section 4.2.2. The records may be photocopied and stored in the project file along with the original.

A sample nomenclature system will be coordinated with the Data Management Team. Each sample name will be unique to include location ID and field sample ID. The Database Manager will add data to EIMS through the input module of the system.

DATA INPUT TO EIMS MAY INCLUDE:
– Sample planning information (e.g., sample depth) – Chain-of-custody data – Sediment coring logs – Geotechnical data – Location and geographic data – Field measurements – Meteorological data – Waste characterization data – Groundwater levels – Radiodating data – Laboratory analytical data

5.3 LABORATORY DATA MANAGEMENT

Laboratory data management involves several important stages that include data transformation, review, verification, and validation, as well as data storage, retrieval, and security. The laboratory will implement a data management system to manage the data from its generation in the laboratory to its final reporting and storage. The data management system will include, but not be limited to, the use of standard record-keeping practices, standard document control systems, and the electronic data management system.

The laboratory data reduction, verification, validation, and reporting procedures and project data management activities, data/information exchange procedures ensure that complete documentation is maintained, transcription and reporting errors are minimized, and data are properly review.

Specific laboratory data management requirements and procedures are discussed in Sections 6 and 9 of this QAPP.

SECTION 6

DOCUMENTS AND RECORDS

6.1 INTRODUCTION

Records will be maintained to document accurately the data generation process during investigation in the field, sample analysis in the lab, and during data validation. Project documentation will be maintained in general accordance with guidelines in the National Enforcement Investigation Center Policies and Procedures (USEPA, 1986). A project file will be maintained that will contain appropriate project documentation; see components in chart. Some of this documentation may be retained electronically in lieu of paper copies. Table 6.1 summarizes the types of project documents and records.

MINIMUM COMPONENTS OF PROJECT FILE
- Project plans and specifications
- Field logbooks and data records
- Photographs, maps, and drawings
- Sample identification documents
- Chain-of-custody records
- Data review notes
- Report notes and calculations
- Progress and technical reports and
- Correspondence and other pertinent information
- Full analytical data deliverables package provided by the lab, including QC documentation and electronic data deliverable

6.2 FIELD RECORDS

Field personnel are responsible for documenting sample handling activities, observations, and data in field sampling records including field logbooks, chain-of-custody records, photographs, and pre-design investigation records. The Field Team Leader is responsible for maintaining these documents. Each record is described below.

6.2.1 Field Logbook

A Field Logbook will be used to document pre-design investigation activities. The field logbook will have consecutively numbered pages, and documentation will be recorded using waterproof ink. Incomplete lines, pages, and changes in the logbook will be lined out with a single line, dated, and initialed. More detailed procedures for documenting investigation

activities (such as field sampling records and boring log forms) and type of information to include in the field logbook may be developed.

MINIMUM REQUIREMENT FOR INFORMATION IN FIELD LOG
- Responsible person's name - Date and time of activity - Equipment and methods used for field preparation of samples - Field measurements of samples (*e.g.*, pH, temperature) - Information coordinating sample handling activities with appropriate field activities and chain-of-custody documentation *Daily calibration activities:* Calibrator's name Instrument name and model Date and time of calibration Standards used and their source Temperature (if appropriate) Results of calibration Corrective actions taken (if any)

6.2.2 Electronic Field Data Management

The field sampling program will have an electronic data management component. The system will be designed to specify the necessary samples taken at any given location and to provide the ability to be updated and amended in the field. This will provide a management system that efficiently tracks the needs of the sampling scope. As the samples are taken, log entries are put in the database, and sample labels are printed. At any given time a chain-of-custody record can be printed as well.

6.2.3 Chain-of-Custody Record

The chain of custody record establishes the documentation necessary to trace sample possession from the date and time of sample collection, through sample shipment, to the date and time of arrival at the laboratory designated to perform analysis. The ability to trace the history of a sample is essential to show that the sample collected was, indeed, the sample analyzed and that the sample was not subjected to biasing influences. Evidence of sample traceability and integrity is provided by chain-of-custody procedures. These procedures are necessary to support the validity of the data and will accompany each shipping container.

A copy of the chain-of-custody record will be detached and kept with the field logbook or placed in the project file; the original record will accompany the shipment.

6.3 LABORATORY RECORDS

Laboratories providing analytical support for this project must maintain records to ensure that all aspects of the analytical processes are adequately documented to ensure legal defensibility of the data.

When a mistake is made, the wrong entry is crossed out with a single line, initialed, and dated by the person making the entry, and the correct information recorded. Obliteration of an incorrect entry or writing over it is not allowed, nor is the use of correction tape or fluid on any laboratory records.

Overwriting or disposal of any electronic media prior to a 5-yr expiration period is strictly prohibited. All electronic and hardcopy data must be stored in an easily accessible climate-controlled environment. The laboratory will exercise "best practices" in terms of frequent, redundant electronic backup procedures on proper long-term storage media to assure that all electronic data representing Honeywell sample analyses will be maintained for the 5-yr storage period. Electronic data must be stored in a secure, limited-access area with redundant copies stored in fireproof vaults and/ or stored off-site of the laboratory facilities.

Sample preparation in the laboratory must be fully documented and include sample preparation conditions (such as digestion temperatures). In addition, documentation must allow complete traceability to all prepared or purchased reagents, acids and solvents, and reference solutions. All spike solutions and calibration standards must be used prior to labeled expiration dates and stored in accordance with manufacturers recommended conditions. Complete and unequivocal documentation must exist to enable traceability of all prepared spike solutions, calibration standards, and prepared reagents back to the reference materials utilized. Organic extracts must be stored in the same type of vials (amber or clear) as the associated standards at the appropriate storage temperatures.

The unit conventions set forth in the figures for reported data will be consistent with standard laboratory procedures. Reporting units used are those commonly used for the analyses performed. Concentrations in soil and sediment samples will be expressed in terms of weight per unit dry weight, with moisture content reported for each sample.

Laboratory records used to document analytical activities in the laboratory will include reagent and titrant preparation records, standard preparation logs, sample preparation logs, bench data sheets, instrument run logs, and strip chart recordings/chromatograms/computer output. Additional records will include calibration records, maintenance records, nonconformance memos, and Corrective Action Request (CAR) forms.

LAB RECORDS SHOULD CONVEY:
- What was done
- When it was done
- Who did it and
- What was found

REQUIREMENTS FOR LAB RECORDKEEPING
- Data entries must be made in indelible water-resistant ink
- Date of each entry and observer must be clear
- Observer uses his or her full name or initials
- Initial and signature log is maintained so the recorder of every entry can be identified
- Information must be recorded in notebook or on other records when the observations are made
- Recording information on loose pieces of paper not allowed

6.3.1 Operational Calibration Records

Operational calibration records will document the calibration of instruments and equipment that are corrected on an operational basis. Such calibration generally consists of determining instrumental response against compounds of known composition and concentration or the preparation of a standard response curve of the same compound at different concentrations. Records of these calibrations are maintained in the following documents:

- Standard preparation information, to trace the standards to the original source solution of neat compound, is maintained in LIMS or laboratory standard preparation logs.
- Instrument logbook provides an ongoing record of the calibration for a specific instrument. The logbook should be indexed in the laboratory operations records and should be maintained at the instrument by the chemist. The chemist must sign and date all entries, and the QM or his designee must review them.
- For Level IV data packages, copies of the raw calibration data will be kept with the analytical sample data so the results can readily be processed and verified as one complete data package. If samples from several projects are processed together, the calibration data is copied and included with each group of data. The laboratory will maintain all calibration, analysis, and corrective action documentation (both hard copy and electronic data) for a minimum of 7 years. The documentation maintained must be sufficient to show all factors used to derive the final (reported) value for each sample. Documentation must include all calculation factors such as dilution factor, sample aliquot size, and dry-weight conversion for solid samples. The individual who performs hand calculations must sign and date them. This documentation must be stored with the raw data. Calculations performed by the data system will be documented and stored as electronic and hard copy data. The instrument printouts will be kept on file, and the electronic data will be stored by the laboratory for a minimum of 7 years.

6.3.2 Maintenance Records

Maintenance records will be used to document maintenance activities, service procedures, and schedules. They must be traceable to each analytical instrument, tool, or gauge. The individual responsible for the instrument must review, maintain, and file these records. These records may be audited by the QAO to verify compliance. Logs must be established to record and control maintenance and service procedures and schedules.

6.3.3 Nonconformance Memos

Nonconformance Memos (NCM) may be either a hard copy record or an electronic database record. In either case, review and release of the record must be documented by the initiator, the analytical group leader where appropriate, the laboratory project manager, and the laboratory QA manager. All internal laboratory nonconformance documentation will be communicated to the Field Team Leader by the laboratory project manager verbally and summarized in the report narrative. The NCM will be used to document equipment that fails calibration and will identify any corrective actions taken.

6.3.4 Corrective Action Request (CAR) Forms

The laboratory must use CAR forms to document any incidents requiring corrective action. The CAR form will be issued to the personnel responsible for the affected item or activity. A copy will also be submitted to the laboratory project manager. The individual to whom the CAR is addressed will return the requested response promptly to the QA personnel and will affix his or her signature and date to the corrective action block after stating the cause of the conditions and corrective action to be taken. QA personnel will maintain a log for status of CAR forms to confirm the adequacy of the intended corrective action and to verify its implementation. CARs will be retained in the project record file.

6.3.5 Analytical Data Reports

Analytical data will be reported as an EDD and as an analytical data package (two copies on CD-Rom and one hard copy). The analytical laboratories are required to submit all data, preliminary and final, in formatted EDDs in accordance with NYSDEC's requirements. The laboratory must meet 100% compliance with these requirements. The Parsons Database Manager will submit written requests dictating the requirements and appropriate files to be supplied by the laboratory. The specifications of the EDD are presented in Section 5.

Analytical data reports will be provided by the laboratory within 28 calendar days following receipt of a complete Sample Delivery Group (SDG). An SDG is considered to include all samples received for the same project or site, to a maximum of twenty investigative samples not to exceed 5 consecutive days of sampling. The data package provided by the laboratory will be Level IV, unless an alternative requirement is specified in a laboratory statement of work (SOW) and will contain all information to support the data validation in accordance with the USEPA Region II Standard Operating Procedures (SOP) as described in Section 9. Additionally, the completed copies of the chain-of-custody records, accompanying each sample from the time of initial bottle preparation to completion of analysis, must be attached to the analytical reports.

6.4 DATA VALIDATION AND AUDIT RECORDS

Data validation personnel are responsible for documenting validation procedures and results in the form of a data usability summary report (DUSR). The QAO will be responsible for maintaining this report and the QAO will be responsible for its distribution. Additionally, audit reports will be prepared and distributed by the QAO. A brief description of each record is described below.

6.4.1 Data Usability Summary Reports

The DUSR will be prepared as required by NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 2B, May, 2010. The DUSR will summarize the impacts of using data that do not achieve overall data quality objectives or that do not meet PARCCS criteria identified in Section 3.3. Additionally, the report will be used to identify, assess and present issues associated with the overall data.

6.4.2 Audit Reports

Among other QA audit reports, which may be generated during the conduct of activities, a final audit report for this project may be prepared by the QAO. The report will include:

- Periodic assessment of measurement data accuracy, precision, and completeness
- Results of performance audits and/or system audits
- Significant QA problems and recommended solutions for future projects
- Status of solutions to any problems previously identified

TABLE 6.1
SUMMARY OF FIELD, LABORATORY, AND DATA MANAGEMENT RECORDS

REPORT	PERSON RESPONSIBLE FOR		STORAGE
	MAINTENANCE	DISTRIBUTION	
PROJECT FILES AND FIELD SAMPLING RECORDS			
Field Logbook	Field Team Leader	Project Manager	Job File at Primary Contractor's Location
Photographs	Field Team Leader	Project Manager	Job File at Primary Contractor's Location
Chain-of-Custody	Field Team Leader	Project Manager	Job File at Primary Contractor's Location
Field Sampling Records	Field Team Leader	Project Manager	Job File at Primary Contractor's Location
LABORATORY RECORDS			
Reagent and Titrant Preparation Records	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Standards Preparation Logs	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Sample Preparation Logs	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Bench Data Sheets	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Instrument Run Logs	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory

TABLE 6.1
SUMMARY OF FIELD, LABORATORY, AND DATA MANAGEMENT RECORDS (CONT.)

REPORT	PERSON RESPONSIBLE FOR		STORAGE
	MAINTENANCE	DISTRIBUTION	
Strip Chart Recordings/ Chromatograms/Computer Output	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Analytical Data Reports	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Log-in Sheets	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Maintenance Records	Quality Assurance Manager	Laboratory Project Manager	Instrument Maintenance Logbook at Laboratory
Periodic Calibration Records	Quality Assurance Manager	Laboratory Project Manager	QA Files at Laboratory
Operational Calibration Records	Quality Assurance Manager	Laboratory Project Manager	Job File at Laboratory
Nonconformance Memos	Quality Assurance Manager	Laboratory Project Manager	Maintained in Datbase File at Laboratory
Corrective Action Request Forms	Quality Assurance Manager	Laboratory Project Manager	Client Correspondence Records at Laboratory
DATA VALIDATION AND AUDIT RECORDS			
Data Validation Reports	Quality Assurance Officer	Quality Assurance Officer	Job File at Primary Contractor's Location
Audit Reports	Quality Assurance Officer	Quality Assurance Officer	Job File at Primary Contractor's Location

SECTION 7

ANALYTICAL PROCEDURES

7.1 INTRODUCTION

To meet program specific regulatory requirements for chemicals of concern, all methods will be followed as stated, with some specific requirements noted below. Chemical analyses for inorganics, organics, and wet chemistry parameters will be conducted in accordance with the QAPP, the Work Assignment Scoping Documents, NYSDEC ASP, laboratory's SOPs (maintained "on-file" at the laboratory), and with referenced analytical methods including USEPA SW846 Test Methods for Evaluating Solid Waste, Physical, and Chemical (USEPA, 1997), and Methods for Chemical Analysis of Water and Wastes (USEPA, 1983). Where requirements conflict, the technical and QA/QC requirements in this QAPP or the work plan take precedence.

7.2 STANDARD OPERATING PROCEDURES

Standard Operating Procedures (SOPs) are a written step-by-step description of laboratory operating procedures exclusive of analytical methods. Laboratories providing analytical support for this project will be required to document all procedures in SOPs. The SOPs must address the following areas:

- Storage containers and sample preservatives
- Sample receipt and logging
- Sample custody
- Sample handling procedures
- Sample transportation
- Glassware cleaning
- Laboratory security
- QC procedures and criteria
- Equipment calibration and maintenance
- Documentation
- Safety
- Data handling procedures
- Document control
- Personnel training and documentation
- Sample and extract storage

- Preventing sample contamination
- Traceability of standards
- Data reduction and validation
- Maintaining instrument records and logbooks
- Nonconformance
- Corrective actions
- Records management

SECTION 8

QUALITY CONTROL

8.1 INTRODUCTION

A QC program is a systematic process that controls the validity of analytical results by measuring the accuracy and precision of method and matrix, developing expected control limits, using these to detect anomalous events, and requiring corrective action techniques to prevent or minimize the recurrence of these events. QC measurements for analytical protocols are designed to evaluate laboratory performance, and measurement biases resulting from the sample matrix and field performance.

- **Field performance:** QC samples are used to evaluate the effectiveness of the sampling program to obtain representative samples, eliminating any cross contamination. These samples will include trip blanks, field duplicates and rinse blanks.
- **Sample performance:** Factors associated with sample preparation and analysis influence accuracy and precision. Such factors are monitored by the use of internal QC samples. QC field samples are analyzed to evaluate measurement bias due to the sample matrix based on evaluation of matrix spike (MS), MSD, and/or matrix duplicate (MD) samples. If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS (or MSB) results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.
- **Laboratory method performance:** All QC criteria for method performance should be met for all target analytes for data to be reported. These criteria generally apply to instrument detector assessment (such as, tunes, Inductively Coupled Plasma (ICP) interference check sample), calibration, method blanks, and LCS (or MSB). Variances will be documented and noted in the case narrative of the report.

8.1.1 Field Quality Control Samples

QC samples will be collected in the field as part of the sampling program to allow evaluation of data quality. Field QA/QC samples will consist of the collection and analysis of rinse blanks, field duplicates, and “extra volume samples”, to be used for MS/MSD samples, at a frequency of 1:20 for each sample media (water and soil). Temperature blanks will accompany each sample shipment container (cooler) shipped to the laboratory for sample analysis. A rinse blank will be collected from disposable sampling equipment at a frequency of once per lot. Standard sample identifiers will identify field QA/QC samples and they may provide no indication of their nature as QA/QC samples.

A summary of the type and collection frequency of field QC sample to be collected respective to the sampling programs specified in this QAPP, is included in Table 8.1. A description of each QC sample is included below.

8.1.1.1 Equipment Rinse Blanks

To assess field sampling and decontamination performance, rinse blanks will be used to evaluate the effectiveness of the decontamination procedures for chemical sampling equipment. Rinse blanks will be collected as part of all chemical sampling programs, except for waste characterization. An equipment rinse blank (rinse blank) is a sample of deionized water provided by the laboratory that is poured over or through the sampling equipment (such as split spoon, wipe template), into the sample container. A rinse blank will be collected at a frequency of 1:20 samples per type of sample collection activity using non-disposable sampling equipment. A rinse blank will be collected from disposable sampling equipment at a frequency of once per lot.

8.1.1.2 Field Duplicates

Coded (blind) field duplicates will be used to assess the precision of field sampling procedures. Precision of a sample is calculated by quantifying the RPD between two sample measurements (Section 3.2.2.1). If the RPD of field duplicate results is greater than the precision criterion, environmental results for the field duplicate pair will be qualified as estimated. The Field Leader responsible for sample collection and processing should be notified to identify the source of variability (if possible), and corrective action should be taken (Section 10.3).

Coded (blind) field duplicates will be collected to evaluate the representativeness and effectiveness of homogenization and proper mixing for soil and aqueous samples. The field duplicate will be analyzed for all of the parameters for which the associated samples are being analyzed. The samples will be labeled in such a manner that the laboratory will not be able to identify the sample as a duplicate sample. This will eliminate bias that could arise by laboratory personnel.

8.1.1.3 Trip Blanks

During field sampling and sample shipping, contamination may be introduced to the samples that could affect the accuracy of analysis results. Trip blanks will be used during sample shipment to detect cross-contamination. Each cooler of aqueous samples sent to the laboratory for analysis of VOCs will contain one trip blank. Trip blanks are prepared only when VOCs samples are taken and are analyzed for VOCs analytes. The trip blank consists of a VOC sample vial filled in the laboratory with American Society for Testing and Materials (ASTM) Type II reagent grade water, transported to the sampling site, handled like an environmental sample, and returned to the laboratory for analysis. Trip blanks are not opened in the field.

8.1.1.4 Temperature Blank

The temperature blank is used to indicate the temperature of the sample cooler upon receipt at the laboratory. A temperature blank consists of laboratory reagent in a 40-ml glass vial sealed with a Teflon® septum. Any cooler temperature exceeding the allowable 4 ± 2 degrees Celsius (°C) must be noted and the QAO notified prior to sample analyses.

8.1.2 Laboratory Quality Control Samples

QC data from the laboratory are necessary to determine precision and accuracy of the analyses and to demonstrate the absence of interferences and contamination of glassware and reagents. The laboratory will analyze QC samples routinely as part of the laboratory QC procedures. Laboratory QC results will consist of analysis of MS/MSD or MS/MD, LCS (or MSB), method/preparation blanks, and surrogate spikes. The frequency of the analysis of laboratory QC is summarized in Table 8.2. QC samples will be prepared and analyzed utilizing the same preparation and analysis procedures as the field samples. These laboratory QC sample analyses will be run independently of the field QC samples. Results of these analyses will be reported with the sample data and kept in the project QC data file. The QC checks, their frequency, acceptance criteria, and corrective actions for noncompliance are summarized for each analytical method in the NYSDEC ASP.

QC samples will be prepared and analyzed utilizing the same preparation and analysis procedures as the field samples. Re-preparation and/or reanalysis of the laboratory QC samples due to a failing recovery and/or precision failure without the re-preparation and reanalysis of the associated samples is prohibited. In all events, QC failures, holding time exceedances, or any other non-standard occurrence must be communicated immediately to the QAO and prior to reporting and then, with approval to report the data, summarized in the case narrative. If the criteria are not met, appropriate corrective action must be taken as specified in Section 9.1 and Section 10.

8.1.2.1 Matrix Spike/Matrix Spike Duplicate/ Matrix Duplicates

MS/MSD, or MD for methods not requiring MS/MSD, samples for organics, metals, and wet chemistry parameters will be taken at a frequency of 1 per 20 field samples (per SDG) per matrix per method. MD samples will be analyzed by the laboratory at frequency required by the analytical method. A “batch” is considered up to twenty samples from the same matrix, of the same extraction/digestion type, prepared and/or analyzed by a given analyst, within 12-hr, within an extraction/digestion event, whichever is more frequent. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes by spiking a normal field sample with a known concentration of the analyte of interest. Samples identified as rinse blanks will not be used for the MS/MSD or MS/MD preparation or analysis.

Spiked samples will be analyzed, and the percent recovery will be calculated. Results of the analysis will be used to evaluate accuracy and precision of the actual sample matrix. For MS/MSD or MD, the result will be compared and used to evaluate the precision of the actual sample matrix. The percent recovery for each analyte in the MS and MSD should fall within the limits established by laboratory QC protocol. The percent recovery and RPD control limits between the MS and MSD and the sample and the duplicate concentrations are provided in the NYSDEC ASP.

The original sample, MS/MSD, and MD sample aliquots will be treated exactly the same throughout the sample preparation and analysis and will not be homogenized more than any other project sample (either in the field or at the laboratory). The spike samples will be analyzed for the same parameters as the sample. Field personnel must indicate on the chain-of-custody form which sample(s) are designated as MS/MSD (or MS/MD). If samples are not designated

for these QC purposes and/or insufficient sample is available the Project Manager and/or QAO will be notified for resolution.

8.1.2.2 Laboratory Control Samples

Laboratory Control Samples (LCS), or MSB are designed to check the accuracy of the analytical procedure by measuring a known concentration of an analyte of interest. An LCS (or MSB) will be analyzed for each analytical batch requested for sample preparation and analysis. LCSs (or MSBs) must be prepared at a frequency of one per batch for all analytical methods. If high LCS (or MSB) recoveries are observed and the associated samples are reported as "not detected" for the requested target analytes, no action is necessary other than to note the issue in the case narrative of the final analytical report. LCS (or MSB) recoveries must meet the criteria specified in NYSDEC ASP.

8.1.2.3 Method and Preparation Blanks

Laboratory blank samples (also referred to as method or preparation blanks) are designed to detect contamination resulting from the laboratory environment or sample preparation procedure. Method blanks verify that method interferences caused by contaminants in solvents, reagents, glassware, or in other sample processing hardware, are known. Method blanks will be analyzed for each analytical batch using similar preparation techniques (separatory funnel and liquid/liquid extraction) to assess possible contamination and evaluate which corrective measures may be taken, if necessary.

Method blanks associated with field samples must undergo all of the processes performed on investigative samples, including but not limited to pre-filtration and sample cleanups. The blank will be deionized water for water samples or a purified solid matrix such as sodium sulfate for extractable soil samples. Where all the field samples in a batch do not require an additional cleanup procedure, an additional blank may be prepared to check the performance of the additional cleanup and will be associated with the field samples getting the specific additional cleanup. Where this is done, both blanks will be reported, and the procedure described in the case narrative. Method blanks must be prepared at a frequency of one per analytical batch.

8.1.2.4 Surrogate Spike Analyses

Surrogate spikes (applicable to organic analysis only) are used to determine the efficiency of analyte recovery in sample preparation and analysis. Calculated percent recovery of the spikes is used to measure the accuracy of the analytical method. A surrogate spike is prepared by adding a known amount of a compound similar in type to the analytes of interest. Surrogate compounds will be added to all samples analyzed by USEPA Methods, including method blanks, MS/MSDs, project environmental samples, and duplicate samples in accordance with the method. Surrogate spike recoveries should fall within the limits established by laboratory QC protocol and the NYSDEC ASP.

8.2 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

8.2.1 Field Equipment

Equipment failure will be minimized by routinely inspecting all field equipment to ensure that it is operational and by performing preventative maintenance procedures. Field sampling

equipment will be inspected prior to sample collection activities, and repairs will be made prior to decontamination and reuse of the sampling equipment. Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure, based on the manufacturer's instructions or recommendations. Maintenance will be performed in accordance with the schedule specified by the manufacturer to minimize the downtime of the measurement system. Qualified personnel must perform maintenance work.

MINIMUM ROUTINE PREVENTIVE MAINTENANCE
Removal of foreign debris from exposed surfaces
Storage in a cool dry place protected from the elements
Daily inspections
Verification of instrument calibrations (Section 8.3.1)

A list of critical spare parts will be developed prior to the initiation of fieldwork. Field personnel will have ready access to critical spare parts to minimize downtime while fieldwork is in progress. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

Non-routine maintenance procedures require field equipment to be inspected prior to initiation of fieldwork to determine whether or not it is operational. If it is not operational, it will be serviced or replaced. Batteries will be fully charged or fresh, as applicable.

8.2.2 Laboratory Instrumentation

Periodic preventive maintenance is required for all sensitive equipment. Instrument manuals will be kept on file for reference if equipment needs repair. The troubleshooting section of factory manuals may be used in assisting personnel in performing maintenance tasks.

Major instruments in the laboratory are covered by annual service contracts with manufacturers or other qualified personnel (internal or external). Under these agreements, trained service personnel make regular preventive maintenance visits. Maintenance is documented and maintained in permanent records by the individual responsible for each instrument.

The laboratory manager is responsible for preparation, documentation, and implementation of the program. The laboratory QA manger reviews implementation to verify compliance during scheduled internal audits.

Written procedures will establish the schedule for servicing critical items to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule and arrange any necessary and prompt service. Qualified personnel will perform required service.

8.3 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

Instruments (field and laboratory) used to perform chemical measurements will be properly calibrated prior to use to obtain valid and usable results. The requirement to properly calibrate instruments prior to use applies equally to field instruments as it does to fixed laboratory instruments to generate appropriate data to meet DQOs.

8.3.1 Field Instruments

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures of field instruments (such as PID, pH, temperature), will conform to manufacturer's standard instructions to ensure that the equipment functions within the allowable tolerances established by the manufacturer and required by the project. Personnel performing instrument calibrations must be trained in its proper operation and calibration. Records of all instrument calibration will be maintained by the Field Team Leader in the field logbook (Section 6.2) and will be subject to audit by the QAO or authorized personnel. The Field Team Leader will maintain copies of all the instrument manuals on the site.

8.3.2 Laboratory Instruments

A formal calibration program will control instruments and equipment used in the laboratory. The program will verify that equipment is of the proper type, range, accuracy, and precision to provide data compatible with specified requirements. Instruments and equipment that measure a quantity or whose performance is expected at a stated level will be subject to calibration. Laboratory personnel or external calibration agencies or equipment manufacturers will calibrate the instruments using reference standards. Upon request, the laboratory will provide all data and information to demonstrate that the analytical system was properly calibrated at the time of analysis including calibration method, frequency, source of standards, concentration of standards, response factors, linear range, check standards, and all control limits. This data will be documented in a calibration record (Section 6.3.1). Calibration records will be prepared and maintained for each piece of equipment subject to calibration.

This section provides an overview of the practices used by the laboratory to implement a calibration program. Detailed calibration procedures, calibration frequencies, and acceptance criteria are specified in the laboratory's analytical method SOPs. The requirements for the calibration of instruments and equipment depend on the type and expected performance of individual instruments and equipment. Therefore, the laboratory will use the guidelines provided here to develop a calibration program.

Two types of calibration are described in this section: periodic calibration and operational calibration. The results of the calibration activities will be documented in the analytical data package and the calibration records (Section 6.3.1).

- **Periodic calibration:** Performed at prescribed intervals for equipment, such as balances and thermometers. In general, equipment which can be calibrated periodically is a distinct, singular purpose unit and is relatively stable in performance.
- **Operational calibration:** routinely performed as part of an analytical procedure or test method, such as the development of a standard curve for use with an atomic absorption

spectrophotometer. Operational calibration is generally performed for instrument systems.

Equipment that cannot be calibrated or becomes inoperable will be removed from service. Such equipment must be repaired and satisfactorily recalibrated before reuse. For equipment that fails calibration, analysis cannot proceed until appropriate corrective action is taken, and the analyst achieves an acceptable calibration. This type of failure will be documented in an NCM (Section 10).

8.3.3 Calibration System

The calibration system includes calibration procedures, equipment identification, calibration frequency, calibration reference standards, calibration failure, and calibration records. These elements are described next.

8.3.3.1 Calibration Procedures

Written procedures will be used by the laboratory for all instruments and equipment subject to calibration. Whenever possible, recognized procedures, such as those published by ASTM or USEPA, will be adopted. If established procedures are not available, a procedure will be developed considering the type of equipment, stability characteristics of the equipment, required accuracy, and the effect of operational error on the quantities measured. Calibration procedure established by the laboratory must, at a minimum, meet the calibration requirements of the method on which the SOP is based.

MINIMUM CALIBRATION PROCEDURES
Equipment to be calibrated
Reference standards used for calibration
Calibration technique and sequential actions
Acceptable performance tolerances
Frequency of calibration
Calibration documentation format

8.3.3.2 Equipment Identification

Equipment that is subject to calibration is identified by a unique number assigned by the laboratory. Calibration records reference the specific instrument identification.

8.3.3.3 Calibration Frequency

Instruments and equipment will be calibrated at prescribed intervals and/or as part of the operational use of the equipment. Calibration frequency will be based on the type of equipment, inherent stability, manufacturer's recommendations, values provided in recognized standards, intended data use, specified analytical methods, effect of error upon the measurement process, and prior experience.

8.3.3.4 Calibration Reference Standards

Two types of reference standards will be used by the laboratory for calibration:

- **Physical standards**, such as weights for calibrating balances and certified thermometers for calibrating working thermometers, refrigerators and ovens, are generally used for periodic calibration. Physical reference standards that have known relationships to nationally recognized standards (such as NIST) or accepted values of natural physical constants will be used whenever possible. If national standards do not exist, the basis for the reference will be documented. Physical reference standards will be used only for calibration and will be stored separately from equipment used in analyses. In general, physical standards will be recalibrated annually by a certified external agency, and documentation will be maintained. Balances will be calibrated against class "S" weights by an outside source annually. Physical standards such as the laboratory's class "S" weights will be recertified annually.
- **Chemical standards,** such as vendor certified stock solutions and neat compounds, will generally be used for operational calibration. The laboratory, to provide traceability for all standards used for calibration and QC samples, will document standard preparation activities.

8.3.4 Operational Calibration

Operational calibration will generally be performed as part of the analytical procedure and will refer to those operations in which instrument response (in its broadest interpretation) is related to analyte concentration. Formulas used for calibration are listed in Table 8.3.

8.3.4.1 Preparation of a Calibration Curve

Preparation of a standard calibration curve will be accomplished by analyzing calibration standards that are prepared by adding the analyte(s) of interest to the solvent that is introduced into the instrument. The concentrations of the calibration standards will be chosen to cover the working range of the instrument or method. All sample measurements will be made within this working range. Average response factors will be used or a calibration curve will be prepared by plotting or regressing the instrument responses versus the analyte concentrations. Where appropriate a best-fit curve may be used for nonlinear curves and the concentrations of the analyzed samples will be back-calculated from the calibration curve.

8.3.4.2 Periodic Calibration

Periodic calibrations are performed for equipment (such as balances and thermometers), that is required in the analytical method, but that is not routinely calibrated as part of the analytical procedure. Table 8.4 lists the periodic calibration requirements used by the laboratories.

8.4 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

In the laboratory, personnel qualifying reagents and standards must be trained to perform the associated instrumental analysis, including instrument calibration, calculations, and data interpretation. Laboratory personnel must document the purchase, receipt, handling, storage, and tracking of supplies and consumables used during analysis. For example, analytical standards, source materials, and reference materials used for instrumental calibration/tunes/checks must be

certified and traceable to the USEPA or NIST through reference numbers documented directly in each analytical sequence. Calibration for all requested analyses must be verified by an independent second source reference. Adhering to these procedures precludes the use of expired supplies and consumables or supplies and consumables that do not meet standard acceptance criteria.

Records must be maintained on reagent and standard preparation in the LIMS reagent system or laboratory standard preparation logs. The records should indicate traceability of the standards to their original source solution or neat compound, the name of the material, concentration, the method and date of preparation, the expiration date, storage conditions, and the preparer's initials. Each prepared reagent or standard should be labeled with a unique identifier that links the solution to the preparation documentation that specifies an expiration and/or re-evaluation date for the solution.

TABLE 8.1

SUMMARY OF FIELD QC SAMPLE TYPES AND COLLECTION FREQUENCY

Field QC Sample Type	Sample Type	Collection Frequency
Rinse	Soil/sediment, Water	Once per week for non-disposable sampling equipment. Once per lot for disposable sampling equipment.
Field Duplicates	Soil/sediment, Water	1:20 Samples
Extra Volume Sample (collected for MS/MSD)	Soil/sediment, Water, Biota	1:20 Samples

Field QA/QC samples will be identified by using standard sample identifiers that will provide no indication of their nature as QA/QC samples.

TABLE 8.2

LABORATORY QUALITY CONTROL SAMPLE FREQUENCY

QC Sample	Frequency
Method/prep Blanks	1 per analytical batch of 1-20 samples, per preparation event
Laboratory Control Sample	1 per analytical batch of 1-20 samples, per preparation event
Surrogates	Spiked into all field and QC samples (Organic Analyses)
Matrix Spike/Matrix Spike Duplicate or Matrix (Laboratory) Duplicate	1 per batch of 1-20 samples

TABLE 8.3

OPERATIONAL CALIBRATION FORMULAS

Application	Formula	Symbols
Linear calibration curves	$C = (R - a_0)/a_1$	C = analytical concentration R = instrument response a_0 = intercept of regression curve (instrument response when concentration is zero) a_1 = slope of regression curve (change in response per change in concentration)
Calibration factors [1]	$CF = A_x / C$	C = concentration (µg/L) CF = calibration factor Ax = peak size of target compound in sample extract
Response factors [2]	$RF = C_{is} A_x / C A_{is}$	C = concentration (µg/L) RF = internal standard response factor Cis = concentration of the internal standard (µg/L) Ax = area of the characteristic ion for the target compound Ais = area of the characteristic ion for the internal standard

1. Used for quantitation by the external standard technique
2. Used for quantitation by the internal standard technique

Note: For organic analysis, the laboratory will make efforts to use the best curve technique for each analyte. This practice is described in detail in the laboratory calibration criteria documents for GC analysis. This may require the use of a quadratic curve for some compounds.

TABLE 8.4

PERIODIC CALIBRATION REQUIREMENTS

Instrument	Calibration Frequency		Corrective Actions
Analytical Balances	Daily:	Sensitivity (with a Class S-verified weight)	Adjust sensitivity
	Annually:	Calibrated by outside vendor against certified Class S weights	Service balance
Thermometers	Annually:	Calibrated against certified NIST thermometers	Tag and remove from service
Automatic Pipettors	Quarterly:	Gravimetric check	Service or replacement

TABLE 8.5

SAMPLE CONCENTRATION CALCULATION FORMULAS

Application	Formula	Symbols
Linear regression calibration curves	$C = (R - a_0)/a_1$	C = analytical concentration R = instrument response a_0 = intercept of regression curve (instrument response when concentration is zero) a_1 = slope of regression curve (change in response per change in concentration)
Calibration factors [1]	$C = A_x V_f / CF V_i$	C = concentration (µg/L) CF = calibration factor A_x = peak size of target compound in sample extract V_f = final volume of extracted sample (mL) V_i = initial volume of sample extracted (mL)
Response factors [2]	$C = C_{is} A_x V_f / RF A_{is} V_I$	C = concentration (µg/L) RF = internal standard response factor C_{is} = concentration of the internal standard (µg/L) A_x = area of the characteristic ion for the target compound V_f = final volume of extracted sample (mL) A_{is} = area of the characteristic ion for the internal standard V_i = initial volume of sample extracted (mL)
Residues [3]	R = (W – T)/V x 1,000,000	R^6 = residue concentration (mg/L) W = weight of dried residue + container (g) T = tare weight of container (g) V = volume of sample used (mL)
Solid samples [4]	K = C V D / W (%S/100)	K = dry-weight concentration (mg/kg) C = analytical concentration (mg/L) V = final volume (mL) of processed sample solution D = dilution factor W = wet weight (g) of as-received sample taken for analysis %S = percent solids of as-received sample

1. Used for quantitation by the external standard technique
2. Used for quantitation by the internal standard technique
3. Used for total, filterable, nonfilterable, and volatile residues as well as gravimetric oil and grease
4. Used to calculate the dry-weight concentration of a solid sample from the analytical concentration of the processed sample.
5. Conversion factor to convert g/mL to mg/L:

$$\frac{mg}{L} = \frac{g}{mL} \times \frac{10^3 mL}{L} \times \frac{10^3 mg}{g}$$

SECTION 9

DATA VALIDATION AND USABILITY ELEMENTS

9.1 DATA REVIEW, VERIFICATION, AND VALIDATION

The data collected during this project will undergo a systematic review for compliance with the DQOs and performance objectives as stated in Section 3. In particular, field, laboratory, and data management activities will be reviewed to confirm compliance with the method QC criteria for performance and accuracy and to show that data were collected in a manner that is appropriate for accomplishing the project objectives. These data will be evaluated as to their usability during data verification. In particular, data outside QC criteria, but not rejected, will be reviewed for possible high and low bias. All data will be validated following verification and reduction.

Qualified data validation personnel will assess and verify data; they will review the data against QC criteria, DQOs (Sections 3 and 9.2.2), NYSDEC ASP, and USEPA Region 2 SOPs for data review to identify outliers or errors and to flag suspect values. Field and laboratory activities that should be reviewed include, at a minimum, sample collection, handling, and processing techniques; field documentation records; verification of proper analytical methods; analytical results of QC samples; and calibration records for laboratory instruments and field equipment. A review of such elements is necessary to demonstrate whether the DQOs outlined in 3 were met. Samples that deviate from the experimental design and affect the project objectives must be reported to the QAO and data validation personnel.

Departures from standard procedures (in the FAP, this QAPP, or the laboratory SOPs, may lead to exclusion of that data from the project database or validation process, based on discussions with and approval of the NYSDEC. However, routine field audits involving thorough reviews of sample collection procedures and sample documentation should preclude such deviations from occurring. Additionally, routine laboratory audits will be used to document proper sample receipt, storage, and analysis; instrument calibration; use of the proper analytical methods; and use of QC samples specified in Section 8 to assist in appropriately qualifying the data.

The laboratory's analytical report for each SDG will be assembled by collecting and incorporating all the data for each analysis associated with the reported samples; the analytical narratives; and other report-related information such as copies of chain-of-custody forms, communication records, and nonconformance forms.

Before the laboratory submits data, the laboratory's data review process will include a full first level "technical" review by the laboratory's analyst during sample analysis and data generation. The review must include a check of all QC data for errors in transcription, calculations, and dilution factors and for compliance with QC requirements. Failure to meet method performance QC criteria may result in the reanalysis of the sample or analytical batch.

After the initial review is completed, the data will be collected from summary sheets, workbooks, or computer files and assembled into a data package.

The laboratory's first review will be followed by a second-level technical review of the data package. The second level review may be performed by a peer trained in the procedures being reviewed or by the appropriate analytical group supervisor. The reviewer will check the data packages for completeness and compliancy with the project requirements and will certify that the report meets the DQOs for PARCCS specifications. The report narrative will be generated at this stage of the data review. Any problems discovered during the review and the corrective actions necessary to resolve them will be communicated to the responsible individual, who will discuss the findings with the laboratory QA manager for resolution.

The first and second review will be conducted throughout sample analysis and data generation to validate data integrity during collection and reporting of analytical data. Data review checklists will be used to document the performance and review of the QC and analytical data.

Before the laboratory's final release to the client, the data will undergo a final review by the laboratory's QA officer or his/her designee. This third level review is to confirm that the report is complete and meets project requirements for performance and documentation. The laboratory's QA officer must review reports involving non-conforming data issues. A summary of all non-conformances will be included in the case narrative. The report will then be released to the client for data validation, and a copy will be archived by the laboratory for a period of 7 yrs.

The laboratory analytical data will be validated using project-specific data validation procedures to confirm that data meet the applicable data quality objectives. Depending on the type of data and the intended data uses, the data validation process for a given SDG (or a specific percentage of sample analyses) or analytical method may be performed following an EPA Level IV protocol (full validation), or an EPA Level III protocol (sample plus QC summary data only, no raw data review). The project-specific Level III data validation protocol will provide a level of review resulting in the generation of a DUSR, as defined by NYSDEC. Level III validation will be performed on all DQO Level III and all DQO Level IV data. Ten percent (10%) of the DQO Level IV Data for each analytical method will undergo a Level IV validation. Certain geotechnical and field screening data may be evaluated in a manner suitable for the intended data uses.

A data validation report will be issued and reviewed by the QAO before finalization. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of PARCCS criteria for each analytical method. The validation criteria are objective and are not sample dependent, except for consideration of sample matrix effects. The criteria specify performance requirements that should be under the control of the field-sampling contractor or analytical laboratory. This QAPP will be the primary reference for evaluating the data.

After data validation, the data will be evaluated for consistency with site conditions and developed conceptual models. Data validation personnel will prepare a project DUSR that summarizes the implications of the use of any data out of criteria. In addition, the data usability report will include the percentage of sample completeness for critical and non-critical samples and a discussion of any issues in representativeness of the data that may develop as a result of validation. The data usability report will address overall data quality and achievement of PARCCS criteria and assess issues associated with the overall data and data quality for all validated Level III and Level IV data.

9.2 VERIFICATION AND VALIDATION METHODS

9.2.1 Laboratory

The laboratory will verify and assess analytical data against the stated requirements on the chain-of-custody record, the sample handling procedures (Section 4), and the QC parameters. The laboratory data reviewers will also check that transcriptions of raw or final data and calculations were performed correctly and are verified.

Following data verification, analytical data generated by the laboratory will be reduced and managed based on the procedures specified in this QAPP and analytical methodologies. Data reduction includes all processes that change either the values or numbers of data items. The data reduction processes used in the laboratory includes establishment of calibration curves, calculation of sample concentrations from instrument responses, and computation of QC parameters. Table 8.5 lists the formulas used to calculate sample concentrations.

The reduction of instrument responses to sample concentrations takes different forms for different types of methods. For most analyses, the sample concentrations are calculated from the measured instrument responses using a calibration curve. The sample concentrations can be back-calculated from a regression equation fitted to calibration data. For gravimetric and titrimetric analyses, the calculations are performed according to equations given in the method. For chromatographic analyses, the unknown concentrations are determined using either calibration factors (external standard procedure) or relative response factors (internal standard procedure). GC analyses are generally quantitated using the external standard technique; GC/MS analyses are quantitated using the internal standard technique. These calculations are generally performed by the associated computerized data systems.

Validated analytical data will be loaded into a database and reported in tabular format. Database fields will include the field sample identification, laboratory sample identification, blinded sample number, analytical results, detection limits, and validation qualifiers. The usability of the data will be evaluated by the QAO or designee.

9.2.2 Analytical Data Validation

The data review process is performed in two phases:

1. **Initial phase, contract compliance screening (CCS)**: Review of sample data deliverables for completeness. Completeness is evaluated by ensuring that all required data deliverables are received in a legible format with all required

information. The CCS process also includes a review of the chain-of-custody forms, case narratives, and RLs. Sample resubmission requests, documentation of nonconformances with respect to data deliverable completeness, and corrective actions often are initiated during the CCS review. The results of the CCS process are incorporated into the data validation process.

2. **Second phase, data validation:** A project-specific data validation procedure based on a "Level III" or the "Level IV" validation protocol will be performed on the analytical results from the fixed-base laboratory or laboratories, with the exception of the bench-scale testing data. The EPA Level III validation protocol includes a review of summary information to determine adherence to analytical holding times, results from analysis of field duplicates, method blanks, field blanks, surrogate spikes, MS/MSDs, LCSs (or MSBs), sample temperatures during shipping and storage, initial and continuing calibration forms, internal standard area count forms, and any other QC forms. Data qualifiers are applied to analytical results during the data validation process based on adherence to method protocols and laboratory-specific QA/QC limits. The EPA Level IV validation protocol incorporates the Level III validation protocol and adds calculation checks from the raw data of reported and summarized sample data and QC results.

FULL VALIDATION (USEPA LEVEL IV EQUIVALENT)	
Organic Analytical Methods	**Inorganic Constituents, Wet Chemistry Parameters**
Percentage of solids	Percentage of solids
Sample preservation and holding times	Sample preservation and holding times
Instrument tuning	Calibrations
Instrument calibrations	Blank results
Blank results	Interference check samples (inorganics only)
System monitoring compounds or surrogate recovery compounds (as applicable)	LCSs
Internal standard recovery results	Project Required Reporting Limit (PRRL) standard check samples
MS and MSD (or MD) results	Duplicates
LCS (or MSB) results	MSs (pre-digestions and post-digestions for inorganics only)
Target compound identification	ICP serial dilutions and
Chromatogram quality	Results verification and reported detection limits
Duplicate results	
Compound quantitation and reported RLs	
System performance and	
Results verification	

The laboratory will send the required analytical data package deliverables, consisting of CD-ROM and hardcopy versions and the EDD, following completion of the laboratory's validation process (Section 9.2.2). Data validation will be performed in accordance with the USEPA **Region 2 Data Validation SOPs** for organic and inorganic data review (USEPA, 2012a, 2012b, 2012c, 2013c, 2013d, 2013e, 2013f). In addition, Parsons will refer to this QAPP and the Work Assignment Scoping Documents to verify that DQOs were met. If problems are identified during data validation, the QAO and the laboratory QA manager will be alerted, and corrective actions will be requested. The Laboratory Project Manager and data validation chemists will maintain close contact with the QAO to ensure all nonconformance issues are acted upon prior to data manipulation and assessment routines.

Data validation will be conducted using the USEPA guidelines (USEPA, 2013a, 2013b, 2013g, 2013h) as supplementary guidelines. Where Contract Laboratory Program (CLP) guidelines and SW-846 disagree, this QAPP and data validation professional judgment will prevail.

Trained and experienced data validation chemists will perform the data validation work. The QAO will review the data validation report before it is finalized. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of PARCCS criteria for each analytical method. A detailed assessment of each SDG will follow. Based on the results of data validation, the validated analytical results reported will be assigned a usability flag (see chart below).

USABILITY FLAGS FOR VALIDATED RESULTS	
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ	Analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
C	This qualifier applies to GC results when the identification has been confirmed by Gas Chromatograph/Mass Spectrometer (GC/MS)
X	This qualifier applies to results when GC/MS analysis was attempted by unsuccessful.
No flag	Result accepted without qualification

9.3 RECONCILIATION WITH USER REQUIREMENTS

Following data validation by qualified personnel, the data will be evaluated by the QAO and the project manager as to consistency with site conditions and developed conceptual models to determine whether field and analytical data meet the requirements for decision making. Specifically, the results of the measurements will be compared to the DQOs (Section 3).

The DQOs will be considered complete and satisfied if the data are identified as usable and if no major data gaps are identified. For example, the objective for data collected under the characterization program is to further refine the limits of dredging and/or capping. If the collected data sufficiently characterizes these limits in a manner that is acceptable for remedial action, then the DQO is satisfied. In cases where data may be considered not usable (for example, rejected during data validation), resampling may be required at a specific location. If resampling is not possible, the data will be identified and noted in the project database to make data users aware of its limitations.

SECTION 10

ASSESSMENT AND OVERSIGHT

10.1 ASSESSMENTS AND RESPONSE ACTIONS

Performance and system audits of both field and laboratory activities may be performed. Any such audits will be performed at a frequency to be determined to ensure that sampling and analysis activities are completed in accordance with the procedures specified in the FAP and this QAPP.

Quality assurance audits will be carried out under the direction of the QAO on field activities, including sampling and field measurements. They will be implemented to verify that established procedures are being followed and to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s).

The QAO will plan, schedule, and approve system and performance audits based on procedures customized to the project requirements. If required, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. Quality auditing personnel will not have responsibility for field or laboratory project work.

10.2 PROJECT-SPECIFIC AUDITS

Project-specific audits include system and performance audits of sampling and analysis procedures, and of associated recordkeeping and data management procedures. Project-specific audits will be performed on a discretionary basis at a frequency determined by the project manager.

10.2.1 System Audits

The QAO may perform system audits. Such audits will encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory QC procedures and associated documentation may be system-audited including the field logbook, field sampling records, laboratory analytical records, sample handling, processing, and packaging in compliance with the established procedures, maintenance of QA procedures, and chain-of-custody procedures. These audits may be carried out during execution of the project to confirm that sampling crews employ consistent procedures. However, if conditions adverse to quality are detected additional audits may occur.

Findings from the audit will be summarized and provided to the PM and/or designated personnel so that necessary corrective action can be monitored from initiation to closure.

10.2.2 Performance Audits

The laboratory may be required to conduct an analysis of PE samples or provide proof that PE samples were submitted by an approved USEPA or NYSDEC performance testing provider within the past 12 months. If necessary, proof that applicable PE samples have been analyzed at the laboratory within the past 12 months will be included in the laboratory procurement package.

10.2.3 Formal Audits

Formal audits are any system or performance audit that the QAO documents and implements. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklist to verify objectively that QA requirements have been developed, documented, and instituted in accordance with contractual and project criteria. At the discretion of the project manager, the QAO or designated personnel may conduct formal audits on project and subcontractor work during the course of the project.

Auditors who have performed the site audit after gathering and evaluating all data will write audit reports. Items, activities, and documents determined by lead auditors to be in noncompliance must be identified at exit interviews conducted with the involved management. Noncompliance will be logged and documented through audit findings. These findings will be attached to and become part of the integral audit report. These audit-finding forms are directed to management to resolve satisfactorily the noncompliance in a specified and timely manner.

The QAO has overall responsibility to see that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports will be submitted to the PM after completion of the audit. Serious deficiencies will be reported to the PM on an expedited basis. Audit checklists, audit reports, audit findings, and acceptable resolutions will be 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.

10.2.4 Laboratory Audits

Internal laboratory audits will be performed routinely to review and evaluate the adequacy and effectiveness of the laboratory's performance and QA program, to ascertain if the QAPP is being completely and uniformly implemented, to identify nonconformances, and to verify that identified deficiencies are corrected. The laboratory QA manager is responsible for such audits and will perform them according to a schedule planned to coincide with appropriate activities on the project schedule and sampling plans. Such scheduled audits may be supplemented by additional audits for one or more of the following reasons:

- When significant changes are made in the QAPP
- When necessary to verify that corrective action has been taken on a nonconformance reported in a previous audit
- When requested by the laboratory's project manager or QA manager.

10.2.4.1 Laboratory Performance Audits

Performance audits are independent sample checks made by a supervisor or auditor to arrive at a quantitative measure of the quality of the data produced by one section or the entire measurement process. Performance audits are conducted by introducing control samples, in addition to those used routinely, into the data production process. These control samples include PE samples of known concentrations. The results of performance audits will be evaluated against acceptance criteria. The results will be summarized and maintained by the laboratory QA manager and distributed to the supervisors who must investigate and respond to any results that are outside control limits.

10.2.4.2 Laboratory Internal Audits

The laboratory QA manager conducts routine internal audits of each laboratory section for completeness, accuracy, and adherence to SOPs. The laboratory audit team will verify that the laboratory's measurement systems are operated within specified acceptable control criteria and that a system is in place to confirm that out-of-control conditions are efficiently identified and corrected.

10.2.4.3 Laboratory Data Audits

The laboratory will maintain raw instrument data for sample analyses on magnetic tape media or optical media in a secured fireproof safe. During routine audits, the audit team will verify the processing of the raw data file by reviewing randomly selected electronic data files and comparing the results with the hardcopy report. Tapes will be archived for a period of 7 yr. Tapes will be also available for audit by the QAO upon request.

10.2.4.4 Laboratory Audit Procedures

Prior to an audit, the designated lead auditor will prepare an audit checklist. During an audit and upon its completion, the auditor will discuss the findings with the individuals audited and discuss and agree on corrective actions to be initiated. The auditor will prepare and submit an audit report to the designated responsible individual of the audited group, the PM, and the QAO. Minor administrative findings that can be resolved to the satisfaction of the auditor during an audit need not be cited as items requiring corrective action. Findings that are not resolved during the course of the audit and findings affecting the overall quality of the project will be included in the audit report.

The designated responsible individual of the audited group will prepare and submit to the QAO a reply to the audit. This reply will include, at a minimum, a plan for implementing the corrective action to be taken on nonconformances indicated in the audit report, the date by which such corrective action will be completed, and actions taken to prevent reoccurrence. If the corrective action has been completed, supporting documentation should be attached to the reply. The auditor will ascertain (by re-audit or other means) if appropriate and timely corrective action has been implemented.

Records of audits will be maintained in the project files. Audit files will include, as a minimum, the audit report, the reply to the audit, and any supporting documents. It is the responsibility of the designated responsible individual of the audited group to conform to the

established procedures, particularly as to development and implementation of such corrective action.

10.2.4.5 Laboratory Documentation

To confirm that the previously defined scope of the individual audits is accomplished and that the audits follow established procedures, a checklist will be completed during each audit. The checklist will detail the activities to be executed and ensure that the auditing plan is accurate. Audit checklists will be prepared in advance and will be available for review.

AUDIT CHECKLIST (AT MINIMUM)
Date and type of audit
Name and title of auditor
Description of group, task, or facility being audited
Names of lead technical personnel present at audit
Checklist of audit items according to scope of audit
Deficiencies or non-conformances

Following each system, performance, and data audit, the QAO or his designee will prepare a report to document the findings of the specific audit. The report will be submitted to the designated individual of the audited group to ensure that objectives of the QA program are met.

MINIMUM CONTENT OF AUDIT REPORT
Description and date of audit
Name of auditor
Copies of completed, signed, and dated audit form and/or checklist
Summary of findings including any nonconformance or deficiencies
Date of report and appropriate signatures
Description of corrective actions

The QAO will maintain a copy of the signed and dated report for each audit. If necessary, a second copy will be placed in project files.

10.3 CORRECTIVE ACTIONS

Corrective action 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. Corrective action enables significant conditions adverse to quality to be noted promptly at the site, laboratory, or subcontractor location. Additionally, it allows for the cause of the condition to be identified and corrective action to be taken to rectify the problem and to minimize the effect on the data set. Further, corrective action is intended to minimize the possibility of repetition.

Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, PM, FTL, and involved subcontractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action. 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 designated responsible individual of the audited group will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

Events that trigger corrective actions
When predetermined acceptance standards are not attained
When a deviation from SOP is required or observed
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 QA 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
As required by analytical method

All project personnel have the responsibility, as part of normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Specifically, the laboratory must designate the assigned individual to act as the primary laboratory contact responsible for timely identification and resolution of any and all issues including contract and administrative issues. Any phone calls initiated by personnel or designated representatives to the laboratory with respect to corrective actions must be returned in a timely manner on a normal business day if the designate individual (or alternate) is not available at the initiation of the phone call.

Project management and related staff, including field investigation teams, remedial design planning personnel, and laboratory groups will monitor on-going work performance as part of daily responsibilities. Work may be audited at the site, the laboratories, or subcontractor locations. Activities or documents ascertained to be noncompliant with QA 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 QAO, PM, or designated personnel.

Personnel assigned to QA functions will have the responsibility to issue and control CAR forms (Figure 10.1). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered.

Similar to the CAR, the laboratory will record and report nonconformances internally using the laboratory's nonconformance documentation tracking system in the form of an NCM. Each NCM is traceable so that it can be cross-referenced with its resolution to the associated project records. The laboratory QA manager summarizes critical nonconformances, such as reissued reports and client complaints, in a monthly report to the laboratory management staff. Management of the NCM is described in Section 6.3. Corrective action procedures applicable to QC requirements that do not meet the criteria of this QAPP are described in the following sections. Consistent, frequent contacts between laboratory personnel, the QAO, or designated personnel are required.

TYPICAL CONTENT OF NCM FORMS
Problem description and root cause
Corrective action
Client notification summary
QA verification
Approval history action

FIGURE 10.1

CORRECTIVE ACTION REQUEST FORM

CORRECTIVE ACTION REQUEST

Number _____ Date:_____

TO: _____

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

Condition:

Reference Documents:

_____ _____ _____ _____ _____ _____

Originator Date Approval Date Approval Date

Response

Cause of Condition:

Corrective Action

Resolution:

(B) Prevention

(B2) Affected Documents

Signature_____ Date_____

CA Follow-up

Corrective Action verified by:_____ Date _____

SECTION 11

REPORTS TO MANAGEMENT

11.1 QA REPORTS

Management personnel receive QA reports appropriate to their level of responsibility. The PM receives copies of all QA documentation. QC documentation is retained within the department that generated the product or service except where this documentation is a deliverable for a specific contract. QC documentation is also submitted to the project QAO for review and approval. Previous sections detailed the QA activities and the reports, which they generate. Among other QA audit reports that may be generated during the conduct of activities, a final audit report for this project will be prepared by the QAO. The report will include:

- Periodic assessment of measurement data accuracy, precision, and completeness
- Results of performance audits and/or system audits
- Significant QA problems and recommended solutions for future projects
- Status of solutions to any problems previously identified.

Additionally, any incidents requiring corrective action will be fully documented.

SECTION 12

REFERENCES

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

USEPA, 1983. Methods for Chemical Analysis of Water and Wastes, EPA600/4-79/020, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, OH, Rev. March.

USEPA, 1986. NEIC Policies and Procedures. EPA 330/9-78-001-R. United States Environmental Protection Agency, Office of Enforcement and Compliance Monitoring, Washington, D.C. May 1978, revised May 1986.

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.

USEPA, 1997. USEPA SW846 Test Methods for Evaluating Solid Waste, Physical and Chemical. 3rd edition including subsequent updates. U.S. Environmental Protection Agency, Washington, D.C. December.USEPA, 2000. Guidance for the Data Quality Objective Process. EPA QA/G-4. Office of Environmental Information. August.

USEPA, 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates, 2nd edition. EPA/600/R-99/064. March.

USEPA, 2001a. EPA Requirements for Quality Assurance Project Plans. EPA QA/R-5. Office of the Environmental Information. March.

USEPA, 2002b. Guidance for Quality Assurance Project Plans. EPA QA/G-5. U.S. Environmental Protection Agency. December.

USEPA, 2009. USEPA SW846 Test Methods for Evaluating Solid Waste, Physical and Chemical. 3rd edition including Final Update III. U.S. Environmental Protection Agency, Washington, D.C. December.

USEPA, 2012a. ICP-AES Data Validation SOP HW-2a, Revision 15, USEPA Region 2, December.

USEPA, 2012b. ICP-MS Data Validation, SOP HW-2b, Revision 15. USEPA Region 2. December.

USEPA, 2012c. Mercury and Cyanide Data Validation SOP HW-2c, Revision 15. USEPA Region 2, December.

USEPA, 2013a. USEPA National Functional Guidelines for Superfund Organic Methods Data Review, EPA 540-R-14-002. U.S. Environmental Protection Agency, Washington, D.C. October.

USEPA, 2013b. USEPA National Functional Guidelines for Superfund Inorganic Methods Data Review, EPA 540-R-13-001. U.S. Environmental Protection Agency, Washington, D.C. October.

USEPA, 2013c. Pesticide Data Validation, SOP HW-36, Revision 4. USEPA Region 2. May.

USEPA, 2013d. Polychlorinated Biphenyl (PCB) Aroclor Data Validation, SOP HW-37, Revision 3. USEPA Region 2, May.

USEPA, 2013e. Semivolatile Data Validation SOP HW-35, Revision 2. USEPA Region 2, March.

USEPA, 2013f. Low/Medium Volatile Data Validation, SOP HW-33, Revision 3. USEPA Region 2. March.

USEPA, 2013g. USEPA CLP National Functional Guidelines for Inorganic Superfund Data Review. EPA 540-R-013-001. U.S. Environmental Protection Agency, Washington, D.C. October.

USEPA, 2013h. USEPA CLP National Functional Guidelines for Superfund Organic Data Review, EPA-540-R-014-002. U.S. Environmental Protection Agency, Washington, D.C. October.

APPENDIX C

PROJECT SAFETY, HEALTH AND ENVIRONMENTAL PLAN

PROJECT SAFETY, HEALTH, AND ENVIRONMENTAL PLAN FOR THE SITE CHARACTERIZATION OF THE FORMER HUNTS POINT GAS WORKS MEAT MARKET PARCEL

Bronx, New York

Prepared For:

Consolidated Edison Company of New York, Inc.

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

Prepared By:

PARSONS

301 Plainfield Road, Suite 350
Syracuse, New York 13212
Phone: (315) 451-9560
Fax: (315) 451-9570

March 2015

Project Key Personnel

Company Executive responsible for Project	Contact Information
Shane Blauvelt	Direct Line: 315-552-9675 Cell Phone: 315-559-9740 Email: Shane.blauvelt@parsons.com
Project Manager	Contact Information.
Shane Blauvelt	Direct Line: 315-552-9675 Cell Phone: 315-559-9740 Email: Shane.blauvelt@parsons.com
Field Team Leader	Contact Information.
Zohar Lavy	Direct Line: 732-537-3506 Cell Phone: 732-796-5536 Email: Zohar.lavy@parsons.com
Project SH&E Representative	Contact Information
Greg Beck	Direct Line: 908-887-1973 Cell Phone: 908-887-1973 Email: Gregory.Beck@parsons.com
Client Project Management POC	Contact Information
Charles Leary	Direct Line: 718-204-4347 Cell Phone: 908-463-1512 Email: LEARYC@coned.com

TABLE OF CONTENTS

Page

LIST OF ACRONYMS vi

SECTION 1 INTRODUCTION.....1

1.1 Parsons Workplace Health & Safety Policy 2

1.2 The project Health and Safety Plan 3

1.3 The Con Edison "Rules We Live By" 3

1.4 Subcontractor Safety Plans 3

1.5 Management of Change (MOC) 4

SECTION 2 SCOPE OF WORK.....1

2.1 Scope of Work 1

2.2 Project Safety, Health, and Environmental Plan Application.....1

SECTION 3 PROJECT SAFETY MANAGEMENT RESPONSIBILITIES AND AUTHORITY.....1

3.1 Safety Responsibility Matrix 1

SECTION 4 ADMINISTRATIVE PHASE 1

4.1 Project Safety Committee 1

4.2 Project Orientation.....1

4.3 Awareness Campaign 1

4.4 Stakeholder PSHEP Alignment Meeting.....2

4.5 Training.....2

4.6 Audits and Inspections.....3

4.7 Meetings 3

4.8 Work-Related Injuries, Measurement and Reporting.....3

4.8.1 Work-related Injury Procedures 3
4.8.1.1 Emergencies 3
4.8.1.2 Non-Emergencies 4
4.8.2 Reporting 7
4.8.3 Measurement 7
4.8.4 Incident Reporting 7

4.9 Incident Investigations 8

4.10 Responsibility/Identification of Key Line Personnel 9

4.11 Medical Requirements and Workers Compensation 9
4.11.1 Medical Surveillance and/or Functional Capacity Exams (FCEs) 9
4.11.2 Substance Abuse and Alcohol Testing 10
4.11.3 Workers Compensation Program 10
4.11.4 Medical Monitoring 10

SECTION 5 PRE-FIELD WORK PHASE 1

5.1 Risk Analysis and Safety Specification Development 1

5.2 Design and Site Characterization Review 1

5.3 Pre-bid Meeting 2

5.4 Subcontractor Prequalification Review 2

5.5 Pre-Field WOrk meeting 2

5.6 Competent Person Submission Review 2

5.7 Subcontractor Safety Plan Submission Review 2

5.8 Mobilization/Kickoff Safety Meeting 4

SECTION 6 INVESTIGATION PHASE 1

6.1 Site Risk Analysis 1
6.1.1 Chemical Hazards 1
6.1.2 Physical Hazards 1
6.1.3 Biological Hazards 7
6.1.4 Site Characterization Activity Hazard Analysis 9

6.2 Five Hazard Control Measures – Order of Precedence 9
6.2.1 Engineer/Design to Eliminate or Minimize Hazards 10
6.2.2 Guard the Hazard 10
6.2.3 Provide Warnings 10

6.2.4 Provide Special Procedures or Training 13
6.2.5 Provide Personal Protective Equipment 13

6.3 Activity Hazards Analysis 15

6.4 Safety Systems Analysis 17

6.5 Site Inspection CHECKLIST and Daily SIte Walk 17

6.6 Safety and Health Enforcement 18

6.7 Notice of Violation of Safety and Health Regulations 18

6.8 Competent First Aid Person 18

SECTION 7 SAFETY TRAINING 1

7.1 Project Safety Orientation 1

7.2 ParsonsU Safety Modules and START Training – Zero Incident Techniques 1

7.3 Daily Toolbox Safety Meetings 1

7.4 Activity Hazards Analysis Training 1

7.5 Regulatory Training Programs 2

7.6 OSHA Outreach Programs 2

7.7 Specialized Training and Orientations 2

SECTION 8 RECORD KEEPING AND POSTING 1

SECTION 9 SAFETY AND HEALTH REQUIREMENTS 1

9.1 Safety and Health Requirements 1

TABLE OF CONTENTS
(CONTINUED)

Page

LIST OF EXHIBITS

Exhibit 1.1 Parsons Workplace Health and Safety Policy 2

Exhibit 3-1 Roles and Responsibilities 2

Exhibit 4.1 Project Orientation Outline 12

Exhibit 4.2 Project Orientation Attendance Sheet 16

Exhibit 5.1 Site-Specific Rick Review Checklist 5

Exhibit 5.2 Pre-Field Work Safety Meeting 7

Exhibit 5.3 Project Technical and General Conditions Specification Review 8

Exhibit 5.4 Subcontractor Competent Person Form 9

Exhibit 5.5 Subcontractor Safety Plan Review 9

Exhibit 5.6 Mobilization/Kick Off Safety Meeting Checklist 11

Exhibit 6.1 Activity Hazards Analysis Form 26

Exhibit 6.2 Activity Hazards Analysis Training Record 27

Exhibit 6.3 Site Safety and Health Inspection Checklist 28

Exhibit 6.4 Notice of Subcontractor Violation of Safety and Health Regulations 29

Exhibit 6.5 Notice of Noncompliance with Safety and Health Regulations 30

Exhibit 7.1 Employee/Subcontractor Training Acknowledgment 3

Exhibit 7.2 Employee Meeting Sign-In Sheet 4

Exhibit 9.1 Competent Person and Activity Hazards Analysis Requirements 1

TABLE OF CONTENTS
(CONTINUED)

LIST OF ATTACHMENTS

ATTACHMENT A PARSONS REQUIREMENTS

ATTACHMENT B CON EDISON REQUIREMENTS

ATTACHMENT C ACTIVITY HAZARD ANALYSIS

ATTACHMENT D SAFETY DATA SHEETS

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
PE&I	Parsons Environment and Infrastructure
PEL	Permissible Exposure Limit
PID	Photo Ionization Detector
PPE	Personal Protective Equipment
PSHEP	Project Safety, Health, and Environmental Plan
PSM	Project Safety Manager
RDLH	Respiratory Airborne Hazards
SCWP	Site Characterization Work Plan
SCBA	Self Contained Breathing Apparatus
SH&E	Safety, Health, and Environment
SOW	Scope of Work
SSHEP	Subcontractor Safety, Health, and Environmental Plan
SSO	Site Safety Officer
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 in connection with the Former Hunts Point Gas Works Meat Market Parcel in Bronx, New York (the Site). It provides guidance for office and field activities required to complete the scope of work. Parsons and its subcontractors will adhere to the Con Edison *Rules We Live By* requirements.

The primary field activities include geophysical site investigations, hand clearances, soil borings, monitoring well installations, groundwater sampling, restorations, and surveying. These activities will be conducted in accordance with the Site Characterization Work Plan (SCWP) for the Former Hunts Point Gas Works Meat Market Parcel.

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 PSHEP addresses these potential exposures for this project. This PSHEP is based upon the Parsons Model Project Safety Plan provided as Attachment A1 in the ESHARP Management Manual, Version 4.0, November 2011. 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

PARSONS

Corporate Safety, Health & Environment Policy Statement

As an industry-leading engineering, construction, and technical services firm, Parsons is firmly committed to maintaining a safe, healthy, and environmentally compliant workplace at all its offices and project facilities, guided by the following tenets:

- Safety, Health and Environment (SH&E) is a core value.
- Executive management will lead the SH&E process.
- SH&E will be a responsibility shared by all.
- SH&E performance will be a key business performance indicator.
- SH&E performance will be communicated openly.
- Employees will be given the knowledge and skills necessary to perform their jobs in a high-performance SH&E manner.
- We will extend our SH&E efforts beyond the workplace to include travel, homes, and communities.
- We will continually strive to improve our SH&E processes.

To meet our SH&E objectives, all employees are expected to be actively engaged with regard to SH&E issues. This requires the combined efforts of a concerned management, responsible and knowledgeable supervision, and conscientious, well-trained employees.

Executive Management shall lead and monitor and improve the performance of the organization's Safety, Health and Environmental Management System, at regular intervals, to ensure its continuing suitability, adequacy, and effectiveness.

Parsons will meet or exceed the applicable SH&E legal and other requirements and will continuously monitor and improve operations, procedures, technologies, and programs that are conducive to maintaining a safe, healthy, and environmentally compliant workplace.

Charles L. Harrington

Chairman and Chief Executive Officer

January 2012

1.2 THE PROJECT HEALTH AND SAFETY PLAN

Parsons goal is zero incidents using control measures designed to minimize or eliminate hazards to personnel, processes, equipment, the general public and the environment. This PSHEP outlines safety, health, and environment (SH&E) requirements and guidelines developed by Parsons for client-specific work. When implemented, these requirements will help protect site personnel, visitors, the public, and the environment from incidents caused due to SH&E hazards. Parsons employees should never perform a task that may endanger their own safety and health, the safety and health of coworkers or the public, or damage the environment.

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

1.3 THE CON EDISON "RULES WE LIVE BY"

This PSHEP has been written to incorporate the Con Edison "Rules We Live By". As indicated by Con Edison, the Rules We Live By "…are critical work procedures or safety requirements that, if not followed, could result in a severe injury or fatality, or place other individuals at significant risk. Some of the Rules are based on OSHA regulations while others are Con Edison procedures." Parsons work performed on behalf of Con Edison will be in compliance with the Con Edison "Rules We Live By". A table summarizing the "Rules We Live By" (Revised April 23, 2014) is included within Attachment B.

1.4 SUBCONTRACTOR SAFETY PLANS

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

All PSHEP 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 SSHEP. Since the SSHEP is part of the PSHEP, subcontractor personnel will be required to receive an Orientation that covers information from both documents, and sign off accepting the PSHEP.

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 SSHEP requirements.

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

SUBCONTRACTORS	WORK ACTIVITIES	EVALUATION GRADE
1. Chazen	Surveying	D
2. Diversified Geophysics Inc.	Geophysical Investigation	D
3. Chemtech	Analytical Laboratory	Not Applicable (off-site lab)
4. Aquifer Drilling and Testing (ADT)	Soil Boring and Monitoring Well Installation	C
5. Clean Earth Technologies	Waste Disposal	Not Applicable

1.5 MANAGEMENT OF CHANGE (MOC)

Modifications may be made to this PSHEP document after discussion and approval by the Parsons GBU/Division SH&E Manager. Insert a description of the changes in the table below.

PSHEP Section	SH&E Initials	Date	Description/Comments

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 Site Characterization Work Plan for the Former Hunts Point Gas Works Meat Market Parcel. The work is being performed under the Parsons Environment and Infrastructure (PE&I) Technology Division, and is the responsibility of Program and Project Manager, Mr. Shane Blauvelt.

The field activities associated with the Site Characterization include geophysical site investigations, soil boring advancement, installation of monitoring wells, monitoring well development, the collection of soil and groundwater samples, restorations, and surveying. As mentioned in Section 1, DGI will be performing the geophysical work; ADT will be performing all drilling and well installation work; Chazen will be performing the site survey; Chemtech will be performing the laboratory analyses; and, Clean Earth will be performing the waste transport and disposal. 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 Site Characterization Work Plan for the Former Hunts Point Gas Works Meat Market Parcel.

2.2 PROJECT SAFETY, HEALTH, AND ENVIRONMENTAL PLAN APPLICATION

The purpose of this PSHEP 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 investigation 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 PSHEP. Subcontractors working for Parsons must prepare and administer a plan with equivalent requirements and 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 PSHEP.

Exhibit 3-1
Roles and Responsibilities

Project Responsibility Matrix		Project												GBU							Corporate					
Phases	Work Elements	Project Manager	Safety & Health	Environmental	Construction/Site Management	Engineering	First Line Supervision	Facilities and Maintenance	Training	Contracts/Procurement	Security	Sustainability	Quality	President	Operations/Risk Management	Division Management	Sector Management	Safety, Health & Environment	Quality	Business Development	CEO	Operations/Risk Management	Safety, Health & Environment	Security	Workers' Compensation	Insurance
Introduction to ESHARP for Project	1. ESHARP Project Management	R	D	D	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P
Business Development	2. Business Development	R	P	P	P	P				P				P	P	A	P	P	P	D	P	P	P	P		P
Startup	3. Initial Hazard Analysis and Planning	A	R	D	P	P					D							P					P	P		
	4. Project Safety Health, and Environmental Plan (PSHEP)	A	D	D	P										P	P	P	R					P	P		
	5. Stakeholder PSHEP Alignment Meeting	A	D	D	P													R								
Construction and/or Field	6. Preconstruction Safety, Health & Environment Activities	A	D	D	P		P						P				P	R	P					P		
	7. Project/Site Orientation, Training, and Recurring Field SH&E Meetings	A	D	D	P		P	P	P									R						P		
	8. SH&E Committee	A	D	D	P		P	P			P							R						P		
	9. Meet Building Trades, Safety, Health, Environmental Regulatory Agencies, & Others	A	D	D	P													R						P	P	
	10. Review Contractor/Subcontractor SH&E Programs	A	D	D	P					P								R						P		
	11. Subcontractor Premobilization Meeting	A	D	D	P	P				P	P							R						P		
	12. Risk Mitigation Planning (2-week look ahead)	A	D	D	R													D						P		
	13. Activity Hazards Analysis	A	D	D	P	P	P	P										R						P		
	14. Project Management Site Safety, Health, & Environmental Inspections	A	D	D	P											P	P	R	P					P		
	15. Audits, Inspections, and Recordkeeping	A	D	D	P		P						P			P	P	R	P					P		
	16. Incident Management Process	A	D	D	P		P						P		P	P	P	R	P					P		P

Exhibit 3-1
Roles and Responsibilities (Continued)

Project Responsibility Matrix		Project												GBU							Corporate					
Phases	Work Elements	Project Manager	Safety & Health	Environmental	Construction/Site Management	Engineering	First Line Supervision	Facilities and Maintenance	Training	Contracts/Procurement	Security	Sustainability	Quality	President	Operations/Risk Management	Division Management	Sector Management	Safety, Health & Environment	Quality	Business Development	CEO	Operations/Risk Management	Safety, Health & Environment	Security	Workers' Compensation	Insurance
Testing, Commissioning, Operations, and Decommissioning	17. Management Systems and Transition	A	R	R	D	P	P	P	P		P	P	P	P	P	P	P	P	P		P	P	P	P		P
	18. Equipment and Systems Integrity	A	P	P	R	P	P	D	P				P					P	P				P			
	19. Operations Training and Education	A	D	D	P	P	P	P	P		P		P					R					P			
	20. Assessments and Corrective Action	A	D	D	P	P	P	P	P		P		P					R					P			
	21. Operations Emergency Management	A	P	P	P	P	P	P	P	P	D		P					R					P	P		
	22. Safe and Environmentally Compliant Work Practices	A	D	D	P	R	R	P	P									P					P			
Closeout	23. Lessons Learned and Final SH&E Report	A	D	D	P											P	P	R	P				P			
	24. Records Retention	A	P	P					P		D		P					R	P				P			

R – Responsible and accountable for ensuring the project develops and implements the work element.
D – Develops the plan, tool, training, document, or other item needed for the work element.
P – Participates by providing advice, assisting in the implementation or development, reviewing and providing comments, or otherwise supporting the development or implementation effort.
A – Approval at the management level with responsibility for the project; establishes requirements for the project or serves as sponsor for the item.

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 a total of 25 Parsons and subcontractor employees, then a Project Safety Committee will be handled at the Program or Facility level. The Project SH&E Representative will be responsible for obtaining and communicating information from the Parsons' Office SH&E Committee meeting minutes, with the project personnel on a monthly basis. 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 PSHEP ALIGNMENT MEETING

A stakeholder PSHEP 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 PSHEP alignment meeting will be incorporated into the project kickoff meeting.

4.5 TRAINING

The project has a comprehensive SH&E training program tailored to the scope of work. All office-based employees, field employees and new hires who spend a significant portion of their time in an office or field trailer shall receive a specialized office training including the following topics:

- Proper lifting techniques
- Ergonomics
- Housekeeping
- Common office hazards and environmental risks (if any)
- Waste management
- Office procedures
- Evacuation / Drills / Emergencies
- Other relevant topics

Office based personnel should review their specific office PSHEP for additional information.

All field 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
- Con Edison *Rules We Live By*

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 SH&E 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 PSHEP.

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 PSHEP).

4.8 WORK-RELATED INJURIES, MEASUREMENT AND REPORTING

4.8.1 Work-related Injury Procedures

4.8.1.1 Emergencies

Call 911.

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**
Mr. Charles Leary (Con Edison)	(718) 204-4347 – office
	(908) 463-1512 –cell
Mr. Matt Madsen (Con Edison)	(718) 267-3866 – office
	(973) 615-8265 - cell
Pollution Toxic Chemical Oil Spills	(800) 424-8802
New York Westchester Square Medical Center	(718) 430-7300
Poison Control Center	(800) 222-1222

4.8.1.2 Non-Emergencies

For work-related injuries or illnesses that may require physician direction on appropriate treatment, Parsons' employees should then promptly contact WorkCare, ideally before seeking medical care, as this will provide the greatest opportunity for appropriate intervention.

WorkCare's Incident Intervention is available 24 hours a day, 7 days a week (24/7), and 365 days per year. The contact number is 1-888-449-7787.

If an injured employee requires medical care for a work related injury/illness, the Order for Treatment of Work-Related Injury/Illness Form MUST be sent with the injured worker and/or faxed to the occupational medicine clinic at the time of the initial evaluation.

The link to the document on ParShare: Order for Treatment of Work-Related Injury or Illness. NOTE: The Workers Compensation carrier and Policy number for each State may be different.

When contacting WorkCare, be prepared to provide the following:

- Injured employee's name and Parsons ID number
- Injured employee's contact number
- Injured employee's location (at a minimum include the city and state)
- Employee's GBU and client/project name
- Functional manager's name

If the WorkCare physician or nurse determines that an employee should be evaluated by a local physician, then an occupational clinic will be used whenever possible (i.e. during normal business hours). A secondary facility must be able to provide treatment during all hours of operations (i.e. hospital). The facilities are listed below:

Non-Emergency Medical Services

- New York Westchester Square, 2475 Saint Raymond Ave, Bronx, NY 10461, Phone (718) 430-7300; or
- Lincoln Medical Center, 234 E 149 Street, Bronx, NY (718) 579-5625

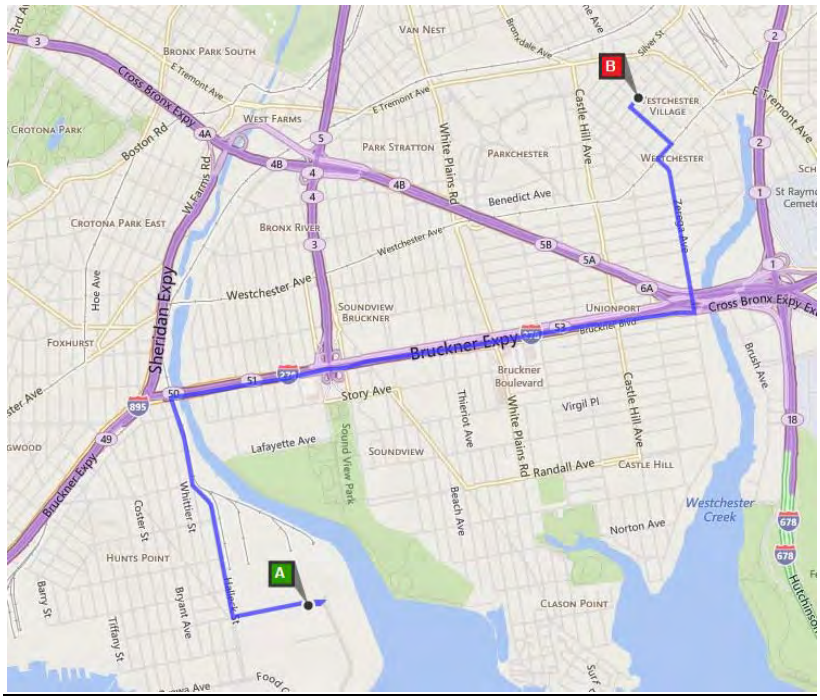
Emergency Medical Services

New York Westchester Square Hospital, 2475 Saint Raymond Ave, Bronx, NY 10461, (718) 430-7300 (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 Westchester Square Hospital
2475 Saint Raymond Ave
Bronx, NY 10461
(718) 430-7300



Directions:

1. **Turn LEFT on Food Center Drive**
2. **Turn 1st RIGHT Halleck Street**
3. **Halleck turns into Edgewater Road**
4. **Turn RIGHT onto Bruckner Blvd.**
5. **Take Ramp on LEFT onto I-278E**
6. **Take exit towards Hutchinson River Pkwy/Zerega Ave.**
7. **Turn LEFT onto Zerega Ave.**
8. **Turn RIGHT onto Westchester Ave.**
9. **Turn 1st LEFT onto Rowland**
10. **Turn 1st RIGHT onto St. Raymond Ave.**
11. **Destination will be on LEFT**

Total Est. Time: 15 minutes **Total Est. Distance: 4.6 miles**

4.8.2 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, spills/releases 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.

4.8.3 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.

4.8.4 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) 552-9675. 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 Shane Blauvelt, (315) 552-9675, 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.

Incident investigation link folder on ParShare is as follows: Incident Investigation.

Procedures for investigating workplace accidents and hazardous exposures include the following:

- Emergency Response Team responds to the accident scene as soon as possible.
- Report all injuries to the Parsons Workers' Compensation Claims Analyst.
- Report on PWeb using the online IndustrySafe Reporting System.
- Report to appropriate client point of contact in accordance with contractual requirements.
- Interview injured workers and witnesses.
- Have employee complete the Employee Accident Report and the Individual Statement Report within 24 hours. If the employee is unable to complete the statement, the functional manager must complete the form. (Note: The Individual Statement Report is also known as the Narrative Statement form.)
- Report to the Division or Project SH&E Manager (or Parsons Project Manager) immediately.
- Examine the workplace for factors associated with the accident/exposure.
- Determine the cause of the accident/exposure.
- Take corrective action to prevent the accident/exposure from recurring.
- Record the findings and corrective actions taken.

The Division or Project SH&E Manager must notify the local OSHA office and/or regional, municipal and/or local regulations office in writing within 8 hours if an accident involves the death of an employee or hospitalization of *three or more* workers. In addition, spills/releases of reportable quantities and other reporting required by environmental regulation are the responsibility of the Project Manager.

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 on the activity where the incident occurred, 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 incident occurred, until Con Edison considers Parsons' preventive action plan acceptable. This procedure is the same for all significant near-miss incidents on site except that there is no requirement to complete and submit a Con Edison Contractor Injury Report.

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 – Somerset	
Address:	200 Cottontail Lane Somerset, NJ 08873	
Telephone	***Fax***	***Email***
(732) 537-3500	(732) 868-3110	
Company Executive responsible for project		***Contact No.***
Shane Blauvelt		(315) 552-9675
Project Manager		***Contact No.***
Shane Blauvelt		(315) 552-9675 (315) 559-9740 (cellular)
Project Scientist		***Contact No.***
Zohar Lavy		(732) 796-5536 (cellular)
Field Team Leader/Site Safety Representative		***Contact No.***
Zohar Lavy		(732) 796-5536 (cellular)
Client - Project Management		***Contact No.***
Mr. Charles Leary		(718) 204-4347

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 PSHEP 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 Talent Management Department administers required substance abuse tests, including random drug and alcohol testing.

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

4.11.3 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

4.11.4 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, 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.

Name/Job Classification	Hazard/Activity	Medical Surveillance/Training
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- Zohar Lavy Contact Information

Zohar Lavy	732-537-3506 (office)
	732-796-5536 (cell)

II. Emergencies

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

B. Route to Hospital

1. Turn LEFT on Food Center Drive

2. Turn 1st RIGHT Halleck Street

3. Halleck turns into Edgewater Road

4. Turn RIGHT onto Bruckner Blvd.

5. Take Ramp on LEFT onto I-278E

6. Take exit towards Hutchinson River Pkwy/Zerega Ave.

7. Turn LEFT onto Zerega Ave.

8. Turn RIGHT onto Westchester Ave.

9. Turn 1st LEFT onto Rowland

10. Turn 1st RIGHT onto St. Raymond Ave.

11. Destination will be on LEFT

C. Other Emergency numbers

Emergency Contacts	**Phone Number**
Ambulance	**911**
Fire Department	**911**
State Police (NYS)	**911**
Mr. Charles Leary (Con Edison)	(718) 204-4347 – office
	(908) 463-1512 –cell
Mr. Matt Madsen (Con Edison)	(718) 267-3866 – office
	(973) 615-8265 - cell
Dig Safely New York	811
Pollution Toxic Chemical Oil Spills	(800) 424-8802
New York Westchester Square Medical Center (Emergency)	(718) 430-7300
Poison Control Center	(800) 222-1222

III. Evacuation Procedures

A. In the event of an evacuation, personnel will proceed to a predetermined assembly area. The location of the assembly area will be identified and discussed during the

first daily tailgate safety meeting. The SSO will use the daily sign-in sheet to account for site personnel and visitors. No one will be permitted to re-enter the site until the SSO in conjunction with the appropriate authorities has determined that it is safe to do so.

B. Depending on the work areas or site conditions, the assembly point may change during the site investigation. The SSO will review and record any assembly point changes during the daily toolbox safety meeting.

IV. 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.

V. 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 (MultiRAE Plus) 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 Site is currently used as a meat warehouse and distribution center. Don high visibility clothing/vests at all times, establish visible barriers around the work area, and communicate with on-site operations personnel regarding anticipated work.

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.)

VI. 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, reflective 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.

VII. 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.

VIII. 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.

IX. 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.

X. 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 SH&E 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 PSHEP, 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 SITE CHARACTERIZATION REVIEW

Periodic 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 site characterization 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)
Zohar Lavy	Field Team Leader/Site Safety Representative	Sept. 2003	8/4/09	Feb. 2016	Confined Space, Wilderness First Aid, LPS

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 SSHEP Review Sheet, which is included as Exhibit 5.5.

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

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

The SSHEP must address the following elements:

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

The SSHEP must include applicable requirements of Parsons PSHEP 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 SSHEP.
- 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	X
Electrical Tie-ins/Lockout–Tagout		Work Adjacent to Production Areas	
Drilling	X	Site Security/Visitor Control/Public Exposure	X
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, Health, and Environmental 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 SSHEP 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.

SSHEP/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/Program Manager (Shane Blauvelt)
- 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.

Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 72°F or above. Monitoring frequency should increase as ambient temperature increases. To monitor the workers, be familiar with the following heat-related disorders and their symptoms:

- Prickly Heat (Heat rash)
- Painful, itchy red rash. Occurs during sweating, on skin covered by clothing.
- Heat Cramps
- Painful spasm of arm, leg or abdominal muscles, during or after work.
- Heat Exhaustion
- Headache, nausea, dizziness. Cool, clammy, moist skin. Heavy sweating. Weak, fast pulse. Shallow respiration, normal temperature.
- Heat Fatigue
- Weariness, irritability, loss of skill for fine or precision work. Decreased ability to concentrate. No loss of temperature control.
- Heat Syncope (Heat Collapse)
- Fainting while standing in a hot environment.
- Heat Stroke
- Headache, nausea, weakness, hot dry skin, fever, rapid strong pulse, rapid deep respirations, loss of consciousness, convulsions, coma. **This is a life threatening condition.**
- Do not permit a worker to wear a semi-permeable or impermeable garment when they are showing signs or symptoms of heat-related illness.

To monitor the worker, measure:

- Heart rate. Count the radial pulse during a 30-second period as early as possible in the rest period.
- If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third. A worker cannot return to work after a rest period until their heart rate is below 100 beats per minute.

- Oral temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).
- If oral temperature exceeds 99.6oF (37.6oC), shorten the next work cycle by one-third without changing the rest period. A worker cannot return to work after a rest period until their oral temperature is below 99.6oF.
- If oral temperature still exceeds 99.6oF (37.6oC) at the beginning of the next rest period, shorten the following cycle by one-third.
- Do not permit a worker to wear a semi-permeable or impermeable garment when oral temperature exceeds 100.6oF (38.1oC).

Prevention of Heat Stress - Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress the following steps should be taken:

- 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. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, id., eight fluid ounces (0.23 liters) of water must be ingested for approximately every eight ounces (0.23 kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
- Maintain water temperature 50o to 60oF (10o to 16.6oC).
- Provide small disposal cups that hold about four ounces (0.1 liter).
- Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
- Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
- Train workers to recognize the symptoms of heat related illness.

Cold-Related Illness:

Cold weather conditions can be hazardous to the safety and health of employees, endanger the stability of the body system, and cause conditions such as hypothermia and frostbite. It is vitally important that adequate precautions be taken to alleviate the effect of cold environments and to ensure that personnel can work safely and efficiently.

Prevent the deep body temperature from dropping below 36^0 C (96.8^0 F) and the core temperature from dropping below 35^0C (95^0F).

The following factors may contribute to a cold injury:

- Age
- Contact with wetness or metal
- Exposure to high winds
- Exposure to humidity
- General health
- Inadequate clothing

The following physical conditions worsen the effects of cold exposure:

- Allergies
- Excessive drinking
- Excessive smoking
- Specific drugs and medicines
- Vascular disease (e.g., Raynaud's phenomenon, acrocyanosis)

To monitor cold stress:

- At air temperatures below 20F (-10C) measure and record the wind chill index at least every 4 hours. The equivalent wind chill temperature and frostbite precautions will be determined using the Wind Chill Index (Table 6.1.3).
- In indoor workplaces, measure and record the wind speed at least every 4 hours when the rate of air movement exceeds 5 mph (2.2 meters per second); in indoor work situations, measure and record the wind speed with the air temperature.
- The wind chill index takes into account the wind velocity. If no anemometer is available, use the following to estimate wind speed:
    - 5 mph: light flag moves
    - 10 mph: light flag fully extended
    - 15 mph: raises newspaper sheet
    - 20 mph: causes blowing and drifting snow

To prevent cold stress:

- Use general or spot heating to increase temperature at the site.
- If work is being performed with bare hands for 10 or more minutes, to keep the worker's hands warm supply warm air jets, radiant heaters, or contact warm heaters.
- If the air velocity at the site is increased by the wind, draft, or ventilation equipment, shield the work area.
- At temperatures below 40^0F, cover metal handles of tools and control bars with thermal insulation.
- When necessary, substitute, isolate, relocate, or redesign equipment and processes to reduce cold stress.

- Use power tools, hoists, cranes, and lifting aids to reduce the metabolic work load.
- If work is performed continuously in an equivalent chill temperature of 30^0F or below, supply heated warming shelters such as tents, cabins, automobiles, or trucks and encourage workers to use them.

Table 6.1.3 - WIND CHILL INDEX

Estimated Wind Speed (mph)	Actual Temperature Reading (^{o}F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (^{0}F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
Wind Speeds greater than 40 mph have little additional effect	LITTLE DANGER in < 1 hr with dry skin. Maximium danger of false sense of security.				INCREASING DANGER danger of freezing exposed flesh within 1 minute.			GREAT DANGER flesh may freeze within 30 seconds.				

Electrocution:

All drilling and excavation equipment will be kept a safe distance from live sources of electricity. At a minimum, a 10' clearance from any overhead electric lines (50kV or less) will be maintained. For electrical lines over 50kV, four-tenths of an inch (0.4 in.) additional for every 1 kV over 50kV will be added. 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. For any intrusive digging tool such as, but not limited to, digging bars and post hole diggers shall either have electrically non-conductive handles and/or those workers using tools that have electrically conductive handles wear 1 kV dielectric gloves that are currently tested and stamped with the expiration date, with leather protectors over them. Proximity to electric lines up in excess of 1,000 volts will require higher rated dielectric protection – and possibly another control method to prevent contact with live electric. For any intrusive activities performed within seven feet of a critical utility (e.g., electric feeder, gas and water mains, fiber optic cables, etc.), those utilities shall first be exposed by manual or vacuum excavation methods. No saw-cutting will be permitted over any oil-filled pipe-type electric feeders (i.e., oil-o-static) no matter what their depth. Where possible and/or practical, electric lines and sources will be deactivated or insulated before digging, drilling, or sampling activities are commenced. Ground fault circuit interrupters (GFCIs) will be utilized on electrical equipment, and extension cords will be inspected for splices, taps, and breaks in its outer cover

insulation. If splices, taps, or breaks are noted on an extension cord, it shall not be used and it will either be removed form the site or cut up and rendered unusable.

No one will be permitted to touch metal covers for any subsurface utility structures until those items have been tested for stray voltage by either a Con Edison Construction Services crew or a Bronx Electric Operations crew.

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 shall be used. The noise level will determine the appropriate type of hearing protection needed (e.g., earplugs or ear muffs). Additionally, due to community noise exposures, a notarized Construction Noise Mitigation Plan will be developed and available on-site.

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.
- Site Investigation tools, equipment, spoils – basically, poor housekeeping

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.

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.

6.1.3 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.

Bloodborne Pathogens:

Bloodborne pathogens include human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and others. All occupational exposure to blood or other potentially infectious materials (OPIM) place workers at risk for infection with bloodborne pathogens. OSHA defines blood to mean human blood, human blood components, and products made from human blood. Other potentially infectious materials (OPIM) means: (1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Understanding simple precautions can greatly minimize your chances of contracting a bloodborne disease. Practicing universal (standard) precautions refers to assuming that any and all blood or body fluids are contaminated and taking all safety measures to avoid transmission of a disease. Properly cover open cuts and skin abrasions. Never eat, drink, store food, smoke, handle contact lenses or apply cosmetics or lip balm in potential exposure areas. Wash hands and exposed skin immediately after an exposure incident, and after removing gloves. Utilize engineering controls to reduce exposure to bloodborne pathogens by removing, eliminating or isolating the hazard. Wear gloves, eye/face protection and mask when working with blood or a splash potential. Check gloves for tears, holes or punctures, and remove immediately when penetrated. Clean up spills and body fluids by carefully covering with a paper towel, gently pouring a 10% bleach solution over towels, and leaving it in place for 10 minutes. Use mechanical means, not your hands to pick up broken glass that is tainted with blood. Dispose of blood products, medical waste, gloves and equipment in properly labeled and approved biohazard containers. Clean wounds with soap and water. Flush eyes and mucous membranes with water or normal saline solution. Notify the site safety representative or your supervisor immediately and complete an incident report.

6.1.4 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- Large Equipment
- Decontamination- Personnel
- Decontamination- Portable Tools
- Utility Clearance Keyholing

* 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. NOTE: Smoking is prohibited anywhere on site at all times during the work shift. 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 approved transporter and TSDF(s) (TBD based on waste characterization results).

Spill Prevention and Control

All heavy equipment and vehicles will be parked/staged on full length/width poly sheeting. At least one spill kit including "speedy dry", sorbent pads and sorbent booms/sausage booms will be available on site throughout the project. The kit will be containerized in a clean rubber garbage containers labeled "spill kit" and will be kept in the Parsons field vehicle near the work area. When heavy equipment is working in close proximity to catch basins, manholes, transformer vaults, etc., oil-absorbent booms (“sausage booms”) will be placed at grade around the structure (i.e., ringing the structure). Fueling of equipment on site shall be performed over polyethylene sheeting with a currently inspected ABC or BC fire extinguisher, 10# minimum, nearby and ready for use.

In the event of a spill, employees involved in or witnessing the spill 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. A Con Edison representative will also be notified immediately in the event of any chemical/oil spill incidents.

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 PSHEP 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 PSHEP, 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 PSHEP shall be approved by the Division Safety Manager, PSM and/or the Project Manager. Subsequently, these modifications, resulting in a PSHEP 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, reflective 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

Fire-resistive outerwear (as per CEHSP S05.03) and currently tested/stamped 1 kV gloves with leather protective gauntlets shall be worn when performing tasks 1, 18, and 23 as described within GEHSI S05.01.06. Note: Not wearing this level of PPE for these tasks where there is the potential for making contact with sub-surface electric installations may be considered a Rules We Live By violation. If, however, a diligent review, including but not limited to a Code 753 markout, review of plates/drawings, performing a geophysical investigation (m-scope and GPR survey), and, when appropriate, talking with the property owner regarding other potential

possibilities of existing subsurface electrical facilities, and it is determined that there is minimal potential for such contact then the field crew may be able to downgrade PPE.

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. The Con Edison *Work Area Protection and Traffic Control Field Manual, Feb. 2011* will be consulted as necessary to create safe work areas.
- **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, respiratory airborne hazard (RDHL), 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 4.12.3 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, first aid, and bloodborne pathogens.

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

- Zohar Lavy - Parsons

TABLE 6.1
HEALTH HAZARD QUALITIES OF HAZARDOUS SUBSTANCES OF CONCERN
AT THE FORMER HUNTS POINT GAS WORKS MEAT MARKET PARCEL

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 with attached sideshields (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, reflective (when working on streets, sidewalks, parking lots, and driveways)
- Nitrile outer gloves and nitrile inner gloves (sampling operations)
- One (1) kV dielectric glove protectors (i.e., leather gauntlets), currently tested and stamped (when saw-cutting and jackhammering, or performing soil intrusive activities using electrically-conductive equipment). Proximity to electric lines up in excess of 1,000 volts will require higher rated dielectric protection – and possibly another control method to prevent contact with live electric. Reflective traffic safety vests (when working on streets, sidewalks, parking lots, and driveways).

  Fire-resistive outerwear (as per CEHSP S05.03) and currently tested/stamped 1 kV gloves with leather protective gauntlets shall be worn when performing tasks 1, 18, and 23 as described within GEHSI S05.01.06. Note: Not wearing this level of PPE for these tasks where there is the potential for making contact with sub-surface electric installations may be considered a Rules We Live By violation. If, however, a diligent review, including but not limited to a Code 753 markout, review of plates/drawings, performing a geophysical investigation (m-scope and GPR survey), and, when appropriate, talking with the property owner regarding other potential possibilities of existing subsurface electrical facilities, and it is determined that there is minimal potential for such contact then the field crew may be able to downgrade PPE.
- 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 documented 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
- PSHEP
- 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/Bloodborne Pathogen (as needed) – 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 – PSHEP review	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

Parsons Talent Management and the Division or Program SH&E Manager are the official recordkeepers for files relating to Parsons' employees. Each subcontractor maintains its own files but will make copies of HAZWOPER training and certification, first aid and CPR certifications available upon request.

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 PSHEP 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 WALLET CARD-INCIDENT REPORTING GUIDELINES**
- **PARSONS ONLINE REPORTING INSTRUCTIONS**
- **PARSONS MONTHLY FIELD/PROJECT REPORTING FORM & SUPPLEMENTAL INFORMATION FORM**
- **PARSONS INCIDENT/ACCIDENT REPORT FORM**
- **PARSONS INVESTIGATION REPORT FORM**

PARSONS (PARCOMM)

Incident Definition: any unexpected or unplanned event that involves personal injury, property damage, environmental spill release or a near miss.

Any incident that results in onsite medical treatment or an employee being taken to a medical facility requires the immediate notification of Division or GBU Safety.

- Buildings Div Safety – John Barker; (704) 778-0033
- Energy Div Safety – Anthony Miller; (704) 264-6159
- Env/VIC Div Safety – Greg Beck; (908) 887-1973
- Life Science/Ind Safety – Anthony Miller; (704) 264-6159
- GBU Safety Director – Anthony Miller; (704) 264-6159

Rev 3/10

PARSONS (PARCOMM)

Procedures following a Parsons/Subcontractor Incident

If the incident results in a lost workday case or worse:

- The Project Manager contacts the Division Manager and Operations Director immediately.

Within four (4) hours of any incident:

- The Project Manager ensures the incident is entered into the PWeb online Safety Reporting System (PARCOMM Home Page)

Within 48/72 hours (Contractor/Parsons) of an incident:

Complete an incident investigation report to determine root causes and corrective actions to prevent recurrence.

PARSONS Emergency Contact Numbers:

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

PARSONS (PARCOMM)

Procedures following a Parsons/Subcontractor Incident

Incident Definition: any unexpected or unplanned event that involves personal injury, property damage, environmental spill/ release or a near miss.

If the incident results in a lost workday case or worse:

- The Project Manager contacts the Div. Manager and Operations Director immediately.

Within four (4) hours of any incident:

- The Project Manager ensures the incident is entered into the PWeb online Safety Reporting System (PARCOMM Home Page)

Within 48/72 hours (Contractor/Parsons) of an incident:

- Complete an incident investigation report to determine root causes and corrective actions to prevent recurrence.

3/10

PARSONS (PARCOMM)

Additional Instructions and Phone Numbers

Any incident that results in onsite medical treatment or an employee being taken to a medical facility requires the immediate notification of Division or GBU Safety.

- Buildings Div Safety – John Barker; (704) 778-0033
- Energy Div Safety – Anthony Miller; (704) 264-6159
- Env/VIC Div Safety – Greg Beck; (908) 887-1973
- Life Science/Ind Safety – Anthony Miller; (704) 264-6159
- GBU Safety Director – Anthony Miller; (704) 264-6159

PARSONS Emergency Contact Numbers:

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

Online 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 the online (PWeb) incident report form: https://project1.parsons.com/safety/login.htm
- 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.

Online Reporting System

Parsons currently uses the IndustrySafe online reporting system. It can be found at PWeb by following the following steps:

1. From the Corporate PWeb Homepage, select PARCOMM from the Org Units menu
2. Locate and select "SAFETY" from the center of the screen.
3. Select the "Online Safety Reporting" drop down.
4. Select the "IndustrySafe Incident Reporting (new tool)" in the center of the screen
5. Select the "Incidents" tab.
6. Select "Add New Incident" at the left hand side of screen.

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 for each project are automatically reported downloaded from PRISM to the IndustrySafe program each month on a project / job number basis. However, the project team must still continue to track on a monthly basis, hours served by Contractors and JV Partners.

Hours served by Contractors and JV Partners 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.

To enter in the hours:

1. From the Corporate PWeb Homepage, select PARCOMM from the Org Units menu
2. Locate and select “SAFETY” from the center of the screen.
3. Select the “Online Safety Reporting” drop down.
4. Select the “IndustrySafe Incident Reporting (new tool)” in the center of the screen
5. Select “System Functions” at the top of the page
6. Select “Monthly Statistics (Hours Worked and Employees)”
7. Enter the Project / Job Number
8. When your Project / Job Number appears, click the appropriate system id number
9. Select the “all” and the appropriate year. Enter the hours served by the Contractors and JV Parter

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

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 mainpage of the IndustrySafe website. Select "Incidents", then click the "Reports and Analysis" link at the left.

Contact Greg Beck for Assistance

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)

PARSONS

Incident/Accident Report Form

Attach all supplemental documentation, including photos, diagrams, witness statements, and field reports

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

Incident Type	☐ Workers 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 Incident

PARSONS

Incident/Accident Report Form (Contd)

Workers 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 – TECHNOLOGY DIVISION
INVESTIGATION REPORT

Date of Incident:	Client:	Client Contact:
Project Name:	Project Location:	Project Manager:

Time of Incident:	Job/WBS:	Incident Reported by:

Type of Incident (check one): __ Near-miss incident __ Personal Injury __ Property damage __ Environmental spill/release	Name of Company/Subcontractor:

Name of Individual(s) Involved:	Trade/Function:

Was the Individual Involved with the Incident Performing their Regular Job? If "No", explain why:	Date of Site Safety Orientation:	Last Formal/Documented Safety Meeting Attended:

Description of incident according to the individual(s) involved or injured (including what happened and how the incident occurred):

According to the individual(s) involved with the incident or injured, what could have been done differently to prevent this incident from occurring?

Why weren't these done prior to the incident?

Describe any First Aid or Medical Treatment Provided On Site and/or at a Medical Facility.

Did the Individual Return to Work by the next day?	Any Work Restrictions or Lost Time? If "Yes", describe:

Complete the information below with an Investigation Team, if appropriate.

Team Investigation – List the Possible Causes of the Incident Below (specify **Personal Factors** (1 = lack of skill/knowledge, 2 = following correct procedure takes more time, 3 = supervisor reinforces unsafe behavior, 4 = did it this way before without adverse consequences), **Job Factors** (5 = lack of or inadequate procedure, 6 = inadequate communication of expectations or procedure, 7 = inadequate tools or equipment) or **External Factors**).

1.
2.
3.
4.

For Each Possible Cause Listed Above, Reply "Why" or "Why not" the Cause Occurred.

1.
2.
3.

Corrective Action(s) for Each Cause - List Person(s) Responsible and Target Date:

1.
2.
3.

Investigation Team Members:

Individual Involved/Injured (Print):	Signature:	Date:
Supervisor (Print):	Signature:	Date:

PARSONS – ENVIRONMENTAL/VIC DIVISION
INVESTIGATION REPORT

Date of Incident:	Client:	Client Contact:
Project Name:	Project Location:	Project Manager:

Time of Incident:	Job/WBS:	Incident Reported by:

Type of Incident (circle one): Near-miss incident - Personal Injury - Property damage - Environmental spill/release	Name of Company/Subcontractor:

Name of Individual(s) Involved:	Trade/Function:

Was the Individual Involved with the Incident Performing their Regular Job? If "No", explain why:	Date of Project Safety Orientation:	Last Formal/Documented Safety Meeting Attended:

Description of incident according to the individual(s) involved or injured (including what happened and how the incident occurred):

According to the individual(s) involved with the incident or injured, what could have been done differently to prevent this incident from occurring?

Why weren't these done prior to the incident?

Describe any First Aid or Medical Treatment Provided On Site and/or at a Medical Facility.

Did the Individual Return to Work by the next day?	Any Work Restrictions or Lost Time? If "Yes", describe:

Complete the information below with an Investigation Team, if appropriate.

Team Investigation – List the Possible Causes of the Incident Below (specify **Personal Factors** (1 = lack of skill/knowledge, 2 = following correct procedure takes more time, 3 = supervisor reinforces unsafe behavior, 4 = did it this way before without adverse consequences), **Job Factors** (5 = lack of or inadequate procedure, 6 = inadequate communication of expectations or procedure, 7 = inadequate tools or equipment) or **External Factors**).

1.
2.
3.
4.

For Each Possible Cause Listed Above, Reply "Why" or "Why not" the Cause Occurred.

1.
2.
3.
4.

Corrective Action(s) for Each Cause - List Person(s) Responsible and Target Date:

1.
2.
3.
4.

Investigation Team Members:

Approval (Individual Involved/Injured):	Signature:	Date:
Supervisor Approval (Print Name):	Signature:	Date:

 Report incidents within 4 hours using the Online Safety Reporting System (PWeb). If completing this report, upload to PWeb at the bottom of the Incident Detail page.

ATTACHMENT B

CON EDISON REQUIREMENTS

- **CON EDISON CEHSP A32.00 – RULES WE LIVE BY**
- **CON EDISON UTILITY CLEARANCE PROCEDURE (REV. 1A)**
- **CON EDISON CONTRACTOR INJURY REPORT**
- **CON EDISON EH&S HAZARD ANALYSIS FOR CONTRACTOR WORK**
- **CON EDISON CEHSP E08.02 – NOISE CONSTRUCTION AND UTILITY ACTIVITIES**
- **CON EDISON CEHSP S05.03 – PERSONAL PROTECTIVE EQUIPMENT: PROTECTIVE CLOTHING**
- **CON EDISON CEHSP S12.00 – LOCKOUT/TAGOUT PROCEDURES**
- **CON EDISON EH&S PLAN CHECKLIST**
- **CON EDISON WORK AREA PROTECTION AND TRAFFIC CONTROL FIELD MANUAL**
- **CON EDISON CEHSP A28.00 – CALLING A TIME OUT**
- **CON EDISON GEHSI S05.01.06 – ACTIVITIES WITH POTENTIAL TO CONTACT SUB-SURFACE ELECTRIC INSTALLATIONS**
- **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**

ATTACHMENT B

CON EDISON REQUIREMENTS

- **CON EDISON CEHSP A32.00 – RULES WE LIVE BY**
- **CON EDISON UTILITY CLEARANCE CHECKLIST**
- **CON EDISON CONTRACTOR INJURY REPORT**
- **CON EDISON EH&S HAZARD ANALYSIS FOR CONTRACTOR WORK**
- **CON EDISON CEHSP E08.02 – NOISE CONSTRUCTION AND UTILITY ACTIVITIES**
- **CON EDISON CEHSP S05.03 – PERSONAL PROTECTIVE EQUIPMENT: PROTECTIVE CLOTHING**
- **CON EDISON CEHSP S12.00 – LOCKOUT/TAGOUT PROCEDURES**
- **CON EDISON EH&S PLAN CHECKLIST**
- **CON EDISON CEHSP S12.00 – LOCKOUT/TAGOUT PROCEDURES**
- **CON EDISON WORK AREA PROTECTION AND TRAFFIC CONTROL FIELD MANUAL**
- **CON EDISON GEHSI S05.01.06 – ACTIVITIES WITH POTENTIAL TO CONTACT SUB-SURFACE ELECTRIC INSTALLATIONS**
- **CON EDISON CEHSP A28.00 – 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**

CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP A32.00 – Rules We Live By
Revision Date: 05/16/2014 Effective Date: 05/16/2014

CONTENTS

SECTION 1.0 – PURPOSE
SECTION 2.0 – APPLICABILITY
SECTION 3.0 – INTRODUCTION
SECTION 4.0 – COMPLIANCE REQUIREMENTS
- 4.1 – RULES WE LIVE BY IDENTIFICATION, TRAINING AND REPORTING
- 4.1.1 – IDENTIFICATION
- 4.1.2 – TRAINING AND COMMUNICATION
- 4.1.3 – REPORTING AND INVESTIGATION
- 4.2 – VIOLATION OF A RULE WE LIVE BY
- 4.3 – DEFINITIONS

RULES WE LIVE BY TABLE

1.0 PURPOSE

This procedure establishes a consistent approach to communicating and reinforcing the importance of following critical safety work practices designed to protect employees, contractors, and the public.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to all Con Edison employees (management and union) and contractor employees working for Con Edison.

3.0 INTRODUCTION

There are safety and operational procedures specifically designed to protect against the potential for significant injury due to the energy (electricity, gas, steam, or falling from elevation) that must be controlled. Operating groups that work with these sources of energy have identified Rules We Live By. At The Learning Center, the RWLB associated with a given activity of an operating department apply. This is defined as a work procedure or safety requirement that, if not followed, could result in a severe injury or fatality, or place other individuals (employees or members of the public) at significant risk.

4.0 COMPLIANCE REQUIREMENTS

4.1 RULES WE LIVE BY IDENTIFICATION, TRAINING, AND REPORTING

4.1.1 IDENTIFICATION

Where work tasks require the safe control of electricity, gas, steam, or work at elevation, the operating organization must identify key procedures required to control the energy or mitigate the

© 2002-2014 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use

effect or impact onto the employee, fellow employees, contractor employees or the public. Lessons learned from previous incidents must be included in the identification process. To see the Central List of the Rules, click here.

An organization must notify Corporate EH&S of any change to a Rule.

4.1.2 TRAINING AND COMMUNICATION

An organization's Rules We Live By and associated procedures must be reinforced in applicable skills training.

Each employee in the organization must receive OJT training on the Rules We Live By identified by the organization.

Rules We Live By must be reinforced, when applicable, in job briefings.

Rules We Live By must be incorporated into the scope of safety field observations and inspections.

Where contractor work practices involve Rules We Live By, contractor employees will be trained on the applicable Rules We Live By, reporting procedure, and consequences. The operating organization must communicate the applicable Rules to contractor management and ensure the Rules are incorporated in the HASP. The contractor supervisor will be required to train their affected employees and subcontractor employees before they begin work.

4.1.3 REPORTING AND INVESTIGATION

If a supervisor observes a Rule We Live By being violated, the work must be stopped immediately.

If an employee, not a supervisor, believes a Rule We Live By may have been violated, he/she must stop the work immediately and report the situation to the supervisor of the employee who committed the alleged violation.

Resolution of the alleged violation must follow the Time Out process as defined in CEHSP A28.00 – Calling a Time Out.

4.2 VIOLATION OF A RULE WE LIVE BY

A violation of a Rule We Live By will result in significant consequences.

Any employee who witnesses a violation of a Rule We Live By and does not stop the work and report the violation will also be considered to have violated the Rule.

A violation by a contractor company or by a sub-contractor must be reported via an action line by the operating organization with contractor oversight.

The organization must notify Corporate EH&S after action has been taken as a result of the violation.

© 2002-2014 Consolidated Edison Co. of New York, Inc.

4.3 DEFINITIONS

Con Edison employee: This includes all management and union employees.

Contractor employee: This includes all per-diem contractor employees and those employees working for a contractor company hired by Con Edison.

© 2002-2014 Consolidated Edison Co. of New York, Inc.

REVISION HISTORY

Revision Date	Revision #	Summary of Change	Author
1/21/14	2013 Annual Review	*CEHSP A32.00.01 RWLB - Table*: Permits, Electric Ops – Added language to clarify that entry for work in structures containing d-faulted feeders is permissible after associated source equipment has been de-energized.	G. Slintak
4/23/14	2013, Revision 1	*CEHSP A32.00.01 RWLB - Table*: Adjusted high hazard PPE rule as applied to Gas Operations in response to 4/22 request. Change clarifies the attachment point for use of PPE (previously associated with "blowing gas," a subjective term).	G. Slintak
5/16/14	2	Combined 'CEHSP A32.00 – Rules We Live By' and 'CEHSP A32.00.01 – Rules We Live By Table' into one document. The table will be an attachment to the procedure.	S. Ng

© 2002-2014 Consolidated Edison Co. of New York, Inc.

RULES WE LIVE BY 2014

Hazard	Electric Operations	Central Operations	Gas Operations	Customer Operations	Business Shared Services (CFS)	Enterprise Shared Services (Facilities)
Verify Dead/Lockout-Tag Out	Properly test or spear to ensure that electric equipment, cable, or wire is "dead" as required regardless of voltage, before beginning dead work activities.	Properly test or verify that equipment is de-energized, isolated and protected prior to initiating dead work activities.				Properly lock out/tag out equipment before beginning work on the equipment.
Permits (Operating, D-faults)	Enter D-Fault tagged structures only when authorized by the operating authority to perform feeder processing, or to perform work after all D-faults have been identified and de-energized. .	• Operating Orders and Work Permits - Only perform work that is within the authorized scope of work as listed on the work permit. • Do not change the status of a piece of equipment that has a Stop Tag applied to it. • Follow the sequence of an operating order.		Do not enter a structure that has been classified and tagged as a D-fault.	• Operating Orders and Work Permits - Only perform work that is within the authorized scope of work as listed on the work permit. • Do not change the status of a piece of equipment that has a Stop Tag applied to it.	
Atmospheric Testing	• Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space. • For excavations greater than 4 feet in depth the atmosphere shall be tested prior to entry or when the excavation is not already occupied.	• Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space. • For excavations greater than 4 feet in depth the atmosphere shall be tested prior to entry or when the excavation is not already occupied.	• Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space. • For excavations greater than 4 feet in depth the atmosphere shall be tested prior to entry or when the excavation is not already occupied.	Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space.	Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space.	
Rescue/Retrieval	Entrant and attendant are required to wear rescue harness when working in enclosed spaces.	Entrant and attendant are required to wear rescue harness when working in enclosed spaces.	Entrant and attendant working in enclosed spaces shall wear rescue harnesses, when required.	Entrant and attendant are required to wear rescue harness when working in enclosed spaces.	Entrant and attendant are required to wear rescue harness when working in enclosed spaces.	
High Hazard Energy PPE	• Use fall protection equipment as required. • Use appropriate rubber gloves, rubber sleeves, fire retardant clothing and eye/protection face shield as required for the electrical hazard.	• Use fall protection equipment as required. • Use the appropriate rubber gloves, rubber sleeves, fire retardant clothing, and eye protection/face shield as required for the electrical hazard. • In Steam Distribution, use appropriate water resistant coveralls and face shields before disconnecting any piping from the dead side of the trap valve up to and including the trap inlet valves and trap bypass valve. These coveralls and face shields must be worn until all piping is reconnected.	• Wear FR coveralls, FR Hood and FR gloves or liners whenever airline Respirators are required . • Use fall protection equipment as required.	• Use fall protection equipment as required. • Use appropriate rubber gloves, rubber sleeves, fire retardant clothing, and eye protection/face shield as required for electrical work. • Do not come into contact or move a downed or low hanging utility wire while performing Site Safety or Damage Assessment work.	• Use fall protection equipment as required. • Use the appropriate rubber gloves, rubber sleeves, fire retardant clothing, and eye protection/face shield as required for the electrical hazard.	Use fall protection equipment as required
Sheeting/Shoring		Ensure that excavations five feet or deeper are properly sheeted and shored before anyone enters.	Ensure that excavations five feet or deeper are properly sheeted and shored before anyone enters.			
Gas Piping Integrity Test			Perform an integrity test before a customer turn-on.	Perform an integrity test before a customer turn-on.		
Securing Loads					Reels over 5,000 lbs are secured per DOT requirements.	

Please note: At The Learning Center, the RWLB associated with a given activity of an operating department apply.

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

1.0 INTRODUCTION

This document outlines a process to identify, locate and clear subsurface utilities as part of all Environmental Health and Safety (EH&S) 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 *Con Edison and or industry* safety procedures that should also be considered. **Note that modifications and additions to the text in this version of the process, relative to the topics outlined in Section 2.0, are italicized.**

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, safety *and environmental* 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 including all revised or added provisions;

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, *which will include surrounding/adjacent facilities and or buildings*, 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, *at a minimum,* be familiar with the 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, be completed by the Con Edison PM *or their designee, such as consultant or Con Edison Construction Management Inspector.* The intent of the checklist is to ensure that all appropriate steps of the process described herein have been completed. Secondly, 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 *or their designee*.

2.0 REVISIONS FROM PREVIOUS VERSION

This version (**Revision 2**) *contains modifications to Revision 1 and includes additional provisions and or guidance based on lessons learned during implementation of the previous versions* for intrusive activities at various sites. The key topics that have been added or modified are listed below and described in greater detailed in the referenced sections of this protocol.

- *Considerations for potential presence of fiber optics;*
- *Accessing manholes and other utilities during field inspection and utility mark out;.*
- *Considerations for potential presence of traffic control electric lines; and*
- *Considerations for potential presence of unmapped non-routine utilities or subsurface utilities, such as drainage pipes, etc.*

Modifications and additions to the text relative to the introductory sections of this document and the topics listed above are *italicized.*

3.0 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

4.0 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 and approval
- 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 for a set of 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.

4.1 Obtain Plates, Drawings and Maps

Hard copies of available utility plates, drawings and/or maps should be obtained by the Con Edison PM *or their designee.* Drawings, plates, etc. should be reviewed as a preliminary step to determine the type and approximate size and location of utilities in the vicinity of the work site. . *When working at, adjacent to or in the immediate vicinity of a Con Edison facility ("Facility"), such as substation or gas regulator station, the Con Edison PM or their designee shall also obtain and review the Facility-specific plates. These shall include all utilities (both Con Edison and non-Con Edison) on and/or entering or leaving the Facility. Regardless of who obtains the requisite utility plates and or drawings, the Con Edison PM shall ensure that the job package is complete and includes ALL required such drawings and or plates of sub-surface facilities in the*

area(s) of intrusive activity, such as excavation or drilling. The drawing title, most recent revision date shown 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: Fiber optics at Con Edison facilities are not routinely identified on utility drawings. Therefore, when conducting intrusive work at Con Edison facilities, the facility engineer should be contacted in advance of the site walk to determine if fiber optic cables are known to be present and, if so, what is their layout. Fiber optic lines generally cannot be detected using routine geophysical methods accordingly, at sites with known fiber optics every effort should be made to determine their location or confirm their absence in the work area.

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

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

Similarly, steam plates can be obtained by selecting "Active" and "Archived" Steam Plates from the website:

http://maps/steam.htm

Based on agreement between Transmission Operations and EH&S, Remediation personnel may access these intranet sites and print the plates using the plotter located in the 2nd floor of Building 138. In addition, a large format photocopier, which is also located in Building 97, is available for use by EH&S remediation. A log book, which is stored at the facility, should be completed each time the facilities (i.e., computer, and or photocopier) are used.

Conduit and Duct Occupancy (C&DO) utility plates can also 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.

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.

Sewer and Water

Drawings showing water and sewer utilities should be obtained from the New York City Department of Environmental Protection (NYCDEP) *or, if in Westchester, then the drawings and or plates should be obtained from the local authority, such as the County Health Department or municipal Departments of Public Works (DPW) and or Buildings (DOB).* Drawings can be requested from the NYCDEP by completing the form provided in **Attachment C** and faxing or mailing it using the appropriate contact information listed on the request form. If you have questions you should contact the NYCDEP personnel at the telephone number 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 Metropolitan Transportation Authority as listed in **Table 1**. It is noted that if intrusive activities will be performed in the immediate vicinity of subsurface MTA structures, such as subway or automobile tunnels, a letter submitted to the MTA may be required to request a work permit from MTA. The letter should include a brief summary of the work and a map(s)/drawing(s) of the proposed work and will be submitted to:

Mr. Rajen Ydeshi
Outside Projects
New York City Transit
2 Broadway, 7th Floor
New York, New York 10004

Fiber Optics

As noted above, fiber optic lines are typically not shown Con Edison's utility drawings. Accordingly, the facility engineer should be consulted regarding the presence,and if present, their location as discussed above.

Traffic Control Cables

Drawings and or plates for subsurface traffic control facilities should be requested from New York City Department of Transportation (NYCDOT) or the local/ municipal DPW or DOT.

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**.

4.2 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 *will require a Code 753 utility survey with supplemental M-scope survey by Con Edison and or a subsurface utility survey by a private utility-locating contractor*. The applicability of each of these surveys is discussed below.

4.2.1 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 physical markings on the street/sidewalk become faint or obscure they should be refreshed by over-painting with new paint as needed. When the utility markouts are being refreshed, typically by consultant, contractor, or other project personnel, 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' on a case-by-case basis and will be limited to the engineering group' availability. 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 may 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. Note for markouts inside substations contact Mark Rimler at (212) 460-3921.

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

Prior to mobilizing to the site the following information MUST be provided to and reviewed by the Con Edison PM:

- the name of the contractor;
- the name of technician(s) who will perform the utility surveys;
- for each technician, a summary of experience and training in conducting surveys in a setting similar that at the site (e.g., urban, inside buildings, etc.); and
- Summary of experience and training of each instrument.

When using a private utility location contractor, the Con Edison PM shall diligently attempt to arrange for the facility or property manager and or engineer, who is most familiar with the utility layout and distribution in the building or on the property to participate in the site walk with the private utility locating contractor during on the first day of conducting the on-site utility survey.

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

- Ground Penetrating Radar (GPR)
- Magnetometer *(M-Scope) [for locating metallic **and** non-metallic pipes and cables]*
- Radio Frequency Induction (RFI) *[for locating non-metallic pipes and cables]*
- Electrical Conductivity
- Electrical Resistance
- Acoustics

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

The utility location contractor **SHALL** specify which utility detection tool/techniques they plan to bring **AND** use at the site. In addition, they **SHALL** bring **ALL** support tools and equipment necessary to allow them access to manholes, vaults, circuit boxes, pipe clean-outs, etc.

At the commencement of a utility survey using a private utility location contractor **AND** prior to them deploying any survey equipment, the utility location contractor **SHALL**, *in cooperation with the Con Edison PM and or their designee:*

1) Review **ALL** utility drawings

2) Reconcile **ALL** drawings with markouts identified by the Code 753 survey at the property perimeter.

3) Determine presence, type and nature of sub-slab utilities and diligently attempt to confirm their configuration during the utility survey.

4) Inspect the site to identify*/reconcile* where **ALL** utility service(s) enters and or leaves the property and or building. This **SHALL** include a thorough inspection of building basement(s); boiler and or machine room(s); externally-exposed utility infrastructure including manholes; vaults; electrical, gas, water valves and or meters; etc.

5) *For work at or adjacent to Con Edison Facilities, conduct the site walk and review the facilities drawings with key Facility Management personnel.*

6) Visually identify, open and inspect **ALL** relevant utility access-ways including manholes, vaults, gas and or water valves boxes and telephone, *fiber optic* cable, *traffic control lines* and communication boxes.

NOTE: Only circular manholes shall be opened. If opened improperly, rectangular manhole covers can fall into the underlying vault and damage the contained utility (e.g., transformer). If it isa anticipated that manholes will need to be opened, Con Edison Transmission and Service Operations (T&SO) shall be contacted prior to conducting the site walk and or utility clearance survey using a private locator.

7) Identify and document **ALL** apparent uncertainties such as manholes containing service lines that apparently go to the building or property, but that cannot be located within the basement of the building or on site.

NOTE: In **ALL** cases, the private utility contractor shall diligently attempt to 'hook-onto' or 'tone' each conduit source (e.g., pertinent electrical conduits in basement, water and or gas valves in valve box, *sewer and or drain pipes,* distribution lines in manhole, *telecommunication lines,* etc.). This may require opening manholes circuit electrical distribution 'trunk' boxes, moving equipment or stored materials at the facility or property to allow access. No project personnel shall enter a manhole or vault unless they are certified and trained in confined space

access, have and know how to use **ALL** pertinent safety equipment, and approved by the Con Edison PM.

In some situations, multiple metallic conduits may be in direct contact in the subsurface. In this circumstance the signal of the locating tool may be transferred from the conduit being 'toned' to an adjacent conduit(s) and may produce a 'secondary' signal. In efforts to understand and identify this occurrence, the location of each apparent signal shall be visually/physically marked using pieces of tape, paint or similar method. The sources being 'toned' shall be numbered and the corresponding signals associated with each signal source shall be marked with the corresponding number at each location where the signals from each source is detected. Accordingly, the resulting mark outs will show apparent multiple conduits for a single source.

4.2.2 Applicability of Utility Clearance Resources

The use of the various utility markout resources that may be employed at various sites is 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 (optional)	X (optional)	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 *key Facility Management personnel*, as appropriate. At a minimum, an M-Scope survey should be completed. In some circumstances, an independent utility locating contractor should also be used. The decision to use a utility contractor will be made by the Con Edison PM. 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)

An independent utility locator should be used for utility markouts on private properties. It is noted that utility mark-outs 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, as well as how the utility (elctric, water gas, steam, etc.) are distributed in the vicinity of the sample locations. Sub- or in-floor utilities often enter along the perimeter of the floor, at support columns, and/or along 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. *However, this action should only be considered after all applicable survey tools and methods have been diligently deployed and or implemented.*

Public Street / Sidewalk

A combination of Con Edison utility survey staff and independent utility locator contractors may 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 may also be requested within a 10 foot radius of each proposed sample location. It is noted that due to often heavy work loads of the M-Scope survey staff, this option may not always be available or practicable and should be considered optional.

4.3 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 (if it will be providing field oversight), contractors (drillers, soil gas, excavators, private utility location contractor, etc.), Con Edison *Facility Managers,* NYSDEC (as deemed appropriate by the Con Edison PM), private facility managers/property owners *and or owners/operators/representatives of private utilities, such as NYCDOT, municipal DPWs, Westchester Department of Sewer, Westchester County Department of Health, etc.* A list of the names and phone numbers of each participant at the site walk will be maintained by the Con Edison PM. 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 *and contingency action as deemed appropriate.*

4.4 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 as shown the 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 25 feet of high pressure gas lines (i.e., 125 psig or greater), ***Gas Emergency Response Center (ERC)*** **shall be contacted** ***[718-319-2330] and notified of the planned activities at least two days prior to start of intrusive work. If working within 5 feet of a transmission main or within 10 feet of the tolerance zone of a main*** **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.

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 the concrete slab of 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. *If sub-slab utilities are suspected of being present, but not confirmed during the utility location survey, the concrete shall be cored or saw cut to an estimated depth of approximately 2/3 the thickness of the concrete (if known). If the thickness of the concrete thickness is not known, it shall be assumed to 8-inches thick. Coring shall proceed at 1-inch increments, with the removal of each one-inch 'plug' of concrete and visual inspection of the core hole to verify the absence of utilities. The remaining 1/3 of the concrete shall be broken using electric jackhammer,,*

hammer drill or using hand tools. Appropriate safety equipment shall be worn during concrete removal actions.

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 during 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/trenches** 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/trenche***s*, 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 two 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 14 feet long by nine (9) 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 pit***s* 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.

5.0 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 by the Con Edison PM. 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 information and activities have been documented.

6.0 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

CHECKLIST FOR INTRUSIVE FIELDWORK

PROJECT BACKGROUND INFORMATION

Site Name: _____ **Job #** _____

Site Address: _____

Con Edison Project Manager: _____ **Phone:** _____

Con Edison Site Manager: _____ _____

Consultant Project Manager: _____ **Phone:** _____

Consultant Site Manager: _____ **Phone:** _____

Subcontractor (driller, excavation, etc): _____

Subcontractor's Contact Person: _____ **Phone** _____

Meeting / Start Date _____ **Time** _____

HEALTH AND SAFETY PLAN REVIEW

Name: _____ **Signature:** _____ **Organization:** _____ **Date:** _____

Name: _____ **Signature:** _____ **Organization:** _____ **Date:** _____

Name: _____ **Signature:** _____ **Organization:** _____ **Date:** _____

Health and Safety Form Completed: _____ **Date** _____

Site Drawings (yes/no/NA): _____ **(Attach site figure with proposed boring locations)**

CODE 753 UTILITY MARK-OUT RREQUESTED? Y / N

Called by: _____ **Organization:** _____

Date: _____ **Time** _____ **Initials** _____

Reference # _____

Utility Drawings Received: _____ (Attach copy of utility maps)

UTILITY INVENTORY

Utility	Utility Company Name	Depth (ft)	Phone	Date Notified	Notification Method	Marked
Above Ground Services:						
Electric		NA				Y / N
Telephone		NA				Y / N
Cable		NA				Y / N
Overhead Supports		NA				Y / N
Traffic light cables		NA				Y / N

Notes: _____

CHECKLIST FOR INTRUSIVE FIELDWORK

UTILITY INVENTORY (continued)

Below Ground Services:

Electric						Y / N
Telephone						Y / N
Cable						Y / N
Gas						Y / N
Water						Y / N
UST System						Y / N
Storm						Y / N
Sanitary						Y / N
Steam						Y / N
Pipeline Companies						Y / N
Other (Tunnels, etc.)						Y / N

PRIVATE UTILITY LOCATING SERVICE RETAINED? Y / N

Called: Date _____ **Time** _____ **Initials** _____

Name of Locating Service: _____

Telephone #/ contact: _____

Type of sensing equipment used: _____

METAL DETECTOR SURVEY

Drilling location cleared by Parsons with a metal detector: **By (initials):** _____ **Date:** _____

INTRUSIVE SAMPLING LOCATIONS MARKED, M-SCOPED AND CLEARED

Locations Marked by: _____ Date: _____

M-Scope performed by: _____ Date: _____

Conduct Site Walk and Complete Site Walk Table

ACKNOWLEDGEMENT

We the undersigned have participated in a site walk at _____ to review proposed intrusive sampling locations and to evaluate the presence, configuration and identification of utilities at this site, as marked out. We agree with the proposed activities that will be completed prior to conducting intrusive work. The utility clearance activities will be completed as summarized in Table A (attached).

Name:		**Signature:**		**Organization:**		**Date:**	
Name:		**Signature:**		**Organization:**		**Date:**	
Name:		**Signature:**		**Organization:**		**Date:**	
Name:		**Signature:**		**Organization:**		**Date:**	
Name:		**Signature:**		**Organization:**		**Date:**	
Name:		**Signature:**		**Organization:**		**Date:**	

CHECKLIST FOR INTRUSIVE FIELDWORK

ADDITIONAL COMMENTS / NOTES:

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: _____

ATTACHMENT C

Instructions for Obtaining Drawings for Sewer and Water Utilities

From the NYC DEP

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.)	(718) 319-2357
Steam	All	Con Edison	Steam Engineering	http://maps/steam.htm(1)	--
			For Questions contact:	Tony Barbera	(212) 460-4843
Sewer /Water	NYC	NYC DEP /	Bureau of Water and Sewer Operations	Vincent Soriano/ Doug Greely	(718) 595-5330
Tunnels	Subway Crossing the East River	MTA	Outside Projects – Adjacent Work	Vasanth Battu/ Rajen Ydeshi / [If drilling in immediate vicinity of MTA structure, e.g., subway tunnel, car tunnel, etc., you will need submit a letter and plan drawing(s) to Mr. Ydeshi]	(646) 252-4473 (646) 252-3641
	Crossing the Hudson River	Port Authority of NY/NJ	Surveying	Richard Danko (rdanko@panynj.gov) Bill Kane (wkane@panynj.gov)	(201) 595-4841 (201) 595-4842

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

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

NATURE OF INJURY / ILLNESS

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

INJURY CLASSIFICATION

Medical Treatment _____
Restrictions (if yes, please describe): _____
Lost Time _____
First Aid _____
Non-recordable (FYI) _____

TYPE OF INCIDENT

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

PO # _____

If you cannot e-mail the form, then you may fax it to: Construction EHS&T at 917-534-4490

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

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

LAND USE

CEHSP E08.02 – Noise Construction and Utility Activities

(CEP converted to CEHSP on 07/24/2008)

Revision 6: 07/16/2012 Effective Date: 07/31/2012

CONTENTS

SECTION 1.0 – PURPOSE
SECTION 2.0 – APPLICABILITY
SECTION 3.0 – INTRODUCTION
SECTION 4.0 – COMPLIANCE REQUIREMENTS
- 4.1 – FIELD OPERATIONS
- 4.2 – OPERATIONS UNDERTAKEN OUTSIDE OF PERMISSIBLE TIMES
- 4.3 – MONITORING NOISE METHODOLOGY

SECTION 5.0 – DEFINITIONS
SECTION 6.0 – REFERENCES
- ATTACHMENT 1 – NORMAL FIELD OPERATION REGULATIONS
- ATTACHMENT 2 – UTILITY NOISE MITIGATION PLAN TEMPLATE
- ATTACHMENT 3 – CONSTRUCTION NOISE MITIGATION PLAN TEMPLATE
- ATTACHMENT 4 – NOISE REGULATIONS FOR OPERATIONS UNDERTAKEN OUTSIDE OF PERMISSIBLE TIME

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO COMPLY WITH STATE AND LOCAL REGULATIONS PERTAINING TO NOISE. The purpose of this procedure is to ensure that all company personnel perform appropriate actions to prevent ***unreasonable noise*** and comply with permissible noise limits.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to all Con Edison personnel and contractors, both on and off Con Edison facilities and at field locations, who attend to Con Edison equipment, facilities, or operations that create noise that could be considered unreasonable.

3.0 INTRODUCTION

New York City, and many local governments in the Company's service area have restrictions on the level of noise that may be produced. In general, these limits apply to two types of situations: ***facility operations***, and ***field operations***. In New York City, however, three distinct situations apply: ***facility operations***, construction activities and utility activities (street work). In addition, the restrictions vary by time of day. Con Edison has compiled tables summarizing the noise regulations applicable in the Company's service area. These tables can be found in Attachments *1* and *2*.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

In addition, New York State regulations address noise from certain heavy duty trucks. These requirements are discussed in Section 4.4, New York State Noise Requirements.

4.0 COMPLIANCE REQUIREMENTS

Equipment and operations associated with Con Edison facilities and services can produce noise. All equipment used by Con Edison should be in good working order, properly maintained, and properly used. Where possible, noisy equipment should not be located near ***noise-sensitive areas and/or sensitive receptors***, e.g., schools, hospitals, and churches.

Where a given operation could be accomplished using a variety of equipment, equipment with operating characteristics that produce less noise should be used. The facility or field manager is responsible for ensuring compliance with all federal, state and local noise regulations.

Qualified personnel should execute the procedures regarding noise measurements described in the following sections. Qualified personnel are defined as personnel from Con Edison Technical Service, who are trained to make noise measurements according to American National Standards Institute ***(ANSI)*** standards, and are operating under the advice from Con Edison's Environment, Health and Safety (EH&S) noise subject matter expert (SME). The person should be familiar with the make and type of equipment used in these measurements, calibration and should be experienced in general noise data collection procedures. The person should be able to identify ***impulsive*** and ***tonal noise.*** Measurements should be made using a Type 1 ***Sound Level Meter (SLM)*** / preamplifier/microphone combination.

4.1 FIELD OPERATIONS

Field operations include maintenance, installation, upgrade, and repair of Con Edison equipment. These types of operations include repair or installation of aboveground and belowground power transmission conduits (electrical, natural gas, steam), repair or installation of power transmission equipment, tree maintenance, on-site or off-site construction or demolition, and use of any safety equipment associated with these procedures.

Most field operations, other than operations undertaken outside of permissible times, can be thought of as construction activities. Construction activities additionally covered under this CEHSP include any activity (except tunneling) necessary or incidental to the erection, demolition, assembling, altering, installing, or equipping of buildings, public or private highways, roads, premises, parks, utility lines including such lines in already-constructed tunnels or other property, land clearing, grading, excavating and filling. Many communities have time restrictions on such activities, which must be adhered to. Additional requirements (discussed below), including the preparation of a Noise Mitigation Plan and additional sound-reducing devices, are required for work performed in New York City.

Unreasonable Noise

In addition to time restrictions, certain noise codes have specific regulations that must be followed regarding field activities. These regulations are summarized below.

- Construction devices – Prohibiting use of construction devices (e.g., air compressor, pile driver, bulldozer, crane, hoist) so as to create unreasonable noise.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

- Containers and construction material – Prohibiting handling or transport of any container or any construction material in a public place so as to create unreasonable noise.

- Exhausts - Except as otherwise provided in the New York City code, prohibiting discharge into the open air of the exhaust of any device, including but not limited to any steam engine, diesel engine, internal combustion engine or turbine engine, so as to create unreasonable noise.

- Power tools – Prohibiting use of power tools (e.g., nail guns, saws, vacuums, drills) so as to create unreasonable noise.

- Schools, hospital, courts – Prohibiting unnecessary noise through the use of any device on any street adjacent to any school or court while the same is in session, or adjacent to any hospital.

- Sensitive receptors – Prohibiting unnecessary noise through the use of any device within 50 feet of a school, house of worship, hospital, retirement community, open tract of serene land, park or recreation area, and psychiatric centers.

4.1.1 Utility Activities Within New York City

Negotiations with NYCDEP from 2005 to 2006 resulted in the partial exemption for utility-related construction, such as street activities, cable and pipe replacements, and new infrastructure installation.

Utility-related Construction must meet the following requirements:

- Each site where utility-related construction activities occur, or construction devices/tools are used, must have a filled-out Utility Noise Mitigation Plan on-site and posted. This requirement does not apply to safety devices utilized while performing routine maintenance task, such as ventilation blowers.

- OJT/Tailboard Talk training for all personnel who perform utility-related construction is required. Although our present CEHSP and GEIs satisfy this training requirement, additional training has been developed to assist with full compliance.

- The new code has restrictions on the types of tools that can be used, rather than list noise limits for each type as in the prior code requirements.

- Sensitive Receptors such as hospitals and schools adjacent to work locations should be communicated with prior to work starting when possible.

- For work longer than 3 days continuously in one location, postings and other communication must be sufficient to inform all residents within 200 feet of schedule.

Utility Noise Mitigation Plans

A utility noise mitigation plan template is included as *Attachment 3*. The utility noise mitigation plan should be filled out by the job supervisor or field foreman prior to the start of construction activities – only devices deemed in compliance with NYCDEP regulations shall be utilized. If

© 1998-2012 Consolidated Edison Co. of New York, Inc.

there are any deviations from the approved items, the ConEd noise SME must be consulted prior to the start of work activities.

Elements of the utility noise mitigation plan include the following requirements:

- Self-certification that tools/equipment maintained so they operate at normal manufacturer's operating specifications.
- Tools/equipment must be equipped with appropriate manufacturer's noise reduction device.
- Specialized vehicles require use of additional noise mitigation measures.
- Use of noise-insulating fabric for portable pumps, compressors, generators, etc.
- Quieter equipment shall be used when available or when required by the NYCDEP. Prohibit unnecessary engine idling.
- Properly install and secure steel traffic plates – must re-set and secure within 24 hours of a call from the DEP to the utility.
- Notify all residents within 200 feet of construction area when work is scheduled to be longer than 3 days.
- Notification shall include information on schedules/work locations.
- Respond to all noise complaints/official DEP notice on same day. If after hours, respond next day.
- Phase in vehicles with quieter backup alarms – already being done at ConEd.
- Establish / implement formal noise mitigation training program.
- Includes field supervisory personnel and subcontract supervisors.
- Supervisors shall field-train all field workers.
- Minimize noise impact of sensitive receptors.
- Schools, hospitals, places of worship, etc.
- Required to work with facility owner/operator.
- Perimeter ***noise barriers*** must be used in accordance with 28-101(g) of NYC Chapter 28.
- If project is non-emergency, long-term (greater than 15 days) where there is a dedicated lane, must comply with 28-100 through 28-104.

Permissible Hours of Utility Activities

Regulations concerning utility activities within New York City are listed below. All utility-related construction activities which fall outside these hours require after-hours authorization from the

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

NYCDEP, the NYCDOB, or the NYCDOT. Additional noise mitigation methods may also be required if the NYCDEP so indicates for after-hours work.

Hours of Work are to be in accordance with NYC DOT permit stipulations and/or NYC DOT Highway Rules, generally 7 AM through 10 PM weekdays for utility activities. Please note the extension to 10 p.m., also applies to Con Edison's contractors. Additional mitigation techniques for receptors within 200 feet may be required by the DEP for hours between 10 PM and 7 AM during weekdays and 7PM through 7AM during weekends.

4.1.2 Construction Operations Within New York City

Construction Activities

General construction and demolition will have to meet the Utility requirements in addition to the following:

- More complex Mitigation Plans (must be completed as part of planning the work and prepared with the assistance of the noise SME)
- Specific mitigation requirements for a variety of tool/equipment types
- Certain activities may require enclosures/barriers to reduce noise
- Certain projects with perimeter construction fences shall be required to have noise attenuating material added to the fencing
- Quieter or "smart" back-up alarms are required.

Construction Noise Mitigation Plans

All construction work performed within New York City must be performed in accordance with NYC Administrative Code, Chapter 28. For all construction activities, a Noise Mitigation Plan (*Attachment 3*) must be completed. Only NYCDEP-approved devices or equivalent may be used on-site. NYCDEP must approve the plan, however would pre-approve generic plans with checklists for certain repetitive work. Consult with the Corporate Environmental Health and Safety Department for assistance.

The Mitigation Plan must be written and clearly posted at the job site. Elements of the construction and demolition noise mitigation plan include the following requirements:

- More complex Mitigation Plans (must be completed as part of planning the work and prepared with the assistance of the noise SME)
- Residents within 200 feet of a construction site shall be given notice when work is scheduled for longer than 3 days. Conspicuous posting of such information, or where necessary notification of building managers/owners, shall satisfy this requirement.
- The owner/operator of sensitive receptors (e.g. schools, hospitals and places of worship), adjacent to this site, shall be contacted when practicable to coordinate work to minimize impact on the property.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

- Self-certification that tools are maintained so that they operate at normal manufacturer's operating specifications. The NYCDEP will refer to an outside source to determine if your equipment "may be the source of a noise complaint".

- Use of mufflers/noise mitigation devices on equipment and construction vehicles to meet requirements. *(Note: If equipment continues to exceed level as specified in the Appendix of Rules, a five day cure periods is allowed to perform maintenance, replace equipment and file an Alternative Noise Mitigation Plan.)*

- Mitigation of noise from internal combustion engines.

- Prevention of vehicle idling and use of quieter backup alarms.

- Use of noise barriers if site is within 75 feet of a residential receptor or 200 feet of ANY receptor.

- By January 1, 2008, quieter or "smart" back-up alarms will be required.

- Construction projects that are not regard as "utility work" (e.g. building construction or demolition, major renovation, or any installations) that are not completed within **15 calendar days**, will not fall under the same exemption as work on the system.

- Construction material shall not be handled in such a way as to create unreasonable noise.

Permissible Hours of Construction

Regulations concerning construction activities within New York City are listed below. All construction activities which fall outside these hours require after-hours authorization from the NYCDEP, the NYCDOB, or the NYCDOT. Additional noise mitigation methods (such as noise barriers) are required if work is performed outside these hours.

Hours of Work are to be in accordance with NYC DOT Permit Stipulations and/or NYC DOT Highway Rules, generally 7 AM through 6 PM weekdays for construction activities. Additional mitigation techniques for receptors within 200 feet may be required by the DEP for hours between 7 PM and 7 AM during weekdays and during weekends. There is an exception for occupied one or two family dwellings, convents or rectories between 10 a.m. and 4 p.m. on wither Saturday or Sunday (Note: Must be a minimum of 300 feet from house of worship).

4.1.3 Operations Outside New York City

Permissible Hours of Construction

Regulations concerning normal field operations are listed in the table in *Attachment 1*, Normal Field Operation Regulations. Except where indicated, these are simply day and time restrictions imposed by the various communities. In many cases, providing that field operations do not occur outside these day and time restrictions, the field operations will be in compliance with the local noise codes.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Specific Requirements

Some noise codes require special muffler requirements on devices such as engines, air compressors, and pavement breakers. In addition, certain communities impose noise limits on construction activities. If there are specific noise levels stated in the Special Requirements column of the table in *Attachment 1*, noise monitoring may be required. Careful attention should be given to the equipment and vehicles used in field operations utilizing impact equipment that emit high impulsive noise levels such as pile drivers, pavement breakers, and steam shovels. [6] P

The following procedures apply only to field operations that require noise monitoring as indicated in *Attachment* 1 and may be skipped if no special requirements are listed in Attachment 1.

4.2 OPERATIONS UNDERTAKEN OUTSIDE OF PERMISSIBLE TIMES

In some jurisdictions, noise from operations undertaken outside of permissible times as a result of dealing with emergency situations is exempt from local noise restrictions. However, some jurisdictions impose time limits on such operations, may require a variance for such operations, and/or may require repair operations to commence within a certain time limit of the ***emergency event***. NYC may issue variance from noise standards for the construction activity. Variance may be granted for the initial period of three days and then renewed. The variance must be clearly posted. If work must begin without variance, an application must be submitted within ***12*** **hours** of commencement.

4.2.1 Utility Activities Within New York City

For utility work conducted outside of 7AM – 10 PM on weekdays, additional authorization must be obtained from NYCDOB, NYCDOT or NYCDEP to work outside those hours. From 6PM – 10PM weekdays, any required daytime noise mitigation controls must be utilized. From 10PM – 7AM weekdays and 7PM – 7AM weekends, additional noise mitigation controls may be required by the DEP if there are any receptors within 200 feet. This will be determined on a case-by-case basis.

4.2.2 Construction Operations Within New York City

In New York City, in the case of urgent necessity in the interest of public safety, the NYCDEP is authorized under the New York City Noise Code to issue a variance from the provisions of the Construction Activity Noise Code provisions for any such construction activity. Such a variance may be granted for an initial period of up to 3 days, and may be renewed for periods of 3 days or less while such urgent necessity continues. The variance must be clearly marked on the license or permit, which must be prominently posted at the job site.

4.2.3 Operations Outside New York City

Refer to the Noise Regulations for Operations Undertaken Outside of Permissible Times (*Attachment 4*), for any required variances, time limitations, and exemptions regarding operations undertaken outside of permissible times. [8] R/P

© 1998-2012 Consolidated Edison Co. of New York, Inc.

4.3 NOISE MONITORING METHODOLOGY

The noise measuring device should be set to use the descriptor specified in the local noise code, as indicated in Special Requirements column of the *Attachment* 1. Noise that is considered impulsive must be noted and used in the evaluation of the maximum allowable levels given in *Attachment 3*, the Normal Field Operation Regulations Table. Measurements should be made in such a way as to exclude ***extraneous noises***. Measurements should not be made while ***adverse meteorological conditions*** are occurring in the study area.

Repeat this procedure for each boundary at the property line. Compare the measured property line levels with the maximum allowable levels for the corresponding area in *Attachment* 1. If measured noise levels are below the maximum allowable noise levels for the corresponding types of noise, as indicated in the Special Requirements column of (*Attachment* 1), then noise levels from the Normal Field Operations meet the requirements of the local noise code. If measured levels exceed the maximum allowable levels, the noise from l field operations exceeds the local noise codes. [7]

New York City no longer requires noise measurements for normal field locations. Use ***A-weighted*** measurements. All measurements must be taken by "qualified personnel" only.

5.0 DEFINITIONS

Adverse Meteorological Conditions: Rain, snowfall, snow-covered ground, wet ground, gusty winds, and high winds. Measurements should not be made during these types of conditions.

ANSI: Acronym for "American National Standards Institute".

A-Weighted: Measurement that assigns each frequency a "weight" through the use of a filter network that is related to the sensitivity of the ear at that frequency. The level of the filtered signal is displayed as the A-weighted level. The A-weighted frequency characteristic was originally designed to mirror the 40-phon equal-loudness-level contour of the 1933 Fletcher-Munson data.

Emergency Event: The need for immediate repair of Con Edison equipment associated with Con Edison operations due to situations that are causing or are likely to cause service interruptions, or situations that present an imminent danger to the public. Examples include repair or installation of aboveground and belowground power transmission conduits (e.g., electrical, natural gas, steam), immediate repair or installation of power transmission equipment, and immediate tree maintenance.

Extraneous Noises: Noises that are not associated with Con Edison operations. Extraneous noises include, but are not limited to, passing automobiles or trucks, railway activity, nearby aircraft, nearby construction or demolition, natural sounds, and other nearby noises not associated with Con Edison operations.

Facility Operations: Operational procedures of Con Edison facilities which are essential for normal Con Edison operations. Examples include power generation, compressors, turbines, pipes and valves, bulk material transport, deliveries, fans, and any on-site maintenance or modifications.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

Field Operations: Maintenance, installation, upgrade, and repair of Con Edison equipment associated with Con Edison operations. Examples include repair or installation of aboveground and belowground power transmission conduits (e.g., electrical, natural gas, steam), repair or installation of power transmission equipment, tree maintenance, and on-site construction or demolition.

Impulsive Noise: A single short burst or a series of short bursts of sound pressure. The pressure-time history of a single burst includes a rise to peak pressure, followed by a decay of the pressure envelope. The pressure-time history of a single burst includes a 6 dB, or greater, rise to peak pressure, followed by a decay of the pressure envelope, when the rise to peak pressure occurs in 1 second or less. For noise containing a series of short bursts of sound pressure, the noise will be considered impulsive if each impulse in the series is separated in time by less than 1 second. Examples include thunder, noise as a result of pile-driving, steam-shoveling, etc.

Noise Barrier: A structure used for the purpose of placing near a noise source to reduce the noise level measurable at a receptor location.

Noise-Sensitive Area (a.k.a Sensitive Receptor): Tracts of land where serenity and quiet are extraordinarily important and serve an important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks, or portions of parks or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and old-age homes.

Octave Band: A filter with a single transmission band or passband with relatively low attenuation extending from a lower band-edge frequency greater than zero to a finite upper edge frequency which is twice the lower band-edge frequency. The nominal midband frequency, for a set of contiguous octave bandpass filters, is one of a series that includes 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, and 8000 hertz, extended by successive multiplication or division by 10.

Qualified Personnel: Personnel from Con Edison Technical Service, who are trained in calibrated noise measurements and calibrated ***octave band*** measurements, according to ANSI standards, and are operating under the advice from Con Edison EH&S. Qualified personnel should be familiar with the make and type of equipment used in the measurements, and experienced in general noise data collection procedures. Qualified personnel should be able to identify impulsive and periodic noise.

Receptor: Real property, including but not limited to buildings, grounds offices and dwelling units, from which sound levels from sound sources outside such property may be measured.

Sound Level Meter (SLM): Device used to measure sound pressure level with a standardized frequency weighting and indicated exponential time weighting for measurements of sound level, or without time weighting for measurement of time-average sound pressure level or sound exposure level.

Tonal Noise: For the purposes of this document, noise containing single-frequency tones, when the sound pressure of any single-frequency tone in any octave band exceeds the non-tonal masking noise in the corresponding octave band by 6-dB or more. This corresponds, in general, to a tone being prominent when it is more than 10 dB above the threshold of audibility.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

Examples of tonal noise would include transformer hum, idling engine noise, and constant-rpm engine noise.

Unreasonable Noise: Any excessive or unusually loud sound that annoys, disturbs, injures, or endangers the comfort, repose, health, peace, or safety of a person or that causes injury to plant or animal life, or damage to property or business.

6.0 REFERENCES

NOTE: Con Edison is subject to numerous local noise regulations. Tables have been developed summarizing the local noise regulations applicable in Con Edison's service area. These tables include:

- Attachment 1, Field Operation Regulations
- Attachment 4, Noise Regulations for Operations Undertaken Outside of Permissible Time

For purposes of the References section, the annotations are limited to citations to New York City and New York State regulations. Readers are referred to the Tables for local requirements.

Note: References are forthcoming.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

ATTACHMENT 1
FIELD OPERATION REGULATIONS

CITY, TOWN or VILLAGE	ALLOWABLE NORMAL OPERATION DAYS/HOURS	SPECIAL REQUIREMENTS
Airmont	Mon-Sat 8:00am-10:00pm	L_{10} (1) levels must not exceed 60dB(A) at construction site boundary
Beacon	7:00am-11:00pm	
Briarcliff Manor	Mon-Sat 8:00am-7:00pm	Blasting and Rock Drilling permitted only Mon-Fri 9:00am-5:00pm
Bronxville	Mon-Fri 8:00am-6:00pm	
Buchanan (Village of)	8:00am-7:00pm	
Chestnut Ridge (Village of)	Mon-Sat 8:00am-7:00pm	L_{10} (1) levels must not exceed 60dB(A) at construction site boundary
Clinton	7:00am-8:00pm	
Croton on Hudson	Mon-Sat 8:00am-10:00pm Sundays 10:00am-8:00pm	
Dover	7:00am-9:00pm	
Greenburg	Mon-Fri 7:00am-8:00pm Sat 9:00am-6:00pm; no work on Sunday	
Hyde Park	6:00am-11:00pm	
LaGrange (Town of)	6:30am-9:00pm	
Larchmont	Mon-Fri 8:00am-7:00pm Sat 9:00am-6:00pm Sun 10:00am-5:00pm	L_{10} (1) levels must not exceed 70dB(A) at a distance of 40 feet
Lewisboro	Mon-Sat 8:00am-7:00pm	
Mamaroneck	Mon-Fri 8:00am-8:00pm Sat 9:00am-6:00pm Sun 9:00am-5:00pm	Pile Drivers and Steam Shovels permitted only Mon-Fri 8:00am-6:00pm No noise permitted beyond property border
Millbrook (Village of)	7:00am-10:00pm	Hours of restriction only apply when within 500 feet of residential zone.
Montebello	Mon-Sat 8:00am-10:00pm	L_{10} (1) levels must not exceed 60dB(A) at construction site boundary
Mount Pleasant	8:00am-6:00pm	• L_{10} (1) levels must not exceed 70dB(A) at a distance of 400 feet when bordering residential zone from 8:00am-6:00pm. • L_{10} (1) levels must not exceed 55dB(A) at a distance of 400 feet when bordering residential zone from 6:00pm-8:00am. • L_{10} (1) levels must not exceed 75dB(A) at a distance of 400 feet bordering nonresidential zone during business hours. • L_{10} (1) levels must not exceed 80dB(A) at a distance of 400 feet bordering nonresidential zone during nonbusiness hours.
Mount Vernon	Mon-Fri 7:00am-6:00pm No weekends permitted unless have current permit from the Committee of Buildings	• L_{10} (1) levels must not exceed 70dB(A) at 400 feet when bordering residential zone from 8:00am-8:00pm. • L_{10} (1) levels must not exceed 55dB(A) at 400 feet when bordering residential zone from 8:00pm-8:00am. • L_{10} (1) levels must not exceed 75dB(A) at 400 feet when bordering commercial zone during business hours. • L_{10} (1) levels must not exceed 75dB(A) at 400 feet when bordering commercial zone during non-business hours. • Sound levels must not exceed 80dB(A) at the site boundary when bordering a manufacturing zone. • Sound levels must not exceed 55dB(A) at site boundary when near any noise-sensitive areas.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

ATTACHMENT 1 (CONTINUED)
FIELD OPERATION REGULATIONS

CITY, TOWN or VILLAGE	ALLOWABLE NORMAL OPERATION DAYS/HOURS	SPECIAL REQUIREMENTS
New Castle	Mon-Fri 7:30am-8:00pm Sat-Sun 10:00am-5:00pm	No blasting on Saturday, Sunday or holidays
New Rochelle (Residential)	Mon – Fri 8:00am-10:00pm Sat-Sun 10:00am-5:00pm 10:00pm-8:00am	• L_{10} (1) levels must not exceed 70dB(A) at a distance of 400 feet in residential areas. • Sound levels must not exceed 55dB near any sensitive receptor. • Compressors require mufflers with 20dBA or more Insertion Loss. • Pavement Breakers manufactured before 12/31/74 require mufflers with 5dBA or more Insertion Loss. • For residential areas, no noise must be audible beyond property perimeter.
New Rochelle (Commercial)		L_{10} (1) levels must not exceed 75dB(A) at a distance of 400 feet during normal business hours L_{10} (1) levels must not exceed 80dB(A) at a distance of 400 feet at all other times In manufacturing areas, during a 24hour period, L_{10} (1) levels must not exceed 80 dB(A) when measured at construction site boundary
New York City	Mon-Fri 7:00am-6:00pm	
North Castle	8:00am-6:00pm(or sundown) Sundown – 8:00am	• Sound levels must not exceed 70dB(A) at a distance of 400 feet when bordering residential zone. • Sound levels must not exceed 75dB(A) at a distance of 400 feet when bordering commercial zone. • Air Compressors require mufflers with 20 dBA or more Insertion Loss. • Paving Breakers manufactured before 12/31/74 require mufflers with 5 dBA or more Insertion Loss. • Sound levels must not exceed 55dB(A) in residential areas or 65dB(A) in commercial / manufacturing areas
North Hempsted (Village of)	Mon-Fri 8:00am-9:00pm Sat-Sun 10:00am-6:00pm	
Ossining (Town of)	Mon-Fri 8:00am-8:00pm Saturday 9:00am-5:00pm	
Ossining (Village of)	Mon-Fri 7:30am-8:00pm Saturday 9:00am-5:00pm	
Pawling (Village of)	Mon-Sat 7:00am-8:00pm	L_{10} (1) levels must not exceed 80dB(A) at construction site boundary. IMPULSIVE Noise must not exceed 130dB(A) at property line.
Peekskill	Mon-Fri 7:30am-8:00pm Saturday 9:00am-5:00pm	No holiday work permitted
Piermont	7:00am-5:00pm	
Poughkeepsie (City)	6:30am-9:00pm	Other hours for construction (emergency work) only with a permit issued by the Building Inspector
Poughkeepsie (Town)	7:00am-10:00pm	
Ramapo	Mon-Sat 8:00am-10:00pm	L_{10} (1) levels must not exceed 60dB(A) at construction site boundary

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

CITY, TOWN or VILLAGE	ALLOWABLE NORMAL OPERATION DAYS/HOURS	SPECIAL REQUIREMENTS
Sleepy Hollow (Village of)	Mon-Fri 8:00am-9:00pm Saturday 9:00am-9:00pm	
Sloatsburg	Mon-Fri 7:00am-7:00pm	
Suffern	Mon-Fri 7:00am-8:00pm	
Unionvale	7:00am-8:00pm	
West Haverstraw	Mon-Fri 6:00am-9:00pm Saturday 8:00am-22:00pm	
White Plains	7:00am-7:00pm	
Yonkers	Mon-Fri 7:00am-9:00pm	

L_{eq}(1): Time-average sound energy level during a time period of 1 hour. For the purposes of this document, all $L_{eq}(1)$ levels are expressed in dB(A).

L_{10}: The sound level exceeded for 10% of the specified time period.
L_{90}: The sound level exceeded for 90% of the specified time period.

© 1998-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

ATTACHMENT 2

Effective July 1, 2007, the NYCDEP Noise Code is updated to include additional construction requirements. A section of the new code specifically exempts utility-related streetwork and similar utility maintenance work from many of the requirements, but Con Edison and its contractors and subcontractors will still have several new requirements (NOTE: vendors should use same form as Con Edison but enter their name and contact number and cross out ours). Existing requirements will likely receive new emphasis. A posted Noise Mitigation Plan will be required on construction sites.

A compilation of construction noise requirements follows.

1) Most of our streetwork will be construction work, with the exception of routine manhole entries and other activities that do not involve construction tools or equipment. **Routine manhole work where the only devices utilized are a blower for atmospheric ventilation and/or an electric water pump inside the structure would not be considered construction work.**

2) The most current version of the attached form "Utility Noise Mitigation Plan" must be filled out and posted with the permit or elsewhere at the site, and presented to an inspector during a visit.
   NOTE: Post as soon as possible for emergencies.

3) **Job briefing and/or tailboard talks should include this page and the Mitigation Plan.**

4) The form includes lines for company name, contact number, and work schedule. Copies of the form have had contact information filled out already, and the schedule is usually on the permit. Emergencies and short-duration work will not require a schedule.

5) The form needs to indicate whether certain equipment will be used, and for jackhammers what type we are using. Check off or circle anything to be used for the job. "Backup" is not applicable at this time.

6) Portable pumps, compressors, and generators must be placed to minimize noise on nearby residents. Watch exhaust direction, as noise is louder in the direction of the exhaust.

7) As is currently required, all equipment/devices must have the manufacturer mufflers and other noise reduction parts in place, and be in good working order.

8) If NYCDEP concludes in response to a noise complaint that **properly used and maintained** equipment /devices are too loud, we will have 5 days to provide quieter models, alter our work, or file a variance.

9) When work is adjacent to **sensitive receptors**, such as schools, places of worship, retirement housing, or hospitals, attempt to contact and coordinate with the facility to minimize noise impact on activities.

10) When work extends past 3 days in the same location, the schedule must be posted conspicuously to inform nearby residents within 200 feet, or contact building owner(s).

11) Report all contact with NYCDEP noise enforcement to your supervisor or EH&S immediately.

12) As is currently required, minimize vehicle idling and ensure road plates are secure.

Utility Noise Mitigation Plan

I. Contact Information

Name of Responsible Party as defined in 15RCNY §28-109(a)
(Utility and/or Contractor and/or Sub):

Consolidated Edison -or-_____

Contact Phone Number 1-800-75CONED -or-_____

Work Schedule_____

DOT Permit (if needed)_____

Unless work duration is undetermined or anticipated to be only one shift, then fill in work in I above. For variances from permit or long-term emergencies, fill in work location/schedule above if known.

Permits need not be posted for emergency response and for routine manhole work in accordance with NYC DOT and NYC DEP rules and regulations. Emergency work may commence immediately and within 3 days, a permit and copy of this Plan shall be posted.

II. Site-Specific Information

Hours of Work are to be in accordance with NYC DOT Permit Stipulations and/or NYC DOT Highway Rules. Additional mitigation techniques for receptors within 200 feet may be required by the DEP for hours between 10 PM and 7 AM during weekdays and 7PM and 7 AM during weekends.

Residents within 200 feet of a construction site shall be given notice when work is scheduled for longer than 3 days. Conspicuous posting of such information, or where necessary notification of building managers/owners, shall satisfy this requirement.

The owner/operator of **sensitive receptors**, adjacent to this site, shall be contacted when practicable to coordinate work to minimize impact on the property.

Vehicle **engine idling** shall be prevented in accordance with NYC Ad. Code §24-163.

All **street plates** at this site, shall be installed and properly secured in accordance with 34RCNY §2-11(10)(e)

All corrective actions, at this site, shall be taken within **24 hours** of notice by the DEP or its agent.

All rules of 28RCNY §106 apply.

III. Construction Devices

This Plan certifies that all equipment indicated in this Mitigation Plan is maintained to operate in accordance with the manufacturer's operating specifications and has been equipped with appropriate manufacturer's noise reducing devices.

Check applicable boxes below:
When the specific devices listed in next column are utilized, the use of barriers is not required unless the Dept. of Environmental Protection receives complaints. NOTE: All devices must have manufacturer's noise reduction device installed and properly functioning. NOTE: Small electric sump pumps inside structures and blowers for atmospheric ventilation are safety devices, not construction devices.

☐ **JACKHAMMERS (including chisel hammer attached to a vehicle like a backhoe)**
- ☐ Copco model TEX P90S with elongated muffler casing or bellows > 15 inches in length (or equivalent)
- ☐ **Chicago Pneumatic CP1240 with a model F-814004 muffler (or equivalent)**
- ☐ Other _____

☐ BACKHOES _____method of mitigating device
☐ GENERATORS (Noise mitigation required – noise insulating fabric or other such techniques)
☐ COMPRESSORS (Noise mitigation required – noise insulating fabric or other such techniques)
☐ PUMPS (Noise mitigation required – noise insulating fabric or other such techniques)
☐ OTHER_____

IV. Specialized Equipment: Circle applicable device

The vehicles listed below and other vehicles with internal combustion motors shall require noise mitigation measures as specified by the DEP, such as the use of noise-insulating material or other such techniques that do not interfere with engine operation. The location of receptors should be considered in the placement and use to minimize noise impact.

Rodding or Cable Truck **Flush / Vac Truck**

Pavement Core Drilling Truck **Vacuum Excavator Truck**

Indicate method(s) of mitigating any of the above devices:_____

☐ BACKUP ALARMS (Required January 2008)
- ☐ Preco Model 45AA (or equivalent)
- ☐ Ecco Model 820 (or equivalent)
- ☐ Preco Model 1048 (or equivalent)
- ☐ Ecco Model SA907 (or equivalent)
- ☐ Grote Model 73100 (or equivalent)
- ☐ BBS-TEK Brigade Model BBS-92 (or equivalent)

Version 2, July 3, 2007
You must use the latest version available. Please check the website: http://www.nyc.gov/html/dep/html/airnoise.html

v.2 7/31/12

Utility Noise Mitigation Plan

v.2 7/31/12

I. Contact Information

Name of Responsible Party as defined in 15RCNY §28-109(a)
(Utility and/or Contractor and/or Sub):

_____

Contact Phone Number_____
Work Schedule_____
DOT Permit (if needed)_____

Unless work duration is undetermined or anticipated to be only one shift, then fill in work in I above. For variances from permit or long-term emergencies, fill in work location/schedule above if known.

Permits need not be posted for emergency response and for routine manhole work in accordance with NYC DOT and NYC DEP rules and regulations. Emergency work may commence immediately and within 3 days, a permit and copy of this Plan shall be posted.

II. Site-Specific Information

Hours of Work are to be in accordance with NYC DOT Permit Stipulations and/or NYC DOT Highway Rules. Additional mitigation techniques for receptors within 200 feet may be required by the DEP for hours between 10 PM and 7 AM during weekdays and 7PM and 7 AM during weekends.

Residents within 200 feet of a construction site shall be given notice when work is scheduled for longer than 3 days. Conspicuous posting of such information, or where necessary notification of building managers/owners, shall satisfy this requirement.

The owner/operator of **sensitive receptors**, adjacent to this site, shall be contacted when practicable to coordinate work to minimize impact on the property.

Vehicle **engine idling** shall be prevented in accordance with NYC Ad. Code §24-163.

All **street plates** at this site, shall be installed and properly secured in accordance with 34RCNY §2-11(10) (e)

All corrective actions, at this site, shall be taken within **24 hours** of notice by the DEP or its agent.

All rules of 28RCNY §106 apply.

III. Construction Devices

This Plan certifies that all equipment indicated in this Mitigation Plan is maintained to operate in accordance with the manufacturer's operating specifications and has been equipped with appropriate manufacturer's noise reducing devices.

Check applicable boxes below:
When the specific devices listed in next column are utilized, the use of barriers is not required unless the Dept. of Environmental Protection receives complaints. NOTE: All devices must have manufacturer's noise reduction device installed and properly functioning. NOTE: Small electric sump pumps inside structures and blowers for atmospheric ventilation are safety devices, not construction devices.

☐ **JACKHAMMERS (including chisel hammer attached to a vehicle like a backhoe)**
- ☐ Copco model TEX P90S with elongated muffler casing or bellows > 15 inches in length (or equivalent)
- ☐ **Chicago Pneumatic CP1240 with a model F-814004 muffler (or equivalent)**
- ☐ Other _____

☐ BACKHOES _____ method of mitigating device
☐ GENERATORS (Noise mitigation required – noise insulating fabric or other such techniques)
☐ COMPRESSORS (Noise mitigation required – noise insulating fabric or other such techniques)
☐ PUMPS (Noise mitigation required – noise insulating fabric or other such techniques)
☐ OTHER _____

IV. Specialized Equipment: Circle applicable device

The vehicles listed below and other vehicles with internal combustion motors shall require noise mitigation measures as specified by the DEP, such as the use of noise-insulating material or other such techniques that do not interfere with engine operation. The location of receptors should be considered in the placement and use to minimize noise impact.

Rodding or Cable Truck **Flush / Vac Truck**

Pavement Core Drilling Truck **Vacuum Excavator Truck**

Indicate method(s) of mitigating any of the above devices:_____

☐ BACKUP ALARMS (Required January 2008)
- ☐ Preco Model 45AA (or equivalent)
- ☐ Ecco Model 820 (or equivalent)
- ☐ Preco Model 1048 (or equivalent)
- ☐ Ecco Model SA907 (or equivalent)
- ☐ Grote Model 73100 (or equivalent)
- ☐ BBS-TEK Brigade Model BBS-92 (or equivalent)

Version 2, July 3, 2007
You must use the latest version available. Please check the website: http://www.nyc.gov/html/dep/html/airnoise.html

ATTACHMENT 3
CONSTRUCTION MITGATION PLAN

The most recent form may be downloaded at

http://www.nyc.gov/html/dep/html/noise/index.shtml

ATTACHMENT 4
NOISE REGULATIONS FOR OPERATIONS UNDERTAKEN OUTSIDE OF PERMISSIBLE TIME

CITY, TOWN, or VILLAGE	Regulations	DETAILS
Bedford	EXEMPT	
Airmont (Village of)	EXEMPT	
Chestnut Ridge (Village of)	EXEMPT	
Clinton (Town of)	EXEMPT WITH APPROVAL	Granted by Zoning Enforcement Officer and the Zoning Board of Appeals
Croton-on-Hudson	EXEMPT	
Dover (Town of)	ONLY FOR TEMPORARY CONDITIONS	
Fishkill (Town of)	BY TEMPORARY PERMIT	Granted by Town Clerk upon recommendation of Zoning Enforcement Officer
Hastings-on-Hudson	EXEMPT	
Hyde Park (Town of)	EXEMPT	
LaGrange (Town of)	EXEMPT	
Mamaroneck (Town of)	ONLY WITH EXCEPTION	Issued by Town of Mamaroneck
Mamaroneck (Village of)	SPECIAL PERMIT REQUIRED	Issued by Building Inspector
Millbrook (Village of)	EXEMPT	
Montebello (Village of)	EXEMPT	
Mount Pleasant	SPECIAL PERMIT REQUIRED	Issued by Building Inspector
Mount Vernon	SPECIAL PERMIT REQUIRED	Issued by Commissioner of Buildings
New Castle	VARIANCE REQUIRED	Issued by Zoning Board of Standards and Appeals
New Hempstead (Village of)	EXEMPT	
New Rochelle	PERMIT FOR RELIEF REQUIRED	Issued by City Clerk
New York City	VARIANCE REQUIRED	Within 12 hours, Variance Required. Variance Valid for 3 days, and must be renewed as required. Mitigation Plan required.
North Castle	SPECIAL PERMIT REQUIRED	Issued by Building Inspector
Nyack (Village of)	EXEMPT	
Pawling (Village of)	EXEMPT	
Piermont (Village of)	VARIANCE REQUIRED	Issued by Village Board
Poughkeepsie (City)	SPECIAL PERMIT REQUIRED	Issued by Building Inspector, valid for up to 3 days. May be renewed for an additional 3 days.
Poughkeepsie (Town of)	EXEMPT	
Ramapo (Town of)	EXEMPT	
Scarsdale	EXEMPT	
Sleepy Hollow	EXEMPT	
Spring Valley (Village of)	SPECIAL	Exempt for 24 hours
Suffern (Village of)	EXEMPT	
Wappingers Falls (Village of)	EXEMPT	
West Haverstraw (Village of)	SPECIAL PERMIT REQUIRED	Issued by Building Inspector for periods of 3 days. May be renewed.
Yonkers	EXEMPT	

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP S05.03 – Personal Protective Equipment: Protective Clothing
Revision 10: 08/27/2013 Effective Date: 09/30/2013

CONTENTS

SECTION 1.0 – PURPOSE
SECTION 2.0 – APPLICABILITY
SECTION 3.0 – INTRODUCTION
SECTION 4.0 – COMPLIANCE REQUIREMENTS
- 4.1 – HAZARD ASSESSMENT AND GENERAL GUIDELINES FOR SELECTION AND USE OF PPE
- 4.2 – CON EDISON PPE REQUIREMENTS
- 4.3 – PPE INSPECTION AND MAINTENANCE
- 4.4 – TRAINING AND TESTING
- 4.5 – RECORDKEEPING

SECTION 5.0 – DEFINITIONS
SECTION 6.0 – RESPONSIBILITIES
SECTION 7.0 – REFERENCES
- ATTACHMENT 1 – GUIDELINES FOR SELECTION OF PROTECTIVE CLOTHING
- ATTACHMENT 2 – PERSONAL PROTECTIVE CLOTHING

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO THE SELECTION OF PROTECTIVE CLOTHING FOR THE BODY (ARMS, LEGS, AND TORSO). The purpose of this procedure is to ensure that appropriate ***personal protective equipment (PPE)*** is selected and worn to protect Con Edison workers, contractors, and visitors at Con Edison facilities and work sites from chemical and physical hazards to the ***body***.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to any Con Edison activity that presents work hazards to the body that require the use of PPE.

3.0 INTRODUCTION

Many hazards can threaten the body, including heat, splashes from hot metals during welding, splashes from hazardous liquids (acids, bases, solvents), impacts, cuts, electrical hazards (arc, flame), and radiation. Based on the results of ***hazard assessments*** performed in each facility in accordance with CEHSP S 05.01, *Hazard Assessment and Personal Protective Equipment*, protective clothing must be identified that provides the correct protection.

Where hazards are determined to be present that can cause injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact, it is necessary to select PPE to adequately protect affected employees. A variety of protective clothing is available to protect against these hazards, including vests, jackets, aprons, coveralls, and full-body suits. In

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

addition, the OSHA Electrical Maintenance Standard, 29 Code of Federal Regulations (CFR) 1910.269, prohibits generation, transmission, and distribution employees who may be exposed to flame or electric arc from wearing clothing that may increase the severity of an injury.

This procedure presents requirements for selecting and maintaining protective clothing to control work hazards to the body, specifically the arms, legs, and torso.

4.0 COMPLIANCE REQUIREMENTS

4.1 HAZARD ASSESSMENT AND GENERAL GUIDELINES FOR SELECTION AND USE OF PPE

Con Edison must perform a hazard assessment to determine the ***proper*** personal protective equipment required for each job task performed by employees. The hazards, physical requirements of the operation, resistance of clothing to work-related destructive factors (chemicals, abrasion, etc.), and worker comfort must be considered when selecting required clothing. The PPE hazard assessment is performed to ensure that PPE is correctly identified and that implementation is consistent with workplace conditions. The assessment must be reviewed when new PPE or new chemicals are introduced into the workplace or when operations change. A ***hazard assessment certification*** must be maintained by personnel and the facility to provide a record of workplace reviews. [1] R

The following paragraphs identify guidelines for the selection and use of protective clothing.

4.1.1 Arc or Flame Protection

OSHA standard 29 CFR 1910.269 requires that all electric power generation, transmission, and distribution employees who may be exposed to arc or flames wear clothing that does not contribute to the severity of an injury that could be sustained by the employee. This requirement is based on the fact that certain fabrics are easily ignited and can cause burns. Employees who are potentially be exposed to electrical arc and/or gas fires must wear flame resistant/flame retardant clothing. Employees who are not exposed to electrical arc and/or gas fires may wear 100% natural fiber clothing (wool or cotton). [2] R

4.1.2 Fit and Appearance

Clothing of all kinds must meet certain safety requirements when there is a potential for it to catch on moving parts of machinery (gears, pulleys, rotating shafts, etc.). Clothing, whenever practical, must not have loose parts, such as sleeve tabs, pant cuffs, pocket flaps, etc. Sleeves or pant legs must fit closely to the wearer.

When appropriate, the color of the garment selected must be chosen to show stains that could indicate contact with a hazardous substance or to make a worker conspicuous. Also, persons working in areas near traffic must wear fluorescent yellow/reflective vests as specified in the Con Edison Work Area Protection and Traffic Control Field Manual. [3] R/P

4.1.3 Laundering

Maintenance and laundering are needed when clothing is soiled due to ***incidental contact*** with substances typically found in the workplace. In the event an employee's uniform or coveralls are contaminated with a hazardous substance (as outlined in this CEHSP) the employee will turn the

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

clothing over to supervision for proper cleaning or disposal as required. All clothes must be laundered in accordance with manufacturer's instructions. [4] R/P

4.2 CON EDISON PPE REQUIREMENTS

4.2.1 Selection of Protective Clothing

Decisions regarding the appropriate garment to wear including hard hats in and around structures must be made on a daily basis according to existing field conditions. The following conditions or materials may be encountered during daily duties:

- Potential for flame or electric arc.
- Presence of oil - non-PCB and PCB-containing.
- Presence of asbestos-containing material (ACM).
- Work with or on lead-containing material.
- Work with hazardous chemicals.

Attachment 1 is a flowchart that provides guidelines for the selection of protective clothing for these hazards. Attachment 2 identifies types of protective clothing.

Based on the potential exposure of the employees, natural fiber clothing may be acceptable. However, in any situation where employees may be exposed to the hazards of electric arc or flame these employees must wear appropriate flame-retardant clothing. These situations will be documented on the appropriate hazard assessment form for the task being conducted.

Requirements for Flame-Retardant Clothing

Employees and contractors must wear flame retardant (FR) clothing when performing tasks that may expose them to the hazards of flame or electric arc. Employees who are potentially exposed to electric arc must wear Nomex, Indura, Ultrasoft, Ultrasoft AC or other FR materials approved by Corporate EH&S. Employees who are potentially exposed to gas flash fire must wear Nomex, Indura, Ultrasoft, Ultrasoft AC or other FR materials approved by Corporate EH&S.

In situations where employees and contractors are required to wear FR clothing, all layers of clothing underneath the FR clothing must be either FR or 100% natural fiber (wool or cotton), including undergarments. In warmer weather, employees or contractors may choose to wear only 100% natural fiber undergarments under the outermost layer of FR clothing. In all cases, the outermost layer of clothing must be FR. Employees and contractors are prohibited from wearing clothing containing polyester, nylon, rayon, and acetate, alone or in blends, when performing tasks that may expose them to flames or electric arc.

In situations that present the potential for flame or electric arc exposure and the possibility that the garments may become soiled with oil, PCB-containing oil, or other liquid, limited-use FR/ **Chemical Resistant (CR)** disposable outerwear must be worn over the FR coveralls. **These disposable FR/CR garments must not be worn without the FR coveralls.**

Clothing Requirements for Oil and PCB-Containing Oil

If oil is present and there is reason to expect that a flame or electrical arc will not occur, employees must use garments that protect against the oil hazard. Depending on the amount of oil present and the potential for contact with oil, either disposable polycoated or Saranex coveralls must be worn. The selection of garment is independent of the PCB content of oil.

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

- Saranex coveralls provide greater protection against oil breakthrough and ***penetration*** than do polycoated coveralls. For this reason Saranex coveralls must be worn when the amount of oil present may result in substantial contact.

- In situations where potential contact with oil is minimal, polycoated coveralls can be used.

If a situation has the potential for flame or electric arc exposure and possible soiling of garments with oil, limited-use FR disposable outerwear must be worn over the FR coveralls. **These disposable FR garments must not be worn without the FR coveralls**.

After work involving potential contact with oil is completed, the disposable coveralls must be removed. If the garments have been in direct contact with oil containing 50 parts per million (ppm) or greater PCBs, the coveralls must be disposed of in accordance with CEHSP E06.12, *Disposal*. If the garments have been in direct contact with oil containing less than 50 ppm PCBs, the coveralls must be disposed of as general waste.

Clothing Requirements for Asbestos-Containing Materials

If asbestos-containing material (ACM) is present and there is reason to expect that a flame or electrical arc will not occur, employees must use garments that protect against the asbestos hazard. In this situation, a Con Edison-approved disposable coverall (Tyvek) must be worn during asbestos removal. This coverall may be worn alone or over FR coveralls.

If there is reason to expect that a flame or electrical arc may occur during asbestos work and there is a potential chemical or oil exposure, such as during the removal of arc-proofing tape in a manhole, the limited-use, chemically resistant FR disposable garments (polycoated Sontara) must be worn in place of the asbestos coverall. If there is reason to expect that a flame or electrical arc may occur during asbestos work and there is no potential chemical or oil exposure, the limited-use FR disposable garments (uncoated Sontara) must be worn in place of the asbestos coverall. In these situations, the limited-use FR disposable outerwear must be worn over the FR coveralls. **These disposable FR garments must not be worn without the FR coveralls**.

Upon completion of asbestos work, the asbestos coverall or limited-use FR garment must be removed and disposed of in accordance with the Asbestos Management Manual, Chapter 11 - Storage, Transfer, Transportation and Disposal.

Clothing Requirements for Work with Hazardous Liquid Chemicals

The proper selection of protective clothing depends on the nature of potential hazard (routes of entry, physical characteristics, toxicological properties, etc.), the type of work to be done, ergonomic constraints, and the chemical and physical performance or resistance characteristics required by the protective clothing. Both polycoated and Saranex Tyvek coveralls are chemical resistant to a wide range of chemicals. If a hazardous chemical splashes onto the coveralls, remove the chemical first by washing it off and then remove the coveralls. Saranex coveralls must be worn when the amount of acid, bases, solvents or other hazardous liquids present may result in substantial contact.

- In situations where potential contact with acids, bases, solvents and other hazardous liquid material is minimal, polycoated Tyvek must be worn.
- The PPE for battery maintenance activities includes a rubber apron and vinyl sleeves.

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

Clothing Requirements for Welding and Burning

Employees exposed to the hazards created by welding, cutting or brazing operations, including assistants and fireguards, must wear flame-retardant coveralls. Employees performing welding or cutting activities must also don the following equipment:

- Flame-resistant gauntlet gloves.
- Flame-retardant coveralls.
- Flame-resistant aprons or leather vests, jackets, leggings, sleeves and spats worn over the flame-retardant coveralls when additional protection against sparks and radiant energy is needed.
- 100% natural fiber undergarments
- A flame-retardant skullcap with ear covers for overhead work.

Clothing Requirements for Lead Splicing Work

Persons performing lead splicing work must wear FR coveralls. If the job will result in soiling of the FR coveralls, limited-use FR garments must be worn over the FR coveralls. This should protect and extend the life of the FR coveralls. **The limited-use FR garment must not be used without the FR coveralls.**

Clothing Requirements for Working with Hazardous Materials

Clothing for all tasks where there is a potential for exposure to hazardous materials must be approved by EH&S. [5] R/P

Clothing Requirements for Working Near or Over Water

U.S. Coast Guard approved personal flotation devices must be worn by an employee whenever the danger of drowning exists. This condition may exist whenever an employee is working near or over water and could be pulled or pushed or fall into the water.

Each personal flotation device must be maintained in a safe condition and inspected frequently enough to ensure that it does not have rot, mildew, water saturation, or any other condition that could render the device unsuitable for use. An employee may cross streams or other bodies of water only if a safe means of passage, such as a bridge, is provided. [6] R/P

4.2.2 Reusable Clothing Maintenance and Laundering

Most reusable work garments require periodic laundering to clean them of general debris and material that accumulates on them at the work location due to incidental contact. The vendor will maintain those clothes that are part of the rental contract. All other clothes must be laundered according to manufacturer's specifications.

When ***accidental contact*** occurs and reusable clothing becomes soiled or contaminated with materials such as ACM or PCBs, appropriate precautions must be taken.

PCB-Contaminated Reusable Clothing

Reusable clothing that has been in direct contact with oil containing 50 ppm or greater PCBs must be disposed of in accordance with CEHSP E06.12, *Disposal*.

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

Reusable clothing that has been in direct contact with oil containing 1 ppm or more PCBs, but less than or equal to 49 ppm PCBs, must be collected and bagged at the work location for vendor pickup.

Friable ACM-Contaminated Reusable Clothing

Reusable clothing that has been in direct contact with friable ACM must be wet down to minimize fiber release, placed in a sealed container, and collected from the employee. The contaminated garment must be removed and disposed of in accordance with the Asbestos Management Manual, Chapter 11 - Storage, Transfer, Transportation and Disposal.

Laundering of 100% Cotton Clothing

The laundering instructions for 100% cotton garments are as follows:

- Machine wash in warm water with similar colors.
- Use only non-chlorine bleach, when needed.
- Tumble dry at low to medium temperature.
- Iron on a low to medium temperature, if required.

Laundering Indura and Proban Coveralls

Both Indura and Proban coveralls are made of cotton that has been treated to make them fire retardant. When washed properly, the fire-retardant treatment should last the life of the garment. The manufacturer's instructions for laundering Indura and Proban treated fabrics must be adhered to, including the following washing instructions:

- Wash clothing inside out to minimize edge and surface abrasion.
- Use a water level sufficient for the quantity of clothing to be washed, preferably the high tide level on the washer.
- Use a quality detergent, such as Tide, All, Era, Yes, or Wisk. Follow the detergent manufacturer's instructions.
- Use a temperature that is as low as possible but that still cleans the garment. When using a quality detergent, the warm or cold setting may be sufficient.
- Do not use chlorine (sodium hypochlorite) bleach such as Clorox as this can affect the fire-retardant properties of these garments.
- When drying garments, use the minimum setting required to dry the clothing in a practical time
- Dry garments inside out.
- To minimize shrinkage, immediately remove garments from the clothes dryer when they are dry or slightly damp.

Laundering Nomex Garments

Nomex garments are made of flame-retardant aramid fibers. The flame-retardant property is "built into" the fiber; it is not applied to a fabric as a treatment or additive, as in the case of the Indura and Proban coveralls. The manufacturer's instructions for laundering Nomex garments must be adhered to, including the following washing instructions:

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

- Nomex garments must be sorted and washed separately from other garments to prevent flammable fibers/lint from being transferred to the Nomex garment.
- Heavily soiled or stained garments must be pre-treated as soon as possible with a full-strength heavy-duty liquid detergent.
- The wash load size must allow the garment to move freely throughout the wash and rinse cycles.
- Normal wash water setting (approximately 140° Fahrenheit) is adequate for moderately soiled garments. Higher temperatures may be required for heavily soiled or stained garments.
- A synthetic heavy-duty liquid laundry detergent, such as liquid Tide, All, Era, Yes, and Wisk, is recommended for cleaning Nomex garments.
- Chlorine bleach must not be used. Bleach will not degrade the flame-retardant properties of the garment, but it may cause strength and color loss over time.
- Nomex garments must be tumble-dried on medium or high temperature settings.
- Iron on medium setting, if necessary. [7] R/P

4.3 PPE INSPECTION AND MAINTENANCE

This information will help to ensure that equipment is maintained in a satisfactory condition and provides the required protection when used. The following minimum requirements for inspection and maintenance will be followed.

- PPE must be properly inspected prior to use. Damaged or missing items like holes in gloves or protective clothing, missing side shields on glasses, and broken laces or cracked soles on shoes can significantly impact the effectiveness of the PPE. Signs of wear, such as smooth soles on shoes that can cause slipping or scratches on goggles that limit vision, can present new hazards. PPE that is damaged, missing items, or shows signs of wear, jeopardizing the protection afforded by the equipment, will be removed from service and repaired or replaced.
- PPE must be cleaned and properly decontaminated in accordance with manufacturer recommendations.
- PPE must be properly stored to protect it from exposure to conditions that can damage or compromise its effectiveness. Specific locations acceptable for the storage of PPE will be identified.
- Employees must be familiar with methods for obtaining new PPE in the event that testing and inspection identify unacceptable equipment.

Con Edison maintains a supply of PPE that can be used by facility personnel when needed. The equipment is specific to the tasks performed by Con Edison personnel. [8] R/P

4.4 TRAINING AND TESTING

Refer to CEHSP S05.01, *Hazard Assessment and Personal Protective Equipment*, Section 4.4 for detailed training and testing requirements. [9] R/P

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

4.5 RECORDKEEPING

In accordance with CEHSP S05.01, *Hazard Assessment and Personal Protective Equipment,* the Training Coordinator for each operating organization must retain training records for three years. Additionally, OSHA 1910.269(a)(2)(vii) requires that training records associated with FR clothing be maintained for the duration of the employee's employment. The Safety Administrator must maintain hazard assessment documentation for all job types currently performed within the organization. [10] R/P

5.0 DEFINITIONS

***Accidental Contact*:** An unexpected event where a substantial amount of a substance spills, splashes, sprays, or otherwise comes into contact with a worker. It is not a typical occurrence for the duties/job being performed.

Body: Arms, legs, and torso.

Hazard Assessment: A systematic review performed to identify exposure hazards and appropriate PPE for specific work operations. This assessment includes a review of the work activities, equipment, and materials used, and end products and by-products to evaluate the potential for physical contact, noise hazards and/or respiratory hazards.

Hazard Assessment Certifications: Written verification that identifies a completed exposure assessment, including the evaluated tasks/processes and areas, the person who performed the assessment, and the date(s) of the assessment.

Incidental Contact: Materials that an employee may contact during the performance of his daily duties. For example, an auto mechanic contact with lube oil while replacing a part or a troubleshooter brushing up against equipment in a vault during an inspection that results in a smudge on their clothing.

Penetration: Flow of chemicals through clothing discontinuities, such as zippers, seams, and pinholes.

***Personal Protective Equipment (PPE)*:** Clothing and equipment worn by personnel to prevent contact with hazards present in the work area. PPE includes safety glasses, face shields, gloves, safety shoes, hearing protection, hard hats, etc.

Proper: Approved, certified, or suitable, within acceptable guidelines set forth by governing codes and standards, as well as recognized safe work practices.

6.0 RESPONSIBILITIES

Employees: The PPE user is responsible for following the requirements of the PPE procedure, including: wearing required PPE; attending required training; caring for, cleaning, and maintaining PPE; and submitting equipment for repair or replacement.

Environment, Health, and Safety (EH&S): EH&S performs the following functions:

- Reviews applicable regulations and ensures that procedures meet all regulatory requirements.

© 2000-2013 Consolidated Edison Co. of New York, Inc.

- Revises procedures as applicable.
- Reviews/approves controlled documents prior to release.
- Distributes updates and changes.
- Reviews training prepared by the Learning Center.
- Provides technical assistance to Safety Administrators.

Facility or Site Manager Responsible for Compliance: The Con Edison designated individual within each operating organization who is responsible for ensuring compliance with federal, state, and local regulations and this procedure.

Law Department: The Law Department assists and provides guidance to EH&S by reviewing changes to these procedures in light of all applicable statutes and regulations to ensure that the procedures meet all legal requirements.

Operating Organizations: Unless otherwise indicated, operating organizations are responsible for compliance with federal, state, and local regulations and this procedure.

Safety Administrator: Responsible for performing hazard assessments, selecting PPE, and maintaining hazard assessment certifications.

Supervisors: Responsible for ensuring that personnel wear proper PPE and for performing necessary training.

Training Coordinators: Enters PPE training records into the Training Registration System.

7.0 REFERENCES

4.1 HAZARD ASSESSMENT AND GENERAL GUIDELINES FOR SELECTION AND USE OF PPE

[1] 29 CFR 1910.132(d) (hazard assessment, including written certification requirement); 29 CFR 1910.132, Appendix B (non-mandatory compliance guidelines for hazard assessment, including Section 7, reassessment of hazards). NOTE: The OSHA regulations do not specifically require reassessment of hazards, although the issue is addressed in the Appendix B non-mandatory guidelines).

[2] 29 CFR 1910.137 (electrical protective equipment); 29 CFR 1910.269(l)(6) (apparel for electrical power generation, transmission, and distribution).

[3] USDOT Federal Highway Administration, *Manual on Uniform Traffic Control Devices,* Section 6D.03, Worker Safety Considerations (2003 Edition) (clothing requirements when working near traffic). The manual can be found at: http://mutcd.fhwa.dot.gov/HTM/2003/html-index.htm. The remaining requirements in this section relating to fit and appearance are required by Con Edison as a matter of policy.

[4] See Note 6 below regarding laundering.

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

4.2 CON EDISON REQUIREMENTS

[5] 29 CFR 1910.132 (general PPE requirements); 29 CFR 1910.137 (electrical protective equipment); 29 CFR 1910.252(b)(3) (protective clothing for welding, cutting and brazing); 29 CFR 1910.269(l)(6) (apparel for electric power generation, transmission and distribution). NOTE: The OSHA regulations do not contain specific requirements for protective apparel comparable to those discussed in CEHSP S05.01, *Hazard Assessment and Personal Protective Equipment* relating to head, eye and/or face, hand and foot protection. The specific clothing identified in this section has been determined to meet OSHA requirements relating to proper PPE. NOTE: 29 CFR 1910.269(l)(6) allows clothing made of acetate, nylon, polyester or rayon provided it has been treated to eliminate hazards; Con Edison bars all clothing containing such fibers as a matter of policy.

[6] 29 CFR 1910.269(w)(5)(i)-(iii) (requiring personal flotation device when danger of drowning exists). NOTE The cited provision applies only to the operation and maintenance of electric power generation, control, transformation, transmission and distribution lines and equipment. Con Edison applies this requirement to all activities that involve the potential for drowning as a matter of policy.

[7] 29 CFR 1910.132(a) (general PPE maintenance requirement); 29 CFR 1910.132(e) (prohibiting use of damaged/defective PPE); 29 CFR 1910.132, Appendix B, Sec. 12 (non-mandatory: cleaning and maintenance); 29 CFR 1910.137(b) (in service use and care of electrical protective equipment). NOTE: Con Edison has developed the specific procedures in this section relating to maintenance and laundering of particular types of clothing to ensure that the clothing continues to provide proper protection to Con Edison employees.

4.3 PPE INSPECTION AND MAINTENANCE

[8] 29 CFR 1910.132(a) (general PPE maintenance requirement); 29 CFR 1910.132(e) (prohibiting use of damaged/defective PPE); 29 CFR 1910.132, Appendix B, Sec. 12 (non-mandatory: cleaning and maintenance); 29 CFR 1910.137(b) (in service use and care of electrical protective equipment). NOTE: Con Edison has developed the specific procedures in this section relating to inspection and maintenance to ensure that protective clothing is maintained in a satisfactory condition.

4.4 TRAINING AND TESTING

[9] See CEHSP S05.01, *Hazard Assessment and Personal Protective Equipment*, for training and testing requirements.

4.5 RECORDKEEPING

[10] 29 CFR 1910.132(d)(2) (written hazard assessment certification); 29 CFR 1910.132(f)(4) (training records); 29 CFR 1910.269(a)(2) (electric power generation, transmission and distribution training recordkeeping). NOTE: the OSHA regulations do not specify a retention period for training records under 29 CFR 1910.132(f)(4). Con Edison has adopted a three-year record retention period as a matter of policy. 29 CFR 1910.269(a)(2) requires training records to be retained for the duration of the employee's employment**.** This training covers PPE, including FR clothing.

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

National Safety Council - Accident Prevention Manual for Business and Industry, 10th edition.

8.0 REVISION HISTORY

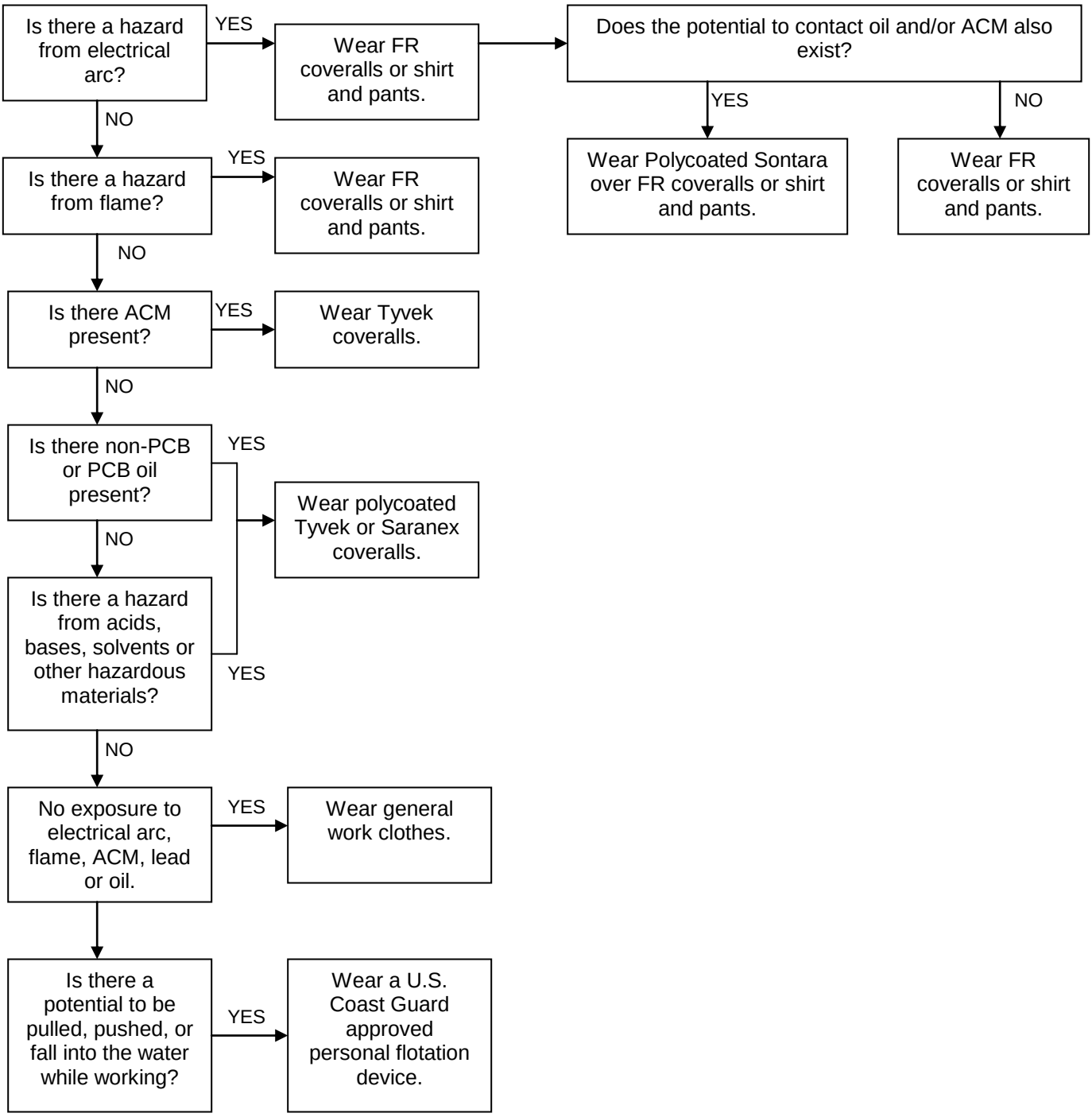
Revision Date	Revision #	Summary of Change	Author
6/28/2013	9	Periodic review by SME and addition of Induara, Ultrasoft, Ultrasoft AC or any other FR clothing approved by Corporate EH&S for Gas Operations. Added revision history section. Assign new revision #, revision and effective date to reflect review of this CEHSP.	P. Kothari, S. Ng
8/27/2013	10	Updated section 4.2.1 to include statement pertaining to the use of hard hats in and around structures; Updated various hyperlinks and title of other CEHSPs referenced throughout this document; Updated revision date and number to reflect these changes	B. Suggs S. Ng

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

ATTACHMENT 1

GUIDELINES FOR SELECTION OF PROTECTIVE CLOTHING



© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

ATTACHMENT 2
PERSONAL PROTECTIVE CLOTHING

PROTECTIVE CLOTHING	USE	GROUP/OPERATION
Flame Retardant (FR)	• Worn when there is potential exposure to flame or electric arc. • Worn when performing lead splicing.	Steam, Powerhouse, Electrical Welding, Hotwork Gas Operations Welding, Hotwork
U.S. Coast Guard Approved Personal Flotation Device	Worn when the potential of drowning exists.	Steam, Powerhouse, Electrical, Spill Response Team Members
Tyvek	Worn when potential for contact with asbestos-containing materials (ACM).	Maintenance, Spill Response Team Members
Kleenguard Ultra (Tyvek equivalent)	Worn for general utility, asbestos, bloodborne pathogens, lead dust, bulk chemical delivery, and short-term, incidental contact with oil, including polychlorinated biphenyls (PCB).	Maintenance, Spill Response Team Members
Disposable Polycoated / Saranex	• Polycoated is worn when there is minimal potential for contact with PCBs. • Saranex is worn where there is greater potential for contact with PCBs.	Maintenance, Spill Response Team Members
Disposable Polycoated/ Saranex	• Polycoated is worn when there is a minimal potential for contact with acid, bases, solvents and other hazardous liquid materials. • Saranex is worn where there is a greater potential for contact with acids, bases, solvents and other hazardous liquid materials	Acid Deliveries, Maintenance of Acid Systems, solvents
Polycoated Sontara	Polycoated Sontara is worn when there is both a potential for arc or flame and a potential for exposure to an oil contaminant or asbestos. This garment protects normal FR clothing.	Operations where there is an exposure to arc or flame and where there is an exposure to oil and/or asbestos
Uncoated Sontara	Uncoated Sontara is worn when there is a potential for arc or flame and no potential for exposure to an oil contaminant. This garment protects normal FR clothing.	Operations where there is an exposure to arc or flame and where there is an exposure to asbestos (no oil)
Rubber Apron Vinyl Sleeves	Rubber apron bib style and vinyl sleeves are worn over work clothes to protect against acids.	Battery Maintenance and acid handling

© 2000-2013 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP S12.00 – Lockout/Tagout Procedures
Revision 4: 7/16/2013 Effective Date: 09/30/2013

CONTENTS

SECTION 1.0 – PURPOSE
SECTION 2.0 – APPLICABILITY
SECTION 3.0 – INTRODUCTION
- 3.1 – PROCEDURE
- 3.2 – PERSONNEL

SECTION 4.0 – COMPLIANCE REQUIREMENTS
- 4.1 – LOCKOUT PROCEDURE
- 4.2 – LOCKOUT/TAGOUT PROCEDURE SEQUENCE
- 4.3 – GROUP LOCKOUT OR TAGOUT
- 4.4 – SHIFT OR PERSONNEL CHANGES
- 4.5 – ANNUAL INSPECTION
- 4.6 – PROTECTIVE HARDWARE AND MATERIAL
- 4.7 – TRAINING

SECTION 5.0 – DEFINITIONS
SECTION 6.0 – REFERENCES
- ATTACHMENT 1 – EXAMPLE SITE PROCEDURE
- ATTACHMENT 2 – LOCKOUT/TAGOUT PERIODIC INSPECTION

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO COMPLY WITH ALL FEDERAL REGULATIONS RELATING TO *LOCKOUT/TAGOUT*. The purpose of this procedure is to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment is isolated from the ***energy source*** and rendered inoperative.

This document does not supersede Con Edison's General Instructions Governing Work on System Electrical Equipment (i.e., Bluebook) or any other existing corporate documents (i.e., COP 5-1-2, Processing & Controlling Operating Orders and Work Permits).

2.0 APPLICABILITY

This Corporate, Environmental and Safety Procedure (CEHSP) applies to all Con Edison facilities, each of which is responsible for establishing and documenting site-specific lockout/tagout procedures for each piece of equipment, machinery or system under that site's supervision. Procedures may be established for classes of equipment or machinery if their function and operation are similar and the procedure can collectively account for the control of all hazardous energy sources.

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please EH&S Connect for the current version prior to use.

This CEHSP also applies to all outside contractors performing work on Con Edison equipment within the facility. It is the responsibility of the Facility's Manager to ensure compliance. Failure to comply may result in immediate termination of such outside contractor's services.

Procedures must be developed, documented and utilized by each Con Edison site for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.

Exception: The site does not need to document the required procedure for a particular machine or equipment, when **all** of the following elements exist:

(1) The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees;

(2) The machine or equipment has a single energy source which can be readily identified and isolated;

(3) The isolation and locking out of that energy source will completely de-***energize*** and deactivate the machine or equipment;

(4) The machine or equipment is isolated from that energy source and locked out during ***servicing and/or maintenance***;

(5) A single ***lockout device*** will achieve a locked-out condition;

(6) The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance;

(7) The servicing and/or maintenance does not create hazards for other employees; and

(8) The employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing and/or maintenance.

3.0 INTRODUCTION

3.1 PROCEDURE

This procedure applies to any job task that may expose workers to potentially hazardous energy. There are several qualified exceptions:

- Anytime a guard is removed. Minor tool changes and adjustments and/or other minor servicing activities that are routine, repetitive, and integral to the use of the equipment and that occur during ***normal production operations***, are not covered by the lockout/tagout standard, provided the work is performed using alternative measures that provide effective protection.

- The standard does not apply while servicing or maintaining cord and plug connected electrical equipment, provided that the equipment is unplugged from the energy source; and the plug remains under the exclusive control of the employee performing the servicing and/or maintenance.

© 2002-2013 Consolidated Edison Co. of New York, Inc

- ***Hot tap*** operations that involve transmission and distribution systems for gas, steam, water, or petroleum products when they are performed on pressurized pipelines provided that continuity of service is essential, shutdown of the system is impractical, and employees are provided with alternative protection that is equally effective. [1] R

3.2 PERSONNEL

Authorized Employees

An authorized employee is one who is able to initiate these procedures, and to employ all parts of the procedures to ensure the safe completion of work. Authorized employees are selected on the basis of their formal training, on the job experience, licenses held and familiarity with mechanical and electrical work and associated hazards related to this work. All authorized employees must meet the training requirements stated in section 4.7 of this procedure.

Affected Employees

Individuals whose jobs requires them to operate a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires them to work in an area in which such servicing or maintenance is being performed.

All other company and outside contract employees whose work operations are or may be in an area where lockout/tagout procedures may be utilized are also deemed affected employees. [2] R

4.0 COMPLIANCE REQUIREMENTS

4.1 LOCKOUT PROCEDURE

Except under conditions noted in Section 4.4, the only authorized employee that can remove a lock and tag is the authorized employee who installed the lock and tag.

- The authorized employee who performed all the steps in Section 4.2, A-B-C-D-E, may apply a sequentially numbered padlock to equipment capable of accommodating a padlock for the purpose of preventing the normal operation of an ***energy isolating device*** such as a switch, valve, etc.

- The authorized employee will continue the procedure in Section 4.2 steps F and G to completion, and return the padlock along with all Stop Tags.

- The authorized employee will update log entries as stated in 4.2 E. [3] R/P

4.2 LOCKOUT/TAGOUT PROCEDURE SEQUENCE

A. Notification

The authorized employee will notify the supervisor of the facility and any affected employee in the facility that a lockout/tagout procedure will be put into effect, the location of the equipment to be taken off-line, and the reason for the procedure.

© 2002-2013 Consolidated Edison Co. of New York, Inc

The authorized employee will issue the appropriate amount of Stop Tags, and enter data into a logbook consisting of:

- Date and time
- ID number of tag(s) issued
- Equipment removed from service
- Authorized employee name(s)
- Date and time tags were returned (equipment returned to service).

The authorized employee is to acknowledge understanding the procedure, and the importance of adhering to the procedure.

B. Identification and Location of Devices

After receiving a job briefing on the hazards associated with the work assignment and required personal protective equipment, the authorized employee will make a survey to locate and identify all energy isolating devices (i.e., which switch(s) valve(s) or other isolating devices apply to the equipment) to be locked out.

Note: More than one energy source may be involved.

C. Shut Down of Equipment

The authorized employee must shut the machinery or equipment down in the operational method described by departmental procedure, or stop and obtain an operating procedure from his/her supervisor before shutting down the equipment.

D. Isolation - Dissipation

The authorized employee will operate the switch, valve, or other energy-isolating device, or multiple combinations thereof, so that the equipment is isolated from all of its energy sources. Stored energy between the isolating device and the equipment must be dissipated. Energy such as spring-loaded components, rotating components, pressurized hydraulic, water, steam, gas, air pressure, or potential stored energy (i.e., capacitors) must be relieved of potential hazard by blocking, restraining, re-positioning or bleeding down as required.

E. Tagout Procedure Sequence

Lockout is the preferred method of isolating machines or equipment from energy sources, and must be used when the energy isolating device is ***capable of being locked out***.

A tagout procedure may be used on those energy isolating devices that are incapable of being locked out after all available methods and means have been exhausted and no satisfactory alternative is available.

The authorized employee will apply Stop Tags to each energy isolating device, in accordance with an associated procedure.

The authorized employee will record the following information on each tag affixed:
1. Name of employee invoking the procedure
2. Date procedure initiated
3. Reason for procedure

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please EH&S Connect for the current version prior to use.

4. Warning legend

When the equipment is returned to operation, the authorized employee will remove all Stop Tags and log each stop tag removed, completing the procedure.

F. Verification

The authorized employee will verify that all energy has been isolated by going back to the original device and verifying by testing that an unexpected release of stored energy will not occur (i.e., electrical, hydraulic, pneumatic, pressurized liquids and gases etc.). After ensuring that personnel are not exposed to any hazards from the release of stored energy, the authorized employee will follow written procedures for performing the assigned task.

G. Restoring Machine or Equipment to Normal Operation

After the assigned task is completed and the equipment is ready for return to normal operation, the authorized employee will perform the following sequence:

1. Check area around the equipment to be sure no other personnel are exposed to danger. Notify all affected employees of the intent to restore energy.
2. Remove all tools and supplies from immediate vicinity.
3. Check to make certain all protective guards, covers, casings, etc. are in place, and that all moving parts are unrestricted.
4. Check position of local starting mechanism, valves, controls, etc. to ensure against premature or unwanted action leading to a hazardous condition.
5. Remove, in reverse sequence of application, all Stop Tags.
6. Re-position valves, switches, etc. in compliance with operating procedures.
7. Operate the energy isolating devices to restore energy to the equipment.
8. Notify the supervisor of the facility and affected employees of the restoration of energy to the equipment.
9. Operate the equipment in the normal manner to detect any discrepancies. Repeat procedures as found necessary.
10. Return Stop Tags and update the log in accordance with step 4.1 E. [4] R/P

4.3 GROUP LOCKOUT OR TAGOUT

When work is performed on machinery or equipment involving more than one person, each employee in the group is responsible for adhering to all provisions of the procedures for lockout or tagout.

In the event a group of employees require the procedure to be used, the following actions must be followed:

1. A single authorized employee will be designated by the supervisor of the facility as having primary responsibility for a set number of persons working under the protection of a group procedure.

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please EH&S Connect for the current version prior to use.

2. This authorized employee will be the individual designated to coordinate with the affected employees and ensure continuity of protection.

3. Each employee working on the unit must review with the authorized employee designated by the supervisor of the facility, placement of Stop Tag or padlock device on each energy isolating device de-energized under the procedure.

4. All affected employees must receive a job briefing by an authorized employee. [5] R

4.4 SHIFT OR PERSONNEL CHANGES

Shift Changes

When work on a machine or piece of equipment will continue into the next work shift, protection must be continued. The oncoming authorized employee must be satisfied that the procedure is properly in effect and it is safe to transfer lockout or ***tagout devices***.

- The oncoming authorized employee will be given a job briefing, and will accompany the off-going authorized employee to the location of each Stop Tag or padlock device.

- The off-going authorized employee will point out the location of all Stop Tags and padlocks applied during his/her shift.

- The oncoming authorized employee will record the number of Stop Tags and padlocks applied.

- The oncoming authorized employees must ensure that they are familiar with the existence and reason for the lockout or tagout procedure, and the number of Stop Tags and padlock devices recorded.

- The authorized employees will review the number of Stop Tags and padlock devices for discrepancies, and then record the transfer of responsibility from the off-going to the oncoming employee in the log.

Personnel Changes

Each Stop Tag or padlock device must be removed from each energy isolating device by the authorized employee who applied them.

If the employee who initiated the procedure is not available to remove the Stop Tag or padlock device, they may be removed by a ***qualified employee*** provided the following conditions are completely satisfied:

1. The qualified employee must be trained in all aspects of this procedure.

2. The qualified employee has complied with all parts of this procedure prior to removing the device.

3. The qualified employee verifies that the employee who initiated the procedure is unavailable. All reasonable attempts must be made to contact the employee and inform the employee of the intended action.

© 2002-2013 Consolidated Edison Co. of New York, Inc

The employee will be informed that the above action was taken before the employee begins work again at the location.

Special Circumstances

In situations where a lockout device must be removed by someone other than the person who installed it, the following steps must be taken:

- A qualified employee on site must personally verify that no affected employees are exposed to danger from re-energizing or reactivating equipment.

- The lockout device(s) may be removed by cutting or similar method only after the qualified employee has verified that no affected employee exposure exists. [6] R

4.5 ANNUAL INSPECTION

The operating organization must conduct, on at least an annual basis, an inspection of the requirements and compliance with this procedure. This inspection must:

- Be performed by an authorized employee other than those using the procedure.

- Correct any inadequacies or deficiencies found.

- Include a review of the employee's responsibilities between each authorized employee and the inspector.

- Be certified to include the machine or equipment, the date of the inspection, the employees included, and the person performing the inspection.

Attachment 2 must be used for these inspections.

These annual inspections are intended to assure that the energy control procedure continues to be implemented properly and that the employees involved are familiar with their responsibilities under that procedure. The inspection must be able to determine whether the:

- Steps in the energy control procedure are being followed;

- Employees involved know their responsibilities under the procedure;

- Procedure is adequate to provide the necessary protection, and what changes, if any, are needed.

When lockout is used, the inspection must include:

- A review with all authorized employees for the procedure being inspected,

- Their responsibilities under that procedure.

- Group meetings between the authorized employee and affected employees.

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please EH&S Connect for the current version prior to use.

When tagout is used, this review must be performed with all affected employees, as defined in the standard, as well as with all authorized employees, for the procedure being inspected.

The site's senior manager must certify that the annual inspections have been performed. The certification must identify:

- The machine or equipment on which the energy control procedure was being utilized,
- The date of the inspection,
- The employees included in the inspection,
- And the person performing the inspection.

The results of the audit will be forwarded to the manager of maintenance, for recordkeeping. [7] R

4.6 PROTECTIVE HARDWARE AND MATERIAL

Lockout and tagout equipment must be provided in sufficient quantity to satisfy the requirements of this procedure. Such hardware and material must be capable of safely tagging, isolating, securing or blocking machines and equipment from energy sources.

Lockout and tagout devices must be singularly identified, must be the only devices used for controlling energy, and must not be used for other purposes.

Whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment must be designed to accept a lockout device

Durable

Lockout and tagout devices must be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

Tagout devices must be constructed and printed so that exposure to weather condition or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.

Tags must not deteriorate when used in corrosive environments such as areas where acid and alkaline chemicals are handled and stored.

Standardized

Lockout and tagout devices must be standardized within the facility where used in at least one of the following criteria - color, shape, or size. Additionally, on tagout devices, print and format must be standardized.

Substantial

Lockout devices must be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

© 2002-2013 Consolidated Edison Co. of New York, Inc

Tagout devices, including their means of attachment, must be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means must be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than fifty (50) pounds and having the basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

Identifiable

Lockout and tagout devices must indicate the identity of the employee applying the devices.

Tagout devices must warn against hazardous condition if the energy isolating device is not operated, and must include a legend such as the following - Do Not Open, Do Not Close, Do Not Start, Do Not Energize, Do Not Operate. [8] R

4.7 TRAINING

The company will provide training to ensure that employees understand the purpose and function of the lockout/tagout procedure and that the knowledge and skills required for the safe application, usage and removal of lockout/tagout controls are acquired by authorized employees.

The company must certify that employee training has been accomplished and is up to date. The certification must contain each employee's name and dates of training.

Equipment-Specific Training

Each authorized employee must receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Each affected employee must be instructed in the purpose and use of the lockout/tagout procedure.

All other employees whose work operations are or may be in an area where lockout/tagout procedures may be utilized must be instructed about the procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment that are locked out or tagged out.

Specific instructions will include the proper procedure for locking out and tagging out of devices. Specific training will be given regarding the limitations of tags. Attachment 1 must be utilized for this purpose.

Training will be done through The Learning Center, or by the safety administrator or by the responsible shop operating supervisor. The tracking and recording of this training will be the responsibility of the department training Coordinator. [9] R/P

Retraining

Retraining must be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedure.

© 2002-2013 Consolidated Edison Co. of New York, Inc

Additional retraining must be conducted whenever a periodic inspection reveals, or local EH&S has reason to believe, that there are deviations from, or inadequacies in the employee's knowledge, or use of the energy control procedures.

The training must reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary. [10] R

5.0 DEFINITIONS

Affected Employee: An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee: A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

Capable of Being Locked Out: An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized: Connected to an energy source or containing residual or stored energy.

Energy Isolating Device*:* A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy Source: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Hot Tap: A procedure used in the repair, maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device: A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

© 2002-2013 Consolidated Edison Co. of New York, Inc

Normal Production Operations: The utilization of a machine or equipment to perform its intended production function.

Qualified Employee: A qualified person is a person who has been trained and has demonstrated proficiency, in compliance with 29 CFR 1910.147(c)(7), to perform servicing and maintenance on the machine or equipment to be inspected.

Servicing and/or Maintenance: Workplace activities such as constructing, installing, ***setting up***, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Setting Up: Any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

6.0 REFERENCES

3.0 INTRODUCTION

3.1 PROCEDURE

[1] 29 CFR 1910.147(a)(2)(ii)-(iii) (applicability and exceptions).

3.2 PERSONNEL

[2] 29 CFR 1910.147(b) (definitions).

4.0 COMPLIANCE REQUIREMENTS

4.1 LOCKOUT PROCEDURE

[3] 29 CFR 1910.147(c)(1) (energy control program generally). See 29 CFR 1910.147, Appendix A (non-mandatory guidelines: typical minimal lockout procedure).

4.2 LOCKOUT/TAGOUT PROCEDURE SEQUENCE

[4] 29 CFR 1910.147(c)(2) (preference for lockout); 29 CFR 1910.147(c)(3) (full employee protection); 29 CFR 1910.147(c)(4) (energy control procedure); 29 CFR 1910.147(c)(9) (notification of employees); 29 CFR 1910.147(d)(1)-(6) (preparation for shutdown, machine or equipment shutdown; machine or equipment isolation; lockout or tagout device application; stored energy; verification of isolation); 29 CFR 1910.147(e)(1)-(3)

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please EH&S Connect for the current version prior to use.

release from lockout or tagout). See 29 CFR 1910.147, Appendix A (non-mandatory guidelines: typical minimal lockout procedure).

4.3 GROUP LOCKOUT OR TAGOUT

[5] 29 CFR 1910.147(f)(3) (group lockout/tagout).

4.4 SHIFT OR PERSONNEL CHANGES

[6] 29 CFR 1910.147(c)(8) (requiring lockout/tagout to be performed only by authorized employee performing servicing and/or maintenance); 29 CFR 1910.147(f)(4) (shift changes).

4.5 ANNUAL INSPECTION

[7] 29 CFR 1910.147(c)(6).

4.6 PROTECTIVE HARDWARE AND MATERIAL

[8] 29 CFR 1910.147(c)(5) (protective materials and hardware).

4.7 TRAINING

[9] 29 CFR 1910.147(c)(7)(i), (iv) (training and recordkeeping). NOTE: This section includes Con Edison-specific procedures relating to training and recordkeeping.

[10] 29 CFR 1910.147(c)(7)(iii) (retraining).

© 2002-2013 Consolidated Edison Co. of New York, Inc

REVISION HISTORY

Revision Date	Revision #	Summary of Change	Author

© 2002-2013 Consolidated Edison Co. of New York, Inc

ATTACHMENT 1
EXAMPLE SITE PROCEDURE

GENERAL

The following simple lockout procedure is provided to assist employers in developing their procedures so they meet the requirements of this standard. When the energy-isolating devices are not lockable, tagout may be used, provided the employer complies with the provisions of the standard that require additional training and more rigorous periodic inspections. When tagout is used and the energy-isolating devices are lockable, the employer must provide full employee protection (see 29 CFR 1910.147 (c)(3)) and additional training and more rigorous periodic inspections are required. For more complex systems, more comprehensive procedures may need to be developed, documented, and utilized.

Lockout Procedure for

_____

(Name of Company for single procedure or identification of equipment if multiple procedures are used).

Purpose

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It must be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance With This Program

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance, must not attempt to start, energize, or use that machine or equipment.

_____

Type of compliance enforcement to be taken for violation of the above.

Sequence of Lockout

(1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.

_____

Name(s)/job title(s) of affected employees and how to notify.

(2) The authorized employee must refer to the company procedure **for the particular machine or equipment** to identify the type and magnitude of the energy that the machine or equipment

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please EH&S Connect for the current version prior to use.

utilizes, must understand the hazards of the energy, and must know the methods to control the energy.

Type(s) and magnitude(s) of energy, its hazards and the methods to control the energy.

(3) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).

Type(s) and location(s) of machine or equipment operating controls.

(4) De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

Type(s) and location(s) of energy isolating devices.

(5) Lock out the energy isolating device(s) with assigned individual lock(s).

(6) Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.

Type(s) of stored energy - methods to dissipate or restrain.

(7) Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.

Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.

Method of verifying the isolation of the equipment.

(8) The machine or equipment is now locked out.

Restoring Equipment to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps must be taken.

(1) Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.

© 2002-2013 Consolidated Edison Co. of New York, Inc

(2) Check the work area to ensure that all employees have been safely positioned or removed from the area.

(3) Verify that the controls are in neutral.

(4) Remove the lockout devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.

(5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please EH&S Connect for the current version prior to use.

ATTACHMENT 2
LOCKOUT/TAGOUT PERIODIC INSPECTION

Facility Name _____ Date _____
Address _____
Equipment Name _____ I.D. No. _____
Authorized Inspector (Print) _____ I.D. No. _____

The identified equipment requires a periodic inspection of the energy control procedures according to §1910.147(6) The Control of Hazardous Energy (Lockout/Tagout). Check (✓) or complete all elements of this form that apply to the Periodic Inspection. Note deficiencies in comments section.

ENERGY SOURCES

☐ Electrical ☐ Hydraulic ☐ Chemical ☐ Other _____
☐ Mechanical ☐ Pneumatic ☐ Thermal _____

ENERGY ISOLATING DEVICES

☐ A manually operating electrical circuit breaker.
☐ A disconnect switch
☐ A manually operated switch by which the circuit's conductors can be disconnected from all underground supply conductors (no pole can be operated individually).
☐ A line valve
☐ A block
☐ A similar device used to block or isolate energy.
☐ Other _____

Note: Push buttons, selector switches, and other circuit type devices are not energy-isolating devices.

	YES	NO	COMMENTS
Do authorized employees understand the energy control procedures for this equipment?			
Do the authorized employees understand the requirements of the standard for this equipment?			
Do the authorized employees understand which locks/tags are to be used on this equipment?			
Are the lockout/tagout procedures being followed?			
Do employees understand their responsibilities in the energy control procedure?			
Have any deviations or inadequacies been identified during this inspection that require attention? If so, list.			
Have tagout procedures been reviewed when tagout alone is the only means of energy isolation?			
Have you reviewed the removal of an isolating circuit breaker?			
Have you reviewed blocking of a controlling switch?			
Have valve handle removal procedures been reviewed?			
Have you reviewed the opening of an extra disconnect switch?			

The items checked above have been reviewed with/explained to the authorized employees at the time of the periodic inspection.

Authorized Employee (Signature)	Date	Authorized Employee (Signature)	Date

I hereby certify that the periodic inspection for compliance with lockout/tagout standards on the equipment as specified by OSHA 29 CFR §1910.147 has been satisfactorily completed with the authorized employees identified above.

Inspector _____ _____ _____
Signature Title Date

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

© 2002-2013 Consolidated Edison Co. of New York, Inc

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult EH&S Connect for the current version prior to use.

conEdison

Work Area Protection and Traffic Control

Field Manual

THE WAY WE WORK IS SAFELY

To All Con Edison Field Forces:

This is your field manual on Work Area Protection and Traffic Control. It is designed to help you achieve a safe work area for our employees, with limited obstruction to traffic, through the use of uniform traffic devices. In addition, it provides protection for pedestrians and motorists.

This edition of the manual has been updated to comply with the current *Manual on Uniform Traffic Control Devices* (MUTCD). The MUTCD is published by the Federal Highway Administration under 23 Code of Federal Regulations, Part 655, Subpart F.

This field manual is based upon three fundamental principles:

- Protection for you and your coworkers while you work in the streets;
- Protection for motorists and pedestrians;
- Safe and expeditious movement of traffic around your work area.

Not all work sites, traffic, or pedestrian situations can be illustrated in this manual. Employees must apply the principles and tools covered in this manual to set up work area protection and traffic-control devices with all applicable traffic regulations in mind.

Table of Contents

1 Practical and Procedural Considerations

Basic Principles of Work Area Protection 4
Plan the Work and Work the Plan 4
Evaluate the Work Area 5
Work Space Considerations 6
Following Through: Setting Up the Street Work Area 7
Terminating the Job: Moving Out of the Work Area 9

2 Advance-Warning Signs and Equipment for Work Area Protection

Advance-Warning Signs 12
High-Level Warning Devices 15
Work Area Protection 16

3 Traffic Control and Work Area Protection Arrangements

Work Area Protection Diagrams 24
Excavation Operations 44
Flagger at Work Sites 45

Practical and Procedural Considerations

1

Because of the vital nature of our jobs, we must gain access to areas where repair, maintenance, and construction are required. Providing a work area that is safe for everyone is of critical importance.

Basic Principles of Work Area Protection

Traffic conditions in our operating area make it necessary to plan protection for work areas in order to avoid vehicular and pedestrian traffic hazards and thus safeguard the public and our own employees.

The work area protection that you set up at the job site has two main goals:

- To provide suitable work area devices so that pedestrians and drivers of vehicles are aware of work area boundaries;
- To provide bridging over excavations where pedestrian and vehicle traffic must be maintained during the job.

In addition, when planning work area setups, an important company concern is to maintain good relations with the public while maintaining safety in the work area. Employees in the field help create good will by the way they conduct themselves and by the way they arrange and maintain their work areas.

Con Edison's reputation as a good neighbor is important. Do your part to preserve it by always using the work area protection principles described in this document when you are on the job.

Plan the Work and Work the Plan

In order to work efficiently and to minimize possible disruptions for pedestrians and vehicular traffic, it's important to prepare in advance before arriving at a work location. Here are some factors to consider:

Scheduling: When scheduling street work, try to avoid hours of unusually heavy traffic.

Permits: Review the work and Department of Transportation (DOT) permit requirements before planning work. Follow DOT stipulations.

Requirements include:

- Posting of permits to face the nearest curb line at the work area setup. Posted permits must provide the following information: name of the contractor, start and expiration dates, contact telephone number, permit number, and type of work (gas, steam, or electric system). Lettering must be 1 1/2 inches high;
- Determining days and times to perform work;
- Securing permission for lane closings.

Efficient Deployment: Maintain street work areas only for as long as is necessary. Move in quickly and safely, do the job, and move out. Minimize obstruction and excessive exposure to traffic.

Materials: Before leaving the yard, review work orders and make sure that all equipment and supplies are available to complete the job as promptly as possible.

Evaluate the Work Area

Determine how existing conditions will affect the job, and how work area protection must be adapted to the location. The following must be considered:

Vehicular Traffic:

- Assess the volume and speed of traffic.
- Arrange in advance with the appropriate authority to shut down a traffic lane when work must be done at approaches to and exits from tunnels and bridges.
- Allow for the free passage of emergency vehicles, including fire engines and ambulances.

Pedestrian Traffic: Observe the pedestrian routes to crosswalks and bus stops.

Changes in Work Plan: Reassess protective devices and working conditions based on any changes in the traffic patterns or scope of work that may occur during the work operation.

Business Establishments and Other Public Facilities: When excavations are to be made near schools, hospitals, theaters, or large business establishments, where there is substantial pedestrian and vehicular traffic, notify customers in advance so that they will be inconvenienced as little as possible.

Work Area Considerations

Use the following parameters in your planning so that the job setup can occupy the smallest work area consistent with safe operations:

Width of Work Area: Generally should not exceed the width of one traffic lane.

Where this is not possible (e.g., excavations, manholes between two lanes), doing the job in steps should be considered. In congested areas with unusual traffic conditions, notify the local police precinct.

Length of Work Area: Should be separated from oncoming traffic by placing a tool cart, Pel bag, vehicle, or other suitable barrier between the working point and oncoming traffic. For increased protection, a buffer zone (the same width as the work area) should be located in front of the work area. The area in front of the buffer zone will be used to channelize and taper traffic flow away from the work area by using traffic cones and/or stanchions.

Mobilization:

1. Day or night, before moving out into traffic lanes, operate hazard lights on the vehicle. For tool carts, mount the directional arrow signs and appropriate advance-warning flasher; and use channelizing devices (traffic cones and/or stanchions), as well as the required warning signs.
2. Warn oncoming motorists during the move into traffic lanes. When necessary, a crew member equipped with a signaling device and wearing a retroreflective vest should warn oncoming motorists.
3. If a traffic light is present, wait for the light to change before mobilizing equipment in or out of traffic lanes.
4. Some operations require work vehicles to be positioned facing oncoming traffic. Maneuvering a vehicle into such a position can present a risk to workers, the vehicle, and the public, if it is not performed using good judgment and appropriate safety equipment, i.e., a hard hat, flag, and retroreflective clothing.
5. The vehicle's hazard lights must be in operation and visible to all approaching traffic during the maneuver until the vehicle is within a protected work area.
6. Select traffic-control devices to protect the work areas.

Following Through: Setting Up the Street Work Area

In creating the work area protection setup, these elements are a part of the job-site characteristics to consider and the tools to use.

Steps to follow for setting up work area:

- Wear proper PPE (traffic vests, hard hat).
- Dome light/flashers/arrow boards.
- Position vehicle upstream from work site to begin channeling traffic.
- Flaggers to warn traffic, when necessary.
- Place advance warning sign(s); "Men Working" sign is first.
- Begin laying down traffic devices (e.g., cones, stanchions), working your way down to the work site.
- Continue to channel traffic using cones; determine work site termination.
- Establish work site.
- Establish work site termination with cones (downstream).
- Establish pedestrian channeling, when necessary.

Hard Hats and Vests: Employees exposed to vehicular traffic, e.g., when setting up, maintaining, removing, or working outside of work area protection, must wear hard hats and retroreflective safety apparel.

Advance-Warning Signs: Remember – oncoming drivers must be able to see the work area if they are to avoid it. Therefore, night or day, arrange your traffic-warning equipment to provide advance warning to oncoming drivers. Channelizing devices tapered to move traffic away from the work area with a series of warning signs extended in the direction of oncoming traffic must be used.

Traffic Devices: Set up the selected devices to control vehicle and pedestrian traffic and protect the work area. Provide clearly defined boundaries of street and sidewalk work areas throughout the work operation day and night.

Intersections: At intersections, place the most effective warning equipment so that it faces the heaviest oncoming traffic. Set up traffic-control devices on alternate sides of an intersection to control flow around a work area.

Lamp Reels: When taking temporary service from a lamppost, cover the open door with a lamppost apron to protect exposed wiring. (Contractors are required to use generators to obtain power.) ALWAYS lay cord along the curb. AVOID laying cord diagonally across traffic lanes. If necessary, use an extra lamp reel. All cords and hose shall be secured to street surface when crossing lanes of vehicle or pedestrian traffic.

Pedestrian Passageways: Must be 5 feet wide. Where required, protect pedestrian and bus-stop passageways with barricades, planking, steel plates, or shunt boards extending well beyond the defined passageway. Use signage to indicate alternate pedestrian paths and access to bus stops.

Chock Equipment: Vehicles and tool carts at work sites must be chocked.

Hazard-Vehicle Lights: If a vehicle must stand in lanes of moving traffic for work purposes and is not within a protected work area, the hazard-vehicle light(s) must be in operation day and night.

Street Openings: If it is necessary to leave street work areas unattended at night, provide traffic-control devices to include use of Type III barricades around the work area to protect motorists and pedestrians.

Plating: Provide plating or decking when required. All road plates must be pinned and ramped to avoid pedestrian foot injury or injury to motorists due to plate movement.

Floodlights: When it is dark, and when using flaggers, use flood lamps where required for additional protective illumination or work illumination. Lamp glare should not impede motorists or workers.

Subsurface Structure Openings: When opening any underground structure, manhole guardrails or telescoping rails must be in place to prevent persons from falling into the structure and to prevent debris or other materials from entering. In addition, you must follow the appropriate entry procedures for enclosed or confined spaces.

Housekeeping: Good housekeeping is an important item in street work area protection.

Terminating the Job:

Steps to follow for breaking down work area:

- Clean up work area.
- Break down work site.
- Pick up traffic devices in reverse order.
- Work your way back toward the "Men Working" sign.

Moving Out of the Work Area

Just as with setup of the work area, proper procedures must be observed when the job is finished and the site is being cleared.

Hazard-Vehicle Lights: Traffic-warning equipment and hazard-vehicle lights must be in operation while moving from traffic lanes to the curb.

Flagger: A trained member of the crew, wearing a retroreflective vest and hard hat, should warn oncoming motorists with a signaling device where necessary.

Traffic Controls: If a traffic light is present, wait for the red light before moving out of the traffic lane.

Plates: Ensure that all road plates are left pinned and ramped to maximize public safety.

Ongoing Work: If the job is shared by another Con Edison work area setup, make sure to leave the work area protection and the setup in good condition.

Housekeeping: Before leaving the area, inspect the site to be sure that no tools, equipment, or debris are left behind. Always work the job to make the public think well of you and the company. Remember, on the job, ***you are Con Edison.***

Advance-Warning Signage and Equipment for Work Area Protection

2

The purpose of advance warning is to properly alert motorists and pedestrians to physical conditions ahead.

Note: The advance-warning area may vary from a single sign to a series of signs in advance of the temporary traffic-control zone activity area.

Signage distances may be adjusted where necessary, depending on roadway limitations or for more effective warning and guidance.

Signage must effectively warn oncoming traffic, allowing adequate time for driver response. The employee must make the judgments necessary to establish and maintain effective advance warning.

Advance-Warning Signs

Description: Warning signs must have a black legend on an orange background and be reflectorized for nighttime use. Diamond-shaped warning signs are preferred. However, where necessary, the alternate rectangular shape may be used. Minimum sizes for warning signs are 36 inches by 36 inches (diamond) and 36 inches by 24 inches (rectangle).

Signs Displaying the Symbol of a Worker or the Words "Road Work Ahead" or "Utility Work Ahead"

Instructions for Use: These signs are required to be posted for all work done in a traffic lane, parking lane, or on a shoulder. They must be posted first and in front of channelizing devices.

The sign displaying the symbol of a worker (the "worker symbol") may be used for short-duration work areas, while the "Road Work Ahead" and "Utility Work Ahead" signs are to be used for long-duration work areas (i.e., more than three days).

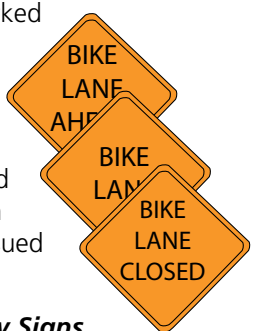
The sign may be mounted on portable "crashworthy" supports and must face oncoming traffic.

For short-duration work that occupies a location for up to three days, such as a manhole operation where workers are present or work in a parking lane, the standard distance between the warning sign and the lane closure or work area is 150 feet.

For long-duration work (more than three days), such as an excavation in a travel lane, the standard distance between the warning sign and the lane closure or work area is 300 feet.

Different distances may be used where necessary for more effective warning and guidance.

Signs placed on the sidewalk should be 2 feet in from the curb and at a height of 7 feet, where the sign is not likely to interfere with pedestrians or be obscured by parked vehicles.

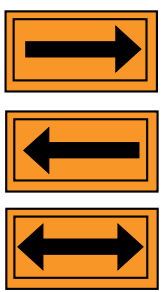


Bike Signs

Use of "Bike Lane" signs are to be used when stipulated on the work permit issued by the city.

Directional-Arrow Signs

Description: Orange reflectorized background at least 3 feet wide and 2 feet high with a clearly recognizable black arrow symbol. Standard or variable arrow signs (as shown) may be used.



Instructions for Use: The arrow may be mounted on a vehicle, tool cart, barricade, or portable supports. It must be mounted at a height of at least 4 feet to the bottom of the sign and must face in the direction of the oncoming traffic. The arrow must indicate the direction in which the traffic may pass.

Note: Arrow signs are intended to give motorists clear information and provide them with effective guidance. Therefore, care must be taken to ensure that the proper message is displayed at all times.

"Flagger Ahead" Signs

Description: The "Flagger Ahead" sign must be diamond shaped, 36 inches by 36 inches, with a black legend and border on an orange background. It shows the silhouette of a person standing with the right arm (facing the viewer) extended horizontally and holding a flagstaff horizontally, with the flag hanging down. The free arm is shown bent with the palm above shoulder level.

Instructions for Use: The "Flagger Ahead" sign shall be placed after the worker symbol or "Road Work Ahead" or "Utility Work Ahead" sign and well before the flagging location.

Lane-Closure Signs

Description: Lane-closure warning signs must have a black legend and border on an orange background.

Instructions for Use: Advance notice of closed lanes must be provided when work areas must interrupt the flow of traffic in through lanes. This sign should be placed after the worker symbol or "Road Work Ahead" sign and may be placed at the beginning of the taper created by the use of channelizing devices.

Street/Road Closed Signs

Description: This is a horizontal rectangular white sign, 36 inches by 36 inches, with a black border and the words "Road Closed" in black on two lines.

Instructions for Use: The "Street Closed Ahead" sign should be used when the roadway is closed to all road users except contractors' equipment or officially authorized vehicles. This sign should be accompanied by appropriate warning and detour signage. This sign should be installed at or near the center of the roadway, on or above a Type III barricade that closes the roadway.

Note: New York City requires closed-street permits from the DOT. Both the police department and the fire department's communications center require notification 24 hours in advance of nonemergency street closings. The local community planning board requires a notification seven days in advance when closing more than 50% of moving lanes per direction. Westchester permits vary by municipality.

"Sidewalk Closed" Signs

Description: This device is used when a sidewalk must be closed in order to conduct work. This is a visual indicator to notify pedestrians that passage though this area is prohibited. Provisions must also be made to indicate redirection of pedestrian traffic.

Persons With Visual Disabilities

Adequate provisions, as determined by an engineering study or by engineering judgment, should be made for persons with visual disabilities. Because printed signs and surface delineations are not accessible to pedestrians with visual disabilities, blocked routes, alternate crossings, and sign and signal information should be communicated to pedestrians with visual disabilities by providing the following: audible information devices, accessible pedestrian signals, and barriers and channelizing devices that are detectable to pedestrians who have low vision or who are traveling with the aid of a long cane. The following three items should be considered when planning for pedestrians:

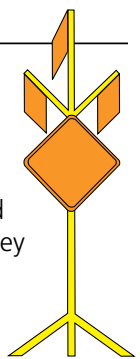
A. Pedestrians should not be led into conflicts with work site vehicles, equipment, and operations.

B. Pedestrians should not be led into conflicts with vehicles moving through or around the work site.

C. Pedestrians should be provided with a reasonably safe, convenient, and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or foot path(s). Where pedestrians who have visual disabilities encounter work sites that require them to cross the roadway to find an accessible route, instructions

should be provided using an audible information device. Accessible pedestrian signals with accessible pedestrian detectors might be needed to enable pedestrians with visual disabilities to cross wide or heavily traveled roadways. A pedestrian route should not be severed and/or moved for nonconstruction activities, such as parking for vehicles and equipment.

High-Level Warning Devices



These devices are used in addition to signage. They can be lighted or unlighted as described below, and they provide clear, highly visible warning of the work area for both pedestrians and vehicles.

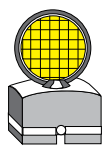
Flag Trees

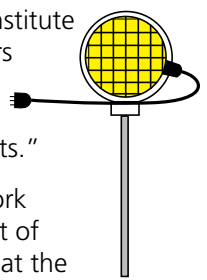
Description: The flag tree should display a minimum of two flags with their lowest corners at a height of 8 feet. Other warning signs may be mounted below the flags to alert and warn traffic in advance of a work area during daylight hours.

Instructions for Use: At work areas where the placement of the advance-warning sign at the standard distances is not practical or is found to be ineffective, a flag tree may be used in conjunction with a worker symbol or road work ahead sign in advance of the work area (also in advance of any arrow boards) to effectively warn traffic. It must be placed at a sufficient distance in front of the work area to warn oncoming drivers.

Advance-Warning Flasher: Type B High-Intensity Flashing Warning Lights

Description: The high-intensity, 7-inch (minimum) warning light (Type B) provides a flashing yellow light in one direction only, for use both day and night. These lights can be mounted on traffic cones, signs, flag trees, or barricades to warn road users. Warning lights must have a minimum mounting height of 30 inches. These warning lights must be in accordance with current Institute of Transportation Engineers (ITE) "Purchase Specification for Flashing and Steady-Burn Warning Lights."





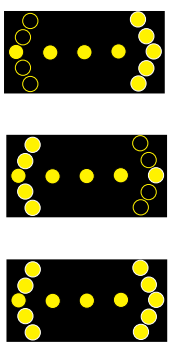
Instructions for Use: At work areas where the placement of the advance warning sign at the standard distances is not practical, or is found to be ineffective, and the advance-warning sign with flag tree is also found to be ineffective, the

advance-warning flasher may be used in conjunction with the advance-warning sign to provide additional warning to oncoming traffic. When mounted on an advance-warning sign, the distance from the roadway to the bottom of the lens of the light must not be less than 8 feet.

Note: The flag tree can be used in conjunction with the advance-warning sign during daylight hours and/or the advance-warning flasher during hours of darkness.

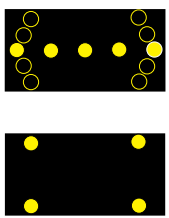
Flashing-Arrow Panel

Description: The unit must consist of a black rectangular background at least 4 feet wide and 2 feet high, with yellow flashing lights at least 4 inches in diameter, which form a clearly recognizable arrow symbol.



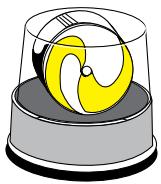
Instructions for Use: The unit may be mounted at a height of at least 7 feet from the bottom of the unit on a trailer or other suitable support. Vehicle-mounted panels should be as high as practicable. This sign can provide additional warning and directional information to assist in merging and controlling traffic around the work area.

If using an arrow panel, the arrow or chevron mode must be used for lane closures on multi-lane streets. If more than one lane is closed, a separate arrow panel must be used for each closed lane. The caution mode must be used in situations where one lane of a two-way street is closed. The caution mode may also be used for work (including surveying) done on shoulders and sidewalks near traffic situations.



Note: Arrow panels may be used in conjunction with warning signs. They may not be used to replace warning signs.

Hazard-Vehicle Light



Description: Vehicle-mounted, revolving (360 degrees) amber light.

Instructions for Use: The light must be displayed and be visible to all approaching traffic when the vehicle is operated at a work site in the roadway and the vehicle is not within a protected work area.

Work Area Protection

Work area protection involves the immediate area in which workers' activities are taking place. Consideration must be given to pedestrian and motorist protection. The work area is generally bordered by:

- stanchions with telescoping rails and/or orange barrier tape, and/or
- barricades Type I, Type II, or Type III.

Traffic-control devices, including channelizing devices, such as stanchions and cones, as well as sign supports and barricades, must conform to new requirements set by the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance of Highway Features," and are to be constructed of crashworthy materials.

Protection of Pedestrians

Traffic-control devices used to delineate pedestrian walkways must be crashworthy so that if struck by a vehicle, there will be a minimal threat to pedestrians, workers, and the occupants of vehicles.

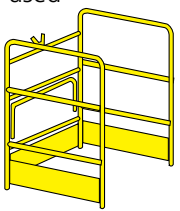
When existing pedestrian paths are disrupted or closed, alternate routes must be provided to crosswalks and bus stops. Signage may be provided to improve recognition of a temporary pedestrian route.

Type II or Type III barricades should be used to channel pedestrians safely around the work area. Such barricades should be detectable to users of canes with a bottom rail no higher than 6 inches aboveground and a top rail at least 36 inches aboveground.

If storing materials outside of the work area setup near pedestrian pathways (sidewalks and crossings), Type III barricades should be used to channel pedestrians safely around these storage areas.

Note: If drums, cones, or stanchions are used to channel pedestrians, there must be no gaps between the bases of these devices (this may be a solid rail between devices), and the devices must be at least 36 inches in height.

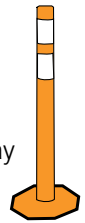
Subsurface Protection Devices



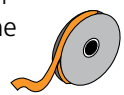
Description: Manhole guardrail and telescoping rails are used to prevent personnel and pedestrians from falling into subsurface structures and is not a traffic-control device. Manhole guardrails are yellow and equipped with three sides and two rails, plus a toe-board. The height of the top rail must not be less than 42 inches. Telescoping rails are mounted onto stanchions. The first rail is placed at the bottom of the stanchions and the second rail is secured at the top.

Instructions for Use: Manhole guardrails are to be used for open manholes. Telescoping rails are to be used for other subsurface structures not accessible by manhole.

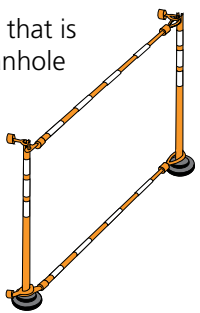
Stanchions, Telescoping Rails, and Boundary Tape



Description: Stanchions must be crashworthy*, must consist of orange uprights at least 42 inches high with bases, and may be of a tubular or cone style. Each must have a minimum of two reflectorized bands near the top of the stanchion. The boundary tape is orange.



Instructions for Use: To outline the boundaries of street work areas such as:



- An open manhole that is protected by a manhole guardrail;
- Vault cage entry;
- Overhead pole work;
- Setup around Vactor/flush trucks.

Note: Type II or Type III barricades or other Temporary Traffic Control (TTC) devices (such as stanchions used together with telescoping rails) consisting of a bottom rail no higher than 6 inches aboveground and a top rail at least 36 inches aboveground should be used to channel pedestrians safely around the work space.

* Temporary Traffic-Control (TTC) devices used to delineate a TTC zone pedestrian walkway must be crashworthy and, when struck by vehicles, present a minimum threat to pedestrians, workers, and occupants of impacting vehicles.

Barricades

Description: Barricades must be crashworthy and are of three types:

Type I – Has one rail that must be a minimum length of 2 feet and a width of 8 inches to 12 inches.

Type II – Has two rails that must each be a minimum length of 2 feet and a width of 8 inches to 12 inches.

Type III – Has three rails that must each be a minimum length of 4 feet and a width of 8 inches to 12 inches.

In addition, for all types:

- Rails must be marked with alternate orange and white stripes at an angle of 45 degrees. Stripes must be 4 inches wide for rails less than 2 feet long and 6 inches wide for rails longer than 3 feet.
- Rails must be reflectorized for night use with a minimum of 270 square inches of reflective area facing traffic.

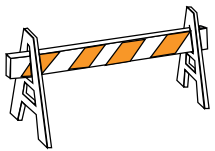
Instructions for Use: Barricades are used to mark an obstruction (work area) in the roadway and are required to outline excavations.

- The Type I barricade is used for temporary or short-duration work and for outlining excavations.

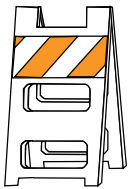
- The Type III barricade is normally used to face oncoming traffic for long-duration work where the barricade is to remain in the roadway for extended periods.
- Type II or Type III barricades may be used to channel pedestrians safely around the work area. Type II or Type III barricades may be used at pedestrian crossings, as well as at sidewalks or other areas where pedestrians would normally come into contact with the work area.
- The stripes of barricades that face oncoming traffic should slope down toward the side on which traffic is to pass.
- Ballasts must not be placed on the top rail and must not consist of nondeformable objects such as rocks or concrete.

Note: The addition of company identification must not detract from the striping on the face of the barricade rail(s) facing oncoming traffic.

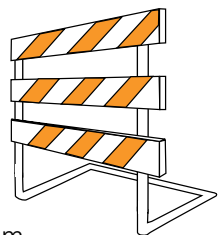
Barricade Panels



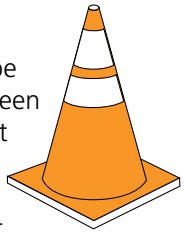
Description: The face of barricade panels must be the same as the face of a barricade rail.



Instructions for Use: A single panel may be placed on the manhole guardrail, a temporary fence, vehicle, or other obstruction in the roadway when the use of a Type I barricade is not practical. The panel must face oncoming traffic, and the top of the panel must be at a minimum height of 3 feet.



Cones



Description: Cones must be orange and must be between 28 and 36 inches in height with two reflectorized bands near the top. For nighttime use, cones must be retroreflectorized or equipped with lighting devices for maximum visibility. Retroreflectorization of cones that are 28 to 36 inches in height must be provided by a 6-inch-wide white band located 3 to 4 inches from the top of the cone and an additional 4-inch-wide white band located approximately 2 inches below the 6-inch-wide band.

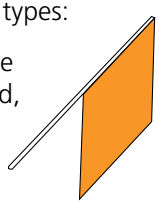
Instructions for Use: The primary function of cones is to channel traffic. The cone should be used to control and direct traffic around or through the work area by gradually narrowing the roadway and indicating the path to be followed. Cones may be used in combination with:

- A flag inserted in the top of the cone to enhance its target value during daylight hours;
- Type B warning lights (high-intensity flashers), which may be used day or night (warning lights must flash when used to warn of a condition);
- Type C steady-burn warning lights when used to channelize traffic.

Signaling Devices

Description: Signaling devices must be one of the following types:

- Signal flag – must be retroreflectorized red, at least 24 inches by 24 inches, securely fastened to a staff 36 inches long.



- Signal light – a steadily burning red or red-orange flashlight wand.

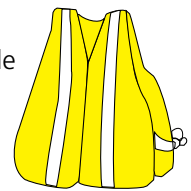
- Paddle – a combination "Stop" and "Slow" sign on an octagonal panel, at least 18 inches wide with letters 6 inches high, securely fastened to a rigid handle. Both faces must be retroreflectorized for nighttime use. The "Stop" face must be red with white letters and border. The "Slow" face must be orange with black letters and border.

Instructions for Use: Signaling devices should be used by flaggers to issue signals to oncoming traffic.

- The signal flag is for use during daylight hours, and the signal light is for use during hours of darkness at locations controlled by a single flagger.
- The "Stop" and "Slow" paddles are used day or night when more guidance to motorists is needed. However, they should not be used where display of the paddle face in the opposite direction would be inappropriate or misleading.
- Use of the "Stop" and "Slow" paddle is preferable in a two-way traffic condition, such as the middle of a street, as opposed to an intersection where traffic may travel in four directions.

Safety Apparel

Description: Flaggers, as well as employees outside of the work area setup, must wear approved safety apparel available in Class & Stock.



Instructions for Use: Vests or compliant apparel must be worn on the outside of all other clothing. Trained employees assigned as flaggers must wear safely apparel when controlling traffic. When leaving or working outside a protected work area, employees exposed to vehicle traffic, e.g., setting up, maintaining, or removing work

area protection, must wear a safety vest. Surveyors and employees working in the roadway with minimum protection must wear a safety vest.

Remember: The value of your safety vest is diminished when you crouch, bend, or move into a position that reduces your visibility or the reflective value of the vest.

Flags (used in conjunction with traffic-control devices)

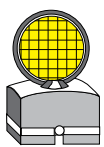
Description: Flags must be orange; a minimum of 16 inches by 16 inches and attached to a staff at least 30 inches long.

Instructions for Use: Flags may be displayed in a manner that does not obscure the legend above any channeling device, on vehicles or tool carts, on stanchions and barricades, and above warning signs.

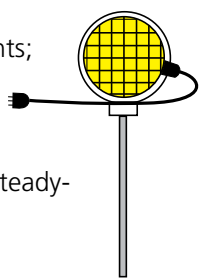
Note: Flags are a supplement to increase the target value and visibility of the work area during daylight hours. Flags may be placed at suitable intervals of not more than 20 feet during daylight hours on barricades used to outline excavations.

Low-Intensity Warning Lights

Description: Low-intensity lighting is for use during nighttime hours only. All warning lights must comply with the ITE "Purchase Specification for Flashing and Steady-Burn Warning Lights," such as:



- Type A low-intensity flashing warning lights;
- Type C steady-burn warning lights;
- Type D 360-degree steady-burn warning lights.



Instructions for Use: On barricades used to outline excavations, one light must be placed on the barricades at suitable intervals of not more than 20 feet. Use during hours of darkness only. (Use Type B high-intensity flashing warning lights for day and night.) Warning lights must have a minimum mounting height of 30 inches.

Traffic Control and Work Area Protection Arrangements

3

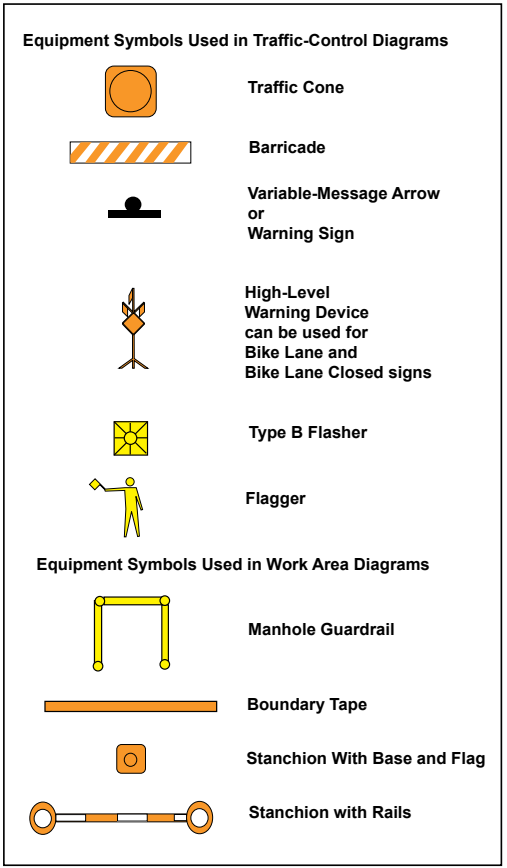
Work Area Protection Diagrams

This section provides graphic diagrams showing a variety of typical work locations. In each case, a scene is provided showing the work area protection properly deployed. In addition, a smaller "blueprint" diagram providing an overhead view of the job site helps to clarify the placement of signage, lights, barriers, and other work area protection equipment.

The arrangements shown in this section do not cover every possible work area configuration. They are intended to provide a representative sample of field conditions and to offer guidance when planning work area protection in similar settings. If you're not sure how to proceed, talk to your supervisor.

Using these diagrams as reference, you must also:

1. Review the DOT permit for conditions of work. Verify information if needed.
2. Select a traffic-control diagram that meets most nearly the requirements to control traffic at the work site.
3. Select a work area protection diagram for your type of operation.
4. Set up the work site in accordance with the arrangements selected. Adapt the arrangements where necessary to meet local conditions.



Work Area Protection Diagrams

These configurations are generally applicable to comparable work areas with similar road conditions.

- Setup for Pole Setting on Four-Lane Road With Two Lanes of Traffic in Each Direction
- Setup for Curved Two-Lane Road With Two-Way Traffic
- Setup in Middle Lane of Three Lanes of Traffic Moving in the Same Direction
- Setup in One Lane of a Four-Lane Road With Two Lanes of Traffic in Each Direction
- Setup at an Intersection With Pedestrian Crosswalks
- Setup at an Intersection With Pedestrian Crosswalks
- Setup Around Subsurface structure in Sidewalk Area
- Setup in Middle of Roadway Diverting Traffic
- Setup in Street Blocking Bike Lane

Setup for Pole Setting on Four-Lane Road With Two Lanes of Traffic in Each Direction

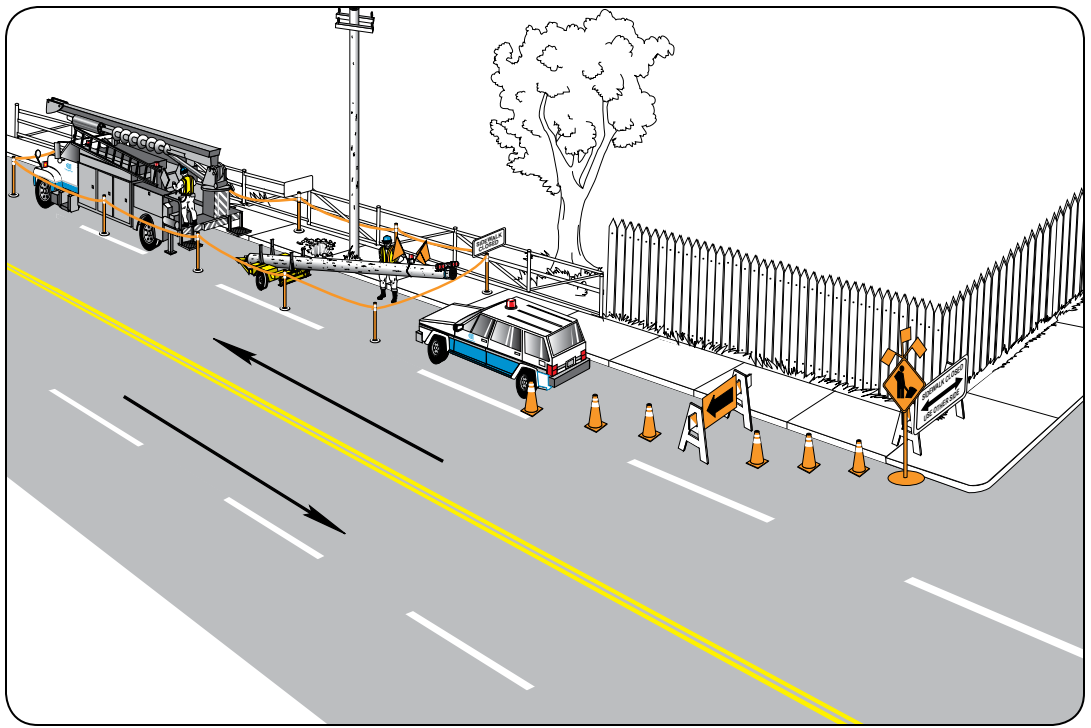
This configuration is generally applicable to comparable work areas with similar road conditions.

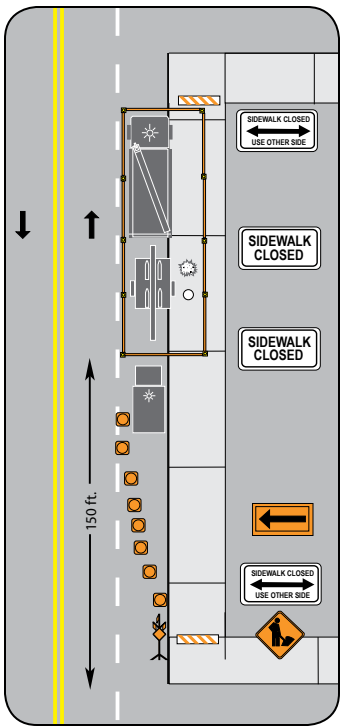
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place the advance-warning sign at the beginning of the tapered work zone.
- Place the "Lane Closed" sign to appear in plain view after the advance-warning sign for traffic traveling toward the one closed lane.
- Place traffic cones so that the traffic is tapered away from the work area.
- Set up stanchions and boundary tape. (Tape may be used when pedestrians have restricted access to the work area.)
- Post "Sidewalk Closed" sign near setup (optional).
- Post "Sidewalk Closed — Use Other Side" sign on both sides of the work area, at the nearest corners to restrict pedestrian traffic on the work side of the street.

Equipment

- advance-warning sign ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- Flag tree and flags
- 28" or 36" traffic cones
- lane-closure sign (arrow board or flashing-arrow panel)
- stanchions and boundary tape
- sidewalk-closed signage





Blueprint of work area

Setup for Bucket Truck on Curved Two-Lane Road With Two-Way Traffic

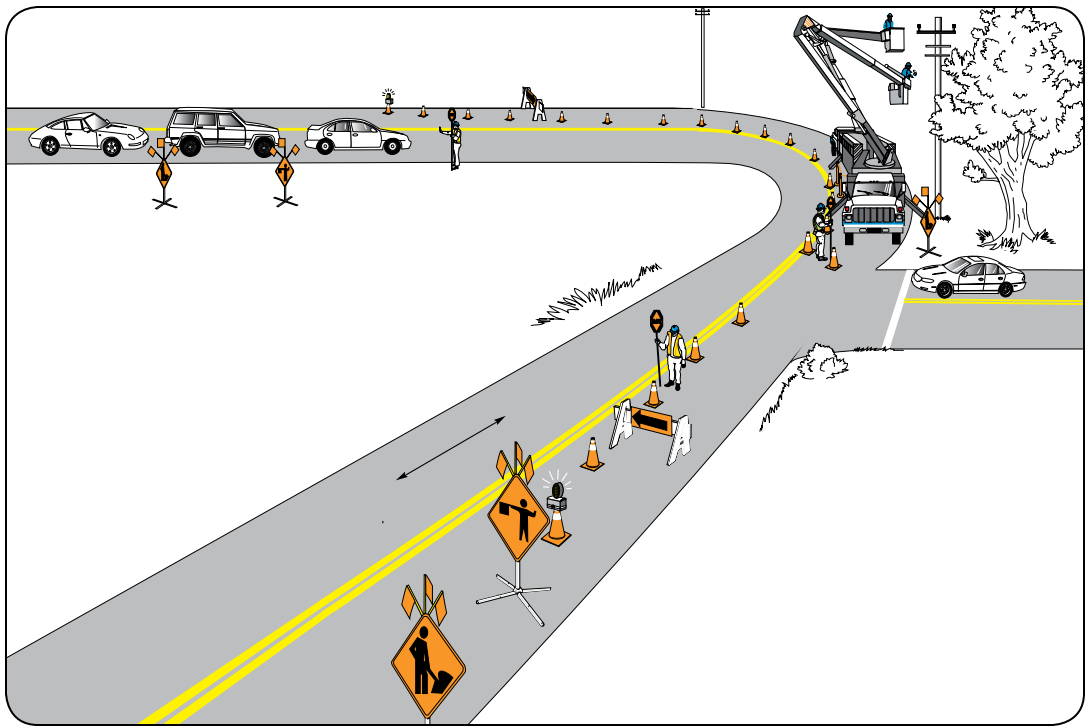
This configuration is generally applicable to comparable work areas with similar road conditions.

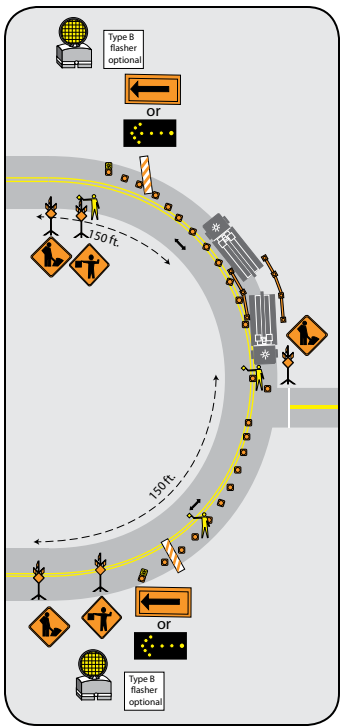
Setup

- Assign three flaggers, one at each end of the work area, and one at a nearby intersection, to control the flow of two-way traffic in one lane. The flagger position should be within a protected area, such as the tapered area.
- Ensure communications among flaggers (walkie-talkies).
- Place the advance-warning sign at the beginning of the tapered work zone for both sides of oncoming traffic.
- Place "Flagger Ahead" signs after the advance-warning sign and well before the flagger position.
- Place the "Lane Closed" sign to appear in plain view after the advanced warning sign for traffic traveling toward the one closed lane.
- Place the "Lane Closed" sign for traffic approaching on the opposite side of the double yellow line (optional).
- Place traffic cones so that upstream and downstream traffic are both tapered away from the work area.
- Set up stanchions and boundary tape to extend around work areas (tape may be used when pedestrians have restricted access to the work area).

Equipment

- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 2 lane-closure signs (arrow board or flashing-arrow panel)
- 2 "Flagger Ahead" signs
- 28" or 36" traffic cones
- stanchions and boundary tape
- Type B flashers (optional)
- 3 sets of flagger-communication equipment
- 3 flagger paddles





Blueprint of work area

Setup for Excavation in Middle Lane of Three Lanes of Traffic Moving in the Same Direction

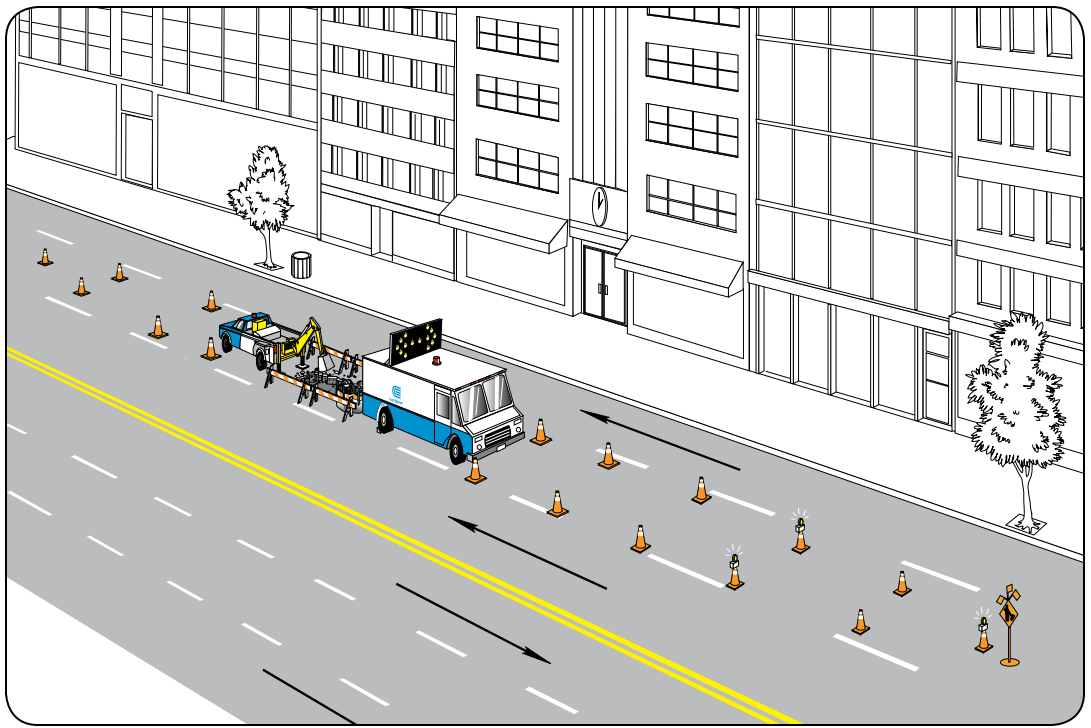
This configuration is generally applicable to comparable work areas with similar road conditions.

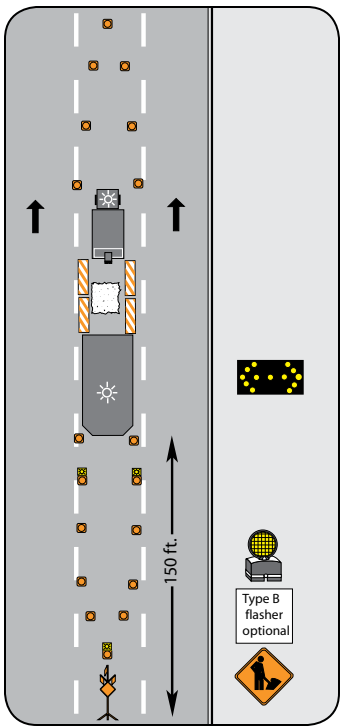
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place the advance-warning sign at the beginning of the tapered work zone.
- Place the "Lane Closed" sign in plain view after the advance-warning sign.
- Place traffic cones so that the traffic is tapered away from the work area.
- Place sturdy barricades around the excavation work area.
- Filled Pel bags should be placed inside the work area nearest barricades that are most at risk of impact from oncoming traffic.

Equipment

- advance-warning sign ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- flag tree and flags
- 28" or 36" traffic cones
- lane-closure sign (arrow board or flashing-arrow panel)
- Type B flashers (optional)





Blueprint of work area

Setup for Flush Truck in One Lane of a Four-Lane Road With Two Lanes of Traffic in Each Direction

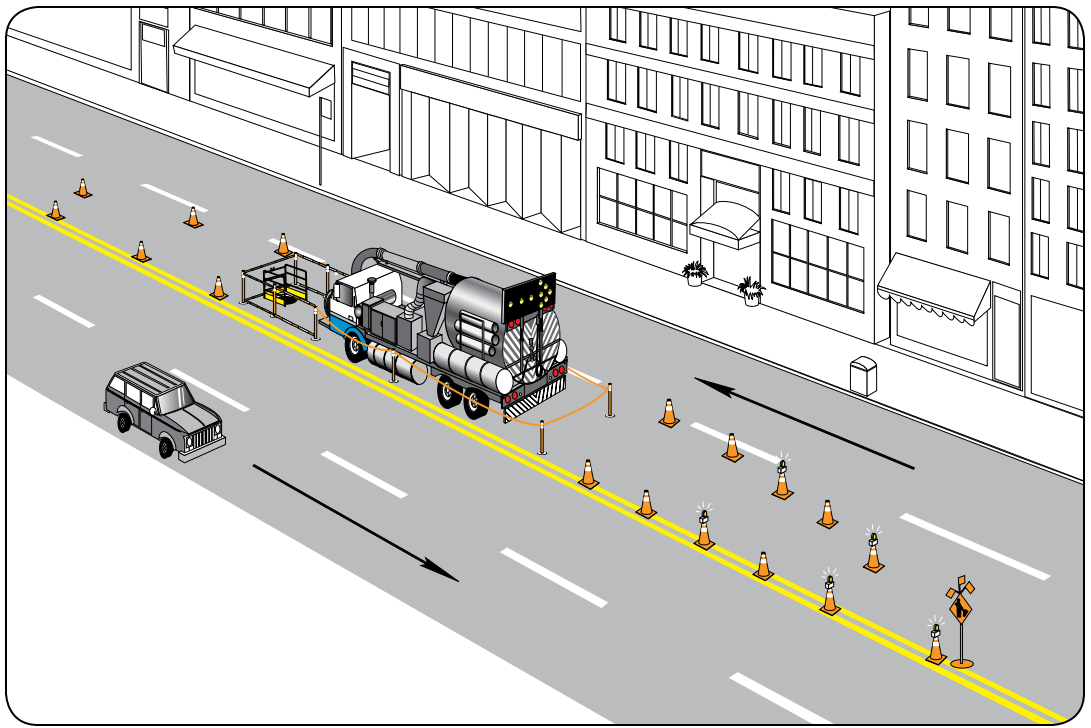
This configuration is generally applicable to comparable work areas with similar road conditions.

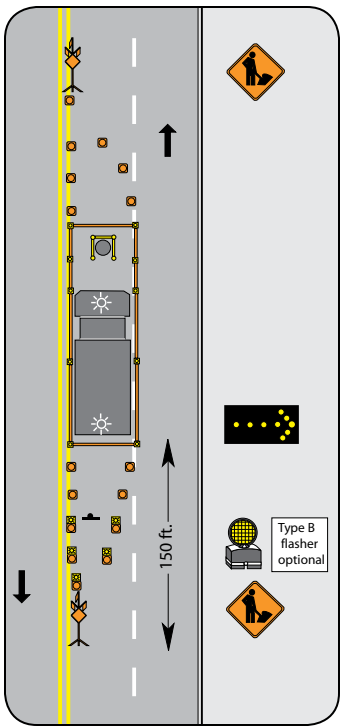
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place the advance-warning sign at the beginning of the tapered work zone for both sides of oncoming traffic.
- Place the "Lane Closed" sign to appear in plain view after the advance-warning sign for traffic traveling toward the one closed lane.
- Place the flashing-arrow panel, in the caution mode (no arrow) for traffic approaching on the opposite side of the double yellow line (optional).
- Place traffic cones so that the oncoming traffic is tapered away from the work area.
- Place traffic cones to ease the downstream traffic flow and maintain separation of traffic flowing in the opposite direction.
- Set up stanchions and boundary tape to extend completely around the flush operation. (Tape may be used when pedestrians have restricted access to the work area.)

Equipment

- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 28" or 36" traffic cones
- lane-closure sign (arrow board or flashing-arrow panel)
- flashing-arrow panel, in the caution mode (optional)
- stanchions and boundary tape
- Type B flashers (optional)
- manhole guardrail





Blueprint of work area

Setup for Tool Cart at an Intersection With Pedestrian Crosswalks

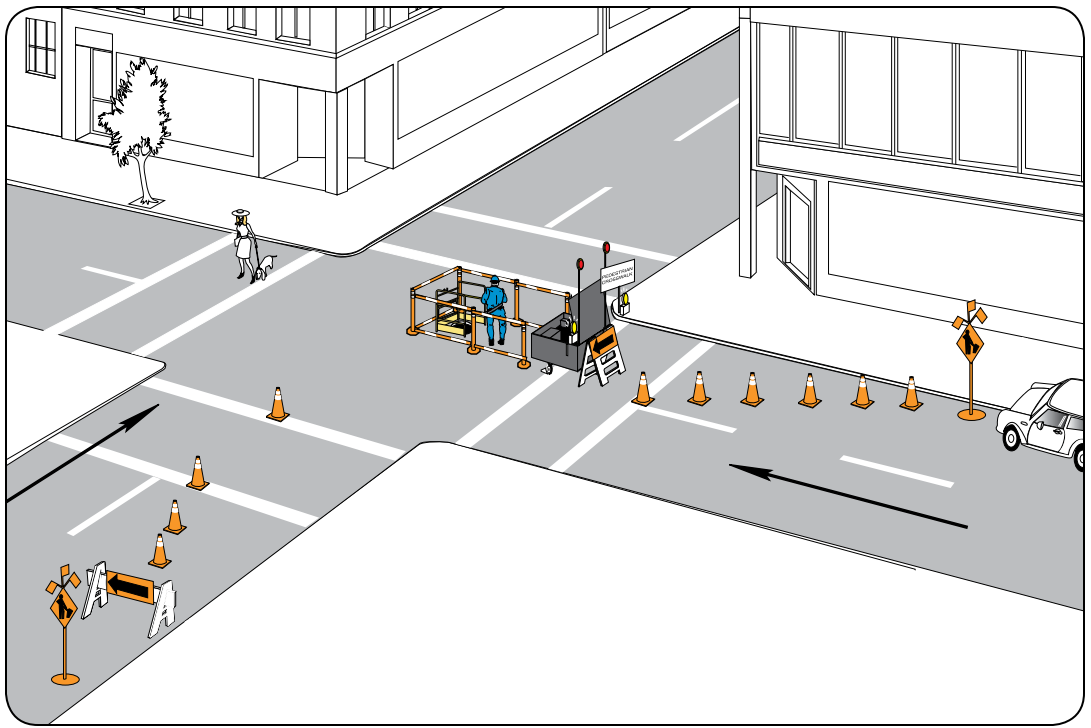
This configuration is generally applicable to comparable work areas with similar road conditions.

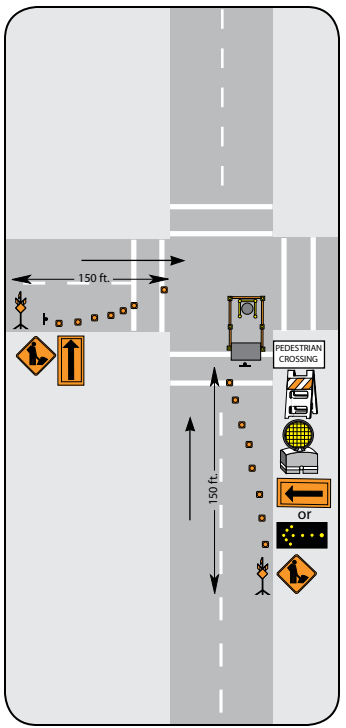
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- This work area is immediately preceded by a parking lane. Place one advance-warning sign in the parking lane and another advance-warning sign for traffic that is restricted to the left of the work area.
- Place the "Lane Closed" sign so that it appears in plain view after the advance-warning sign for traffic that is restricted to the left of the work area. ("Lane Closed" signs are not required for parking lanes.)
- Place traffic cones so that the traffic is tapered away from the work area for oncoming traffic. Maintain pedestrian access to crossings not affected by the work area.
- Maintain pedestrian safety from upstream traffic at all relocated crossings with placement of Type III barricades or with barricades equipped with a bottom rail at most 6 inches above street level and a top rail at least 36 inches high (see Protection of Pedestrians, page 17).
- Place Type B flashers on barricades at pedestrian crossings.
- Post the "Pedestrian Crossing" sign to redirect pedestrian traffic.
- Set up stanchions and boundary tape to extend around work areas. (Tape may be used when pedestrians have restricted access to the work area.)

Equipment

- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 28" or 36" traffic cones
- 1 lane-closure sign (arrow board or flashing-arrow panel)
- Type III barricades or barricades equipped with two rails
- stanchions and boundary tape
- 2 to 4 Type B flashers (required)
- "Pedestrian Crossing" sign (optional)
- manhole guardrail





Blueprint of work area

Setup for Cable Trucks at an Intersection With Pedestrian Crosswalks

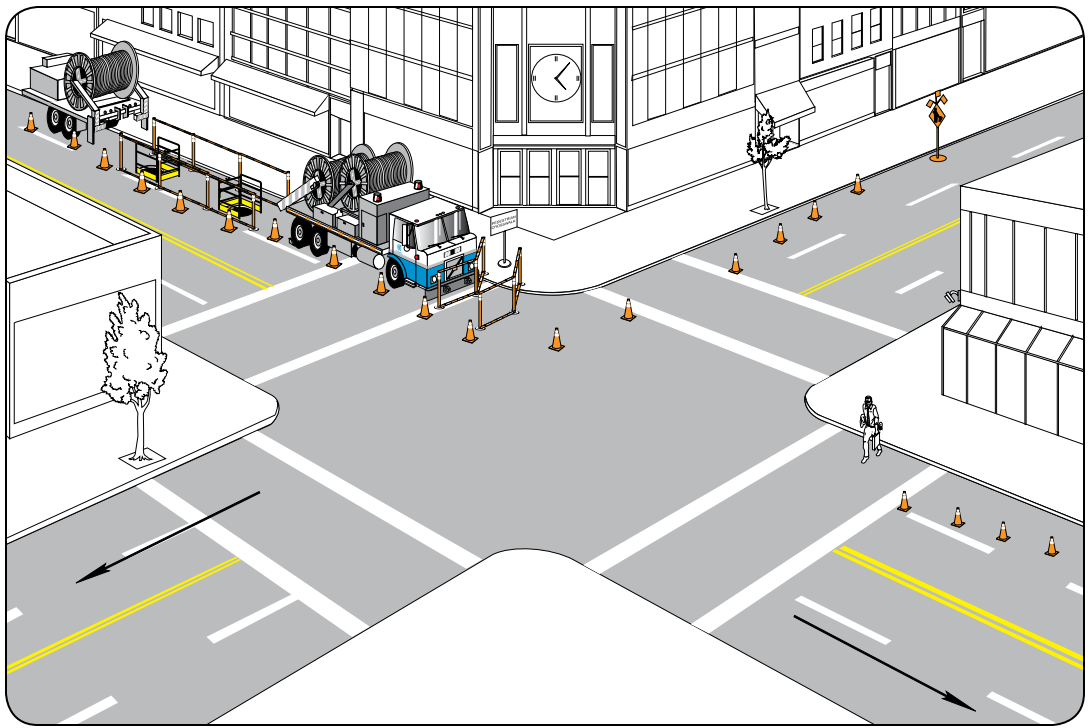
This configuration is generally applicable to comparable work areas with similar road conditions.

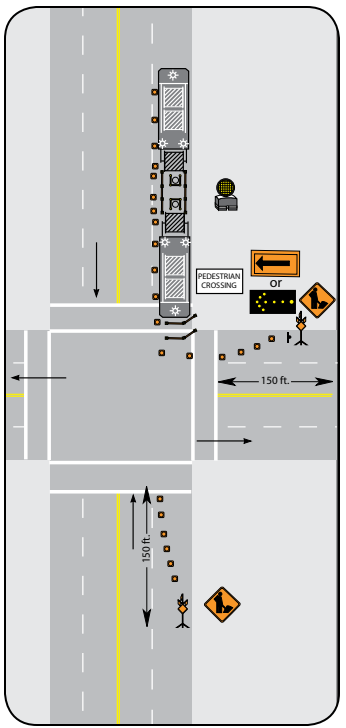
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place the advance-warning signs on the far side of the intersection for traffic traveling upstream and for traffic that is restricted from turning into that lane.
- Place the "Lane Closed" sign to appear in plain view after the advance-warning sign for traffic traveling toward the one closed lane.
- Place traffic cones so that the traffic is tapered away from the work area for oncoming traffic.
- Maintain pedestrian access to crossings not affected by the work area.
- Maintain pedestrian safety from upstream traffic at all relocated crossings with placement of Type III barricades or with barricades equipped with a bottom rail at most 6 inches above street level and a top rail at least 36 inches high (see Protection of Pedestrians, page 17).
- Place Type B flashers on barricades at pedestrian crossings.
- Post the "Pedestrian Crossing" sign to redirect pedestrian traffic.
- Set up stanchions and boundary tape to extend around work areas. (Tape may be used when pedestrians have restricted access to the work area.)

Equipment

- 2 advance warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag tress and flags
- 28" or 36" traffic cones
- 2 lane-closure signs (arrow board or flashing-arrow panel)
- Type III barricades or barricades equipped with two rails
- stanchions and boundary tape
- 2 to 4 Type B flashers (required)
- "Pedestrian Crossing" sign (optional)
- manhole guardrail and boundary tape
- "Sidewalk Closed" signage





Blueprint of work area

Job setup on sidewalk

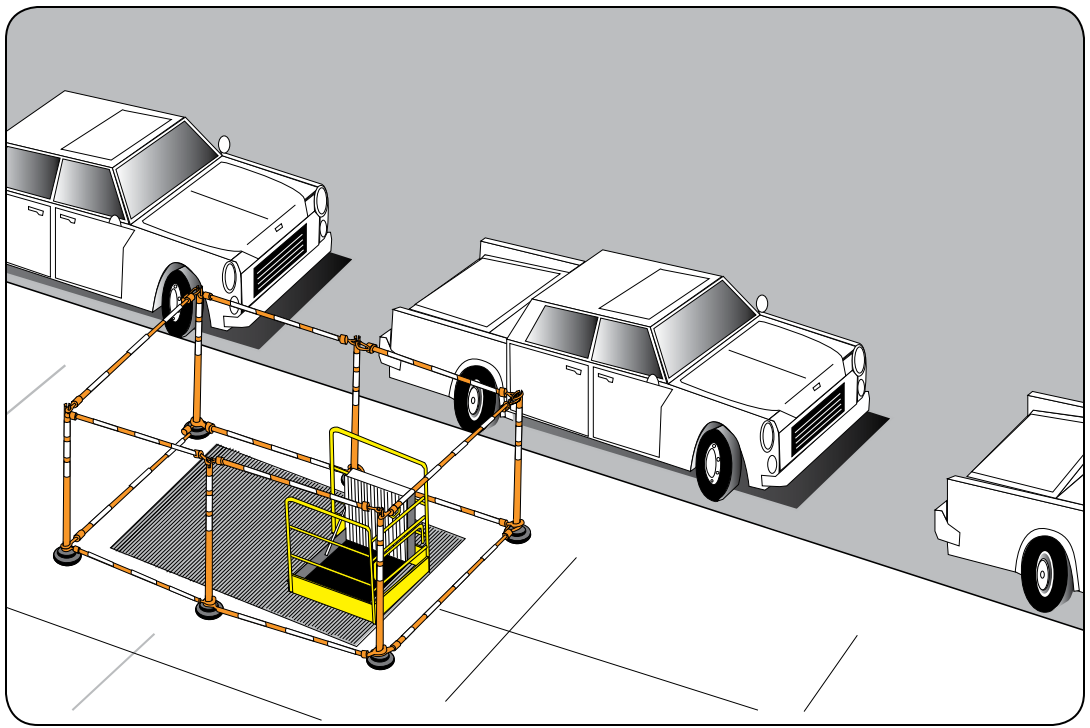
This configuration is generally applicable to comparable work areas with similar sidewalk conditions.

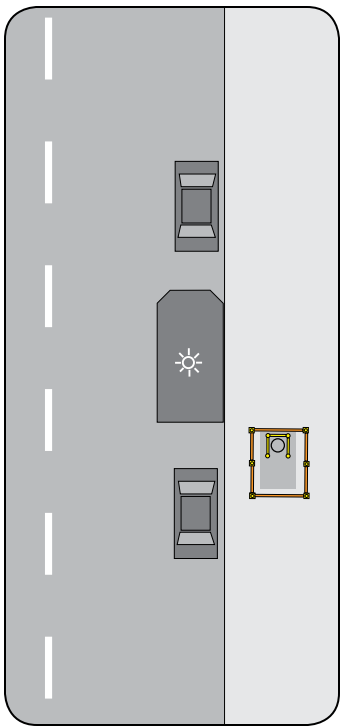
Setup

- Secure area with telescoping rail/stanchion combination.
- Two telescoping rails must be used per section, one on the bottom and the other hung on the top of the stanchions.
- Place cones around setup to give advance warning to pedestrians.
- Open underground structure covers.
- Utilize manhole guardrails, when feasible.

Equipment

- 28" or 36" traffic cones
- stanchions and telescoping rails
- manhole guardrail





Blueprint of work area

Closure/redirection of bike lane

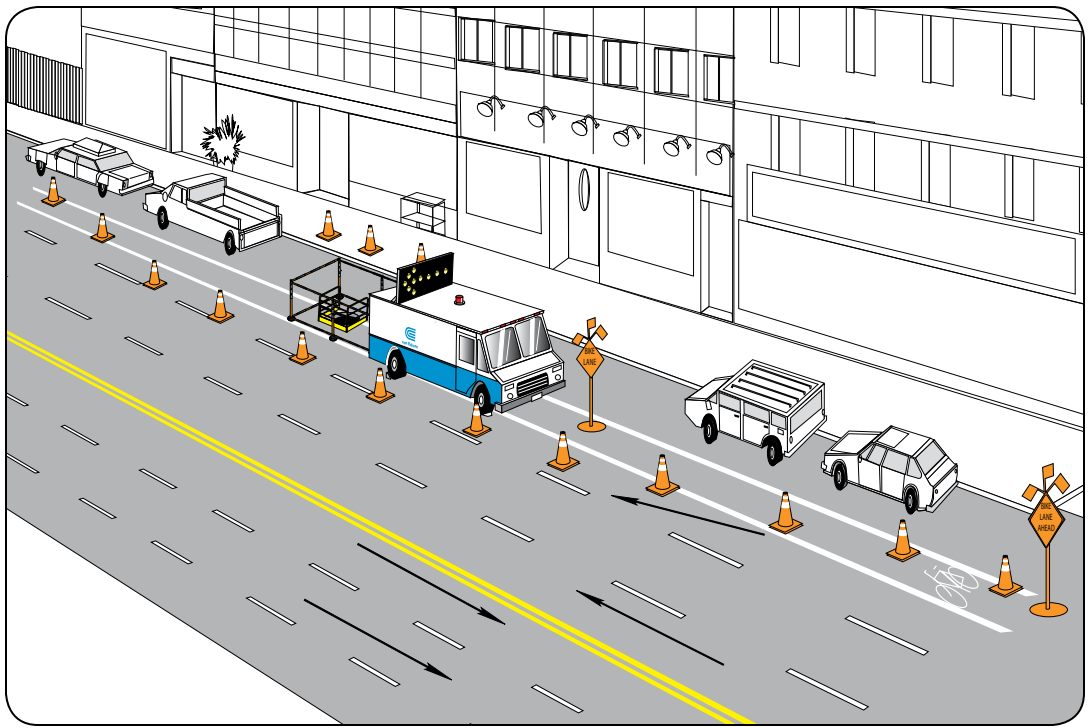
This configuration is generally applicable to comparable work areas with similar road conditions.

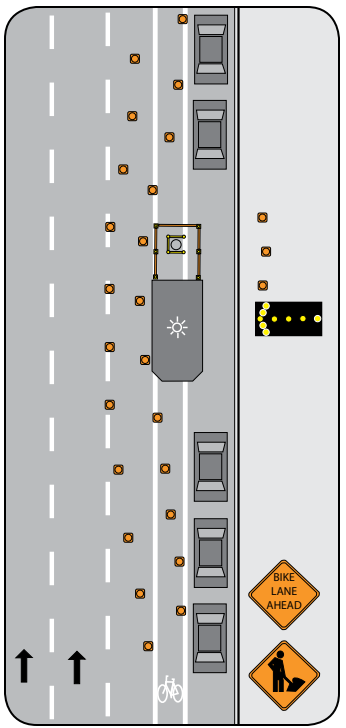
Setup

- Assign two flaggers while the work area is being prepared.
- Place the advance-warning signs on the far side of the intersection for traffic traveling upstream and for traffic that is restricted from turning into that lane.
- Place the "Bike Lane Ahead" sign to appear in plain view to alert all bicyclists to the redirected bike lane.
- Place traffic cones so that the traffic is tapered away from the work area for oncoming traffic, while maintaining the bike lane.
- Maintain pedestrian access to crossings not affected by the work area.
- Set up stanchions with telescoping rails to extend around work areas. (Tape may be used when pedestrians have restricted access to the work area.)

Equipment

- advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- flag trees and flags
- 28" or 36" traffic cones
- 2 lane-closure signs (arrow board or flashing-arrow panel)
- stanchions and telescoping rails
- manhole guardrail and boundary tape





Blueprint of work area

Diverting traffic into an oncoming lane

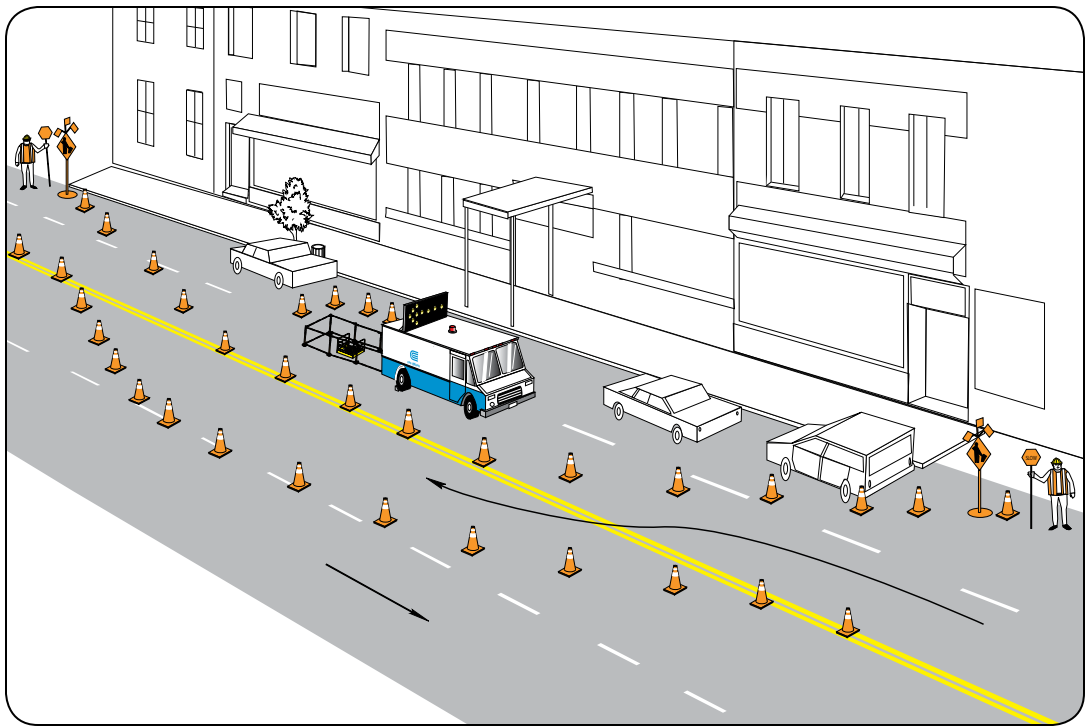
This configuration is generally applicable to comparable work areas with similar road conditions.

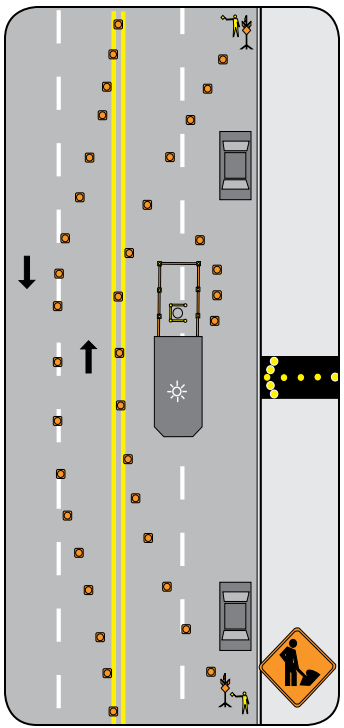
Setup

- Assign two flaggers while the work area is being prepared.
- Place the advance-warning sign at the beginning of both ends of the tapered work zone for both sides of oncoming traffic.
- Place the "Lane Closed" sign to appear in plain view after the advance-warning signs for traffic traveling toward the one closed lane.
- Place the flashing-arrow panel for traffic approaching on both sides of the double yellow line, directing the the traffic away from the work area.
- Place traffic cones so that the oncoming traffic is tapered away from the work area.
- Place traffic cones to ease the downstream traffic flow and maintain separation of traffic flowing in the opposite direction.
- Set up stanchions with telescoping rails around work set up behind the vehicle.

Equipment

- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 28" or 36" traffic cones
- 2 lane-closure signs (arrow board or flashing-arrow panel), whichmust direct traffic coming from both directions
- stanchions and telescoping rails around work area
- manhole guardrail and boundary tape





Blueprint of work area

Setup for Excavations in Sidewalk Area Re-directing Pedestrian Traffic

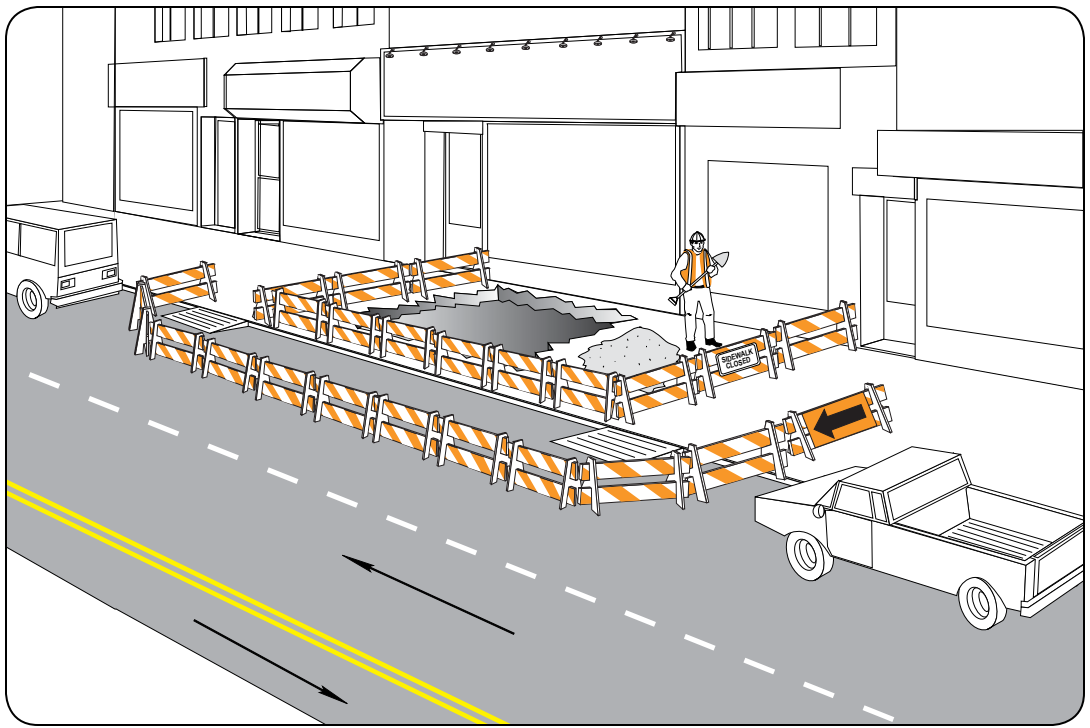
This configuration is generally applicable to comparable work areas with similar road conditions.

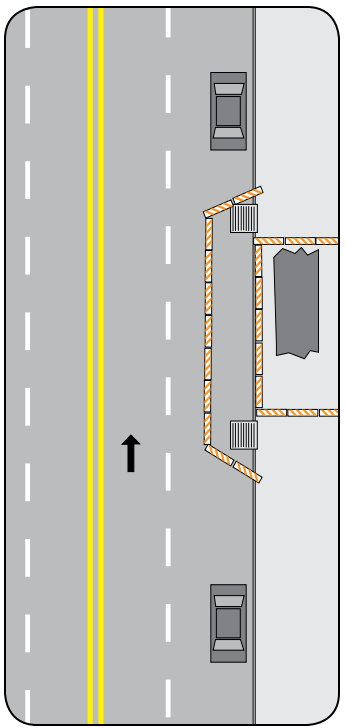
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place sturdy barricades around the excavation work area
- Filled Pel bags should be placed in work area
- Post "Sidewalk Closed" sign near setup (optional)
- Post "Sidewalk Closed Use Other Side" sign on both sides of work area, at the nearest corners, to restrict pedestrian traffic on the work side of the street.

Equipment

- Type III barricades or barricade equipped with 2 rails
- Directional-arrow signs
- Sidewalk closed signs





Blueprint of work area

Setup for Excavation Near Curbside in Vehicle Parking Lanes

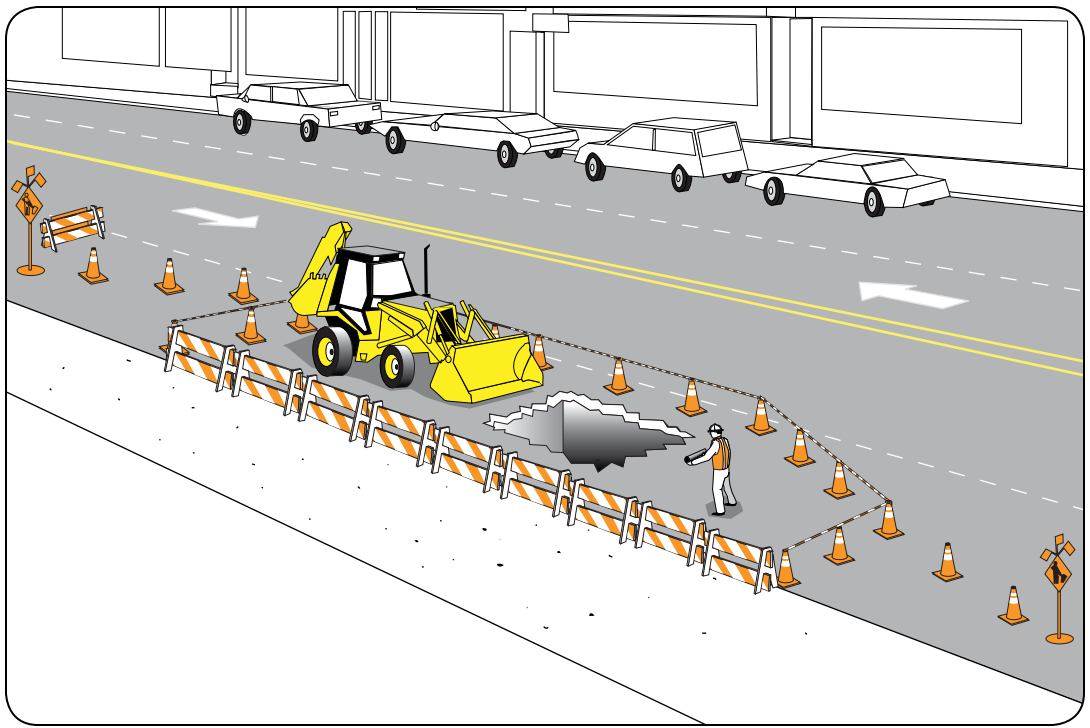
This configuration is generally applicable to comparable work areas with similar road conditions.

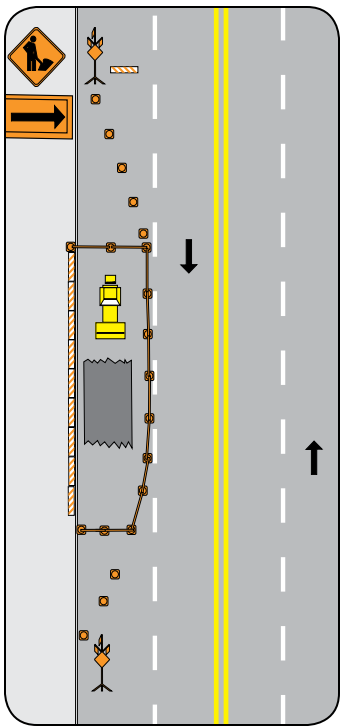
Setup

- Place sturdy barricades around the excavation work area
- Cones with telescoping rails may be used around work area closed to vehicle traffic (optional)
- Lane-closure sign (arrow board or flashing-arrow panel)
- Type B flashers (optional)
- Advance–warning sign at the beginning of the tapered work zone
- Filled Pel bags should be placed inside the work area nearest barricades that are most at risk of impact from oncoming traffic.

Equipment

- Type III barricades or barricade equipped with 2 rails
- Directional-arrow signs
- 28"-36" traffic cones
- Advance–warning sign
- Telescoping rails





Blueprint of work area

Setup for Excavations Near Intersections and Crosswalks While Redirecting Pedestrians

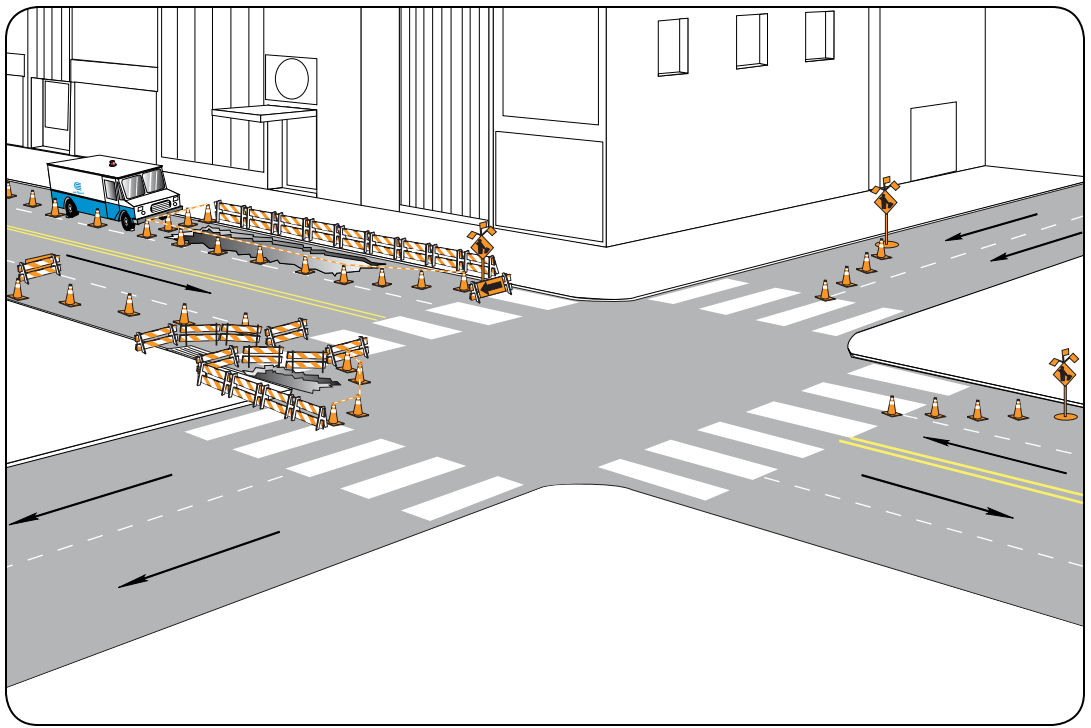
This configuration is generally applicable to comparable work areas with similar road conditions.

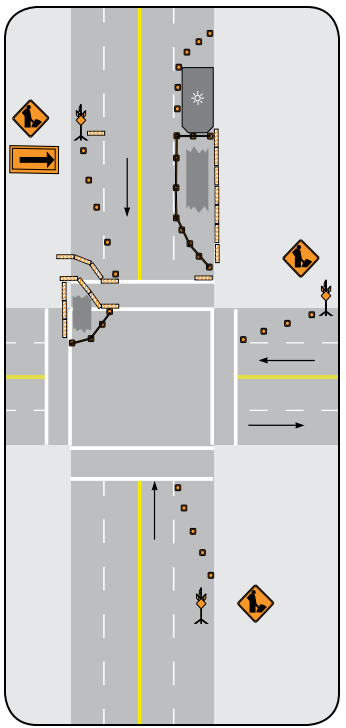
Setup

- Place sturdy type barricades around the excavation work area
- Post the "Pedestrian Crossing" sign to redirect pedestrian traffic
- Place Type B flashers on barricades at pedestrian crossing
- Filled Pel bags should be placed inside the work area nearest barricades that are most at risk of impact from oncoming traffic.
- Maintain pedestrian safety from upstream traffic at all relocated crossings with placement of Type III barricades or barricades equipped with a bottom rail, no more than 6 inches above street level, and a top rail at least 36 inches high (see Protection of Pedestrians, page 17).

Equipment

- Advance–warning sign
- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 28" or 36" traffic cones
- 1 lane-closure sign (arrow board or flashing-arrow panel)
- Type III barricades or barricades equipped with two rails
- Stanchions telescoping rails
- 2 to 4 Type B flashers (required)
- "Pedestrian Crossing" sign (optional)



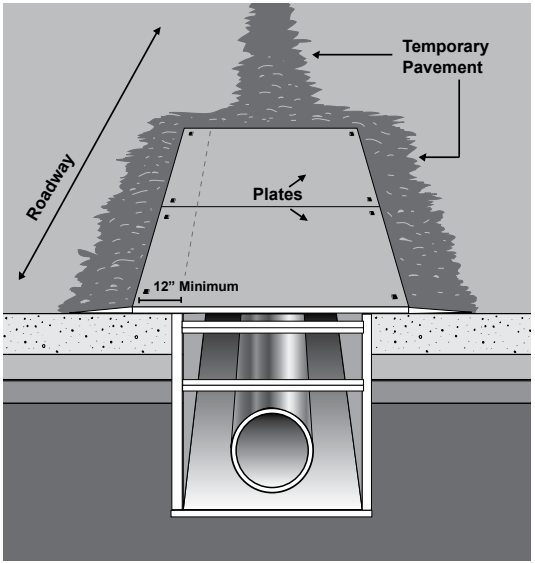


Blueprint of work area

Excavation Operations

Where operations require open trenches, and pedestrian or vehicular traffic requires maintaining passageways or traffic lanes, plates should be used.

- Plates must be large enough to span the opening, must have a minimum bearing area 1 foot wide on each side of the trench, and must be adequate to carry the load.
- Trench walls and adjacent soil must be sufficiently stable for the use of plates.
- Area at the edge of plates must be tapered to provide smooth riding and safer walking conditions. ***It is important to avoid pedestrian tripping hazards or plate movement.***
- Plates must be fastened with spikes in pre-drilled holes or spiked securely from the side so that they will not move off of the openings.
- For wide trenches or where unstable soil conditions exist, consideration should be given to construction of temporary bridges.

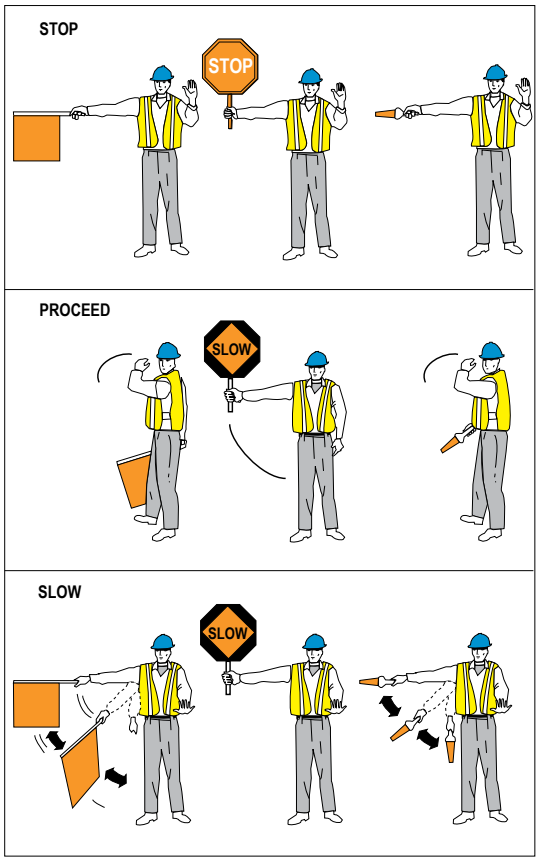


Flagger at Work Sites

A flagger will be required for certain work operations where the traffic must be stopped or controlled. Flagging is a form of communication with the motorist. The language of flagging consists of only three signals: STOP, SLOW, and PROCEED.

When traffic in both directions must use a single lane for a limited distance, movements from each end must be coordinated. Provisions should be made for alternate one-way movement through the constricted section via methods such as flagger control, a flag transfer, a pilot car, traffic-control signals, or stop, or yield control. Control points at each end should be chosen to permit easy passing of opposing lanes of vehicles. If traffic on the affected one-lane roadway is not visible from one end to the other, then flagging procedures, a pilot car with a flagger, or a traffic-control signal should be used to control opposing traffic flows.

- Flaggers must wear approved safety apparel available in Class & Stock that is compliant with American National Standard for High-Visibility Apparel, ANSI/ISEA 107-2004, Class 2 or 3 risk exposure.
- The flagger must be clearly visible at all times to approaching traffic for a distance sufficient to permit proper response by the motorist to the flagger's instructions and to permit traffic to reduce speed before entering the work zone.
- The "Flagger Ahead" sign must go before the flagger station, and the flagging station should be well ahead of the work area.



- The flagger station should be located at the start of the taper.
- The flagger should always face the oncoming traffic and make eye contact with the lead motorist.
- The flagger should stand alone, never permitting a group of workers to congregate around the flagger station.
- Flaggers will focus on the task at hand, directing traffic, and shall not be distracted by other factors, including, but not limited to, personal cell phones, electronic devices, and the like.
- When the situation requires the use of flags, only approved flags shall be used.
- When two flaggers are used, one flagger will be designated as the lead flagger.
- When two flagging stations are not visible to one another, radio communication is required or a third flagger may be stationed at a point visible in between each flagging station.
- If the flagging stations are too far apart for verbal communications, the flag transfer method of one-lane, two-way traffic control may be used. In this method, the driver of the last vehicle proceeding into the one-lane section is given a red flag and instructed to deliver it to the flagger at the other end. The opposite flagger, upon receipt of the flag, then knows that it is reasonably safe to allow traffic to move in the other direction.
- Flaggers must be illuminated at night.
- Floodlights must not produce a disabling glare condition for approaching road users, flaggers, or workers.

THE WAY WE WORK IS SAFELY

February 2011

ACTIVITIES WITH POTENTIAL TO CONTACT ENERGIZED SUB-SURFACE ELECTRIC INSTALLATIONS

OVERVIEW

This GEHSI gives guidance on the proper selection and use of personal equipment for use in specific construction activities with potential to contact sub-grade electric utility infrastructure. This GEHSI is used in the development of hazard assessments for the company and contractor-performed tasks listed on the included table. Company employees and Company contractors must be authorized by the responsible operating organization to perform these tasks and trained as applicable.

GENERAL PROTECTIVE REQUIREMENTS

All equipment selection, use, and training are based on the documented hazard assessment for each task.

All equipment cited in this document will be used in addition to the equipment otherwise required for any listed task.

DAMAGED EQUIPMENT OBSERVATION / NOTIFICATION

Report all identified cable or joint abnormalities/defects to the Electric Operations Control Room of the appropriate territory/region or facility. After reporting the condition to the Electric Operations Control Room, notify the local supervisor and EH&S representative. Electric Operations will evaluate the reported condition and determine the appropriate action/response. All work in the area of the reported abnormality must stop immediately and sufficient work area protection maintained until an Electric Operations representative(s) determines the required response (see Con Edison specification EO-1184, Identifying Cable and Splice Abnormalities on Distribution Feeders). Examples of reportable abnormalities/defects include: oil leaking from cable or joints, damaged cable of joints, hot localized surface temperatures on cable or joints, swollen joints, exposed copper, improper racking conditions, and broken/damaged conduits that could potentially house damaged distribution cable. Any condition found on a cable or joint that is not listed above, but is suspected of being an indication of a defect/abnormality, should be reported to the Electric Operations Control Room for the appropriate action/response.

© 2000-2014 Consolidated Edison Co. of New York, Inc.
Paper copies of instructions are uncontrolled and may be outdated. Consult EH&S Connect for the current version prior to use.

Personal Equipment Matrix for Activities with Potential to Damage Sub-surface Electric Installations[a]

	Task	Class 0 Gloves	FR Clothing	FR Hood	Blast Goggles	Face Shield	Safety Glasses
1	Pavement breaking	Y	N				Y
2	Breaking out concrete encased duct	Y	Y				Y
3	Moving energized primary cables that are located inside a structure, or outside structure while in proximity to joints	Y	Y	Y	Y		
4	Moving primary cables outside structure (no joints involved)	Y	Y				Y
5	Moving energized secondary cables	Y	Y				Y
6	Hand excavate to locate pre cast ducts	N	N				Y
7	Hand excavate to locate direct buried cables	Y	Y				Y
8	Removing cable from conduit	Y	Y				Y
9	Breaking structure for POE from outside/inside	Y	Y			Y	Y
10	Breaking sub-structure walls	Y	Y				Y
11	Pulling cable/rope within structure with energized cable	Y	Y				Y
12	Pulling cable within enclosed spaces	Y	Y				Y
13	Pulling rope in enclosed spaces	Y	Y				Y
14	Benching cable	Y	Y				Y
15	Breaking out unknown precast electric duct	Y	Y				Y
16	Barholing	Y	N				Y
17	Pogoing	Y	N				N
18	Using digging bar near electric facility	Y	N				N
19	Using digging bar over direct buried cables	Y	Y				Y
20	Using pneumatic clay digger in vicinity of electric facility	Y	Y				Y
21	Installing forms for field-constructed sub-surface structures from inside the designed footprint when connected cables are present	Y	Y				Y
22	Installing forms for field-constructed subsurface structures from outside the designed footprint when connected cables are present	N	N				Y
23	Installing forms for field-constructed subsurface structure prior to first energization of new cables	N	N				Y
24	Saw cutting operation	Y	N				Y
25	Hand excavate to locate cable fault	Y	Y				Y
26	Hand excavating to find service dead leg	Y	Y				Y
27	Removing underground silo	Y	Y				Y
28	Regrade	Y	N				Y
29	Build/remove shunt box w/ energized cable inside	Y	Y				Y

[a] Listed items are in addition to all typical protective and garment requirements. Class 0 gloves are sufficient protection for the tasks listed above for both primary and secondary work. Follow Company specifications and procedures when moving energized primary cables (i.e. use of pot ropes, nylon slings, etc.)

© 2000-2014 Consolidated Edison Co. of New York, Inc.
Paper copies of instructions are uncontrolled and may be outdated. Consult EH&S Connect for the current version prior to use.

REVISION HISTORY

Revision Date	Revision #	Summary of Change	Author
01/29/2014	1	Updated Pogoing job task (on Personal Equipment Matrix) to require 100% natural fiber clothing and no safety glasses.	W. Suggs
6/26/2014	2	Periodic review completed; Personal Equipment Matrix - Added item 19 and changed PPE requirements on items 16 and 18 based on Gas Ops Hazard Assessments.	W.K. Capune

© 2000-2014 Consolidated Edison Co. of New York, Inc.
Paper copies of instructions are uncontrolled and may be outdated. Consult EH&S Connect for the current version prior to use.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP A28.00 – Calling A Time Out
(CSP converted to CEHSP on 07/16/2008)
Revision 4: 01/30/12 Effective Date: 02/03/12

CONTENTS

SECTION 1.0 – PURPOSE
SECTION 2.0 – APPLICABILITY
SECTION 3.0 – INTRODUCTION
SECTION 4.0 – COMPLIANCE REQUIREMENTS
- 4.1 – CALLING A TIME OUT
- 4.2 – RESOLVING A TIME OUT
- 4.3 – TIME OUT SAFETY TALK
- 4.4 – TIME OUT CARD

SECTION 5.0 – DEFINITIONS
SECTION 6.0 – RESPONSIBILITIES
SECTION 7.0 – REFERENCES

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO MINIMIZE ENVIRONMENTAL, HEALTH AND SAFETY (EH&S) CONCERNS WHENEVER POSSIBLE. This procedure outlines the process for calling a ***Time Out*** or work stoppage due to a safety, health and/or an environmental concern and resolving the Time Out before proceeding with work.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to all Con Edison employees and contractors.

3.0 INTRODUCTION

The company's commitment to EH&S excellence requires that all work proceed only if it is safe and environmentally sound. The responsibility for fulfilling this requirement rests with every employee and contractor. Success depends on open communication between individuals and their supervisors prior to beginning work, and – in certain cases – after EH&S issues are identified.

4.0 COMPLIANCE REQUIREMENTS

4.1 CALLING A TIME OUT

All work shifts must begin with a job briefing in which safety, health, and environmental issues are discussed. If an employee has an EH&S concern, he/she must discuss it with his/her

© 2004-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

supervisor before proceeding with the job. After discussion, if there is still uncertainty on how to proceed or the concern is not adequately addressed, the employee has the right to call a Time Out without reprisal.

When a safety, health, and/or environmental concern arises on a job, the concerned employee must stop the work in question and immediately contact his/her supervisor to provide information regarding the nature of the hazard or EH&S-related concern. The supervisor must discuss the concern with the employee, either in person or on the phone, and attempt to resolve it. If the concern is resolved to the satisfaction of the employee and the supervisor and if there is certainty that all safety, health, and environmental procedures are being followed, the work may continue. If the concern is not resolved to the satisfaction of the employee and/or supervisor, work is to remain stopped and the employee must call a Time Out. In order to call a Time Out, the employee must clearly state the words "Time Out." The employee does not need to have a Time Out card in their possession in order to call a Time Out. The Time Out applies only to the location where it has been called; there are no system-wide or company-wide Time Outs.

4.2 RESOLVING A TIME OUT

Once a "Time Out" is called, the following process must be followed to resolve the concerns:

- The local EH&S representative is to be contacted to obtain assistance in resolving the concern. For support groups working in the field, their organization's contact person must also be notified. The local EH&S representative will act as the authority (expert) related to health, safety, and environmental rules, regulations, and procedures and either make a determination on the merits of the concern or contact an appropriate subject matter expert (SME) from other areas of the company, including, but not limited to Engineering, Corporate EH&S, or operations. In general, the number of people involved in the Time Out must be kept to the minimum required to resolve the issue. If the local EH&S representative understands all of the issues involved in the Time Out and all EH&S concerns are addressed, the local EH&S representative's determination is final and the Time Out is concluded.

- When the local EH&S representative determines that support is needed from a company SME, the SME will serve as the final arbiter of the Time Out. In this instance, once all EH&S concerns are addressed, the SME's decision is final and the Time Out is closed.

- In either case, whether the local EH&S representative or the SME is called, once the EH&S concern is evaluated and either it is determined that no safety, health or environmental issue exists or that the EH&S concern has been mitigated, the employees are expected to return to work.

- If the local EH&S representative cannot be reached, the job cannot continue until EH&S intervention is obtained. The Corporate EH&S Response Team (ERT) can be used either to directly resolve the issue or to reach another EH&S representative who can. Furthermore, any person listed on the ***Time Out card*** may be called to resolve the issue.

- Pending resolution of the Time Out, in emergency and other situations where extensive job and procedural reviews are necessary to resolve the concerns, an alternate work plan (where practical) approved by the responsible SME will be implemented to complete the job. Before proceeding with any work prior to the resolution of the "Time Out," the

 © 2004-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

Operating Supervisor and the local EH&S representative must ensure that the work will be performed in full accord with EH&S procedures, that all rules and regulations will be followed, and that safety, health, and environmental risks will be minimized.

At the conclusion of all "Time Out" situations, it must be clearly stated to all those involved that the "Time Out" is over.

When an EH&S concern has been raised, the employee and supervisor have resolved the issue themselves, and work has proceeded, the supervisor must notify the local EH&S representative if the concern was significant or could recur. In all Time Out situations, the EH&S representative will review the incident in a timely manner, determine if the Time Out has implications outside the organization/area where it occurred, and take appropriate steps to prevent its recurrence.

4.3 TIME OUT SAFETY TALK

To ensure that all employees are familiar with and understand the Time Out Program, a safety talk (SAF7240) must be provided.

4.4 TIME OUT CARD

Each organization must issue a Time Out card to all of its employees. An employee does not need to have a card in their possession to call a Time Out. All cards must be green and white, approximately 3-1/2 inches by 2 inches, and include the following information, at a minimum:

SIDE 1	SIDE 2
You Can Always Call a Time Out	Operating Area Location/Organization
If you have a safety, health, and/or environmental question and/or concern, we are available 24 hours a day for assistance.	No job proceeds until it is made safe and environmentally sound
Con Edison Picture of "Referee"	List names and telephone numbers of local EH&S staff or Call the Control Center at (xxx) xxx-xxxx, to reach a Safety or Environmental Specialist to assist you

5.0 DEFINITIONS

Time Out: Mechanism for any company employee to stop a job if he or she is unsure of how to proceed because of a safety, health or environmental concern. A Time Out can only be called if the concern cannot be resolved to the satisfaction of the employee and supervisor.

Time Out Card*:* A green and white card, approximately 3-1/2 inches by 2 inches, issued to all company employees for the purpose of calling a Time Out.

 © 2004-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

6.0 RESPONSIBILITIES

Employees**:** Employees are responsible for discussing EH&S concerns with their operating supervisors and calling a Time Out, when appropriate.

Local EH&S Representative: The local EH&S representative is the operating department's EH&S manager or one of his/her staff members. The local EH&S representative is responsible for:

- Determining the merits of EH&S issues identified by operating supervisors and resolving Time Outs, if possible.
- Contacting the appropriate SME if additional guidance is needed.

Operating Supervisor: The operating supervisor is a supervisor in an operating department with that title or any other supervisor in another department. The operating supervisor is responsible for:

- Attempting to resolve EH&S concerns raised by employees.
- Contacting the local EH&S representative if the employee EH&S concern cannot be resolved.
- Assessing the significance of any EH&S concerns raised and notifying the local EH&S representative of concerns that are significant or are likely to recur.

Subject Matter Expert: The SME is an individual who has detailed, specific knowledge on a particular subject by the nature of his/her education, training and experience. The SME is responsible for:

- Providing assistance to the local EH&S representative in resolving Time Outs.
- Serving as final arbiter of Time Outs.
- Approving alternate work plans, where necessary

Corporate EH&S Response Team (ERT)**:** If the local EH&S representative cannot be reached, the ERT is responsible for directly resolving the Time Out or reaching another EH&S representative who can.

7.0 REFERENCES

This CEHSP was developed by Con Edison as a matter of policy to ensure open communication about, and prompt resolution of, EH&S issues arising on the job.

 © 2004-2012 Consolidated Edison Co. of New York, Inc.

Paper copies of procedures and instructions are uncontrolled and therefore may be outdated. Please consult Outlook Public Folders for the current version prior to use.

conEdison

LAST REVIEW DATE:	REVIEW CYCLE:
10/29/13	5 Years

SPECIFICATION: **G-11863-9**

TITLE: **INSPECTION AND ASSESSMENT REQUIREMENTS ASSOCIATED WITH EXCAVATION ACTIVITIES NEAR GAS PIPELINES OPERATING AT 125 PSIG AND ABOVE**

VOLUME: **1 and 10**

REGISTRATION NO.: **GAS0413**

GAS TARGET TRAINING GROUPS: **Gas Construction; Gas Distribution Services, Gas Transmission Engineering-Major Projects, Gas Transmission Planning & Pipeline Integrity, Gas Distribution Engineering- Maps & Records, LNG; Corrosion Control, Pressure Control, Gas Emergency Response Center, Tunnel Maintenance**

OTHER TARGET TRAINING GROUPS: **Electric Operations and Central Operations (Construction, Steam Distribution, System and Transmission Operations (S&TO) and Substation Construction)**

REVISIONS: (See ★)

1) Section 4.1 - Added saw cutting and pavement removal/rehab requirement. Clarified entities calling in Code 753 markouts.

2) Section 5.2 - Added reference to "Construction Management Manual – Excavation and Installation of Con Edison Facilities."

3) Section 6.0 - Revised title of the section.

4) Section 9.0 - Added "Construction Management Manual – Excavation and Installation of Con Edison Facilities" to reference list.

5) Appendix C - Updated phone number for Major Projects.

conEdison

Gas Operations Standards

TITLE: INSPECTION AND ASSESSMENT REQUIREMENTS ASSOCIATED WITH EXCAVATION ACTIVITIES NEAR GAS PIPELINES OPERATING AT 125 PSIG AND ABOVE

EFFECTIVE DATE: November 29, 2013

★ TABLE OF CONTENTS

SECTION	TITLE	PAGE
1.0	SCOPE	2
2.0	LEGAL REQUIREMENTS	2
3.0	ORGANIZATIONS APPLICABLE	2
4.0	NOTIFICATIONS	2
5.0	DAMAGE PREVENTION – EXCAVATION OVERSIGHT	4
★ 6.0	DAMAGE PREVENTION – PIPELINE PATROLS AND FOLLOW-UP ACTIONS	8
7.0	DAMAGE PREVENTION – MARK-OUT VERIFICATION	9
8.0	PIPELINE DIRECT ASSESSMENT	10
9.0	REFERENCE SPECIFICATIONS	14
10.0	ATTACHMENTS	14

TITLE: INSPECTION AND ASSESSMENT REQUIREMENTS ASSOCIATED WITH EXCAVATION ACTIVITIES NEAR GAS PIPELINES OPERATING AT 125 PSIG AND ABOVE

1.0 SCOPE

This specification covers the inspection and assessment procedures that Con Edison will perform associated with any excavation activity or condition that could potentially impact pipeline integrity 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 (including Gas Operations, Electric Operations and Central Operations) that perform excavation work or have contractors that excavate for them in Manhattan, Queens, the Bronx and Westchester. This includes all departments that oversee and monitor municipal contractors, Company contractors, third party contractors and Code Rule 753 mark-out vendors (Construction).

Also included are the Gas Emergency Response Center (GERC); Gas Transmission Engineering – Major Projects, Gas Transmission Planning & Pipeline Integrity (GTPPI); Gas Distribution Engineering – Maps & Records; and Corrosion Control.

4.0 NOTIFICATIONS

★ 4.1 The GERC, at telephone numbers listed in Appendix C, shall be notified of any excavation activity within 25 feet of a gas pipeline operating at 125 psig and above (TM). This notification includes **planned and emergency work** by all Company forces, Company contractors, municipal contractors and all third party contractors. The GERC shall also be notified of **any of the following**:

- known or suspected water leak(s) (main and/or service water leaks);
- facility installation(s) using trenchless technology;
- overhead pole installation work;
- soil borings;
- any work in or around open excavations and backfilling;
- pavement removal or rehabilitation which includes but is not limited to milling and paving, pavement saw cutting, or pavement breaking (jack hammering).

4.0 **NOTIFICATIONS** (Continued)

This notification includes any Code Rule 753 mark-out requests by company, contractors, municipalities or private contractors. Whenever feasible, this notification should be made as a result of Code Rule 753 requests and faxed or e-mailed to the GERC.

The notification to the GERC shall include:

- The location of the work;
- Name and telephone number of the contractor;
- Start and completion dates;
- Brief description of the planned excavation;
- Remarks (e.g. identifying where work will take place);
- Gas transmission main size; and
- M&S plate number

All notifications should be made at least two (2) working days prior to the start of the excavation (when known) and when work is completed.

4.2 Upon notification of any work 25 feet or less from the Gas Transmission Main (TM), the GERC shall prepare and issue an e-mail contingency notification to Gas Engineering, GTPPI & Corrosion Control, the applicable Gas Construction and Gas Distribution Services groups, Gas Control, and Construction.

4.3 GERC shall notify Gas Transmission Engineering – Major Projects and request a review if it receives any notifications of the following:

- planned facilities being installed using trenchless technology (microtunneling, directional drilling, pipe bursting, Underground Piercing Tools (a.k.a hole hogging)) that may cross or impact a TM.

- pile driving, blasting or other conditions that may potentially impact the TM.

4.4 If the GERC receives notifications of water services or other facilities being installed using trenchless technology (microtunneling, directional drilling, pipe bursting, Underground Piercing Tools (a.k.a hole hogging)) that crosses a TM, they shall notify GTPPI to review.

4.0 **NOTIFICATIONS** (Continued)

4.5 If the GERC receives notification of a suspected water leak, they shall dispatch Gas Distribution Services (GDS).

- If the water leak is within 25 feet of a TM, Gas Distribution Services or approved company personnel shall perform a gas leak investigation.
- If the water leak is within 5 feet of a TM, the GERC shall request a review by Gas Transmission Engineering - Major Projects or GTPPI. Based on their inspection, they shall determine the need to excavate.
- Upon notification from the GERC, Construction shall assign full-time inspection of: A) confirmed water leaks that are within 5 feet of a TM; B) confirmed water leaks that are within 5 to 15 feet of a TM in which a gas leak is detected in the water leak area.

4.6 Whenever a TM is fully or partially exposed; or damaged (including coating), the GERC and/or Construction shall notify Corrosion Control and request an inspection of the pipeline coating including any visible metal surface.

4.7 The GERC shall maintain appropriate mailing lists for their notifications. They shall also establish and maintain a tracking system for all new and completed reports of excavations crossing or within 25 feet of a TM.

4.8 The GERC shall be notified after all work within 25 feet of a TM is completed. The GERC shall then issue a notice to cancel the contingency.

4.9 Gas Distribution Engineering – Maps & Records shall notify GTPPI anytime an M&S Plate is updated that has a TM.

5.0 **DAMAGE PREVENTION – EXCAVATION OVERSIGHT INSPECTION**

5.1 Definition of Parties performing work in the vicinity of the gas transmission pipeline:

- **1st Party** - Any Con Edison Gas operator qualified employee or crew
- **2nd Party Contractors** - Any gas qualified contractor working for Gas Operations or Construction Management under the direction/supervision of a Gas Operator Qualified supervisor/ inspector.

5.0 **DAMAGE PREVENTION – EXCAVATION OVERSIGHT INSPECTION** (Continued)

- **3rd Party Contractors** - Any contractor or Company crew not working directly under the direction/supervision of a Gas Operations operator qualified supervisor. This includes: Electric and Central Operations employees and/or Municipal, Telephone, fiber optic, cable company or other contractors and/or personnel working in the vicinity of the Gas Transmission main.

★ 5.2 Prior to any excavation within 25 feet of a TM, a Con Edison representative shall meet with the excavator at the field site to explain the physical attributes of the TM, such as size, operating pressure, depth of cover, presence of special facilities or appurtenances (regulators, drips, etc.). Construction shall also discuss limits of excavation and methods and procedures for supporting and protecting the pipeline and facilities. Work shall be in accordance with the latest version of the "Construction Management Trenching Manual Excavation and Installation of Con Edison Facilities."

5.3 Con Edison representative shall perform a daily visual inspection of all excavation work within 15 to 25 feet of a TM to ensure the contractor's scope of work has not changed; and markings are renewed as required.

5.4 Con Edison representative shall provide daily updates to GERC via phone and/or email, for all known excavations and work within 25 feet of a TM. The GERC shall document excavation activities using the "Damage Prevention Checklist" found in Appendix B as a guideline, based on communication with Construction Inspectors/company. This may be achieved by replying to or attaching the latest contingency e-mail.

5.5 Oversight requirements for work within 15 feet of the gas transmission main:

A) Anytime **3rd Party Contractor** work is being performed within 15 feet (see Figure 1) of a gas TM centerline, Construction shall assign a full time inspector.

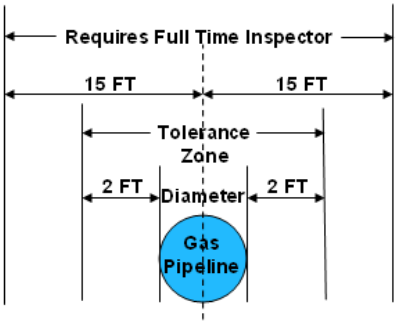


Figure 1

5.0 **DAMAGE PREVENTION – EXCAVATION OVERSIGHT INSPECTION** (Continued)

B) Anytime **2nd Party Contractor** (Gas Qualified Contractor) is working for:

- Gas Operations and is performing work within 15 feet of a gas TM centerline – a Gas Operations supervisor shall perform 2 field inspections of 2nd Party contractors per shift.
- Construction Management and is performing work within 15 feet of a gas TM centerline– a Construction Management inspector that is Gas Operator Qualified shall perform a minimum of 2 field inspections of 2nd Party contractors per shift.

NOTE: Construction Management inspectors that are not Gas Operator Qualified shall perform full time inspection of 2nd party contractors.

Con Edison representative shall provide daily updates to GERC via phone and/or email, for each field inspection performed per shift. The GERC shall document inspection activities using the "Damage Prevention Checklist" found in Appendix B as a guideline, based on communication with inspector. This may be achieved by replying to or attaching the latest contingency e-mail.

C) **1st Party** work within 15 feet of a gas TM centerline shall not require oversight.

For guidance related to this section and for specific circumstances which may not require full coverage, contact GTPPI. (See Appendix C)

5.6 Inspection 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 a TM. Other non-typical excavations, work and situations in the vicinity of a TM shall be addressed as specified herein or as directed by Gas Transmission Engineering - Major Projects. The three (3) representative cases covered in the flow diagrams are:

- **Unregistered excavations within 25 feet of a TM** – excavations or work which was **not** reported to the GERC.
- **Registered excavation activity within 25 feet of a TM** - excavations or work which was reported to the GERC.
- **Water leaks within 25 feet of a TM** – water main in the vicinity of a TM.

5.0 **DAMAGE PREVENTION – EXCAVATION OVERSIGHT INSPECTION** (Continued)

5.7 As required by Code Rule 753, hand excavation shall be performed until the exact location of a TM is determined before powered equipment can be used within the tolerance zone (one half of the pipe diameter plus two feet). A minimum of 4 inches clearance from a TM shall be maintained after verifying the location.

Construction must also witness and report to GERC 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 a TM.

5.8 The GERC shall arrange for crews to standby valves whenever an excavator is using mechanical excavation equipment within 5 feet of a TM or whenever any heavy mechanical construction work is being performed within 5 feet of a TM (e.g. lifting/placing of heavy materials that could potentially damage a TM). They shall also arrange for valve crews when otherwise requested by Gas Transmission Engineering – Major Projects or GTPPI.

The local Gas Operations area shall verify the locations and accessibility of the isolation valves (except Remote Operating Valves (ROVs)). When crews are standing by valves, Construction shall maintain a full time inspector who shall maintain communication with the GERC. GERC shall direct gas field crews as required.

5.9 For excavations parallel to and within 5 to 15 feet of a TM and within the angle of repose of the TM, Construction shall contact the GERC, who shall advise Gas Transmission Engineering - Major Projects. If the pipeline is within the angle of repose and the excavation is longer than shown in the table below, Gas Transmission Engineering – Major Projects shall discuss the project with Construction to evaluate sheeting being used, type of soil, method of excavation and other field conditions. When warranted, field visits shall also be made by Gas Transmission Engineering - Major Projects with Construction.

The need for follow-up visits by Construction shall 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

★ 6.0 DAMAGE PREVENTION – PIPELINE PATROLS AND FOLLOW-UP ACTIONS

6.1 Corrosion Control shall patrol the routes of all TMs on a weekly basis not to exceed 12 calendar days.

6.2 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 and the records retained for the lifetime of the pipeline. The patroller shall possess up-to-date M&S Plates (hard copy or electronically) in their possession for the pipeline being patrolled. The Patroller shall also use the latest contingency tracking spreadsheet, established by the GERC, during patrol of the pipelines to identify excavation work that is not on the list (Unregistered Excavation).

6.3 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 or listed in the GERC contingency tracking list/spreadsheet. (Unregistered Excavation)
- 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. The patroller shall immediately notify the GERC, who shall notify the DEP and municipalities, regarding any suspected water leaks.
- 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.

★ 6.0 **DAMAGE PREVENTION – PIPELINE PATROLS AND FOLLOW-UP ACTIONS** (Continued)

6.4 If a leak or some other situation that presents an immediate danger to the pipeline is discovered, the patroller shall immediately notify the Gas Emergency Response Center (GERC) and standby for further instructions. The patroller should make every attempt to stop work or other situations that are presenting immediate danger to the pipeline, including requesting Fire Department assistance to protect the pipeline until further instructions are provided.

6.5 If a recent patch or plate is found over or within 5 feet of a TM that was not previously identified in the GERC Contingency tracking list/spreadsheet, the patroller shall notify the GERC, who shall request a review by Construction. If Construction determines an excavation was performed and not covered by Con Edison personnel, the GERC shall identify the location as an "unregistered excavation" and contact Corrosion Control to perform an indirect inspection tool survey (Close Interval Survey – CIS) of the pipeline. Survey indication classification and indirect inspection prioritization shall be in accordance with G-11868 – Table 1 & Table 2. "Unregistered excavation" locations may be required to be excavated to perform a detailed pipeline integrity assessment to ensure that the TM and its associated appurtenances have not been damaged.

The indirect inspection tool survey shall be performed within fifteen (15) calendar days of the date the patch or plate was discovered. Results of this survey will be used in determining the scheduling of excavation based on indication severity. An indirect inspection tool survey will not be required if the location is excavated for direct assessment/examination within fifteen (15) calendar days of the date the patch or plate was discovered. Refer to "Section 8.0 – PIPELINE DIRECT ASSESSMENT" for specifics on Direct Assessment requirements and scheduling.

6.6 GTPPI may require excavation of "unregistered excavation" locations to perform a detailed pipeline integrity assessment to ensure that the TM and its associated appurtenances have not been damaged. GTPPI shall work with Construction and/or Gas Operations to excavate the locations as required.

7.0 **DAMAGE PREVENTION – MARK-OUT VERIFICATION**

7.1 Corrosion Control shall monitor/verify 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 TM. A minimum of 15% of planned mark-outs shall 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.

7.0 **DAMAGE PREVENTION – MARK-OUT VERIFICATION** (Continued)

7.2 If a discrepancy (more than 2 feet) is found, Corrosion Control shall immediately notify Construction and Gas Distribution Engineering - Maps & Records for a resolution. Maps & Records shall correct any confirmed mapping errors. GTPPI shall maintain records of all locations verified for the lifetime of the pipeline.

8.0 **PIPELINE DIRECT ASSESSMENT**

8.1 GTPPI shall arrange for a pipeline integrity investigation excavation (test pit) when an "unregistered excavation" (i.e. unknown patch, plate or unmonitored excavation) is discovered over or within 5 feet of a TM as reported to them by the GERC. GTPPI shall work with Construction and/or Gas Operations to excavate the locations as required.

Scheduling locations for excavation and direct assessment shall be based on indirect inspection tool survey indication severities in accordance with the following:

- "Immediate" tool indications, which may be indicative of severe coating damage and potential 3rd party damage, shall be scheduled to be excavated within sixty (60) calendar days (system condition permitting).

- "Scheduled" or "Monitored" indications shall be completed as soon as possible (system condition permitting) but not to exceed 180 days from date of discovery.

  NOTE: Excavation of locations not exhibiting any indications shall not be required.

The TM must be fully exposed and examined for coating and/or pipe damage, unless Company personnel (Corrosion Control, Construction, GTPPI, etc.) can provide verification or documentation that the pipeline was not exposed by 3rd party activity. A pipeline integrity investigation excavation (test pit) shall also be requested when a water service crossing a TM was installed using trenchless technology.

8.2 Gas Transmission Engineering - Major Projects or GTPPI shall review any reports of defects or damage to the pipeline. They shall also determine what corrective actions, if any, are needed. A report of their review and the corrective actions taken shall be prepared and maintained for the life of the structure.

8.0 **PIPELINE DIRECT ASSESSMENT** (Continued)

8.3 Water impingement rubber mat(s) (Class & Stock #: 059-5306) shall be installed between water facilities and the gas transmission main, anytime a water service or main crosses (above or below) the gas transmission pipeline.

Where possible, a minimum clearance of 12 inches must be maintained from any water main or service. If this clearance cannot be maintained, rubber matting (2' X 2' X 1/2" thick mat, class and stock #059-5306) must be installed. The matting shall be installed either horizontally over/under the gas main or vertically alongside the gas main (DO NOT wrap the rubber mat around the gas main). The rubber matting shall be installed a minimum of 2 inches from the gas main and shall not be installed "edge to edge". When more than one rubber mat is installed to protect the gas, the mats shall overlap a minimum of 6 inches.

8.4 Installation of phenolic boards shall be installed between subsurface structures (including electric facilities) when clearances are less than 12 inches. If 12 inches clearance cannot be maintained, then a minimum clearance of 2 inches is acceptable, provided that the service is properly protected (e.g. with phenolic board - 1' X 2' - class and stock #596-4473; 1' X4' - class and stock #596-4432) from damage that might result from the proximity to the other structure.

8.5 If a TM is exposed, a qualified Corrosion Control employee shall visually inspect the coating of the exposed surface and determine if further excavation and a full direct assessment inspection is required. Visual inspection of the exposed pipeline shall be documented on the "Pipeline Visual Inspection Form" located in Appendix A.

A) Visual inspections that do not reveal coating and/or pipeline anomalies shall require completion of the "Pipeline Visual Inspection Form" located in Appendix A.

B) Visual inspections that reveal coating and/or pipeline anomalies shall be reviewed by a qualified Corrosion Control employee to determine if the entire circumference of the pipe should be excavated and a full direct assessment inspection be performed.

- Visual inspections that reveal minor coating anomalies (with no pipeline anomalies) do not require a full direct assessment inspection or excavation of the entire pipe circumference. These findings shall require completion of the "Pipeline Visual Inspection Form" located in Appendix A and repair with mastic in accordance with G-8209.

8.0 **PIPELINE DIRECT ASSESSMENT** (Continued)

A minor coating anomaly is defined as an area of the coating which has damage such as a scrape, scratch, abrasion, etc. *The underlying steel pipe surface has not been exposed, scratched, scraped, defaced, etc. as determined by the inspection performed by a qualified Corrosion Control employee.*

- Visual inspections that reveal coating and/or pipeline anomalies that may require further investigation shall require a full direct assessment inspection. A qualified Corrosion Control employee shall inspect the coating and pipe; and document the inspection on the "Direct Assessment Data Collection Form" in accordance with G-11868 (Appendix B) and Con Edison's Integrity Management Plan (Chapter 7). Associated activities performed by a qualified Corrosion Control employee shall include, but are not limited to, the following:
  - Arrange for the entire circumference of the pipe to be excavated.
  - Arrange for the appropriate level of coating removal/abatement and/or pipe cleaning in order to perform an accurate inspection.
  - Coating that is inspected and found to be sound and well adhered to the pipe does not require removal unless required by the qualified Corrosion Control employee to perform an accurate inspection of the pipeline or its coating.
  - Gather all pertinent data (field measurements, pipe anomaly measurements, field testing, and photographic documentation) necessary to analyze the integrity of the affected section of gas main.
  - Arrange for coating repairs.
  - Document all inspections and file a copy of the Direct Examination Data Collection Form in the appropriate pipeline integrity file.

8.6 Upon notification of the anomalous condition and receipt of pertinent pipe inspection data (Direct Examination Data Collection Form, etc.), GTPPI shall evaluate any potential threat to pipeline integrity and determine through remaining strength calculations whether the affected pipeline section can safely remain in-service, requires remediation, or shall be protected by an immediate pressure reduction commensurate with the remaining strength of the pipe. Results of the evaluation and action recommendations shall be communicated to the Chief Gas Transmission Engineer via email for approval.

8.0 **PIPELINE DIRECT ASSESSMENT** (Continued)

8.7 When a corrosion pipe anomaly is discovered on a gas transmission pipeline, GTPPI shall calculate its remaining strength from the remaining wall thickness and geometry of the corroded area in accordance with methodology described in Chapter 10 of the Integrity Management Plan (i.e. this methodology is based on ASME B31G "Manual for Determining the Remaining Strength of Corroded Pipelines, A Supplement to ASME B31 Code for Pressure Piping") or an equivalent method.

A) Any corrosion that results in a local wall thickness less than the mill tolerance of new pipe is deemed significant and requires an evaluation of the strength of remaining metal at the corroded area.

B) The applicability of ASME B31G is limited to evaluating the remaining strength of steel pipe damaged by corrosion pitting or general area corrosion. (Corrosion pitting that is closely grouped and affects the overall strength of the pipe is considered general area corrosion.)

C) The remaining strength evaluation of steel pipe with anomalies other than corrosion, such as mechanical damage (e.g. dent, gouge, scratch, or groove) caused by a third party, defective welds, arc burns, cracks, or manufactured defects, cannot be evaluated using ASME B31G. These anomaly types shall be assessed by Gas Transmission Engineering - Major Projects or an approved metallurgical vendor.

8.8 Documentation of integrity assessment, analysis, and recommendations shall be maintained by GTPPI in accordance with Con Edison's Integrity Management Program (IMP), Chapters 7A and 10.

8.9 Anomalies shall be repaired in accordance with G-11870, "Repair of Steel Gas Transmission Pipelines Operating at 125 PSIG or More."

8.10 Steel plates shall be installed to provide protection, if feasible, whenever company forces or company contractors expose a transmission main. If other subsurface structures interfere with the installation of protection plates and the subsurface structures are located above the Transmission Main, Gas Engineering – Major Projects must be notified. Refer to EO-6799-C for plate installation.

★ 9.0 REFERENCE SPECIFICATIONS

EO-6799-C	-	Protective Covers for Gas Main Installations
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-11854	-	Installation and Maintenance of Line Markers and Signs for Gas Transmission and Distribution Mains
G-11868	-	External Corrosion Direct Assessment (ECDA) Process for Buried Onshore Gas Transmission Pipelines
G-11870	-	Repair of Steel Gas Transmission Pipelines Operating at 125 PSIG or More
G-8005	-	General Specification for the Installation of Gas Distribution Mains
G-8209	-	Field Coating of Steal Pipe and Fitting Installed Underground and in Subsurface Structures
ASME B31G	-	Manual for Determining the Remaining Strength of Corroded Pipelines
CM Manual	-	Construction Management Trenching Manual Excavation And Installation of Con Edison Facilities

10.0 ATTACHMENTS

Appendix A	Pipeline Visual Inspection Form
Appendix B	Damage Prevention Checklist for Construction and GERC for Excavations Within 25 Feet of TM
Appendix C	Telephone Numbers - Gas Operations
Appendix D	Process Flow Diagrams

APPENDIX A

PIPELINE VISUAL INSPECTION FORM

1. GENERAL INFORMATION

Location (Dimension /Street):

Date of Inspection:

Technician(s)/Inspector(s):

Contingency Number:

Pipeline Section: **Segment:**

Corrosion Section: **Segment:**

Pipe Diameter: **inch**

Reason for Excavation: (Check One)

- ☐ **3rd Party Excavation**
- ☐ **Planned Gas Work**
- ☐ **Contingency/Patrol Finding**
- ☐ **Other**

Supervisor Review:

Date of Review:

2. ACCESSIBILITY

Is pipeline accessible for a visual inspection?

☐ **YES** **Continue to Section 3**

☐ **NO** **Explain in Remarks/Notes below**

3. VISUAL INSPECTION

Coating or pipeline damage or anomaly?

☐ **NO** **Inspection Complete.**

☐ **YES; Minor coating damage only**
- Coating Repair completed? ☐ **YES** ☐ **NO**

☐ **YES; damage or anomaly is not minor** **Perform full direct assessment; document on "*Direct Assessment Data Collection Form*".**

Remarks/Notes:

4. HAND SKETCH AREA

<E, W, N, S> ⟶

Note: Photos supporting findings should be taken and filed with this inspection form.

APPENDIX B

DAMAGE PREVENTION CHECKLIST FOR CONSTRUCTION AND GERC FOR EXCAVATIONS WITHIN 25 FEET OF TM

The GERC shall document the following information for each known excavation within 25 feet 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 shall be addressed by either Construction, Gas Operations, etc., for each known excavation within 25 feet of a gas transmission main as noted:

- **The location is monitored daily by Construction and mark-outs 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 feet of the pipe centerline, Construction has assigned a fulltime inspector to the location throughout the excavation or other heavy mechanical construction work ;**
- **That, if the excavation or other heavy mechanical construction work is within 5 feet of the pipe centerline, Gas Operations shall 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 has witnessed the backfilling operation to insure no large rocks or other injurious material are placed against the pipe and that protection plates have been installed as per Section 8.10.**

Note: Code 753 information should be provided as soon as possible for emergency or short lead time work.

★ APPENDIX C

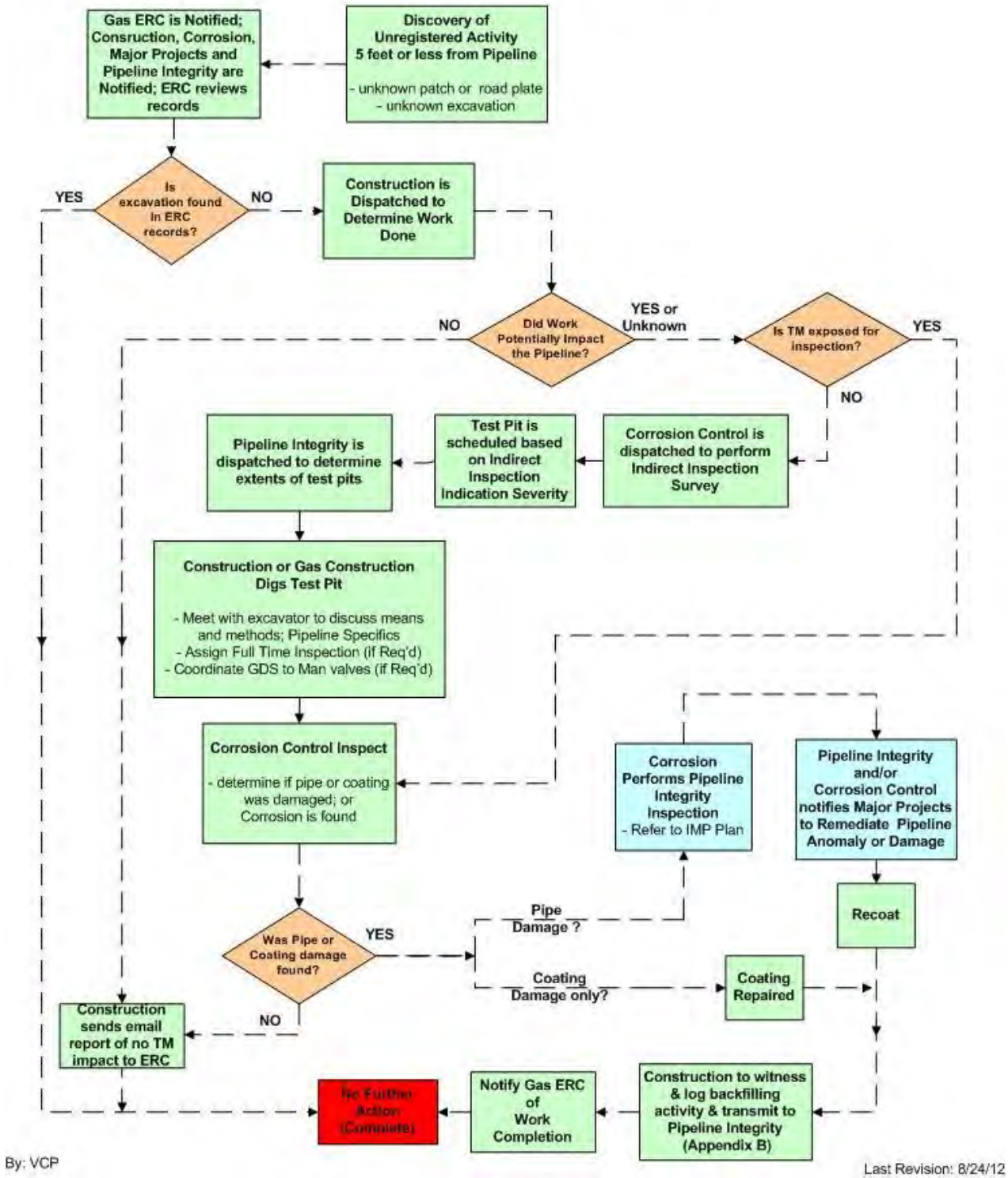
TELEPHONE NUMBERS – GAS OPERATIONS

Section	Phone Number
Gas Engineering – Major Projects	718-839-1781 ★
Gas Transmission Planning & Pipeline Integrity	718-839-1759 or email to PipelineIntegrity@coned.com
Corrosion Control	718-579-1216
Leak Survey	718-579-1225
Emergency Response Center	Bronx: 718-319-5447 Queens: 718-319-5492 Manhattan: 718-319-5481 Westchester: 718-319-5498

APPENDIX D

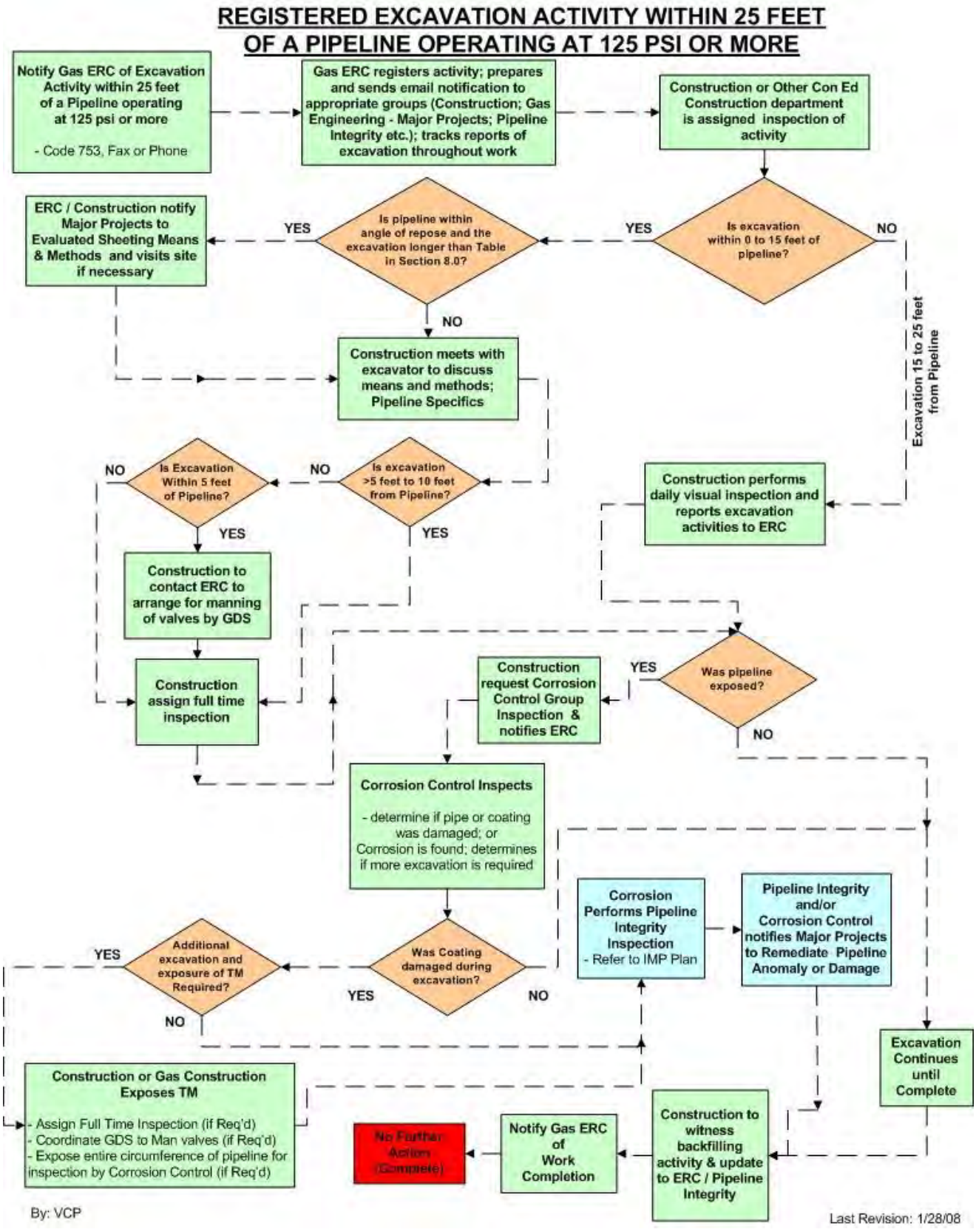
PROCESS FLOW DIAGRAMS

UNREGISTERED EXCAVATION ACTIVITY WITHIN 25 FEET OF PIPELINE OPERATING AT 125 PSIG OR MORE



APPENDIX D

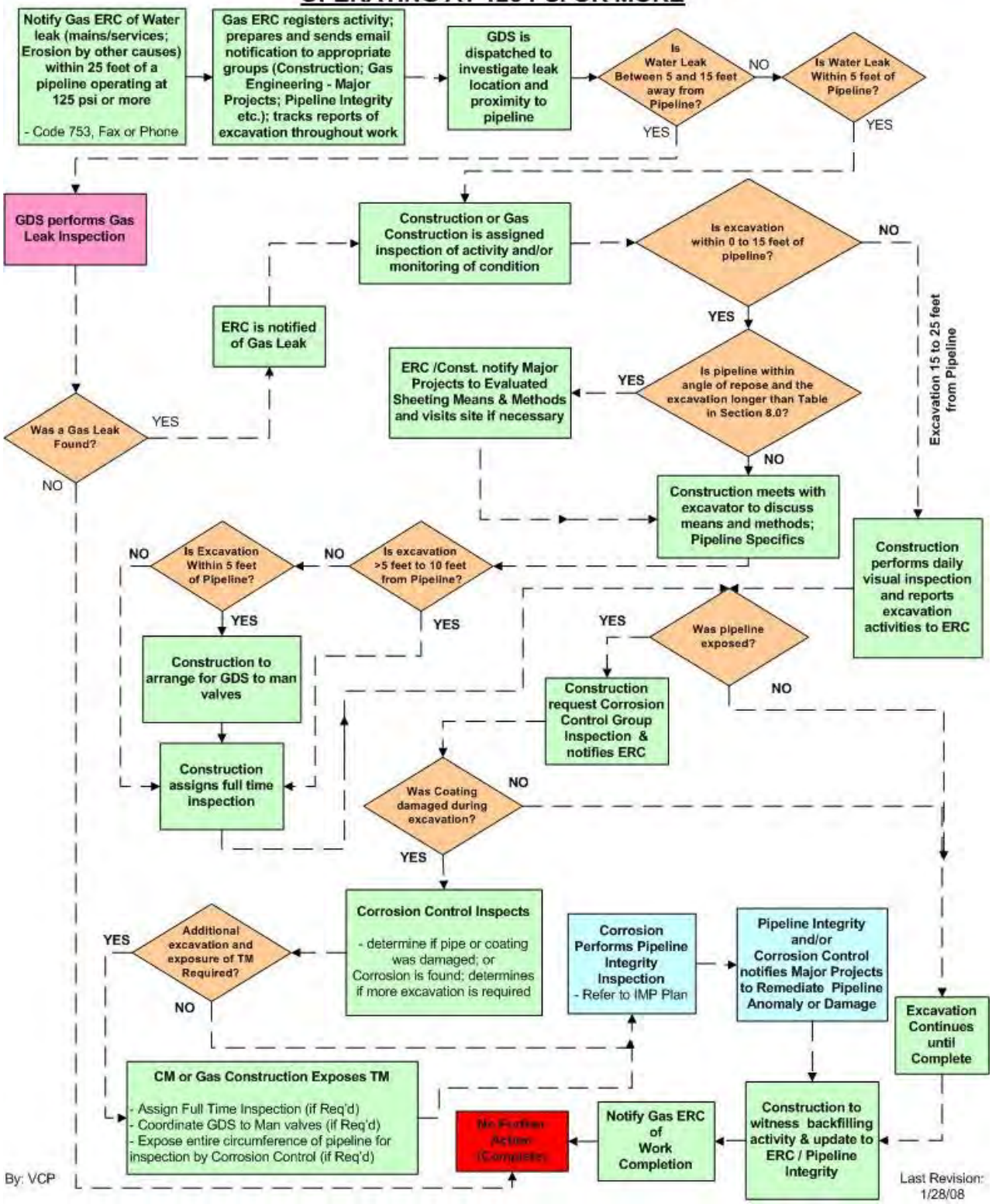
PROCESS FLOW DIAGRAMS



APPENDIX D

PROCESS FLOW DIAGRAMS

WATER LEAKS WITHIN 25 FEET OF PIPELINE OPERATING AT 125 PSI OR MORE



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.**

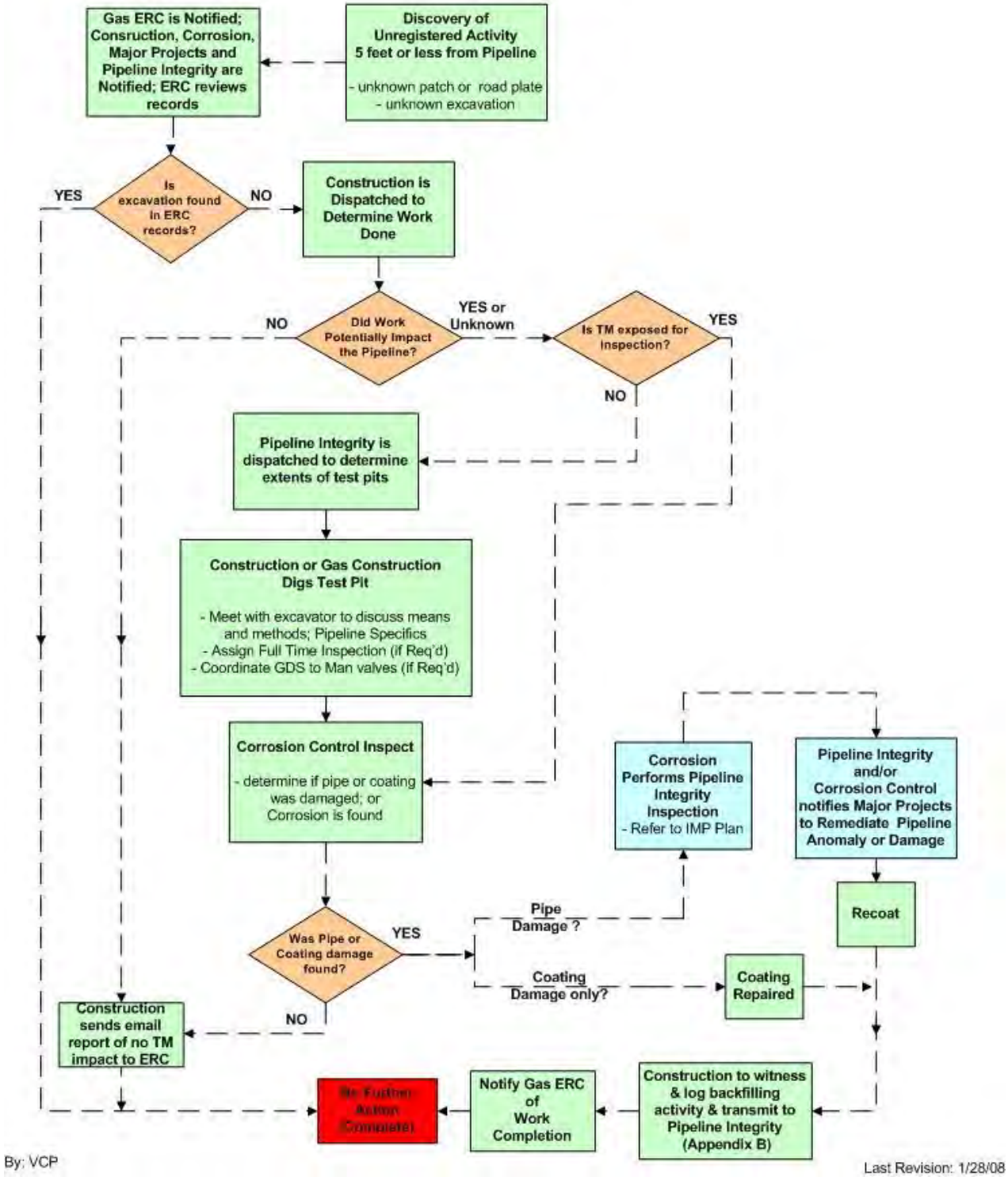
APPENDIX C

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

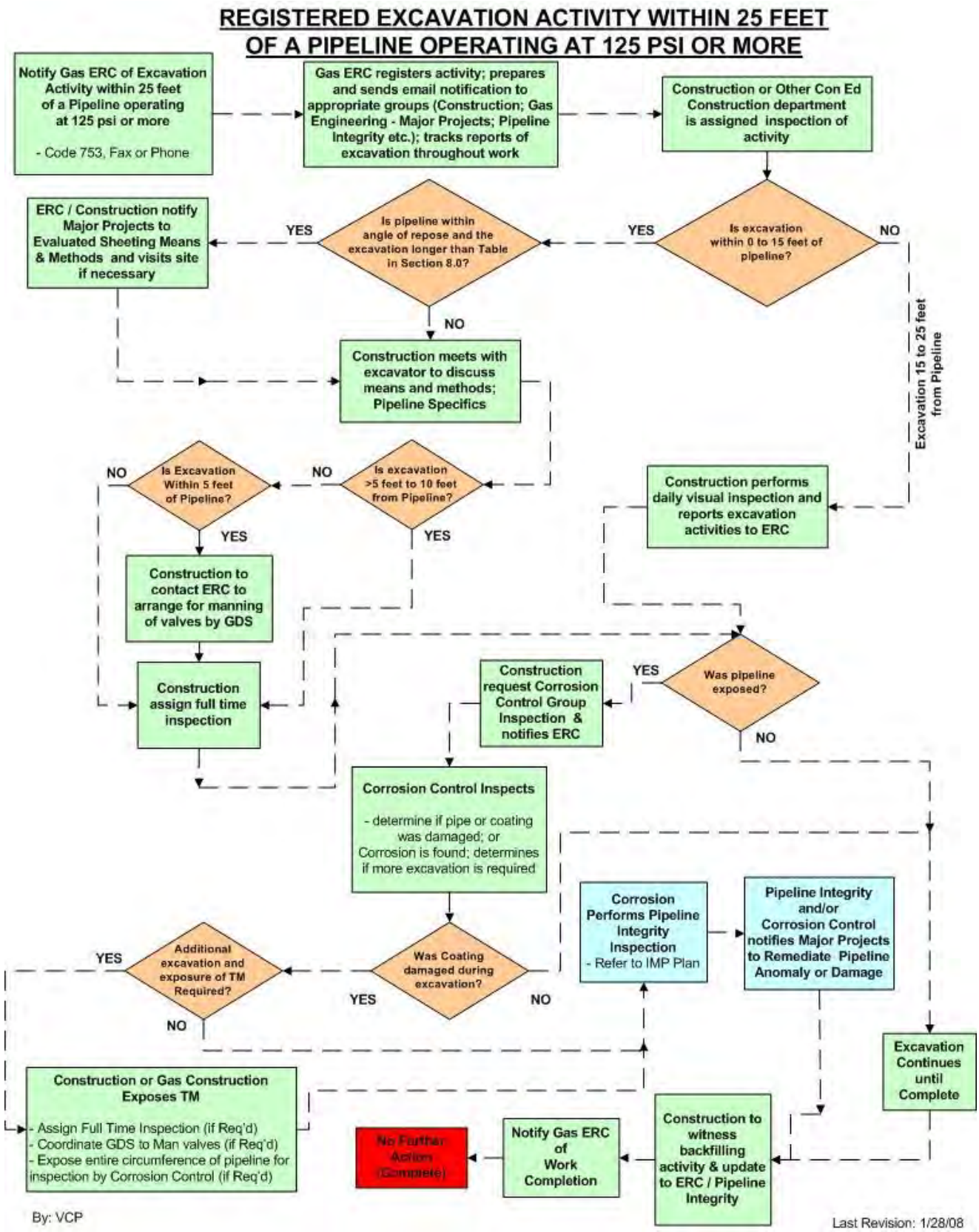
UNREGISTERED EXCAVATION ACTIVITY WITHIN 25 FEET OF PIPELINE OPERATING AT 125 PSIG OR MORE



By: VCP

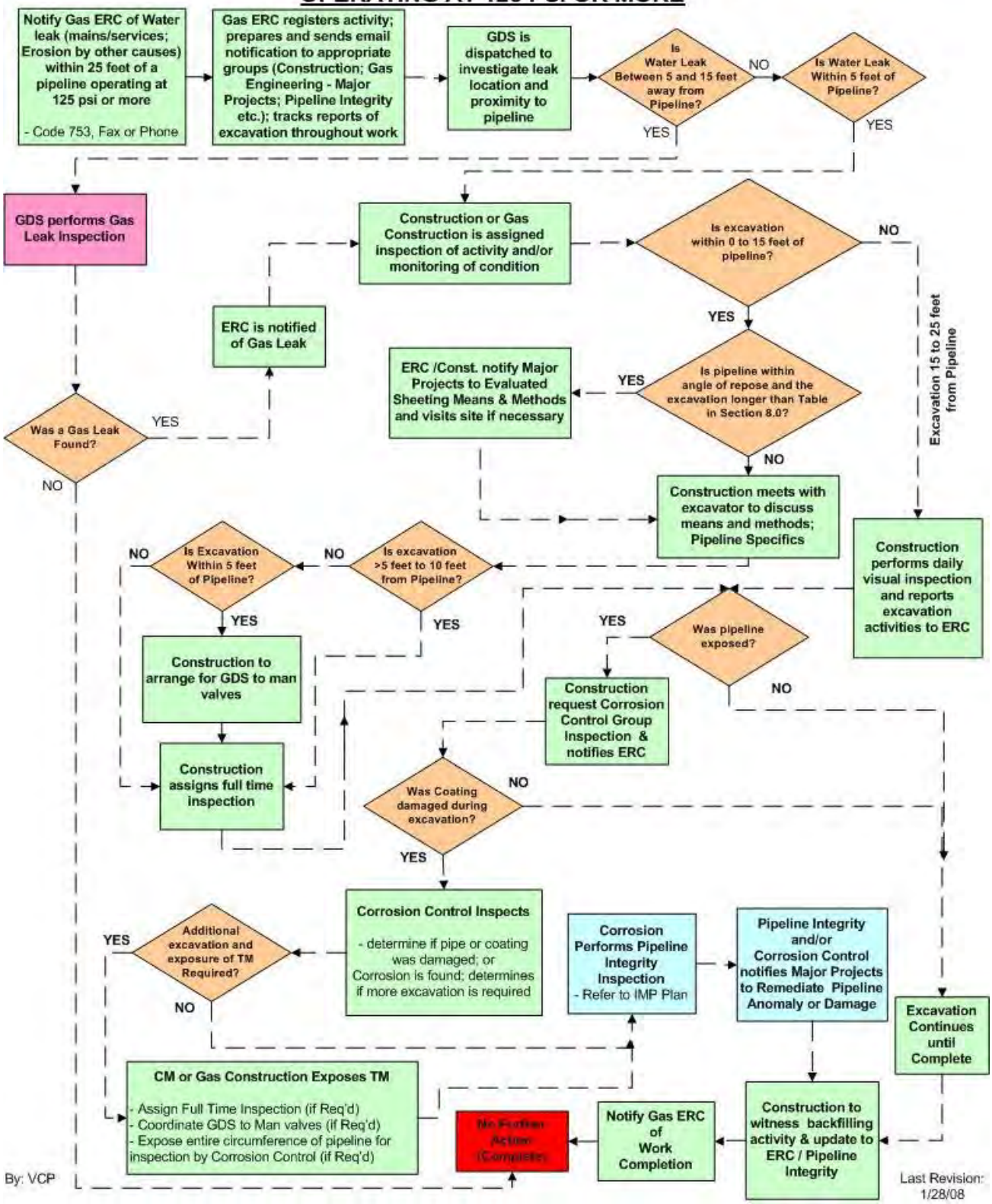
Last Revision: 1/28/08

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 Hunts Point MGP Site Characterization	**AHA No.** 001	**Date:** March 7, 2007	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 002	**Date:** March 8, 2007	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 0003	**Date:** 4/27/05	**New:** No
Location: Food Center Drive, Bronx, New York	**Contractor:** Parsons		**Revised:** 05/22/08
Required Personal Protective Equipment: Wear seat belt at all times; make sure that clothing will not interfere with driving. Use headlights at all times.		**Analysis by:** Region Mgrs	**Date:** 04/2008
	Superintendent/Competent Person	**Reviewed by:** John Ott	**Date:** 05/22/08
Work Task/Activity: Operating a Motor Vehicle		**Approved by:** Greg Beck	**Date:** 05/29/08

Job Step	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Accessing in/out of a vehicle	Back strain	▪ Entering - place your buttocks in the vehicle seat first and then move your legs into the vehicle. ▪ Adjusting Seat – if the vehicle has power/electric seats, then adjust the seat position prior to entering the vehicle. If no power/electric seats, then adjust seat position only while facing forward when sitting in seat, and before securing seatbelt. ▪ Exiting – move your legs out of the vehicle first.	
	Knee strain	▪ Entering – if a vehicle has running boards, then step onto the running board with your left foot first while placing your left hand on the door arm rest and right hand on the steering wheel. Place your right foot into the vehicle and sit on the seat before positioning yourself in front of the steering wheel. ▪ Exiting – move your legs out of the vehicle so that your left foot is placed on the running board first. Place your left hand on the door arm rest and right hand on the steering wheel before placing your right foot onto the ground.	
	Struck against	▪ Note the position of the driver's seat and the distance between the seat and the dashboard or steering wheel to allow access into the vehicle without striking knee/leg. Adjust seat as necessary as stated above.	

	Slip/fall	▪ Be aware of "black ice" that forms on pavement when the snow melts into water during the day time due to the sun or warmer temperatures, and turns into ice when the sun goes down or temperatures drop below 37 F.	
Backing up a Vehicle	Personnel Injury/ Property Damage	▪ Physically check behind the vehicle for people, animals or objects (i.e. toys) before backing up. ▪ Look behind while backing and check side view mirrors. ▪ Use a spotter whenever possible, or if view is obstructed.	
Driving to/from a work location	Vehicle Accident/ Property Damage	▪ Complete the ParsonsU safety modules on Defensive Driving ▪ Follow the Smith System "Five Keys to Space Cushion Driving" – Aim High in Steering, Get the Big Picture, Keep Your Eyes Moving, Leave Yourself an Out and Make Sure They See You. ▪ Complete vehicle inspection before driving and check for proper equipment/supplies. Keep windows, mirrors and eye glasses clean. ▪ Adjust seat position and mirrors to reduce the "blind spot" and increase visibility of surroundings. ▪ Plan your travel route and check maps for directions, discuss with colleagues or use a GPS system. **Note:** Follow all manufacturer safety recommendations when using any GPS device, such as using voice guidance, and entering destination data only when the vehicle is stopped. ▪ Look ahead for driving hazards and plan a strategy to avoid the hazard. Give yourself plenty of lead time (approx. 15 seconds) when approaching vehicles and objects, position yourself in traffic to minimize risk and leave enough space to react safely. ▪ Keep your eyes on the move - check side view and rear view mirrors every 5-8 seconds. Be alert for signs of other distracted or aggressive drivers. ▪ Follow the 4-second rule for maintaining a safe distance when following other vehicles. Before changing lanes, look over each shoulder briefly to check the "blind spot". Make sure other drivers see you – avoid "blind spots", establish eye contact and use lights or horn to increase visibility. ▪ Wear sun glasses to reduce sun glare, as needed. Remove sun	▪ Complete vehicle inspections as per Parsons Vehicle Safety Policy (i.e. daily, weekly, monthly, annual, etc). ▪ Inspect fluid levels, air pressure in tires, wiper blade condition, adjust mirrors and seat positions appropriately, watch fuel level and fill up fuel tank when level is below half. ▪ All company vehicles shall have a safety inspection performed as required by the State the vehicle is registered in (i.e. annually, biannually, etc), or by a certified inspection station annually if an inspection is not required by the State the vehicle is registered in. ▪ Follow vehicle maintenance schedule in accordance with manufacturer's recommendations to reduce the potential of a

		glasses when driving in tunnels, after dusk or with overcast skies (i.e. cloudy). ▪ Properly secure and/or stow materials, tools and equipment inside and outside vehicles (i.e. trunk, pick up) to prevent shifting or falling off of vehicle.	mechanical failure or breakdown while driving.
Driving to/from a work location (cont'd)	Vehicle Accident/ Property Damage	▪ Whenever possible, select parking spaces that will allow the vehicle to pull forward in the parking space to increase visibility when pulling out of the space, or back into a parking space.	
	Smoke/Fire (engine compartment)	▪ Pull over to the side of the road in a safe location. ▪ Turn off engine. ▪ Exit the vehicle and stand a safe distance away from the vehicle and other vehicle traffic. ▪ Call for assistance as appropriate (i.e. "911", AAA) ▪ Do not open the hood of the vehicle until the smoke has dissipated and there is a fire extinguisher available.	▪ Check engine temperature gauge to determine if engine is overheating. ▪ Look under the vehicle for signs or leaking fluids.
	Foreign Body (eye)	▪ Drive with the vehicle windows in the up position, whenever possible. ▪ Keep dust/debris free from air vents.	
	Unfamiliar vehicle	▪ Drive at reduced speeds with the vehicle until the driver is familiar / comfortable with the handling ability of the vehicle.	
	Weather /Road conditions	▪ Check road and weather conditions prior to driving. ▪ Be prepared to adjust driving habits/speed, if road conditions change for the worse (i.e. rain, snow, fog, etc). ▪ Be aware of "black ice" that forms on pavement when the snow melts into water during the day time due to the sun or warmer temperatures, and turns into ice when the sun goes down or temperatures drop below 37 F. ▪ Do not use cruise control in the rain, snow, ice or other conditions that can create a slippery road surface. ▪ Travel during daylight hours, whenever possible. ▪ Give yourself plenty of time to allow for delays due to road construction, work zones, accidents or other unforeseen circumstances. ▪ Apply Rain-X or other similar product to windshield to reduce	▪ Check the tire tread depth and reduce normal driving speed in adverse weather conditions when the tire tread depth is nearing the end of service life.

		the effect of rain and splashed water onto the windshield. ▪ Using headlights or driving lights at all times is recommended, but required when driving during inclement weather, when windshield wipers are in use, or traveling through a road construction zone.	
Driving to/from a work location (cont'd)	Distractions	○ Stop driving a vehicle, regardless of the speed or location (i.e. 5 mph or on a private road), when the potential of being distracted exists. ▪ Drivers are prohibited from using communication devices (i.e. cell phones, PDA, etc) while operating any motor vehicle. ▪ Avoid performing other tasks that take away your focus while driving (i.e. reading directions/map or newspaper, eating food, writing, looking at passengers while talking, improper use of GPS) - pull over to the side of the road in a safe location.	
	Fatigue/Falling asleep	▪ Get adequate rest prior to driving. ▪ Pull over and rest/take a micro break (i.e. 15 minute power nap), if experiencing signs/symptoms of fatigue or drowsiness. ▪ Share driving duties with another person. ▪ Do not take medications that could cause drowsiness.	▪ Read and follow instructions/warnings when taking prescription or over the counter medications.
	Medical Condition (i.e. heart attack, seizure, etc)	▪ Follow habits (i.e. proper diet, exercise, sleep, etc) for maintaining good health and visit your personal physician as appropriate. ▪ Consider enrolling in the Parsons Wellness for Life Program.	
	Impairment	▪ Do not take medications that could cause impairment to judgment. ▪ A zero tolerance for alcohol consumption prior to and during driving must be maintained. ▪ A zero tolerance for using controlled substances prior to and during driving must be maintained.	▪ Read and follow instructions/warnings when taking prescription or over the counter medications.

	Flat tire/blowout	▪ Drive with two hands on the steering for increased control in the event of an unexpected tire blowout. ▪ Find a safe place to pull over to the side of the road. Do not park on the shoulder of a busy highway. ▪ Do not attempt to change a flat tire without the proper training and physical ability/fitness. Call "911", AAA and/or your supervisor for assistance as appropriate. ▪ Install "donut" spare tire on the rear of vehicle. If flat tire is on the front, move a normal sized rear tire to the front.	▪ Check air pressure of spare tire. ▪ Know the location and use of the jack and lug wrench. ▪ Make sure the ground is firm and level, the parking break is applied and wheels chocked before changing a tire.

Training Requirements:

All drivers are required to have a current valid driver's license for the type of vehicle being operated (i.e. Commercial Drivers License). All vehicles must have the required State vehicle registration and/or inspection documents. 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, rental vehicle or personal vehicle for company business are required to familiarize themselves with the contents of this AHA before operating a vehicle.

PARSONS

Activity Hazards Analysis

Operation- Heavy Equipment or Machinery

AHA 004

Project Name & Number: Con Edison Hunts Point MGP Site Characterization	**AHA No.** 004	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 005	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 006	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 007	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 08	**Date:** October 25, 2007	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 09	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 010	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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 Hunts Point MGP Site Characterization	**AHA No.** 011	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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

Utility Clearance Keyholing

AHA 012

Project Name & Number: Con Edison Hunts Point MGP Site Characterization	**AHA No.** 012	**Date:** 7/7/09	**New:** Yes
Location: Food Center Drive, Bronx, New York	**Contractor:** Parsons		**Revised:**
Required Personal Protective Equipment:	Hard Hat, Safety Glasses/Face Shield, Hearing Protection, Safety Shoes, Dielectric Work Gloves, Leather Work Gloves, Traffic Vest (if working near vehicles)	**Analysis by:** M. Vetter	**Date:** 7/7/09
	Superintendent/Competent Person	**Reviewed by:** **Shane Blauvelt**	**Date:** **7/7/09**
Work Operation: Hand Clearing		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Load tools and travel to site	1. Strains 2. Pinches 3. Traffic Accidents	1. Use proper lifting techniques 2. Wear gloves 3. Inspect vehicle before driving. Check for fire extinguisher and first aid kit. Drive defensively.	1. Complete vehicle inspection checklist
Site set-up	1. Hazardous site conditions 2. Traffic Hazards 3. Slips, trips, and falls. 4. Explosion, electrocution, utility damage from underground utilities.	1. Review scope of work prior to start of activities. Conduct site reconnaissance by walking site to become aware of marked utilities; other site activities; slip, trip, and fall hazards; methods of ingress and egress; and emergency evacuation routes and gathering locations. Review weather conditions. 2. Wear highly visible clothing when adjacent to traffic/construction vehicles. Set-up work zone away from traffic, if possible. Use traffic cones, caution tape, and signage to mark out work zone. Follow applicable traffic patterns. Use spotter when backing up vehicles. 3. Maintain good housekeeping procedures. Store tolls neatly away from work zone. Keep hoses and tools out of pedestrian traffic areas. 4. Confirm Digsafe NY, NJ One Call or other appropriate locaters have been called and have responded to mark-out request. Identify utility markings.	1. Complete Parsons Pre-Drill Protocol forms

Use of hand tools	1. Cuts and bruises from use of tools 2. Explosion, electrocution, utility damage from underground utilities.	1. Wear proper PPE. Use the proper tools in the manner they were designed for. 2. Identify all above ground electrical devices and possible electrical supplies. Use extreme caution and work slowly when the location of underground utilities are suspected or unknown near the excavation area. Prior to drilling, clear location to at least 5ft below ground surface. Look for signs of previous excavation work (i.e. sand bedding, tracer or warning tapes, saw cuts, and patched asphalt). Ensure hand tools have electrically non-conductive handles and/or workers wear 1kV dielectric gloves under leather work gloves.	1. Document equipment inspection prior to use. 2. Ensure dielectric gloves are tested and stamped with expiration date. 3. Check capacity of electric lines in vicinity. If working adjacent to electric lines exceeding 1,000 volts, higher rated dielectric protection and/or possible other control measures will be required
Air knife use	1. Equipment set-up 2. Cuts, bruises, burns from high air pressure. 3. Striking by air hose or connector 4. Striking by blowing debris 5. Hearing loss 6. Explosion, electrocution, utility damage from underground utilities. 7. Entrapment in excavation	1. Secure equipment shall with chokes to prevent equipment from rolling out of place. Workers shall stand clear of equipment at all times. The equipment shall be set up on stable solid flat ground surface to prevent tip overs. 2. Only trained personnel shall operate the unit. Do not point air nozzle at body or other people. Delineate work zone so that high pressure dissipates before leaving the work area. Use two hands to operate air nozzle. 3. Check that all mechanical hose connections are secure. Make sure all manual connections are “positive locked” and have safety cables properly attached. 4. Delineate work zone to minimize possible contact by others. Check that deflector is in place on the air nozzle. Wear safety glasses and full face shield. Use ground cover over excavation to prevent flying debris. 5. Wear hearing protection 6. See above for use of hand tools. 7. Keep arms and legs out of excavation to avoid possible cave-ins of large debris that may pinch or entrap body parts.	1. Document equipment inspection prior to use, including all connections. 2. Ensure dielectric gloves are tested and stamped with expiration date. 3. Check capacity of electric lines in vicinity. If working adjacent to electric lines exceeding 1,000 volts, higher rated dielectric protection and/or possible other control measures will be required.
Soil vacuuming	1. Equipment set-up 2. Cuts, bruises, burns from high suction. 3. Contacting others	1. See above for air knife use. 2. Only trained personnel shall operate the unit. Avoid contact with open end of suction hose. Do not attempt to unclog hose while vacuum is	1. Document equipment inspection prior to use, including all connections and valves.

	with suction hose. 4. Hearing Loss 5. Explosion, electrocution, utility damage from underground utilities. 6. Entrapment in excavation	applies. Shut down vacuum and depressurize hose with shut-off valve before removing clogs. Use two hands to operation suction hose. 3. Delineate work zone to minimize possible contact by others. 4. Wear hearing protection 5. See above for use of hand tools. 6. See above for air knife use.	2. Ensure dielectric gloves are tested and stamped with expiration date. 3. Check capacity of electric lines in vicinity. If working adjacent to electric lines exceeding 1,000 volts, higher rated dielectric protection and/or possible other control measures will be required

Training Requirements: All personnel engaged in the hot work will have knowledge and experience working with air knives, soil vacuuming, 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 013

Project Name & Number: Con Edison Hunts Point MGP Site Characterization	**AHA No.** 013	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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 trench is deeper than 4 feet and personnel are entering trench.	Competent person will verify that engineering controls are appropriate for site conditions and stability of soil.

		▪ 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

Sampling - Groundwater

AHA 014

Project Name & Number: Con Edison Hunts Point MGP Site Characterization	**AHA No.** 014	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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: Sampling Groundwater		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Groundwater Sampling	▪ Inhalation of volatile contaminants ▪ Ingestion of contaminants ▪ Skin/eye contact with contaminated water	▪ 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. ▪ Keep the affected person warm and at rest. Obtain medical treatment for all of these situations as required. ▪ Wear appropriate safety equipment (i.e., goggles, gloves, and boots, tyvek) 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 NAPL	▪ Monitoring to determine exposure and action levels	
		▪ 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	
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	
	Equipment Contamination	▪ Decontamination (see HASP)	

PARSONS

Activity Hazards Analysis

Geophysical Investigation

AHA 015

Project Name & Number: Con Edison Hunts Point MGP Site Characterization	**AHA No.** 015	**Date:** December 7, 2005	**New:** Yes
Location: Food Center Drive, Bronx, 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:** A. Merget	**Date:** November 25, 2008
	Superintendent/Competent Person	**Reviewed by:** D. Martoccia	**Date:** November 25, 2008
Work Operation: Geophysical Investigation		**Approved by:**	**Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Geophysical Investigation Survey	▪ 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. ▪ Work area protection using hazard tape, traffic cones, signs and barricades to alert drivers and pedestrians of the work area. ▪ Use of a trained flagger when diverting traffic.	
	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	▪ Site walk through prior to work if uncertain of site layout and equipment. Purpose of inspection is to identify any potential site hazards in the area where work will be. Facility Manager will determine if his/her presence during work is required. ▪ Training and safety awareness of potential exposure to contaminates at the site. ▪ Training of all personnel decontamination procedures (if necessary). ▪ Appropriate PPE will be worn dependent on site conditions and actions levels. ▪ Must sign off on health and safety plan. ▪ Previously unidentified hazards will be brought to the attention of the Con Edison representative immediately.	
	Lack of communication	Prior to commencement of daily activities, 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.	

Training Requirements:

Visitors will report to the Site Safety Officer (SSO) 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.

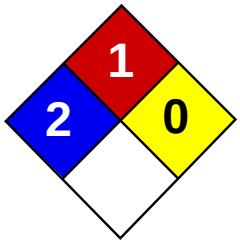
All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity.

ATTACHMENT D

SAFETY DATA SHEETS

ATTACHMENT D

MATERIAL SAFETY DATA SHEETS



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

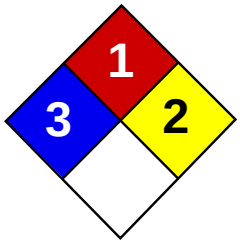
References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II.

Other Special Considerations: Not available.

Created: 10/09/2005 03:35 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet
Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

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
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, 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:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, 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, acids, moisture.

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: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:16 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name CETCO® COARSE CHIPS

Version # 06

Revision date 31-March-2010

Chemical name Bentonite

Chemical description Smectite Clay

Company

CETCO
Drilling Products Group
2870 Forbs Avenue
Hoffman Estates, IL 60192 US
safetydata@amcol.com
http://www.cetco.com/
General Information (800) 527-9948
CHEMTREC® (800) 424-9300

2. Hazards Identification

Emergency overview Material can be slippery when wet

Potential health effects

Routes of exposure Inhalation. Eye contact.

Eyes Dust or powder may irritate eye tissue.

Skin Non-irritating to the skin.

Inhalation Repeated or prolonged inhalation may cause toxic effects. For additional information on inhalation hazards, see Section 11 of this safety data sheet.

Ingestion No significant adverse effects are expected upon ingestion of the product.

Target organs Lungs.

Chronic effects This product has the potential for generation of respirable dust during handling and use. Dust may contain respirable crystalline silica. Overexposure to dust may result in pneumocononiosis, a respiratory disease caused by inhalation of mineral dust, which can lead to fibrotic changes to the lung tissue, or silicosis, a respiratory disease caused by inhalation of silica dust, which can lead to inflammation and fibrosis of the lung tissue. Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

3. Composition / Information on Ingredients

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

Composition comments Bentonite contains naturally occurring crystalline silica (not listed in Annex I of Directive 67/548/EEC) in quantities less than 6%. Occupational Exposure Limits for impurities are listed in Section 8.

4. First Aid Measures

First aid procedures

Eye contact Flush eyes immediately with large amounts of water. Get medical attention if irritation develops or persists.

Skin contact No special measures required. Get medical attention if irritation develops or persists.

Inhalation If symptoms are experienced, remove source of contamination or move victim to fresh air. If the affected person is not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Call a physician if symptoms develop or persist.

Ingestion No special measures required. If ingestion of a large amount does occur, seek medical attention.

Notes to physician Provide general supportive measures and treat symptomatically.

5. Fire Fighting Measures

Flammable properties None known.

Extinguishing media

Suitable extinguishing media Use any media suitable for the surrounding fires. Dry chemical, CO2, water spray or regular foam.

Protection of firefighters

Protective equipment and precautions for firefighters	Material can be slippery when wet
Hazardous combustion products	None known.

6. Accidental Release Measures

Personal precautions	Material can be slippery when wet. Wear a dust mask if dust is generated above exposure limits.
Environmental precautions	No special environmental precautions required.
Methods for containment	None necessary.
Methods for cleaning up	Avoid the generation of dusts during clean-up. Collect dust or particulates using a vacuum cleaner with a HEPA filter. Reduce airborne dust and prevent scattering by moistening with water.

7. Handling and Storage

Handling	Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. In case of insufficient ventilation, wear suitable respiratory equipment.
Storage	Guard against dust accumulation of this material. No special storage conditions required. No special restrictions on storage with other products.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Constituents	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	10 mg/m3	Inhalable particles.
		3 mg/m3	Respirable particles.
QUARTZ (14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.

U.S. - OSHA

Constituents	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	PEL	15 mg/m3	Total dust.
		5 mg/m3	Respirable fraction.
	TWA	5 mg/m3	Respirable fraction.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
		15 mg/m3	Total dust.
QUARTZ (14808-60-7)	TWA	2.4 mppcf	Respirable.
		0.3 mg/m3	Total dust.
		0.1 mg/m3	Respirable.
		0.1 mg/m3	Respirable dust.

Exposure guidelines	Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.
Engineering controls	If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. If engineering measures are not sufficient to maintain concentrations of dust particulates below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Eye / face protection	Wear dust goggles.
Skin protection	No special protective equipment required.
Respiratory protection	Use a particulate filter respirator for particulate concentrations exceeding the Occupational Exposure Limit.
General hygiene considerations	Eye wash fountain is recommended. Use good industrial hygiene practices in handling this material.

9. Physical & Chemical Properties

Appearance	Not available.
Color	Various.
Odor	None.

Odor threshold	Not available.
Physical state	Solid.
Form	Pellets. Chips. Tablet.
pH	7 - 9
Melting point	Not available.
Freezing point	Not available.
Boiling point	Not available.
Flash point	Non-flammable
Evaporation rate	Not available.
Flammability	Not available.
Flammability limits in air, upper, % by volume	Non-explosive
Flammability limits in air, lower, % by volume	Non-explosive
Vapor pressure	Not available.
Vapor density	Not available.
Specific gravity	2.5503 estimated
Relative density	Not available.
Solubility (water)	Negligible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
VOC	0 % estimated
Percent volatile	0 % estimated

10. Chemical Stability & Reactivity Information

Chemical stability	Stable at normal conditions.
Conditions to avoid	None known.
Incompatible materials	None known.
Hazardous decomposition products	None known.
Possibility of hazardous reactions	Will not occur.

11. Toxicological Information

Chronic effects

In 1997, IARC (the International Agency for Research on Cancer) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However in making the overall evaluation, IARC noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicates dust and organic fibres, 1997, Vol. 68, IARC, Lyon, France.)

In June 2003, SCOEL (the EU Scientific Committee on Occupational Exposure Limits) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust is silicosis. "There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk..." (SCOEL SUM Doc 94-final, June 2003)

According to the current state of the art, worker protection against silicosis can be consistently assured by respecting the existing regulatory occupational exposure limits. Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

Carcinogenicity

IARC Monographs: Overall evaluation

QUARTZ (14808-60-7) 1 Carcinogenic to humans.

Carcinogenicity

US ACGIH Threshold Limit Values: A2 carcinogen

QUARTZ (14808-60-7)	A2 Suspected human carcinogen.

US NTP Report on Carcinogens: Known carcinogen

QUARTZ (14808-60-7)	Known carcinogen.

12. Ecological Information

Ecotoxicological data

Product	Test Results
CETCO® COARSE CHIPS	LC50 Fish: 19000 mg/l 96.00 Hours estimated

* Estimates for product may be based on additional component data not shown.

Ecotoxicity This material is not expected to be harmful to aquatic life.

Environmental effects Based on the physical properties of this product, significant environmental persistence and bioaccumulation would not be expected.

Persistence and degradability Not available.

13. Disposal Considerations

Disposal instructions Dispose in accordance with all applicable regulations. Material should be recycled if possible.

14. Transport Information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations OSHA Process Safety Standard: This material is not known to be hazardous by the OSHA Highly Hazardous Process Safety Standard, 29 CFR 1910.119.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - No
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Section 302 extremely hazardous substance No

Section 311 hazardous chemical Yes

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

QUARTZ (14808-60-7) Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

QUARTZ (14808-60-7) Listed: October 1, 1988 Carcinogenic.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

QUARTZ (14808-60-7) Listed.

16. Other Information

Further information

This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

Recommended restrictions

Workers (and your customers or users in the case of resale) should be informed of the potential presence of respirable dust and respirable crystalline silica as well as their potential hazards. Appropriate training in the proper use and handling of this material should be provided as required under applicable regulations.

HMIS ratings

NFPA ratings

Health: 1
Flammability: 0
Instability: 0

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The manufacturer expressly does not make any representations, warranties, or guarantees as to its accuracy, reliability or completeness nor assumes any liability, for its use. It is the user's responsibility to verify the suitability and completeness of such information for each particular use.

Third party materials: Insofar as materials not manufactured or supplied by this manufacturer are used in conjunction with, or instead of this product, it is the responsibility of the customer to obtain, from the manufacturer or supplier, all technical data and other properties relating to these and other materials and to obtain all necessary information relating to them. No liability can be accepted in respect of the use of this product in conjunction with materials from another supplier. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Issue date

31-March-2010

Other information

CETCO is an AMCOL International company.

SAFETY DATA SHEET

Version 5.3
Revision Date 05/02/2014
Print Date 05/12/2014

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name	:	Benz[*a*]anthracene
Product Number	:	B2209
Brand	:	Aldrich
Index-No.	:	601-033-00-9
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	56-55-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 1B), H350
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.

P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,2-Benzanthracene Tetraphene
Formula	:	$C_{18}H_{12}$
Molecular Weight	:	228.29 g/mol
CAS-No.	:	56-55-3
EC-No.	:	200-280-6
Index-No.	:	601-033-00-9

Hazardous components

Component	Classification	Concentration
Benz[a]anthracene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350, H410	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Nature of decomposition products not known.

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 157 - 159 °C (315 - 318 °F)
f)	Initial boiling point and boiling range	437.6 °C (819.7 °F)
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

Inhalation: no data available

Dermal: no data available

LD50 Intravenous - rat - > 200 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Benz[a]anthracene)
NTP:	Reasonably anticipated to be a human carcinogen (Benz[a]anthracene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: Not available

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

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benz[a]anthracene)
Marine pollutant: Marine pollutant

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benz[a]anthracene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

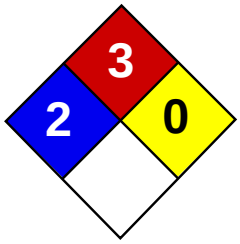
NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information
Copyright 2014 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3 Revision Date: 05/02/2014 Print Date: 05/12/2014



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

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
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

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 immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

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: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powferful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:
Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism,and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

SAFETY DATA SHEET

Version 5.1
Revision Date 06/30/2014
Print Date 09/18/2014

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzo[*a*]pyrene

Product Number : B1760
Brand : Sigma
Index-No. : 601-032-00-3

CAS-No. : 50-32-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

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

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin sensitisation (Category 1), H317
Germ cell mutagenicity (Category 1B), H340
Carcinogenicity (Category 1B), H350
Reproductive toxicity (Category 1B), H360
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H317 May cause an allergic skin reaction.
H340 May cause genetic defects.
H350 May cause cancer.
H360 May damage fertility or the unborn child.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and

	understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P321	Specific treatment (see supplemental first aid instructions on this label).
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	3,4-Benzpyrene 3,4-Benzopyrene Benzo[def]chrysene
Formula	:	$C_{20}H_{12}$
Molecular Weight	:	252.31 g/mol
CAS-No.	:	50-32-8
EC-No.	:	200-028-5
Index-No.	:	601-032-00-3

Hazardous components

Component	Classification	Concentration
Benzo[a]pyrene		
	Skin Sens. 1; Muta. 1B; Carc. 1B; Repr. 1B; Aquatic Acute 1; Aquatic Chronic 1; H317, H340, H350, H360, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		

Benzo[a]pyrene	50-32-8	TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		1910.1002 As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Benzo[a]pyrene	50-32-8	1-Hydroxypyrene (1-HP)		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 177 - 180 °C (351 - 356 °F) - lit.
f)	Initial boiling point and boiling range	495 °C (923 °F) - lit.
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	1.35 g/cm3
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	log Pow: 5.97
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

Inhalation: no data available

Dermal: no data available

LD50 Subcutaneous - rat - 50 mg/kg

Skin corrosion/irritation
Skin - mouse
Result: Mild skin irritation

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
Chronic exposure may cause dermatitis.

Germ cell mutagenicity
May alter genetic material.
In vivo tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Benzo[a]pyrene)
NTP:	Reasonably anticipated to be a human carcinogen (Benzo[a]pyrene)
OSHA:	OSHA specifically regulated carcinogen (Benzo[a]pyrene)

Reproductive toxicity
May cause congenital malformation in the fetus.
Presumed human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: DJ3675000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.25 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 0.02 mg/l - 72 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
Bioaccumulation: Lepomis macrochirus (Bluegill) - 48 h - 0.0005 mg/l

Bioconcentration factor (BCF): 3,208

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[a]pyrene)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[a]pyrene)
Marine pollutant: No

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[a]pyrene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	1990-01-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H317	May cause an allergic skin reaction.
H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Muta.	Germ cell mutagenicity

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information
Copyright 2014 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling

or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1 Revision Date: 06/30/2014 Print Date: 09/18/2014

SAFETY DATA SHEET

Version 5.2
Revision Date 04/02/2014
Print Date 05/12/2014

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name	:	Chrysene
Product Number	:	BCR269
Brand	:	Fluka
Index-No.	:	601-048-00-0
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	218-01-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H341	Suspected of causing genetic defects.
H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.

P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_{18}H_{12}$
Molecular Weight	:	228.29 g/mol
CAS-No.	:	218-01-9
EC-No.	:	205-923-4
Index-No.	:	601-048-00-0

Hazardous components

Component	Classification	Concentration
Chrysene		
	Muta. 2; Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H341, H350, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature: 2 - 8 °C

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Confirmed animal carcinogen with unknown relevance to humans		
Chrysene	218-01-9	TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		1910.1002 As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis

Chrysene	218-01-9	1-Hydroxypyrene (1-HP)		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 252 - 254 °C (486 - 489 °F)

f)	Initial boiling point and boiling range	448 °C (838 °F)
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 5.73
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

Inhalation: no data available

Dermal: no data available

LD50 Intraperitoneal - mouse - > 320 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Chrysene)
NTP:	Known to be human carcinogen (Chrysene)
	Reasonably anticipated to be a human carcinogen (Chrysene)
NTP:	Known to be human carcinogen (Chrysene)
	Reasonably anticipated to be a human carcinogen (Chrysene)
OSHA:	OSHA specifically regulated carcinogen (Chrysene)

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: Not available

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

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1.90 mg/l - 2 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Not dangerous goods

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chrysene)
Marine pollutant: Marine pollutant

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chrysene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Chrysene	218-01-9	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

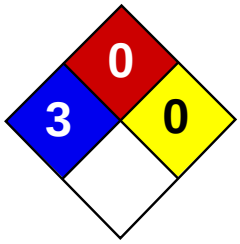
Further information

Copyright 2014 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.2 Revision Date: 04/02/2014 Print Date: 05/12/2014



Health	3
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet
Sodium Cyanide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Cyanide

Catalog Codes: SLS2314, SLS3736

CAS#: 143-33-9

RTECS: VZ7525000

TSCA: TSCA 8(b) inventory: Sodium Cyanide

CI#: Not available.

Synonym:

Chemical Name: Sodium Cyanide

Chemical Formula: NaCN

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
Sodium Cyanide	143-33-9	100

Toxicological Data on Ingredients: Sodium Cyanide: ORAL (LD50): Acute: 6.44 mg/kg [Rat]. DERMAL (LD50): Acute: 10.4 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator). Corrosive to eyes and skin. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to skin, eyes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate 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:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of acids, of moisture.

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:
Dangerous on contact with acids, acid fumes, water or stream. It will produce toxic and flammable vapors of CN-H and sodium oxide. Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas. When heated to decomposition it emits toxic fumes hydgrogen cyanide and oxides of nitrogen

Special Remarks on Explosion Hazards: Fusion mixtures of metal cyanides with metal chlorates, perchlorated or nitrates causes a violent explosion

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Corrosive solid. Poisonous solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F).

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. Synthetic apron. Vapor and 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. Vapor and 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:
STEL: 5 (mg/m3) from ACGIH (TLV) [United States] SKIN CEIL: 4.7 from NIOSH CEIL: 5 (mg/m3) from NIOSHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Granular solid. Flakes solid.)

Odor:
Faint almond-like odor. Odorless when perfectly dry. Emits odor of hydrogen cyanide when damp.

Taste: Not available.

Molecular Weight: 49.01 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: 1496°C (2724.8°F)

Melting Point: 563°C (1045.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.595 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Vapor Density of Hydrogen Cyanide gas: 0.941

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Soluble in cold water. Slightly soluble in Ethanol

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, moisture, incompatibles.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity:
Corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Violent reaction with fluorine gas, magnesium, nitrates, nitric acid. Dangerous on contact with acids, acid fumes, water or stream. It wil produce toxic and flammable vapors of CN-H and sodium oxide. Cyanide may react with CO2 in ordinary air to form toxic hydrogen cyanide gas. Strong oxidizers such as acids, acid salts, chlorates, and nitrates. Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas.

Special Remarks on Corrosivity: Corrosive to aluminum

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 6.44 mg/kg [Rat]. Acute dermal toxicity (LD50): 10.4 mg/kg [Rabbit].

Chronic Effects on Humans: May cause damage to the following organs: skin, eyes, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause adverse reproductive effects (maternal and paternal fertility) based on animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health effects: Skin: May cause itching and irritation. May be fatal if absorbed through injured skin with symtpoms similar to those noted for inhalation and ingestion. Eyes: May cause eye irritation and eye damage. Inhalation: May cause respiratory tract irritation. May be fatal if inhaled. The substance inhibits cellular respiration causing metabolic asphyxiation. May cause headache, weakness, dizziness, labored breathing, nausea, vomiting. May be followed by cardiovascular effects, unconciousness, convulsions, coma, and death Ingestion: May be fatal if swallowed. May cause

gastrointestinal tract irritation with nausea, vomiting. May affect behavior and nervous systems(seizures, convulsions, change in motor activity, headache, dizziness, confusion, weakness stupor, aniexity, agitation, tremors), cardiovascular system, respiration (hyperventilation, pulmonary edema, breathing difficulty, respiratory failure), cardiovascular system (palpitations, rapid heart beat, hypertension, hypotension). Massive doses by produce sudden loss of conciousness and prompt death from respiratory arrest. Smaller but still lethal doses on the breath or vomitus. Chronic Potential Health Effects: Central Nervous system effects (headaches, vertigo, insomnia, memory loss, tremors, fatigue), fatigue, metabolic effects (poor appetite), cardiovascular effects (chest discomfort, palpitations), nerve damage to the eyes, or dermatitis, respiratory tract irritation, eye irritation, or death can occur. may prolong the illness for 1 or more hours. A bitter almond odor may be noted

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Sodium cyanide UNNA: 1689 PG: I

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut carcinogen reporting list.: Sodium Cyanide Illinois chemical safety act: Sodium Cyanide New York release reporting list: Sodium Cyanide Rhode Island RTK hazardous substances: Sodium Cyanide Pennsylvania RTK: Sodium Cyanide Minnesota: Sodium Cyanide Massachusetts RTK: Sodium Cyanide Massachusetts spill list: Sodium Cyanide New Jersey: Sodium Cyanide New Jersey spill list: Sodium Cyanide Louisiana RTK reporting list: Sodium Cyanide Louisiana spill reporting: Sodium Cyanide California Director's List of Hazardous Substances: Sodium Cyanide TSCA 8(b) inventory: Sodium Cyanide TSCA 4(a) final test rules: Sodium Cyanide TSCA 8(a) PAIR: Sodium Cyanide TSCA 8(d) H and S data reporting: Sodium Cyanide TSCA 12(b) one time export: Sodium Cyanide SARA 302/304/311/312 extremely hazardous substances: Sodium Cyanide CERCLA: Hazardous substances.: Sodium Cyanide: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-6: Reactive and very flammable material. CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive solid.

DSCL (EEC):
R27/28- Very toxic in contact with skin and if swallowed. R41- Risk of serious damage to eyes. S1/2- Keep locked up and out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28- After contact with skin, wash immediately with plenty of water S36/37- Wear suitable protective clothing and gloves. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

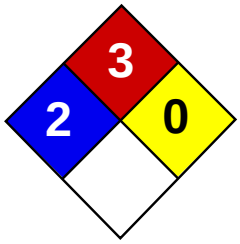
References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 01:58 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C8H10

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
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:
CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:
Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Can cause mild skin irritation. It can be absorbed through intact skin. Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm , it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS) Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include

headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987). Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethylbenzene Massachusetts RTK: Ethylbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Manufacturer's Material Safety Data Sheet. -Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA) -Registry of Toxic Effects of Chemical Substances (RTECS) -Chemical Hazard Response Information System (CHRIS) -Hazardous Substance Data Bank (HSDB) -New Jersey Hazardous Substance Fact Sheet -Ariel Global View -Reprotext System

Other Special Considerations: Not available.

Created: 10/09/2005 05:28 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

SAFETY DATA SHEET

Version 5.4
Revision Date 06/27/2014
Print Date 09/18/2014

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Fluoranthene

Product Number : 48535
Brand : Supelco

CAS-No. : 206-44-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

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

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P330 Rinse mouth.
P391 Collect spillage.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Benzo[j,k]fluorene

Formula : $C_{16}H_{10}$
Molecular Weight : 202.25 g/mol
CAS-No. : 206-44-0
EC-No. : 205-912-4

Hazardous components

Component	Classification	Concentration
Fluoranthene		
	Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1; H302, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 105 - 110 °C (221 - 230 °F) - lit.
f)	Initial boiling point and boiling range	384 °C (723 °F) - lit.
g)	Flash point	198.0 °C (388.4 °F) - closed cup
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

LD50 Oral - rat - 2,000 mg/kg

Inhalation: no data available

Inhalation: no data available

Dermal: no data available

LD50 Dermal - rabbit - 3,180 mg/kg

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Fluoranthene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Reasonably anticipated to be a human carcinogen (Fluoranthene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: LL4025000

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

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.0077 mg/l - 96 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 560 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 0.005 - < 0.01 mg/l - 3 d
	Immobilization EC50 - Daphnia magna (Water flea) - 0.78 mg/l - 20 h
	NOEC - Daphnia magna (Water flea) - 0.085 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Fluoranthene)
Reportable Quantity (RQ): 100 lbs
Marine pollutant:
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Fluoranthene)
Marine pollutant: No

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Fluoranthene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	1
Reactivity Hazard:	0

Further information
Copyright 2014 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the

product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 06/27/2014 Print Date: 09/18/2014

Material Safety Data Sheet

Nonflammable Gas Mixture: Hydrogen Cyanide 0.1- 2.79% / Nitrogen 97.21-99%

Section 1. Chemical product and company identification

Product name : Nonflammable Gas Mixture: Hydrogen Cyanide 0.1- 2.79% / Nitrogen 97.21-99%

Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Product use : Synthetic/Analytical chemistry.

MSDS # : 002271

Date of Preparation/Revision : **3/1/2012.**

In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Gas.

Emergency overview : DANGER!

MAY BE FATAL IF INHALED.
CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

Do not puncture or incinerate container. Do not breathe gas. Contains material that may cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container closed.

Contact with rapidly expanding gases can cause frostbite.

Target organs : Contains material which may cause damage to the following organs: blood, kidneys, lungs, liver, mucous membranes, heart, cardiovascular system, upper respiratory tract, skin, eyes, central nervous system (CNS), thyroid.

Routes of entry : Inhalation Dermal Eyes

Potential acute health effects

Eyes : Slightly irritating to the eyes. Contact with rapidly expanding gas may cause burns or frostbite.

Skin : Slightly irritating to the skin. Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : Very toxic by inhalation. Slightly irritating to the respiratory system.

Ingestion : Ingestion is not a normal route of exposure for gases

Potential chronic health effects

Chronic effects : Contains material that may cause target organ damage, based on animal data.

Target organs : Contains material which may cause damage to the following organs: blood, kidneys, lungs, liver, mucous membranes, heart, cardiovascular system, upper respiratory tract, skin, eyes, central nervous system (CNS), thyroid.

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

Nonflammable Gas Mixture: Hydrogen Cyanide 0.1- 2.79% / Nitrogen 97.21-99%

Section 3. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits
Nitrogen	7727-37-9	97.21 - 99	Oxygen Depletion [Asphyxiant]
Hydrogen Cyanide	74-90-8	0.1 - 2.79	**ACGIH TLV (United States, 2/2010). Absorbed through skin. Notes: Measured as CN** C: 5 mg/m³, (measured as CN) C: 4.7 ppm, (measured as CN) **NIOSH REL (United States, 6/2009). Absorbed through skin.** CEIL: 5 mg/m³ 10 minute(s). CEIL: 4.7 ppm 10 minute(s). **OSHA PEL (United States, 6/2010). Absorbed through skin.** TWA: 11 mg/m³ 8 hour(s). TWA: 10 ppm 8 hour(s). **OSHA PEL 1989 (United States, 3/1989). Absorbed through skin.** STEL: 5 mg/m³ 15 minute(s). STEL: 4.7 ppm 15 minute(s).

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training.If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus.It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : Call medical doctor or poison control center immediately. Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

Flammability of the product : Non-flammable.

Products of combustion : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

Fire-fighting media and instructions : Use an extinguishing agent suitable for the surrounding fire.

Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

Handling : Use only with adequate ventilation. High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Keep container closed. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Storage : Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protection in case of a large spill : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.

Product name

nitrogen	Oxygen Depletion [Asphyxiant]
Hydrogen cyanide	**ACGIH TLV (United States, 2/2010). Absorbed through skin. Notes: Measured as CN** C: 5 mg/m³, (measured as CN) C: 4.7 ppm, (measured as CN) **NIOSH REL (United States, 6/2009). Absorbed through skin.** CEIL: 5 mg/m³ 10 minute(s). CEIL: 4.7 ppm 10 minute(s). **OSHA PEL (United States, 6/2010). Absorbed through skin.** TWA: 11 mg/m³ 8 hour(s). TWA: 10 ppm 8 hour(s). **OSHA PEL 1989 (United States, 3/1989). Absorbed through skin.** STEL: 5 mg/m³ 15 minute(s). STEL: 4.7 ppm 15 minute(s).

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Melting/freezing point : -210.01°C (-346°F) This is based on data for the following ingredient: nitrogen.

Critical temperature : Lowest known value: -146.9°C (-232.4°F) (nitrogen).

Vapor density : Highest known value: 0.967 (Air = 1) (nitrogen).

Gas Density (lb/ft ^{3}) : Weighted average: 0.07

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Incompatibility with various substances : Not considered to be reactive according to our database.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Hydrogen cyanide	LD50 Intravenous	Rat	810 ug/kg	-
	LC50 Inhalation Gas.	Rat	150 ppm	30 minutes
	LC50 Inhalation Gas.	Rat	140 ppm	1 hours

Chronic effects on humans : Contains material which may cause damage to the following organs: blood, kidneys, lungs, liver, mucous membranes, heart, cardiovascular system, upper respiratory tract, skin, eyes, central nervous system (CNS), thyroid.

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
Hydrogen cyanide	-	Acute LC50 0.068 to 0.072 mg/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
	-	Acute LC50 0.042 to 0.046 mg/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
	-	Acute LC50 0.028 to 0.035 mg/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile	96 hours

		(Fledgling, Hatchling, Weanling)	
-	Acute LC50 152 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 13 weeks - 30.8 mm - 0.289 g	96 hours
-	Acute LC50 133 to 140 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 13 weeks - 30.8 mm - 0.289 g	96 hours
-	Acute LC50 124 to 144 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 13 weeks - 30.8 mm - 0.289 g	96 hours
-	Acute LC50 117 to 135 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 13 weeks - 30.8 mm - 0.289 g	96 hours
-	Acute LC50 68 to 72 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
-	Acute LC50 42 to 46 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
-	Acute LC50 28 to 35 ug/L Fresh water	Fish - Rainbow trout,donaldson trout -	96 hours

		Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling)

Products of degradation : Products of degradation: carbon oxides (CO, CO_2) and water, nitrogen oxides (NO, NO_2 etc.).

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation.Return cylinders with residual product to Airgas, Inc.Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		-
TDG Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75
Mexico Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		-

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 15. Regulatory information

United States

U.S. Federal regulations :

TSCA 8(a) IUR: Not determined
United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: Hydrogen cyanide
SARA 302/304 emergency planning and notification: Hydrogen cyanide
SARA 302/304/311/312 hazardous chemicals: nitrogen; Hydrogen cyanide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: nitrogen: Sudden release of pressure; Hydrogen cyanide: Fire hazard, reactive, Immediate (acute) health hazard

Clean Water Act (CWA) 307: Hydrogen cyanide

Clean Water Act (CWA) 311: Hydrogen cyanide

Clean Air Act (CAA) 112 accidental release prevention - Toxic Substances:
Hydrogen Cyanide

Clean Air Act (CAA) 112 regulated toxic substances: Hydrogen cyanide

SARA 313

		Product name	CAS number	Concentration
Form R - Reporting requirements	:	Hydrogen Cyanide	74-90-8	0.1 - 2.79
Supplier notification	:	Hydrogen Cyanide	74-90-8	0.1 - 2.79

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations :

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: NITROGEN; HYDROGEN CYANIDE
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: NITROGEN; HYDROGEN CYANIDE; HYDROCYANIC ACID
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: The following components are listed: hydrogen cyanide
New York Acutely Hazardous Substances: The following components are listed: Hydrocyanic acid
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: NITROGEN; HYDROCYANIC ACID
Rhode Island Hazardous Substances: None of the components are listed.

Canada

WHMIS (Canada) :

Class A: Compressed gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).

CEPA Toxic substances: None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: The following components are listed: Hydrogen cyanide
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Section 16. Other information

United States

Label requirements :

MAY BE FATAL IF INHALED.
CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

Canada

Label requirements :

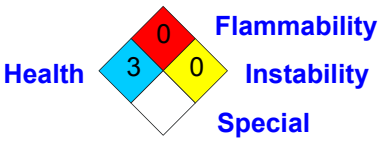
Class A: Compressed gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).

Nonflammable Gas Mixture: Hydrogen Cyanide 0.1- 2.79% / Nitrogen 97.21-99%

Hazardous Material Information System (U.S.A.) :

Health	*	3
Flammability		0
Physical hazards		0

National Fire Protection Association (U.S.A.) :



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Material Safety Data Sheet

Hydrogen Sulfide

Section 1. Chemical product and company identification

Product name : Hydrogen Sulfide

Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Product use : Synthetic/Analytical chemistry.

Synonym : Dihydrogen monosulfide; Dihydrogen sulfide; Hydrosulfuric acid; Stink damp; Sulfur hydride; Sulfureted hydrogen; H2S; Sulfuretted hydrogen; Hydrogen-sulphide-; Hydrogen sulfide (H2S); Acide sulfhydrique; Hydrogene sulfure; Idrogeno solforato; Rcra waste number U135; Schwefelwasserstoff; Siarkowodor; UN 1053; Zwavelwaterstof; Hepatic gas; Hepatic acid; Hydrogen monosulfide; Sewer gas; Sour gas; Sulfur hydroxide

MSDS # : 001029

Date of Preparation/Revision : **5/7/2013.**

In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Gas. [COLORLESS LIQUEFIED COMPRESSED GAS WITH A ROTTEN EGG ODOR, BUT ODORLESS AT POISONOUS CONCENTRATIONS. [NOTE: SENSE OF SMELL BECOMES RAPIDLY FATIGUED AND CAN NOT BE RELIED UPON TO WARN OF THE CONTINUOUS PRESENCE OF H2S.]]

Emergency overview : DANGER!

FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
MAY BE FATAL IF INHALED.
MAY CAUSE EYE AND SKIN IRRITATION.
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

Keep away from heat, sparks and flame. Do not puncture or incinerate container. Do not breathe gas. Avoid contact with eyes, skin and clothing. May cause target organ damage, based on animal data. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed.

Contact with rapidly expanding gases can cause frostbite.

Target organs : May cause damage to the following organs: lungs, upper respiratory tract, eyes, central nervous system (CNS).

Routes of entry : Inhalation Dermal Eyes

Potential acute health effects

Eyes : Moderately irritating to eyes. Contact with rapidly expanding gas may cause burns or frostbite.

Skin : Moderately irritating to the skin. Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : Very toxic by inhalation.

Ingestion : Ingestion is not a normal route of exposure for gases

Potential chronic health effects

Chronic effects : Can cause target organ damage.

Target organs : May cause damage to the following organs: lungs, upper respiratory tract, eyes, central nervous system (CNS).

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

Section 3. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits
Hydrogen Sulfide	7783-06-4	100	**ACGIH TLV (United States, 3/2012).** STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s). **NIOSH REL (United States, 1/2013).** CEIL: 15 mg/m³ 10 minute(s). CEIL: 10 ppm 10 minute(s). **OSHA PEL 1989 (United States, 3/1989).** STEL: 21 mg/m³ 15 minute(s). STEL: 15 ppm 15 minute(s). TWA: 14 mg/m³ 8 hour(s). TWA: 10 ppm 8 hour(s). **OSHA PEL Z2 (United States, 11/2006).** AMP: 50 ppm 10 minute(s). CEIL: 20 ppm

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training.If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus.It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : Call medical doctor or poison control center immediately. Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

Flammability of the product : Flammable.

Auto-ignition temperature : 259.85°C (499.7°F)

Flammable limits : Lower: 4% Upper: 44%

Products of combustion : Decomposition products may include the following materials:
sulfur oxides

Fire-fighting media and instructions : In case of fire, use water spray (fog), foam or dry chemical.

In case of fire, allow gas to burn if flow cannot be shut off immediately. Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. Flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

Handling : Use only with adequate ventilation. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling. High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Keep container closed. Avoid contact with skin and clothing. Avoid contact with eyes. Keep away from heat, sparks and flame. To avoid fire, eliminate ignition sources. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Storage : Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Segregate from oxidizing materials. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protection in case of a large spill : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.

Product name

hydrogen sulphide

ACGIH TLV (United States, 3/2012).
STEL: 5 ppm 15 minute(s).
TWA: 1 ppm 8 hour(s).
NIOSH REL (United States, 1/2013).
CEIL: 15 mg/m³ 10 minute(s).
CEIL: 10 ppm 10 minute(s).
OSHA PEL 1989 (United States, 3/1989).
STEL: 21 mg/m³ 15 minute(s).
STEL: 15 ppm 15 minute(s).

TWA: 14 mg/m³ 8 hour(s).
TWA: 10 ppm 8 hour(s).

OSHA PEL Z2 (United States, 11/2006).
AMP: 50 ppm 10 minute(s).
CEIL: 20 ppm

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight : 34.08 g/mole

Molecular formula : H2-S

Boiling/condensation point : -60°C (-76°F)

Melting/freezing point : -82.8°C (-117°F)

Critical temperature : 100.5°C (212.9°F)

Vapor pressure : 252 (psig)

Vapor density : 1.19 (Air = 1)

Specific Volume (ft ^{3}/lb) : 11.236

Gas Density (lb/ft ^{3}) : 0.089

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Incompatibility with various substances : Extremely reactive or incompatible with the following materials: oxidizing materials.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
hydrogen sulphide	LD50 Intraperitoneal	Rat	2300 ug/kg	-
	LD50 Intravenous	Rat	270 ug/kg	-
	LC50 Inhalation Vapor	Rat	820 mg/m3	3 hours
	LC50 Inhalation Vapor	Rat	700 mg/m3	4 hours
	LC50 Inhalation Vapor	Rat	470 mg/m3	6 hours
	LC50 Inhalation Gas.	Rat	712 ppm	1 hours
	LC50 Inhalation Gas.	Mouse	634 ppm	1 hours
	LC50 Inhalation Gas.	Rat	444 ppm	4 hours

IDLH : 100 ppm

Chronic effects on humans : May cause damage to the following organs: lungs, upper respiratory tract, eyes, central nervous system (CNS).

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
hydrogen sulphide	-	Acute EC50 770 ug/L Fresh water	Crustaceans - Amphipod - Crangonyx richmondensis ssp. lauren - 10 mm	48 hours
	-	Acute EC50 540 ug/L Fresh water	Crustaceans - Amphipod - Crangonyx richmondensis ssp. lauren - 10 mm	48 hours
	-	Acute EC50 95 ug/L Fresh water	Crustaceans - Scud - Gammarus pseudolimnaeus - 11 mm	2 days
	-	Acute EC50 71 ug/L Fresh water	Crustaceans - Scud - Gammarus pseudolimnaeus - 11 mm	2 days
	-	Acute EC50 62 ug/L Fresh water	Crustaceans - Scud - Gammarus pseudolimnaeus - 11 mm	2 days
	-	Acute LC50 4 ug/L Fresh water	Fish - Lake whitefish - Coregonus clupeaformis - Yolk-sac fry	96 hours
	-	Acute LC50 3.2 ug/L Fresh water	Fish - Asian redtail catfish - Hemibagrus nemurus	96 hours
	-	Acute LC50 3 ug/L Fresh water	Fish - Lake whitefish - Coregonus clupeaformis - Yolk-sac fry	96 hours
	-	Acute LC50 2 ug/L Fresh water	Fish - Lake whitefish - Coregonus clupeaformis - Yolk-sac fry	96 hours
	-	Acute LC50 <2 ug/L Fresh water	Fish - Yellow perch - Perca flavescens - Yolk-sac fry	96 hours

Products of degradation :

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation.Return cylinders with residual product to Airgas, Inc.Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1053	HYDROGEN SULFIDE	2.3	Not applicable (gas).		**Reportable quantity** 100 lbs. (45.4 kg) **Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: Forbidden. **Cargo aircraft** Quantity limitation: Forbidden. **Special provisions** 2, B9, B14
TDG Classification	UN1053	HYDROGEN SULFIDE; OR HYDROGEN SULPHIDE	2.3	Not applicable (gas).		**Explosive Limit and Limited Quantity Index** 0 **ERAP Index** 0 **Passenger Carrying Ship Index** Forbidden **Passenger Carrying Road or Rail Index** Forbidden

Hydrogen Sulfide						
Mexico Classification	UN1053	HYDROGEN SULFIDE	2.3	Not applicable (gas).		-

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 15. Regulatory information

United States

U.S. Federal regulations : **United States inventory (TSCA 8b):** This material is listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: hydrogen sulphide
SARA 302/304 emergency planning and notification: hydrogen sulphide
SARA 302/304/311/312 hazardous chemicals: hydrogen sulphide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: hydrogen sulphide: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: hydrogen sulphide

SARA 313

		Product name	CAS number	Concentration
Form R - Reporting requirements	:	Hydrogen Sulfide	7783-06-4	100
Supplier notification	:	Hydrogen Sulfide	7783-06-4	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations : **Connecticut Carcinogen Reporting:** This material is not listed.
Connecticut Hazardous Material Survey: This material is not listed.
Florida substances: This material is not listed.
Illinois Chemical Safety Act: This material is not listed.
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
Louisiana Reporting: This material is not listed.
Louisiana Spill: This material is not listed.
Massachusetts Spill: This material is not listed.
Massachusetts Substances: This material is listed.
Michigan Critical Material: This material is not listed.
Minnesota Hazardous Substances: This material is not listed.
New Jersey Hazardous Substances: This material is listed.
New Jersey Spill: This material is not listed.
New Jersey Toxic Catastrophe Prevention Act: This material is listed.
New York Acutely Hazardous Substances: This material is listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

Canada

WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

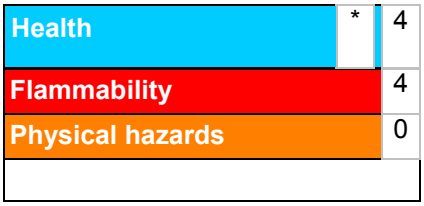
United States

Label requirements : FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
MAY BE FATAL IF INHALED.
MAY CAUSE EYE AND SKIN IRRITATION.
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

Canada

Label requirements : Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

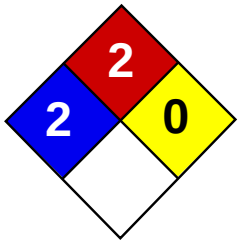
Hazardous Material Information System (U.S.A.) :



National Fire Protection Association (U.S.A.) :

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Health	2
Fire	2
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Naphthalene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Naphthalene

Catalog Codes: SLN1789, SLN2401

CAS#: 91-20-3

RTECS: QJ0525000

TSCA: TSCA 8(b) inventory: Naphthalene

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: C10H8

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
Naphthalene	91-20-3	100

Toxicological Data on Ingredients: Naphthalene: ORAL (LD50): Acute: 490 mg/kg [Rat]. 533 mg/kg [Mouse]. 1200 mg/kg [Guinea pig]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit]. VAPOR (LC50): Acute: 170 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant, permeator). Severe over-exposure can result in death.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 567°C (1052.6°F)

Flash Points: CLOSED CUP: 88°C (190.4°F). OPEN CUP: 79°C (174.2°F).

Flammable Limits: LOWER: 0.9% UPPER: 5.9%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Flammable solid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Israel: TWA: 10 (ppm) TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) [1995] TWA: 52 STEL: 79 (mg/m3) from ACGIH [1995] Australia: STEL: 15 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline solid.)

Odor: Aromatic.

Taste: Not available.

Molecular Weight: 128.19 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: 218°C (424.4°F)

Melting Point: 80.2°C (176.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.162 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: 4.4 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.038 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties:
Partially dispersed in hot water, methanol, n-octanol. Very slightly dispersed in cold water. See solubility in methanol, n-octanol.

Solubility:
Partially soluble in methanol, n-octanol. Very slightly soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Highly reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: May attack some forms of rubber and plastic

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 490 mg/kg [Rat]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 170 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 305.2 ppm 96 hour(s) [Trout].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Naphthalene, refined : UN1334 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
Rhode Island RTK hazardous substances: Naphthalene Pennsylvania RTK: Naphthalene Florida: Naphthalene Minnesota: Naphthalene Massachusetts RTK: Naphthalene TSCA 8(b) inventory: Naphthalene TSCA 8(a) PAIR: Naphthalene TSCA 8(d) H and S data reporting: Naphthalene: 06/01/87 SARA 313 toxic chemical notification and release reporting: Naphthalene: 1% CERCLA: Hazardous substances.: Naphthalene: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-4: Flammable solid. CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R36- Irritating to eyes. R40- Possible risks of irreversible effects. R48/22- Harmful: danger of serious damage to health by prolonged exposure if swallowed. R48/23- Toxic: danger of serious damage to health by prolonged exposure through inhalation. R63- Possible risk of harm to the unborn child.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 2

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 01:30 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET

ERA A Waters Company

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER:	**ERA**	**BUSINESS PHONE:**	**303-431-8454**
ADDRESS:	**16341 Table Mountain Parkway**	**FAX: 303-421-0159**	**EMAIL: info@eraqc.com**
	Golden, CO, 80403 U.S.A.	**CHEMICAL EMERGENCY PHONE:**	**352-535-5053 (INFOTRAC)**

Product Name(s):	**PCBs in Oil, PriorityPollutnT™, PCBs in Oil**
Catalog / Part Number(s):	**729, 729S, 820, 821, 822, 823, 824, 825, 826, 827, 828, 835, 835S, 835SAL1-4, 186004327, 186004328, 186004329, 186004330, 186004331, 186004332, 18600433, 186004334, 186004397**
MSDS Creation Date:	**November 28, 2006**
Revision Date:	**July 19, 2012**
MSDS Reference Number:	**820-828**

SECTION 2: HAZARDS IDENTIFICATION

Warning. Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage. May cause cancer. The matrix of the standard is a petroleum based oil mixture which is classified as dangerous by Directive 199/45/EC. Use only as directed and in accordance with good laboratory practices.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

				EXPOSURE LIMITS		EU LABEL
CHEMICAL INGREDIENT NAME	**CAS NUMBER**	**EC NUMBER**	**% BY WT.**	**OSHA**	**ACGIH**	**HAZARD LABEL**
Distillate (petroleum), hydrogen treated light naphthenic	**64742-53-6**	**256-156-6**	**≤99.9**	**5 mg/m3 (mist)**	**5 mg/m3; 10 mg/m3 STEL (mist)**	

Notes: This standard is a mixture of PCB Aroclors (randomly selected) 1242, 1248, 1254 or 1260 which are present at levels <0.05% in a matrix of distillate (petroleum), hydrogen treated light naphthenic (hydrocarbons C15-C30) packaged in 2-10 ml flame sealed amber ampoule. Only one arochlor will be present in each standard. Exposure Limits are 8-Hour TWA (Time Weighted Average) unless designated C (Ceiling) or STEL (Short Term Exposure Limit). Other components considered Non-Hazardous under OSHA 1910.1200 (HazCom) as they are not present in concentrations exceeding 1% (or 0.1% if considered a known or potential carcinogen).
Material Use: Analytical reagent or certified reference material used in laboratories. Uses also include research and development.

SECTION 4: FIRST-AID MEASURES

Inhalation: Remove to fresh air. Skin Contact: Flush with water.
Eye Contact: Immediately flush with water for a minimum of 15 minutes.
Ingestion: Methanol may be fatal or cause blindness. Seek immediate medical attention.
Note to Physician: Effects may be delayed. Ethanol may inhibit methanol metabolism.
After following first aid measures, seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

Flammable Properties: Not flammable
Extinguishing Media: Dry chemical, carbon dioxide or appropriate foam.
Unique Aspects Contributing To a Fire: None.
Special Fire Fighting Procedures: None.
Note: As in any fire, wear self-contained breathing apparatus, and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Due to small quantities involved, spills or leaks should not pose a significant problem. Absorb with spill pillow or other absorbent and place in closed container for later disposal. Wear appropriate personal protective equipment.

SECTION 7: HANDLING AND STORAGE

Handle in accordance with good laboratory practices. Store in a dark, dry well-ventilated place. This product is intended for use only by people trained in the safety and handling of chemicals and laboratory preparations.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Handle in accordance with good laboratory practices.
Respiratory Protection: Not normally needed. If exposure limits are exceeded, use approved/certified respirator.
Eye Protection: Splash goggles.
Skin Protection: Neoprene or other chemical resistant gloves. Disposable nitrile are acceptable for light intermittent exposure.
Engineering Controls: Work in a fume hood or use general or other local exhaust ventilation to meet Exposure Limits.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

DATA FOR MATRIX (Data is for Distillate (petroleum), hydrogen treated light naphthenic):

Appearance:	**Yellow color**	**Specific Gravity:**	**~0.88**	**Melting Point:**	**NA**
Physical State:	**Liquid**	**Flash Point:**	**ASTM D-92 >145°C (293°F)**	**Vapor Pressure:**	**<0.013 kPa at 20°C**
Odor:	**Slight**	**Explosion Limits:**	**LEL NA% UEL NA%**	**Vapor Density (air=1):**	**>5**
pH:	**NA**	**Boiling Point:**	**260-371°C**	**Solubility in Water:**	**Soluble**

SECTION 10: STABILITY AND REACTIVITY

Hazardous Polymerization Will Not Occur __X__ May Occur____ Stability: Stable __X__ Unstable ____

Hazardous Decomposition/Combustion Products: Aldehydes, oxides of carbon, sulfur oxides. Does not decompose at ambient temperatures.
Conditions and Materials to Avoid: Excessive heat; high energy sources of ignition.

SECTION 11: TOXICOLOGICAL INFORMATION

Primary Route(s) of Exposure Under Normal Use: Inhalation, eye contact, absorbed through skin.

Target Organ(s): Skin.

Acute Effects: If swallowed, may be aspirated and cause lung damage. May cause cancer. Reproductivity system male/female. May be irritating to the eyes, nose, throat, and lungs. May defat and dry the skin.

Carcinogenic Cat. 2 - *Carcinogenic Classifications are per European Union-EINECS*
Distillate (petroleum), hydrogen treated light naphthenic: Oral, rat: LD50=>2000 mg/kg; Inhalation, rat: LC50 =>5000 mg/m3; Dermal, rabbit: LD50=>20000 mg/kg

Chronic Effects: Dermatitis.

California Prop-65: This standard is or contains chemicals known to the state of California to cause cancer. Components in this standard are listed as RTK in Massachusetts, Pennsylvania & New Jersey.

SECTION 12: ECOLOGICAL INFORMATION

No information available on this preparation or mixture. By complying with sections 6 & 7 there will be no release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

To determine proper disposal, consult applicable federal, state and local environmental control regulations.

SECTION 14: TRANSPORT INFORMATION

Shipment Name/Type: Non-hazardous for transport.
UN Number: NA Shipping/Hazardous Class: NA Packing Group: NA

Shipping regulations are based on combinations of criteria such as quantity, class and packaging according to DOT, IATA and (49) CFR.

SECTION 15: REGULATORY INFORMATION

EU Symbol of Danger: Toxic (T)
EU Risk Phrases: May cause cancer [R45]

U.S. TSCA: Constitutes listed
Canada: This product has been classified according to the hazard criteria of the CPR and this MSDS contains all the information required by the CPR.

SECTION 16: OTHER INFORMATION

United States EPA Regulatory Information:		**NFPA Rating:**	**Health: 1**	**Flammability: 1**	**Reactivity: 0**	
SARA 313:	**NA**					
CERCLA RQ:	**NA**	**HMIS Rating:**	**Health: 1**	**Flammability: 1**	**Physical Hazard: 0**	

NOTE: NA = Data not available, not established, determined or not pertinent.

DISCLAIMER: The information contained herein has been compiled from data presented in various technical sources believed to be accurate. This information is intended to be used only as a guide and does not purport to be complete. ERA makes no warranties and assumes no liability in connection with the use of this information. It is the user's responsibility to determine the suitability of this information and to assure the adoption of necessary precautions.

MATERIAL SAFETY DATA SHEET
ERA A Waters Company

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER: ERA
ADDRESS: 16341 Table Mountain Parkway, Golden, CO, 80403 U.S.A.
BUSINESS PHONE: 303-431-8454
FAX: 303-421-0159 **EMAIL:** info@eraqc.com
CHEMICAL EMERGENCY PHONE: 352-535-5053 (INFOTRAC)

Product Name(s): **PCBs in Soil, PriorityPollutnT™, PCBs in Soil**

Catalog / Part Number(s): **490, 491, 492, 493, 494, 495, 496, 497, 498, 624, 624AL1-4, 726, 186004307, 186004308, 186004309, 186004310, 186004311, 186004312, 186004313, 186004314, 186004321**

MSDS Creation Date: November 22, 2005
Revision Date: July 19, 2012
MSDS Reference Number: 490-498

SECTION 2: HAZARDS IDENTIFICATION

Not hazardous according to Directive 199/45/EC. Use only as directed an in accordance with good laboratory practices.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

				EXPOSURE LIMITS		EU LABEL
CHEMICAL INGREDIENT NAME	CAS NUMBER	EC NUMBER	% BY WT.	OSHA	ACGIH	HAZARD LABEL
No Hazardous Ingredients	NA	NA	NA	NA	NA	NA

Notes: Each product is 20-50 grams of an internal standard containing a mixture of organic chemicals & PCB arochlors with levels <0.05 % dried in inert clean topsoil/sand. The soil may contain silica, crystalline – quartz. The sample is solid, loose dirt and does not contain liquid. Considered Non-Hazardous under OSHA 1910.1200 (HazCom) as product contains no known or potential carcinogens in excess of 0.1% of the composition nor any other hazardous chemical in excess of 1% of the composition.
Material Use: Analytical reagent or certified reference material used in laboratories. Uses also include research and development.

SECTION 4: FIRST-AID MEASURES

Inhalation: Remove to fresh air.
Skin Contact: Flush with water.
Eye Contact: Immediately flush with water for a minimum of 15 minutes.
Ingestion: Get medical attention.
After following first aid measures, seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

Flammable Properties: Not flammable.
Extinguishing Media: Dry chemical, carbon dioxide or appropriate foam.
Unique Aspects Contributing To a Fire: None.
Special Fire Fighting Procedures: None.
Note: As in any fire, wear self-contained breathing apparatus, and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Sweep up dirt and avoid creating dust. Place wastes into closed containers for proper disposal.

SECTION 7: HANDLING AND STORAGE

Keep container tightly closed. Store is a cool dry place. Handle in accordance with good laboratory practices. This product is intended for use only by people trained in the safety and handling of chemicals and laboratory preparations.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Handle in accordance with good laboratory practices.
Respiratory Protection: Not normally needed. May use HEPA or nuisance dust mask to reduce inhalation of dust.
Eye Protection: Safety glasses with side shields.
Skin Protection: Neoprene or other chemical resistant gloves. Disposable nitrile gloves are acceptable for light intermittent exposure.
Engineering Controls: Work in a fume hood or use general or other local exhaust ventilation to meet Exposure Limits.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

DATA FOR MIX/MATRIX:

Appearance:	**brown soil or blond sand**	**Specific Gravity:**	**NA**	**Melting Point:**	**NA**
Physical State:	**Solid**	**Flash Point:**	**NA**	**Vapor Pressure:**	**NA**
Odor:	**NA**	**Explosion Limits:**	**NA**	**Vapor Density (air=1):**	**NA**
pH:	**NA**	**Boiling Point:**	**NA**	**Solubility in Water:**	**NA**

SECTION 10: STABILITY AND REACTIVITY

Hazardous Polymerization Will Not Occur __X__ May Occur____ Stability: Stable __X__ Unstable ____
Hazardous Decomposition/Combustion Products: NA
Conditions and Materials to Avoid: NA

SECTION 11: TOXICOLOGICAL INFORMATION

Primary Route(s) of Exposure Under Normal Use: NA

Target Organ(s): NA

Acute Effects: NA

Chronic Effects: NA

Other Information: Chemical Ingredient(s) not classified as carcinogen(s) by OSHA, IARC, NTP, ACGIH, or California.

SECTION 12: ECOLOGICAL INFORMATION

No information available on this preparation or mixture. By complying with sections 6 & 7 there will be no release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

To determine proper disposal, consult applicable federal, state and local environmental control regulations.

SECTION 14: TRANSPORT INFORMATION

Shipment Name/Type: Non-hazardous for transport.
UN Number: NA Shipping/Hazardous Class: NA Packing Group: NA
Shipping regulations are based on combinations of criteria such as quantity, class and packaging according to DOT, IATA and (49) CFR.

SECTION 15: REGULATORY INFORMATION

EU Symbol of Danger: NA
EU Risk Phrases: NA

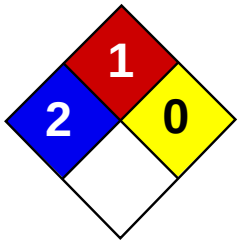
U.S. TSCA: NA
Canada: This product has been classified according to the hazard criteria of the CPR and this MSDS contains all the information required by the CPR.

SECTION 16: OTHER INFORMATION

United States EPA Regulatory Information:		**NFPA Rating:**	**Health: NA**	**Flammability: NA**	**Reactivity: NA**	
SARA 313:	**NA**					
CERCLA RQ:	**NA**	**HMIS Rating:**	**Health: NA**	**Flammability: NA**	**Physical Hazard:**	**NA**

NOTE: NA = Data not available, not established, determined or not pertinent.

DISCLAIMER: The information contained herein has been compiled from data presented in various technical sources believed to be accurate. This information is intended to be used only as a guide and does not purport to be complete. ERA makes no warranties and assumes no liability in connection with the use of this information. It is the user's responsibility to determine the suitability of this information and to assure the adoption of necessary precautions.



Health	2
Fire	1
Reactivity	0
Personal Protection	C

Material Safety Data Sheet
Pyrene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Pyrene

Catalog Codes: SLP3868

CAS#: 129-00-00

RTECS: UR2450000

TSCA: TSCA 8(b) inventory: Pyrene

CI#: Not available.

Synonym: Benzo(D,E,F)phenanthrene

Chemical Name: Pyrene

Chemical Formula: C16-H10

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Pyrene	129-00-00	100

Toxicological Data on Ingredients: Pyrene: ORAL (LD50): Acute: 2700 mg/kg [Rat]. 800 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of heat, of combustible materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of heat. Non-explosive in presence of open flames and sparks.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested,

seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F). Preferably refrigerate.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Synthetic apron. Gloves (impervious).

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline solid. Powdered solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 202.26 g/mole

Color: Yellow.

pH (1% soln/water): Not applicable.

Boiling Point: 404°C (759.2°F)

Melting Point: 151.2°C (304.2°F)

Critical Temperature: Not available.

Specific Gravity: 1.271 @ 23 C (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 4.9

Ionicity (in Water): Not available.

Dispersion Properties:
Is not dispersed in cold water, hot water. See solubility in diethyl ether.

Solubility:
Soluble in diethyl ether. Insoluble in cold water, hot water. Pyrene is fairly soluble in organic solvents. It is soluble in alcohol, benzene, carbon disulfide, ether, petroleum ether, and toluene

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 800 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May affect genetic material (mutagenic). May cause cancer (tumorigenic) according to animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause skin irritation. May be absorbed through skin. Eyes: May cause eye irritation. Conjunctival irritation may be noted. Inhalation: May cause respiratory tract irritaiton. Ingestion: May cause gastrointestinal tract irritation. May affect behavior/Central Nervous System (excitation and muscel spasicity), liver and urinary system, and immune system, and blood.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 1.8 mg/l 48 hours [Water flea].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut carcinogen reporting list.: Pyrene Illinois chemical safety act: Pyrene New York release reporting list: Pyrene Pennsylvania RTK: Pyrene Massachusetts RTK: Pyrene Massachusetts spill list: Pyrene New Jersey: Pyrene New Jersey spill list: Pyrene Louisiana RTK reporting list: Pyrene Louisiana spill reporting: Pyrene California Director's list of Hazardous Substances: Pyrene TSCA 8(b) inventory: Pyrene TSCA 8(a) CAIR: Pyrene TSCA 8(d) H and S data reporting: Pyrene: June 1, 1987-June1, 1997 SARA 302/304/311/312 extremely hazardous substances: Pyrene CERCLA: Hazardous substances.: Pyrene: 5000 lbs. (2268 kg)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R20/21/22- Harmful by inhalation, in contact with skin and if swallowed. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: C

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves (impervious). Synthetic apron. Not applicable. Safety glasses.

Section 16: Other Information

References: Not available.

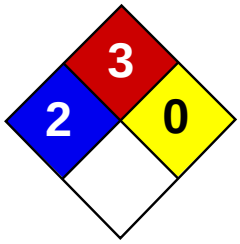
Other Special Considerations: Not available.

Created: 10/09/2005 06:14 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for

lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

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
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

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 immediate 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:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

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: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

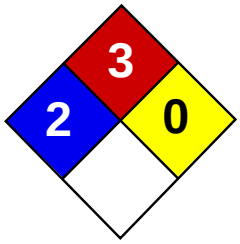
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:30 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Xylenes MSDS

Section 1: Chemical Product and Company Identification

Product Name: Xylenes

Catalog Codes: SLX1075, SLX1129, SLX1042, SLX1096

CAS#: 1330-20-7

RTECS: ZE2100000

TSCA: TSCA 8(b) inventory: Xylenes

CI#: Not available.

Synonym: Xylenes; Dimethylbenzene; xylol; methyltoluene

Chemical Name: Xylenes (o-, m-, p- isomers)

Chemical Formula: C6H4(CH3)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
Xylenes	1330-20-7	100

Toxicological Data on Ingredients: Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

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: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

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 immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

Flammable Limits: LOWER: 1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Vapors may travel to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Vapors may form explosive mixtures with air. Containers may explode when heated. May polymerize explosively when heated. An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 (ppm) [Canada] TWA: 435 (mg/m3) [Canada] TWA: 434 STEL: 651 (mg/m3) from ACGIH (TLV) [United States] TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 138.5°C (281.3°F)

Melting Point: -47.4°C (-53.3°F)

Critical Temperature: Not available.

Specific Gravity: 0.864 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 1 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Miscible with absolute alcohol, ether, and many other organic liquids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2119 mg/kg [Mouse]. Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:
Lowest Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects (male and femael fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. Can be absorbed through skin. Eyes: Causes eye irritation. Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves. Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/ kidneys. May cause effects similar to those of acute inhalation. Chronic Potential Health Effects: Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may alsocause mucosal bleeding. Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Xylenes UNNA: 1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Xylenes Illinois chemical safety act: Xylenes New York acutely hazardous substances: Xylenes Rhode Island RTK hazardous substances: Xylenes Pennsylvania RTK: Xylenes Minnesota: Xylenes Michigan critical material: Xylenes Massachusetts RTK: Xylenes Massachusetts spill list: Xylenes New Jersey: Xylenes New Jersey spill list: Xylenes Louisiana spill reporting: Xylenes California Director's List of Hazardous Substances: Xylenes TSCA 8(b) inventory: Xylenes SARA 302/304/311/312 hazardous chemicals: Xylenes SARA 313 toxic chemical notification and release reporting: Xylenes CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R10- Flammable. R21- Harmful in contact with skin. R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 12:54 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Close this window MSDS

Common Name: GREEN PATCH ASPHALT

Manufacturer: COLD MIX

MSDS Revision Date: 4/18/2013

MSDS Format: No Format Specified

Grainger Item Number(s): 39F846, 39F847

Manufacturer Model Number(s):

MSDS Table of Contents

Click the desired link below to jump directly to that section in the MSDS.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION
SECTION 2. COMPOSITION INFORMATION ON INGREDIENTS
SECTION 3. HAZARD INFORMATION
SECTION 4. FIRST AID MEASURES
SECTION 5. FIRE FIGHTING MEASURES
SECTION 6. ACCIDENT RELEASE MEASURES
SECTION 7. HANDLING AND STORAGE
SECTION 8. EXPOSURE CONTROL AND PERSONAL PROTECTION
SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES
SECTION 10. STABILITY AND REACTIVITY
SECTION 11. TOXICOLOGICAL INFORMATION
SECTION 12. ECOLOGICAL INFORMATION
SECTION 13. DISPOSAL CONSIDERATIONS
SECTION 14. TRANSPORTATION INFORMATION
SECTION 15. REGULATORY INFORMATION
SECTION 16. OTHER INFORMATION

CMM
COLD MIX MANUFACTURING

GREEN PATCH(R*)
PAVING THE WAY TO GO GREEN

GREENPATCH 50 POUND BAG - ITEM #39F846
GREENPATCH 40 POUND PAIL - ITEM #39F847

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

top

PRODUCT NAME(S): GREEN PATCH COLD MIX ASPHALT

SYNONYMS: COLD MIX/POTHOLE PATCHING MATERIAL

PRODUCT CODE NUMBER:

PRODUCT USES:
GREEN PATCH COLD MIX ASPHALT IS A VOC-FREE HIGH PERFORMANCE COLD PATCH FOR USE IN REPAIRING ASPHALT PAVEMENT, PARKING LOTS, AND DRIVEWAYS.

MANUFACTURING INFORMATION:
COLD MIX MANUFACTURING
120-30 26TH AVENUE
FLUSHING, NY 11354

CONTACT: MIKE MILANO

GENERAL INFORMATION TELEPHONE NUMBER: 718-463-1444
WEBSITE: WWW.GREENPATCH.COM

EMERGENCY TELEPHONE NUMBERS:
718-463-1444 (8 A.M. - 5 P.M. EST)
718-463-6292 FAX
845-216-1926 AFTER HOURS

SECTION 2. COMPOSITION INFORMATION ON INGREDIENTS

top

INGREDIENT	CAS NUMBER	PERCENT BY WEIGHT
AGGREGATE (DOLOMITE)	7000-29-5	40 - 60
RECLAIMED ASPHALT PAVEMENT (RAP)	VARIOUS	40 - 60
ASPHALT (AS FUME)	8052-42-4	<10
CRYSTALLINE SILICA (AS QUARTZ) (NATURALLY IN AGGREGATE & RAP	14808-60-7	>1
FATTY ACID ALKYL ESTERS	VARIOUS	<4

SECTION 3. HAZARD INFORMATION

top

EXCLAMATION MARK

WARNING:

TOXIC - HARMFUL BY INHALATION. (CONTAINS CRYSTALLINE SILICA)

IRRITANT: CAUSES EYE, SKIN AND INHALATION IRRITATION.

USE PROPER ENGINEERING CONTROLS, WORK PRACTICES, AND PERSONAL PROTECTIVE EQUIPMENT.

READ MSDS FOR DETAILS.

EYE PROTECTION

GLOVES

EMERGENCY OVERVIEW:
GREEN PATCH IS A BLEND OF AGGREGATES COATED WITH AN ASPHALT MIXTURE DESIGNED FOR USE AND APPLICATION AT AMBIENT TEMPERATURES. THE PRODUCT SHOULD NOT BE HEATED. IF THE PRODUCT IS HEATED, THE RELEASE OF TOXIC HYDROGEN SULFIDE (H2S) MAY OCCUR. CONTENT WITH HEATED COATED AGGREGATE MAY RESULT IN THERMAL BURNS.

PRIMARY ROUTES OF ENTRY: SKIN AND/OR EYE CONTACT.

EYE CONTACT:
AIRBORNE PARTICULATES MAY CAUSE IMMEDIATE OR DELAYED IRRITATION OR INFLAMMATION. EYES MAY BECOME RED OR ITCHY. EYE CONTACT REQUIRES IMMEDIATE FIRST AID.

SKIN CONTACT:
MAY CAUSE SKIN IRRITATION AND DERMATITIS UPON PROLONGED CONTACT.

INGESTION (NOT A PROBABLE ROUTE OF EXPOSURE):
IF INGESTION OCCURS, DO NOT INDUCE VOMITING. INGESTION MAY CAUSE STOMACH DISTRESS, NAUSEA, OR VOMITING. IF CONSCIOUS, DRINK WATER. SEEK MEDICAL ATTENTION OR CONTACT POISON CONTROL CENTER IMMEDIATELY.

INHALATION (NOT A PROBABLE ROUTE OF EXPOSURE):
MOVE TO FRESH AIR. SEEK MEDICAL ATTENTION.

CHRONIC CARCINOGENICITY EFFECTS:
THIS PRODUCT OR ONE OF ITS INGREDIENTS PRESENT AT 0.1% OR MORE, ARE LISTED AS A CARCINOGEN BY NTP, ARC, OR OSHA.

SEE SECTION 11 (TOXICOLOGICAL INFORMATION) FOR DETAILS.

SECTION 4. FIRST AID MEASURES

top

EYES:
IN CASE OF CONTACT, HOLD EYELIDS OPEN AND IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION IMMEDIATELY IF IRRITATION DEVELOPS AND PERSISTS.

SKIN:
REMOVE CONTAMINATED CLOTHING AND SHOES. WASH AFFECTED AREAS WITH SOAP AND WATER, OR A MILD DETERGENT. GET MEDICAL ATTENTION IF SYMPTOMS DEVELOP.

INHALATION:
REMOVE PERSON FROM THE CONTAMINATED AREA TO FRESH AIR. IF BREATHING IS DIFFICULT, GIVE OXYGEN. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. GET MEDICAL ATTENTION IMMEDIATELY. SEEK MEDICAL ATTENTION FOR DISCOMFORT OR IF COUGHING OR OTHER SYMPTOMS DO NOT SUBSIDE.

INGESTION:
GET MEDICAL ATTENTION IMMEDIATELY. DO NOT INDUCE VOMITING. IF CONSCIOUS, HAVE PERSON DRINK PLENTY OF WATER.

SECTION 5. FIRE FIGHTING MEASURES

top

FLASH POINT: NOT APPLICABLE (N/A)

AUTO IGNITION TEMPERATURES: N/A

LOWER EXPLOSIVE LIMIT: N/A
UPPER EXPLOSIVE LIMIT: N/A

GENERAL HAZARD:
A GRANULATED SOLID WITH A PARTIALLY COMBUSTIBLE COATING, AVOID BREATHING FUMES.

FIRE AND EXPLOSION HAZARDS:
DURING A FIRE, CARBON MONOXIDE, CARBON DIOXIDE, OXIDES OF NITROGEN AND SULFUR, HYDROGEN SULFIDE AND IRRITATING AND/OR TOXIC GASES MAY BE GENERATED.

EXTINGUISHING MEDIAN:
CARBON DIOXIDE, WATER SPRAY (WITH CAUTION) OR DRY CHEMICAL.

FIRE FIGHTING INSTRUCTIONS:
A SCBA AND FULL PROTECTION GEAR IS RECOMMENDED TO LIMIT EXPOSURE TO COMBUSTION PRODUCTS WHEN FIGHTING ANY FIRE.

SECTION 6. ACCIDENT RELEASE MEASURES

top

COLLECT AND DISPOSE IN ACCORDANCE WITH APPLICABLE REGULATIONS.

AVOID RELEASE TO WATERWAYS AND SEWERS.

GENERAL:
USE A SHOVEL TO SCOOP UP AND PLACE IN SUITABLE STURDY CONTAINER FOR RECOVERY OR DISPOSAL. WEAR APPROPRIATE PROTECTION EQUIPMENT DESCRIBED IN SECTION 8.

SECTION 7. HANDLING AND STORAGE

top

GENERAL:
KEEP CONTAINERS/BAGS TIGHTLY CLOSED. STORE IN COOL, DRY, WELL-VENTILATED AREAS. DO NOT EXPOSE TO HEAT, OPEN FLAMES, STRONG OXIDIZERS OR SOURCES OF IGNITION.

USAGE:
USE ONLY WITH ADEQUATE VENTILATION.

AVOID CONTACT WITH SKIN, EYES AND CLOTHING. THOROUGHLY WASH HANDS AND EXPOSED SKIN IF EXPOSED.

CLOTHING: REMOVE AND LAUNDER CLOTHING THAT IS SOILED.

SECTION 8. EXPOSURE CONTROL AND PERSONAL PROTECTION

top

ENGINEERING CONTROLS: USE WITH ADEQUATE AND LOCAL EXHAUST VENTILATION.

PERSONAL PROTECTION EQUIPMENT (PPE):
EYE AND FIRE PROTECTION; ANSI APPROVED GLASSES, SAFETY GOGGLES OR FIRE SHIELD RECOMMENDED.

SKIN PROTECTION: USE PROTECTIVE GLOVES AND APRON TO PREVENT SKIN CONTACT.

FOOT PROTECTION: WEAR ANSI APPROVED SAFETY FOOTWEAR.

RESPIRATORY PROTECTION:
NONE NORMALLY REQUIRED. RESPIRATORY PROTECTION EQUIPMENT USE MAY BE REQUIRED FOR SECONDARY OPERATION, SUCH CUTTING OR OPERATIONS CAUSING DUST OR FUMES. THE LEVEL OF RESPIRATORY PROTECTION REQUIRED SHOULD BE BASED ON THE EVALUATION OF CHEMICAL EXPOSURE BY A HEALTH OR SAFETY PROFESSIONAL.

OCCUPATIONAL EXPOSURE LIMITS FOR INDIVIDUAL INGREDIENTS (IF APPLICABLE):

INGREDIENT	OSHA PEL - TWA	ACGIH TLV-TWA
ASPHALT (FUME)	5 MG/M3	0.5 MG/M3 BENZENE SOLUBLE AEROSOL
SILICA (QUARTZ)	10 MG/M3/%SiO2+2 RESPIRABLE DUST	0.25 MG/M3

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

top

APPEARANCE: BLACK, GRANULATED SOLID

EVAPORATION RATE: N/A

ODOR: SLIGHT PETROLEUM ODOR

PH: N/A

PHYSICAL STATE: GRANULATED SOLID

BOILING POINT: N/A

VAPOR PRESSURE: N/A

FREEZING POINT: N/A

VAPOR DENSITY: N/A

SOLUBILITY: NOT SOLUBLE

SPECIFIC GRAVITY: >2.3

VOLATILE POINT: <0.2%

SECTION 10. STABILITY AND REACTIVITY

top

STABILITY:
STABLE. AVOID CONTACT WITH HEAT, SOURCES OF IGNITION AND OPEN FLAME.

INCOMPATIBILITY:
MAY BE INCOMPATIBLE WITH STRONG ACIDS, BASES AND OXIDIZING AGENTS.

HAZARDOUS POLYMERIZATION: NOT EXPECTED TO OCCUR.

HAZARDOUS DECOMPOSITION:
NOT EXPECTED TO OCCUR IF HANDLED AND STORED PROPERLY.

CONDITION TO AVOID:
SOURCES OF IGNITION, OPEN FLAME AND STRONG OXIDIZING AGENTS.

SECTION 11. TOXICOLOGICAL INFORMATION

top

CHRONIC/CARCINOGENICITY:

IARC CLASSIFIES THE BELOW LISTED INGREDIENTS AS CARCINOGENIC TO HUMANS

SILICA, QUARTZ (GROUP 1)

ASPHALT AS FUME (GROUP 3A)

ACGIH (A2) NTP (GROUP 2) HAVE DESIGNATED SILICA, QUARTZ AS SUSPECTED HUMAN CARCINOGENS

MISCELLANEOUS TOXICOLOGICAL INFORMATION:
TESTING HAS NOT BEEN CONDUCTED ON THIS PRODUCT. AVAILABLE DATA FOR

INDIVIDUAL INGREDIENTS ARE NOTED BELOW.

COMPONENT	OSHA-PEL-TWA (MG/M2)	ACGIH TLV-TWA (MG/M2)	LD50 (RAT, ORAL)	LC50
ASPHALT (FUME)	N/A	0.5	N/A	N/A
CRYSTALLINE SILICA (QUARTZ)	[(10) / (% SiO2+2)] (R); [(30) / (%SiO+2)] (T)	0.025 (R)	N/A	N/A
FATTY ACID ALKYL ESTER	N/A	N/A	17.G/KG	N/A

SECTION 12. ECOLOGICAL INFORMATION

top

THE ENVIRONMENTAL IMPACT (ECO-TOXICITY) OF THIS PRODUCT HAS NOT BEEN INVESTIGATED.

THE FATTY ACID ALKYL ESTER IS BIODEGRADABLE.

SECTION 13. DISPOSAL CONSIDERATIONS

top

WASH DISPOSAL METHOD:

COMPONENT WASTE NUMBERS:
EPA WASTE NUMBERS ARE NOT AVAILABLE FOR THIS PRODUCT OR ITS COMPONENTS.

INSTRUCTIONS:
DISPOSE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

REFER TO SECTION 7 FOR HANDLING PROCEDURES AND SECTION 8 FOR PPE RECOMMENDATIONS.

CONTAMINATED PACKAGING: DISPOSE IN ACCORDANCE WITH LOCAL REGULATIONS.

SECTION 14. TRANSPORTATION INFORMATION

top

US DOT: NOT REGULATED

IMDG: NOT REGULATED

IATA: NOT REGULATED

TDG: NOT REGULATED

SECTION 15. REGULATORY INFORMATION

top

U.S. REGULATORY INFORMATION:

OSHA/MSHA HAZARD COMMUNICATION:
THIS PRODUCT IS CONSIDERED BY OSHA/MSHA TO BE A HAZARDOUS CHEMICAL AND SHOULD BE IN THE EMPLOYEES' HAZARD COMMUNICATION PACKAGE.

CERCLA/SUPERFUND:
NEITHER THIS PRODUCT NOR ITS COMPONENTS ARE LISTED AS A CERCLA HAZARDOUS SUBSTANCE.

EPCRA SARA TITLE III:

COMPONENT	SARA 311/312	SARA 313 TITLE III
AGGREGATE (SILICA)	ACUTE HEALTH HAZARD (IRRITATION)	
ASPHALT	DELAYED (CHRONIC) HEALTH EFFECTS	

RCRA:
IF DISCARDED AS PURCHASED, THIS PRODUCT IS NOT HAZARDOUS WASTE EITHER BY LISTING OR CHARACTERISTIC.

TSCA:
COMPONENTS OF THIS PRODUCT ARE LISTED ON THE TOXIC SUBSTANCES CONTROL ACT (TSCA) INVENTORY.

INGREDIENTS/COMPONENTS STATE REGULATED:

COMPONENT	STATE					
	CA(1)	MA	MN	NJ	PA	RI
SILICA, QUARTZ	YES	YES	NK	YES	YES	NK
ASPHALT	YES	YES	YES	YES	YES	YES

(1) CONTAINS SUBSTANCES CRYSTALLINE SILICA AND ASPHALT; KNOWN BY STATE OF CALIFORNIA TO CAUSE CANCER. CALIFORNIA'S PROPOSITION 65.

CANADIAN REGULATORY INFORMATION:
CLASSIFICATION OF THIS PRODUCT BY HAZARDOUS CRITERIA OF CPA COMPONENT CRYSTALLINE SILICA AS D2A - VERY TOXIC AND IS SUBJECT TO WHMIS REQUIREMENTS.

WHMIS - CANADA PICTOGRAMS): D2 - MATERIALS CAUSING OTHER TOXIC EFFECTS

NFPA:
1
0
0

HMIS:
HEALTH 1
FLAMMABILITY 0
REACTIVITY 0
PERSONAL PROTECTION

SECTION 16. OTHER INFORMATION

top

ABBREVIATIONS:

>: GREATER THAN

<: LESS THAN

ACGIH: AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

ANSI: AMERICAN NATIONAL STANDARDS INSTITUTE

ARC: AMERICAN RED CROSS

CAS NO.: CHEMICAL ABSTRACT SERVICE NUMBER

CERCLA:
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT

CPA: CONSUMER PROTECTION AGENCY

DOT: U.S. DEPARTMENT OF TRANSPORTATION

EPA: ENVIRONMENTAL PROTECTION AGENCY

EPCRA: EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

EST: EASTERN STANDARD TIME

HMIS: HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

IARC: INTERNATIONAL AGENCY FOR RESEARCH ON CANCER

IATA: INTERNATIONAL AIR TRANSPORT ASSOCIATION.

IMDG: INTERNATIONAL MARITIME DANGEROUS GOODS CODE

LC50: LETHAL CONCENTRATION

LD50: LETHAL DOSE

MG/M3: MILLIGRAMS PER CUBIC METER

MSHA: MINE SAFETY AND HEALTH ADMINISTRATION

N/A: NOT APPLICABLE

NFPA: NATIONAL FIRE PROTECTION ASSOCIATION

NTP: NATIONAL TOXICOLOGY PROGRAM

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

PEL: PERMISSIBLE EXPOSURE LIMIT

PH: NEGATIVE LOG OF HYDROGEN ION

PPE: PERSONAL PROTECTIVE EQUIPMENT

R: RESPIRABLE PARTICULATE

RCRA: RESOURCE CONSERVATION AND RECOVERY ACT

SARA: SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT

SCBA: SELF-CONTAINED BREATHING APPARATUS

T: TOTAL PURCHASE

TDG: TRANSPORTATION OF DANGEROUS GOODS

TLV: THRESHOLD LIMIT VALUE

TSCA: TOXIC SUBSTANCES CONTROL ACT

TWA: TOTAL WEIGHTED AVERAGE (8 HOUR)

VOC: VOLATILE ORGANIC COMPOUND

WHMIS: WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM

THIS MSDA WAS REVISED ON APRIL 18, 2013 BY PRI ASPHALT TECHNOLOGIES, INC.; TAMPA, FL 33610.

COLD MIX MANUFACTURING (CMM) BELIEVES THE INFORMATION CONTAINED HEREIN IS PRESENTED IN GOOD FAITH. HOWEVER, CMM MAKE NO GUARANTEES WITH RESPECT TO SUCH ACCURACY AND ASSUMES NO LIABILITY IN CONNECTION WITH THE USE OF THE INFORMATION CONTAINED HEREIN WHICH IS NOT INTENDED TO BE AND SHOULD NOT BE CONSTRUED AS LEGAL ADVICE OR AS INSURING COMPLIANCE WITH ANY FEDERAL, STATE, OR LOCAL LAWS OR REGULATIONS. ANY PARTY USING THIS PRODUCT SHOULD REVIEW ALL SUCH LAWS, RULES, OR REGULATIONS PRIOR TO USE, INCLUDING, BUT NOT LIMITED TO U.S. AND CANADA FEDERAL, PROVINCIAL AND STATE REGULATIONS.

NO WARRANTY IS MADE, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE.

U.S. SILICA COMPANY

Material Safety Data Sheet

Product Name: Silica Sand and Ground Silica
Product Description: Crystalline Silica

1. Identification of the substance/preparation and of the company/undertaking

1.1. Identification of the substance or preparation

Product Name/Trade Names:
Sand and Ground Silica Sand (sold under various names: ASTM TESTING SANDS • GLASS SAND • FILPRO® · FLINT SILICA • DM-SERIES • F-SERIES • FOUNDRY SANDS • FJ-SERIES H-SERIES • L-SERIES • N-SERIES • NJ SERIES • OK-SERIES • P-SERIES • T-SERIES • hydraulic fracturing sand, all sizes • frac sand, all sizes • MIN-U-SIL® Fine Ground Silica • MYSTIC WHITE® • #1 DRY • #1 SPECIAL • PENN SAND® • PRO WHITE® · SILURIAN® · Q-ROK® • SIL-CO-SIL® Ground Silica • MICROSIL® • SUPERSIL® • MASON SAND • GS SERIES • PER-SPEC • proppant, all sizes • SHALE FRAC® - SERIES • KOSSE WHITE® • OTTAWA WHITE® • OPTIJUMP®.

Chemical Name or Synonym:
Crystalline Silica (Quartz), Sand, Silica Sand, Flint, Ground Silica, Silica Flour.
White or tan sand or ground silica with no odor.

1.2. Use of the Substance/Preparation

Main Applications (non-exhaustive list): brick, ceramics, foundry castings, glass, grout, hydraulic fracturing sand, frac sand, proppant, mortar, paint and coatings, silicate chemistry, silicone rubber, thermoset plastics.

DO NOT USE U.S. SILICA COMPANY SAND OR GROUND SILICA FOR SAND BLASTING.

1.3. Company / Producer

U.S. Silica Company
8490 Progress Drive, Suite 300
Frederick, MD 21701
U.S.A.

Phone: 800-243-7500
Emergency Phone: 301-682-0600
Fax: 301-682-0690

2. Hazards Identification

2.1. EMERGENCY OVERVIEW:

The material is white or tan sand, or ground sand; the ground sand looks like white powder. It has no odor and is not flammable, combustible or explosive. It does not cause burns or severe skin or eye irritation. A single exposure will not result in serious adverse health effects. Crystalline silica is not known to be an environmental hazard.

Personal protective equipment – respirator -- is not required unless the concentration of respirable silica dust exceeds applicable occupational exposure levels.

Crystalline silica (quartz) is incompatible with hydrofluoric acid, fluorine, chlorine trifluoride or oxygen difluoride.

2.2. OSHA REGULATORY STATUS
This material is considered hazardous under the OSHA Hazard Communications Standard (29 CFR 1910.1200).

2.3. POTENTIAL HEALTH EFFECTS: The potential health effects are CHRONIC; the route of exposure is INHALATION; the hazards described are associated with respirable crystalline silica dust – respirable dust particles are less than 10 microns in aerodynamic diameter.
.

2.3.1. Inhalation:
a. Silicosis: The prolonged repeated inhalation of respirable crystalline silica can cause silicosis, a fibrosis (scarring) of the lungs.

Silicosis may be progressive; it may lead to disability and death.

b. Lung Cancer: Crystalline silica is classified as carcinogenic to humans.

c. Tuberculosis: Silicosis increases the risk of tuberculosis.

d. Autoimmune and Chronic Kidney Diseases: Some studies show excess numbers of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease in workers exposed to respirable crystalline silica.

e. Non-Malignant Respiratory Diseases (other than silicosis): Some studies show an increased incidence in chronic bronchitis and emphysema in workers exposed to respirable crystalline silica.

2.3.2. Eye Contact:
Crystalline silica (sand or ground silica) may cause abrasion of the cornea.

2.3.3. Skin Contact:
Not applicable.

2.3.4. Ingestion:
Not applicable.

2.3.5. Chronic Effects:
The adverse health effects -- silicosis, lung cancer, autoimmune and chronic kidney diseases, tuberculosis, and non-malignant respiratory diseases -- are chronic effects.

2.3.6. Signs and Symptoms of Exposure:
Generally, there are no signs or symptoms of exposure to crystalline silica; silicosis may result in shortness of breath, especially upon exertion. See Section 11 for additional information.

2.3.7. Medical Conditions Generally Aggravated by Exposure:
The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure.

2.3.8 **Potential Environmental Effects**
None known.

See Section 11, Toxicological Information, for additional detail on potential adverse health effects.

3. Composition / Information on Ingredients

Component / CAS #		%	Hazardous under OSHA Haz Comm Standard?
Crystalline Silica (quartz)	14808-60-7	99.0 – 99.9	Yes
Aluminum Oxide	1344-28-1	<1.0	No
Iron Oxide	1309-37-1	<0.1	No
Titanium Oxide	13463-67-7	<0.1	No

4. First Aid Measures

4.1. Eye Exposure:
Wash immediately with plenty of water. If irritation persists, seek medical attention.

4.2. Skin Exposure:
Not applicable

4.3. Inhalation:
No specific first-aid is necessary since the adverse health effects associated with inhalation of respirable crystalline silica result from chronic exposures. If there is a gross inhalation of crystalline silica, remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

4.4. Ingestion:
Not applicable

5. Fire Fighting Measures

5.1. Fire Hazard Data:

Auto ignition: Not Applicable

Flash Point: Not Applicable

Flammability Limits (vol/vol%): **Lower:** Not Applicable **Upper:** Not Applicable

Extinguishing Media:
Product is not flammable, combustible or explosive. Use extinguishing media appropriate for surrounding fire.

Special Fire Fighting Procedures:
Not applicable.

Unusual Fire and Explosion Hazards:
None

6. Accidental Release Measures

6.1. Personal precautions:

Avoid generating dust. If the concentration of respirable silica dust exceeds the OSHA PEL or other applicable limit (if lower than the PEL), wear respirator specified in Section 8 of this Safety Data Sheet.

Environmental precautions: No specific precautions. Discard any product, residue, disposable container or liner in compliance with regulatory requirements.

Methods for cleaning up: Avoid dry sweeping. Do not use compressed air to clean spilled sand or ground silica. Use water spraying/flushing or ventilated or HEPA filtered vacuum cleaning system. Dispose of in closed containers.

7. Handling and Storage

7.1. Handling:

Avoid generating dust. Do not breathe dust. Do not rely on your sight to determine if dust is in the air. Respirable crystalline silica dust may be in the air without a visible dust cloud.

Use adequate exhaust ventilation and dust collection. Maintain and test ventilation and dust collection equipment. Use all available work practices to control dust exposures, such as water sprays. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Keep airborne dust concentrations below permissible exposure limits.

Where necessary to reduce exposures below the PEL or other applicable limit (if lower than the PEL), wear a respirator approved for silica containing dust when using, handling, storing or disposing of this product or bag. See Section 8, for further information on respirators.. Do not alter the respirator. Do not wear a tight-fitting respirator with facial hair such as a beard or mustache that prevents a good face to face piece seal between the respirator and face. Maintain, clean, and fit test respirators in accordance with applicable standards. Wash or vacuum clothing that has become dusty.

Participate in training, exposure monitoring, and health surveillance programs to monitor any potential adverse health effects that may be caused by breathing respirable crystalline silica.

The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.1200, 1917.28, 1918.90, 1926.59 and 1928.21, and state and local worker or community "right-to-know" laws and regulations should be strictly followed.

DO NOT USE U.S. SILICA COMPANY SAND OR GROUND SILICA FOR SAND BLASTING.

7.2. Storage

Use dust collection to trap dust produced during loading and unloading. Keep containers closed and store bags to avoid accidental tearing, breaking, or bursting.

7.3. Specific uses

Apply safe handling recommendations in Section 7.1.

8. Exposure Controls / Personal Protection

8.1. Local Exhaust Ventilation:
Use sufficient local exhaust ventilation to reduce the level of respirable crystalline silica to below the OSHA PEL or other applicable limit (if lower than PEL). See ACGIH "Industrial Ventilation, A Manual of Recommended Practice" (latest edition).

8.2. Respiratory Protection:
If it is not possible to reduce airborne exposure levels to below the OSHA PEL or other applicable limit with ventilation, use the table below to assist you in selecting respirators that will reduce personal exposures to below the OSHA PEL. This table is part of the NIOSH Respirator Selection Logic, 2004, Chapter III, Table 1, "Particulate Respirators". The full document can be found at www.cdc.gov/niosh/npptl/topics/respirators; the user of this MSDS is directed to that site for information concerning respirator selection and use. The assigned protection factor (APF) is the minimum anticipated level of protection provided by each type of respirator worn in accordance with an adequate respiratory protection program. For example, an APF of 10 means that the respirator should reduce the airborne concentration of a particulate by a factor of 10, so that if the workplace concentration of a particulate was 150 ug/m^3, then a respirator with an APF of 10 should reduce the concentration of particulate to 15 ug/m^3.

Assigned protection factor [1]	Type of Respirator (Use only NIOSH-certified respirators)
10	Any air-purifying elastomeric half-mask respirator equipped with appropriate type of particulate filter. [2] Appropriate filtering facepiece respirator. [2,3] Any air-purifying full facepiece respirator equipped with appropriate type of particulate filter. [2] Any negative pressure (demand) supplied-air respirator equipped with a half-mask.
25	Any powered air-purifying respirator equipped with a hood or helmet and a high efficiency (HEPA) filter. Any continuous flow supplied-air respirator equipped with a hood or helmet.
50	Any air-purifying full facepiece respirator equipped with N-100, R-100, or P-100 filter(s). Any powered air-purifying respirator equipped with a tight-fitting facepiece (half or full facepiece) and a high-efficiency filter. Any negative pressure (demand) supplied-air respirator equipped with a full facepiece. Any continuous flow supplied-air respirator equipped with a tight-fitting facepiece (half or full facepiece). Any negative pressure (demand) self-contained respirator equipped with a full facepiece.
1,000	Any pressure-demand supplied-air respirator equipped with a half-mask.

1. The protection offered by a given respirator is contingent upon (1) the respirator user adhering to complete program requirements (such as the ones required by OSHA in 29CFR1910.134), (2) the use of NIOSH-certified respirators in their approved configuration, and (3) individual fit testing to rule out those respirators that cannot achieve a good fit on individual workers.
2. Appropriate means that the filter medium will provide protection against the particulate in question.
3. An APF of 10 can only be achieved if the respirator is qualitatively or quantitatively fit tested on individual workers.

8.3. Exposure controls

8.3.1. Occupational exposure controls / guidelines

Component	CAS No.	OSHA PEL		ACGHI TLV		NISOSH REL		
		TWA	STEL	TWA	STEL	TWA	STEL	Unit
Crystalline Silica (quartz)	14808-60-7	$\frac{10}{\%\ SiO_2 + 2}$	None	0.025	None	0.05	None	mg / m^3

If crystalline silica (quartz) is heated to more than 870°C, quartz can change to a form of crystalline silica known as tridymite; if crystalline silica (quartz) is heated to more than1470°C, quartz can change to a form of crystalline silica known as cristobalite. It OSHA PEL for crystalline silica as tridymite or cristobalite is one-half of the OSHA PEL for crystalline silica (quartz).

Engineering Controls:
Ventilation must be adequate to maintain the crystalline silica concentrations in the workplace air below the exposure limit(s) outlined in Section 8.3.1 of this Safety Data Sheet.

Respiratory Protection
In case of exposure to dust, and in any case if such exposure is above regulatory limits (see above), wear a personal respirator as outlined in Section 8.2 above.

Eye / Face Protection:
If eye contact while using product may be anticipated, wear appropriate safety glasses with side shields or chemical goggles [as described by European Standard EN 166].

Skin Protection
Maintain good industrial hygiene. Protection recommended for workers suffering from dermatitis or sensitive skin.

8.3.2. Environmental Exposure Controls

No special requirements. There is no reported ecotoxicity for silica, a naturally occurring substance abundantly present in nature.

9. Physical and Chemical Properties

9.1. General Information

Physical State:	White or tan sand: granular, crushed or ground to a powder.
Odor:	None

9.2. Important Health, Safety and Environmental Information

pH:	6 - 8
Specific Gravity:	2.65 g/cc
Melting Point:	3110°F/1710°C
Freezing Point	Not Applicable
Boiling Point:	4046°F/2230°C
Flashpoint:	Not Applicable
Flammability:	Not Applicable
Explosive properties:	Not Applicable
Oxidizing properties:	contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, and oxygen difluoride may cause fires.
Vapor Pressure:	None
Relative Density:	Not Applicable
Solubility*:*	Silica will dissolve in hydrofluoric acid and produce a corrosive gas, silicon tetrafluoride
Water Solubility:	Insoluble
Percent Volatiles by Volume:	Not Applicable
Viscosity:	Not Applicable

Vapor density:	Not Applicable
Molecular Weight:	60.08
Evaporation rate:	Not Applicable

10. Stability and Reactivity

10.1. Chemical Stability:
Stable

10.2. Conditions to Avoid:
Contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, and oxygen difluoride may cause fires.

10.3. Materials / Chemicals to Be Avoided:
Contact with powerful oxidizing agents, such as fluorine, chlorine trifluoride and oxygen difluoride, may cause fires.

10.4. Hazardous Decomposition Products:
Will not occur.

10.5. Hazardous Polymerization:
Will not occur.

11. Toxicological Information

The method of exposure that can lead to the adverse health effects described below is inhalation.

A. SILICOSIS

The major concern is silicosis, caused by the inhalation of respirable crystalline silica dust. Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute.

Chronic or Ordinary Silicosis is the most common form of silicosis, and can occur after many years (15 to 20 or more) of prolonged repeated inhalation of relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis. Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function or disability. Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath and cough. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pumonale).

Accelerated Silicosis can occur with prolonged repeated inhalation of high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that lung lesions appear earlier and progression is more rapid.

Acute Silicosis can occur after the repeated inhalation of very high concentrations of respirable crystalline silica over a short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough, weakness and weight loss. Acute silicosis is fatal.

B. CANCER

IARC - The International Agency for Research on Cancer ("IARC") concluded that "crystalline silica in the form of quartz or cristobalite dust is carcinogenic to humans (Group 1)". For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 100C,"A Review of Human Carcinogens: Arsenic, Metals, Fibres and Dusts " (2011).

The American College of Occupational and Environmental Medicine ("ACOEM") notes: "In 1996, [IARC] re-classified silica as a Class I human lung carcinogen, based on sufficient animal and human data. Although the degree of increased risk varies (with relative risks ranging from 1.3 to 6.9), the risk appears to be greatest in workers with silicosis who smoke. The cancer risk to silica-exposed workers without silicosis (especially if they are not smokers) is less clear despite continuing research, some of which has yielded disparate results." ACOEM, "Medical Surveillance of Workers Exposed to Crystalline Silica", June 2005.

The EU Scientific Committee for Occupational Exposure Limits (SCOEL) concluded in June 2002 (SCOEL Sum Doc. 94-final): "The main effect in humans of inhalation of respirable silica dust is silicosis. There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore preventing the onset of silicosis will also reduce the cancer risk."

C. AUTOIMMUNE DISEASES

Several studies have reported excess cases of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers.).

D. TUBERCULOSIS

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to tuberculosis bacteria. Individuals with chronic silicosis have a three-fold higher risk of contracting tuberculosis than similar individuals without silicosis.

E. KIDNEY DISEASE

Several studies have reported excess cases of kidney diseases, including end stage renal disease, among silica-exposed workers. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", Nephron, Volume 85, pp. 14-19 (2000).

F. NON-MALIGNANT RESPIRATORY DISEASES

The reader is referred to Section 3.5 of the NIOSH Special Hazard Review cited below, for information concerning the association between exposure to crystalline silica and chronic bronchitis, emphysema and small airways disease. There are studies that disclose an association between dusts found in various mining occupations and non-malignant respiratory diseases, particularly among smokers. It is unclear whether the observed associations exist only with underlying silicosis, only among smokers, or result from exposure to mineral dusts generally (independent of the presence or absence of crystalline silica, or the level of crystalline silica in the dust).

Sources of information:

The ***NIOSH Hazard Review - Occupational Effects of Occupational Exposure to Respirable Crystalline Silica*** published in April 2002 summarizes and discusses the medical and epidemiological literature on the health risks and diseases associated with occupational exposures to respirable crystalline silica. The *NIOSH Hazard Review* should be consulted for additional information, and citations to published studies on health risks and diseases associated with occupational exposure to respirable crystalline silica. The *NIOSH Hazard Review* is available from NIOSH - Publications Dissemination, 4676 Columbia Parkway, Cincinnati, OH 45226, or through the NIOSH web site, www.cdc.gov/niosh/topics/silica, then click on the link "NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica".

For a more recent review of the health effects of respirable crystalline silica, the reader may consult *Fishman's Pulmonary Diseases and Disorders*, Fourth Edition, Chapter 57. "Coal Workers' Lung Diseases and Silicosis".

12. Ecological Information

12.1. Ecotoxicological Information:
Crystalline silica (quartz) is not known to be ecotoxic; i.e., no data suggests that crystalline silica (quartz) is toxic to birds, fish, invertebrates, microorganisms or plants.

13. Disposal Considerations

13.1. Waste Disposal Method:
Discard any product, residue, disposable container or liner in full compliance with national regulations.

13.2. Container Handling and Disposal:
Dispose of container and unused contents in accordance with national regulations.

14. Transportation Information

Shipping Name:

ADR/RID/IMO/ICAO /US DOT	**Proper Shipping Name**	Not Regulated
	Hazard Class	Not Regulated
	ID Number	Not Regulated
	Packaging Group	Not Regulated

Crystalline silica (quartz) is not a hazardous material for purposes of transportation under the U. S. Department of Transportation Table of Hazardous Materials, 49 CFR §172.101.

15. Regulatory Information

Silica sand has no harmonized classification & labeling under Directives 67/548/EEC and 1999/45/EC. Because the respirable fraction is high (10% and more) in ground silica (flour), the preparation is self-classified as Xn (harmful). In such case, the following risk and safety phrases are applicable.

Risk Phrases:
R 48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Safety Phrases:
S 22: Do not breathe dust.
S 38: In case of insufficient ventilation, wear suitable respiratory equipment.

UNITED STATES (FEDERAL AND STATE)

TSCA No.: Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7.

RCRA: Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

CERCLA: Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

Emergency Planning and Community Right to Know Act (SARA Title III): Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

Clean Air Act: Crystalline silica (quartz) mined and processed by U.S. Silica Company is not processed with or does not contain any Class I or Class II ozone depleting substances.

FDA: Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300(b)(3)(xxvi).

NTP: Silica, crystalline (respirable size) is classified as Known to be a Human Carcinogen.

OSHA Carcinogen: Crystalline silica (quartz) is not listed.

California Proposition 65: Crystalline silica (airborne particles of respirable size) is classified as a substance known to the State of California to be a carcinogen.

California Inhalation Reference Exposure Level (REL): California established a chronic REL of 3 µg for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no adverse health effects are anticipated in individuals indefinitely exposed to the substance at that level.

Massachusetts Toxic Use Reduction Act: Silica, crystalline (respirable size, <10 microns) is “toxic” for purposes of the Massachusetts Toxic Use Reduction Act.

Pennsylvania Worker and Community Right to Know Act: Quartz is a hazardous substance under the Act, but it is not a special hazardous substance or an environmental hazardous substance.

CANADA

Domestic Substances List: U. S. Silica Company products, as naturally occurring substances, are on the Canadian DSL.

WHMIS Classification: D2A

OTHER

EINECS No.: 238-878-4

EEC Label (Risk/Safety Phrases): R 48/20, S22, S38

CLP Label (Hazard Class/Hazard Statement/Precaution Statements):
STOT RE 1/ H372/ P260, P285, P501

IARC: Crystalline silica (quartz) is classified in IARC Group 1.

Australian Inventory of Chemical Substances (AICS): All of the components of this product are listed on the AICS inventory or exempt from notification requirements.

Japan Ministry of International Trade and Industry (MITI): All of the components of this product are existing chemical substances as defined in the Chemical Substance Control Law Registry Number 1-548.

Korea Existing Chemicals Inventory (KECI) (set up under the Toxic Chemical Control Law): Listed on the ECL with registry number 9212-5667.

Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed for PICCS.

National, state, provincial or local emergency planning, community right-to-know or other laws, regulations or ordinances may be applicable--consult applicable national, state, provincial or local laws.

16. Other Information

16.1 Hazardous Material Information System (HMIS):

Health	*
Flammability	0
Reactivity	0
Protective Equipment	E

* For further information on health effects, see Sections 2, 8 and 11 of this MSDS.

16.2 National Fire Protection Association (NFPA):

Health	0
Flammability	0
Reactivity	0

16.3 Web Sites with Information about Effects of Crystalline Silica Exposure:

The U. S. Silica Company web site will provide updated links to OSHA and NIOSH web sites addressing crystalline silica issues: www.ussilica.com, click on “Info Center”, then click on “Health & Safety”.

The U.S. National Institute for Occupational Safety and Health (NIOSH) and Occupational Safety and Health Administration (OSHA) maintain sites with information about crystalline silica and its potential health effects. For NIOSH, http://www.cdc.gov/niosh/topics/silica; for OSHA, http://www.osha.gov/dsg/topics/silicacrystalline/index.

The IARC Monograph concerning crystalline silica, Volume 100C, can be accessed in PDF form at the IARC web site, http://monographs.iarc.fr/ENG/Monographs/PDFs/index.php.

U. S. Silica Company Disclaimer

The information and recommendations contained herein are based upon data believed to be up-to-date and correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects that may be caused by purchase, resale, use or exposure to our silica. Customers and users of silica must comply with all applicable health and safety laws, regulations, and orders. In particular, they are under an obligation to carry out a risk assessment for the particular work places and to take adequate risk management measures in accordance with the national implementation legislation of EU Directives 89/391 and 98/24.

Date: March 2012

MATERIAL SAFETY DATA SHEET

ALCONOX®

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	**ALCONOX®**
CHEMICAL FAMILY NAME:	Detergent.
PRODUCT USE:	Critical-cleaning detergent for laboratory, healthcare and industrial applications
U.N. NUMBER:	Not Applicable
U.N. DANGEROUS GOODS CLASS:	Non-Regulated Material
SUPPLIER/MANUFACTURER'S NAME:	Alconox, Inc.
ADDRESS:	30 Glenn St., Suite 309, White Plains, NY 10603. USA
EMERGENCY PHONE:	**TOLL-FREE in USA/Canada** 800-255-3924
	International calls 813-248-0585
BUSINESS PHONE:	914-948-4040
DATE OF PREPARATION:	May 2011
DATE OF LAST REVISION:	February 2008

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is a white granular powder with little or no odor. Exposure can be irritating to eyes, respiratory system and skin. It is a non-flammable solid. The Environmental effects of this product have not been investigated.

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS

EUROPEAN and (GHS) Hazard Symbols

Signal Word: **Warning!**

EU LABELING AND CLASSIFICATION:

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1
EC# 205-633-8 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 268-356-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-838-7 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-767-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 207-638-8 Index# 011-005-00-2
EC# 205-788-1 This substance is not classified in the Annex I of Directive 67/548/EEC

GHS Hazard Classification(s):

Eye Irritant Category 2A

Hazard Statement(s):

H319: Causes serious eye irritation

Precautionary Statement(s):

P260: Do not breath dust/fume/gas/mist/vapors/spray
P264: Wash hands thoroughly after handling
P271: Use only in well ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection/

Hazard Symbol(s):

[Xi] Irritant

Risk Phrases:
R20: Harmful by inhalation
R36/37/38: Irritating to eyes, respiratory system and skin

Safety Phrases:
S8: Keep container dry
S22: Do not breath dust
S24/25: Avoid contact with skin and eyes

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: Exposure to this product may cause irritation of the eyes, respiratory system and skin. Ingestion may cause gastrointestinal irritation including pain, vomiting or diarrhea.

CHRONIC: This product contains an ingredient which may be corrosive.

TARGET ORGANS: ACUTE: Eye, respiratory System, Skin CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	HAZARD CLASSIFICATION; RISK PHRASES
Sodium Bicarbonate	144-55-8	205-633-8	1044	33 - 43%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	268-356-1	Not Listed	10 – 20%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Tripolyphosphate	7758-29-4	231-838-7	1469	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Tetrasodium Pyrophosphate	7722-88-5	231-767-1	1140	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Carbonate	497-19-8	207-638-8	1135	1 - 10%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Sodium Alcohol Sulfate	151-21-3	205-788-1	0502	1 – 5%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing dificulty continues.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, or eye problems may be aggravated by prolonged contact.

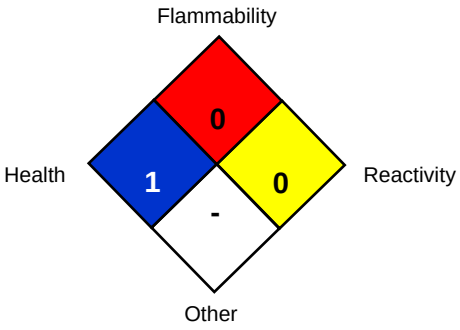
RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: Not Flammable
AUTOIGNITION TEMPERATURE: Not Applicable
FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): NA Upper (UEL): NA
FIRE EXTINGUISHING MATERIALS: As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is non-flammable and has no known explosion hazards.
Explosion Sensitivity to Mechanical Impact: Not Sensitive.
Explosion Sensitivity to Static Discharge: Not Sensitive
SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE)	1
FLAMMABILITY HAZARD (RED)	0
PHYSICAL HAZARD (YELLOW)	0

PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Personnel should be trained for spill response operations.
SPILLS: Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use. Store away from strong acids or oxidizers.

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Sodium Bicarbonate	144-55-8	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium Tripolyphosphate	7758-29-4	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Tetrasodium Pyrophosphate	7722-88-5	5 mg/m³	5 mg/m³	5 mg/m³
Sodium Carbonate	497-19-8	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust
Sodium Alcohol Sulfate	151-21-3	10 mg/m³ Total Dust	15 mg/m³ Total Dust	10 mg/m³ Total Dust

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Based on test data, exposure limits should not be exceeded under normal use conditions when using Alconox Detergent. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use chemical resistant gloves to prevent skin contact.. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE:	Solid
APPEARANCE & ODOR:	White granular powder with little or no odor.
ODOR THRESHOLD (PPM):	Not Available
VAPOR PRESSURE (mmHg):	Not Applicable
VAPOR DENSITY (AIR=1):	Not Applicable.
BY WEIGHT:	Not Available
EVAPORATION RATE (nBuAc = 1):	Not Applicable.
BOILING POINT (C°):	Not Applicable.
FREEZING POINT (C°):	Not Applicable.
pH:	9.5 (1% aqueous solution)
SPECIFIC GRAVITY 20°C: (WATER =1)	0.85 – 1.1
SOLUBILITY IN WATER (%)	>10% w/w
COEFFICIENT OF WATER/OIL DIST.:	Not Available
VOC:	None
CHEMICAL FAMILY:	Detergent

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable
DECOMPOSITION PRODUCTS: When heated to decomposition this product produces Oxides of carbon (COx)
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids and strong oxidizing agents.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials and dust generation.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is available for mixture:

CAS# 497-19-8 LD50 Oral (Rat)	4090 mg/kg
CAS# 497-19-8 LD50 Oral (Mouse)	6600 mg/kg
CAS# 497-19-8 LC50 Inhalation (Rat)	2300 mg/m³ 2H
CAS# 497-19-8 LC50 Inhalation (Mouse)	1200 mg/m³ 2H
CAS# 7758-29-4 LD50 Oral (Rat)	3120 mg/kg
CAS# 7758-29-4 LD50 Oral (Mouse)	3100 mg/kg
CAS# 7722-88-5 LD50 Oral (Rat)	4000 mg/kg

SUSPECTED CANCER AGENT: None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.
IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.
SENSITIZATION OF PRODUCT: This product is not considered a sensitizer.
REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: No Data available at this time.
EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.
PROPER SHIPPING NAME: Non-Regulated Material
HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable
UN IDENTIFICATION NUMBER: Not Applicable
PACKING GROUP: Not Applicable.
DOT LABEL(S) REQUIRED: Not Applicable
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): Not Applicable
MARINE POLLUTANT: None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:
This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:
This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):
This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:
This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes Chronic Health: No Fire: No Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): None of the ingredients are on the California Proposition 65 lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This product is categorized as a Controlled Product, Hazard Class D2B as per the Controlled Product Regulations

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory if Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

Disclaimer: To the best of Alconox, Inc. knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type either express or implied are provided. The information contained herein relates only to this specific product.

ANNEX:

IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE

Used to clean: Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, catheters, tubing, pipes, radioactive contaminated articles, optical parts, electronic components, pharmaceutical apparatus, cosmetics manufacturing equipment, metal castings, forgings and stampings, industrial parts, tanks and reactors. Authorized by USDA for use in federally inspected meat and poultry plants. Passes inhibitory residue test for water analysis. FDA certified.

Used to remove: Soil, grit, grime, buffing compound, slime, grease, oils, blood, tissue, salts, deposits, particulates, solvents, chemicals, radioisotopes, radioactive contaminations, silicon oils, mold release agents.

Surfaces cleaned: Corrosion inhibited formulation recommended for glass, metal, stainless steel, porcelain, ceramic, plastic, rubber and fiberglass. Can be used on soft metals such as copper, aluminum, zinc and magnesium if rinsed promptly. Corrosion testing may be advisable.

Cleaning method: Soak, brush, sponge, cloth, ultrasonic, flow through clean-inplace. Will foam—not for spray or machine use.

Directions: Make a fresh 1% solution (2 1/2 Tbsp. per gal., 1 1/4 oz. per gal. or 10 grams per liter) in cold, warm, or hot water. If available use warm water. Use cold water for blood stains. For difficult soils, raise water temperature and use more detergent. Clean by soak, circulate, wipe, or ultrasonic method. Not for spray machines, will foam. For nonabrasive scouring, make paste. Use 2% solution to soak frozen stopcocks. To remove silver tarnish, soak in 1% solution in aluminum container. RINSE THOROUGHLY—preferably with running water. For critical cleaning, do final or all rinsing in distilled, deionized, or purified water. For food contact surfaces, rinse with potable water. Used on a wide range of glass, ceramic, plastic, and metal surfaces. Corrosion testing may be advisable.

QUIKRETE®
CEMENT & CONCRETE PRODUCTS™

RAPID SETTING REPAIR MATERIALS

MATERIAL SAFETY DATA SHEET
(Complies with OSHA 29 CFR 1910.1200)

SECTION I: PRODUCT IDENTIFICATION

The QUIKRETE® Companies
One Securities Centre
3490 Piedmont Road, Suite 1300
Atlanta, GA 30329

Emergency Telephone Number
(770) 216-9580

Information Telephone Number
(770) 216-9580

MSDS D4
Revision: May-12

QUIKRETE® Product Name	**Product #**
RAPID ROAD REPAIR	FIBERED 1242-50, UN-FIBERED 1242-52 EXTENDED 1242-80
RAPID HARDENING SAND MIX	1243-50
HYDRAULIC WATER STOP	1126-00
QUICK SETTING CEMENT	1240-00
EXTERIOR USE ANCHORING CEMENT	1245-80, -81
FASTSET™ WATER-STOP CEMENT	1126-00

PRODUCT USE: HYDRAULIC CEMENT-BASED RAPID-SETTING REPAIR MATERIALS

SECTION II - HAZARD IDENTIFICATION

Route(s) of Entry: Inhalation, Skin, Ingestion
Acute Exposure: Product becomes alkaline when exposed to moisture. Exposure can dry the skin, cause alkali burns and affect the mucous membranes. Dust can irritate the eyes and upper respiratory system. Toxic effects noted in animals include, for acute exposures, alveolar damage with pulmonary edema.
Chronic Exposure: Dust can cause inflammation of the lining tissue of the interior of the nose and inflammation of the cornea. Hypersensitive individuals may develop an allergic dermatitis.
Carcinogenicity: Since Portland cement and blended cements are manufactured from raw materials mined from the earth (limestone, marl, sand, shale, etc.) and process heat is provided by burning fossil fuels, trace, but detectable, amounts of naturally occurring, and possibly harmful, elements may be found during chemical analysis. Under ASTM standards, Portland cement may contain 0.75 % insoluble residue. A fraction of these residues may be free crystalline silica. Respirable crystalline silica (quartz) can cause silicosis, a fibrosis (scarring) of the lungs and

possibly cancer. There is evidence that exposure to respirable silica or the disease silicosis is associated with an increased incidence of Scleroderma, tuberculosis and kidney disorders.

Carcinogenicity Listings:		
	NTP:	Known carcinogen
	OSHA:	Not listed as a carcinogen
	IARC Monographs:	Group 1 Carcinogen
	California Proposition 65:	Known carcinogen

NTP: The National Toxicology Program, in its "Ninth Report on Carcinogens" (released May 15, 2000) concluded that "Respirable crystalline silica (RCS), primarily quartz dusts occurring in industrial and occupational settings, is *known to be a human carcinogen*, based on sufficient evidence of carcinogenicity from studies in humans indicating a causal relationship between exposure to RCS and increased lung cancer rates in workers exposed to crystalline silica dust (reviewed in IAC, 1997; Brown *et al*., 1997; Hind *et al*., 1997)

IARC: The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz or cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans (*Group 1)." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances or studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates." (1997)

Signs and Symptoms of Exposure: Symptoms of excessive exposure to the dust include shortness of breath and reduced pulmonary function. Excessive exposure to skin and eyes especially when mixed with water can cause caustic burns as severe as third degree.

Medical Conditions Generally Aggravated by Exposure: Individuals with sensitive skin and with pulmonary and/or respiratory disease, including, but not limited to, asthma and bronchitis, or subject to eye irritation, should be precluded from exposure. Exposure to crystalline silica or the disease silicosis is associated with increased incidence of scleroderma, Tuberculosis and possibly increased incidence of kidney lesions.

Chronic Exposure: Dust can cause inflammation of the lining tissue of the interior of the nose and inflammation of the cornea. Hypersensitive individuals may develop an allergic dermatitis. (May contain trace (<0.05 %) amounts of chromium salts or compounds including hexavalent chromium, or other metals found to be hazardous or toxic in some chemical forms. These metals are mostly present as trace substitutions within the principal minerals)

Medical Conditions Generally Aggravated by Exposure: Individuals with sensitive skin and with pulmonary and/or respiratory disease, including, but not limited to, asthma and bronchitis, or subject to eye irritation, should be precluded from exposure.

SECTION III - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components	CAS No.	PEL (OSHA) mg/M^3	TLV (ACGIH) mg/M^3
Silica Sand, crystalline	14808-60-7	$\frac{10}{\%SiO_2+2}$	0.05 (respirable)
Portland Cement	65997-15-1	5	5
May Contain one or more of the following ingredients:			
Amorphous Silica	07631-86-9	$\frac{80\ mg/M^3}{\%\ SiO_2}$	10
Calcium Sulfate	10101-41-4 or 13397-24-5	5	5
Lime	01305-62-0	5	5
Fly Ash	68131-74-8	5	5
Calcium Aluminate Cement	65997-16-2	5	5
Clay	01332-58-7	5	5
Pulverized Limestone	01317-65-3	5	5

Other Limits: National Institute for Occupational Safety and Health (NIOSH). Recommended standard maximum permissible concentration=0.05 mg/M^3 (respirable free silica) as determined by a full-shift sample up to 10-hour working day, 40-hour work week. See NIOSH Criteria for a Recommended Standard Occupational Exposure to Crystalline Silica

SECTION IV – First Aid Measures

Eyes: Immediately flush eye thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.
Skin: Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment if irritation or inflammation develops or persists. Seek immediate medical treatment in the event of burns.
Inhalation: Remove person to fresh air. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. Seek medical help if coughing and other symptoms do not subside. Inhalations of large amounts of Portland cement require immediate medical attention.
Ingestion: Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

SECTION V - FIRE AND EXPLOSION HAZARD DATA

Flammability: Noncombustible and not explosive.
Auto-ignition Temperature: Not Applicable
Flash Points: Not Applicable

SECTION VI – ACCIDENTAL RELEASE MEASURES

If spilled, use dustless methods (vacuum) and place into covered container for disposal (if not contaminated or wet). Use adequate ventilation to keep exposure to airborne contaminants below the exposure limit.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND STORAGE

Do not allow water to contact the product until time of use. DO NOT BREATHE DUST. In dusty environments, the use of an OSHA, MSHA or NIOSH approved respirator and tight fitting goggles is recommended.

SECTION VIII – EXPOSURE CONTROL MEASURES

Engineering Controls: Local exhaust can be used, if necessary, to control airborne dust levels.

Personal Protection: The use of barrier creams or impervious gloves, boots and clothing to protect the skin from contact is recommended. Following work, workers should shower with soap and water. Precautions must be observed because burns occur with little warning -- little heat is sensed.

WARN EMPLOYEES AND/OR CUSTOMERS OF THE HAZARDS AND REQUIRED OSHA PRECAUTIONS ASSOCIATED WITH THE USE OF THIS PRODUCT.

Exposure Limits: Consult local authorities for acceptable exposure limits

SECTION IX - PHYSICAL/CHEMICAL CHARACTERISTICS

Appearance: Gray to gray-brown colored powder. Some products contain coarse aggregate.

Specific Gravity:	2.6 to 3.15	**Melting Point:**	>2700°F
Boiling Point:	>2700°F	**Vapor Pressure:**	Not Applicable
Vapor Density:	Not Applicable	**Evaporation Rate:**	Not Applicable
Solubility in Water:	Slight	**Odor:**	Not Applicable

SECTION X - REACTIVITY DATA

Stability: Stable.
Incompatibility (Materials to Avoid): Material when mixed with water will react with Aluminum and other alkali and alkaline earth elements liberating hydrogen gas.
Hazardous Decomposition or By-products: None
Hazardous Polymerization: Will Not Occur.
Condition to Avoid: Keep dry until used to preserve product utility.

SECTION XI – TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, Ingestion
Toxicity to Animals:
LD50: Not Available
LC50: Not Available
Chronic Effects on Humans: Conditions aggravated by exposure include eye disease, skin disorders and Chronic Respiratory conditions.
Special Remarks on Toxicity: Not Available

SECTION XII – ECOLOGICAL INFORMATION

Ecotoxicity: Not Available
BOD5 and COD: Not Available
Products of Biodegradation: Not available
Toxicity of the Products of Biodegradation: Not available
Special Remarks on the Products of Biodegradation: Not available

SECTION XIII – DISPOSAL CONSIDERATIONS

Waste Disposal Method: The packaging and material may be land filled; however, material should be covered to minimize generation of airborne dust. This product is not classified as a hazardous waste under the authority of the RCRA (40CFR 261) or CERCLA (40CFR 117&302).

SECTION XIV – TRANSPORT INFORMATION

DOT/UN Shipping Name: Non-regulated
DOT Hazard Class: Non-regulated
Shipping Name: Non-regulated
Non-Hazardous under U.S. DOT and TDG Regulations

SECTION XV – OTHER REGULATORY INFORMATION

US OSHA 29CFR 1910.1200: Considered hazardous under this regulation and should be included in the employers hazard communication program
SARA (Title III) Sections 311 & 312: Qualifies as a hazardous substance with delayed health effects
SARA (Title III) Section 313: Not subject to reporting requirements
TSCA (May 1997): All components are on the TSCA inventory list
Federal Hazardous Substances Act: Is a hazardous substance subject to statues promulgated under the subject act
California Regulation: WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Canadian Environmental Protection Act: Not listed
WHMIS Classification: Considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations (Class D2A, E- Corrosive Material) and subject to the requirements of Health Canada's Workplace Hazardous Material Information (WHMIS). This product has been classified according to the hazard criteria of the Controlled Products Regulation (CPR). This document complies with the WHMIS requirements of the Hazardous Products Act (HPA) and the CPR.

SECTION XVI – OTHER INFORMATION

HMIS-III:

Health –	0 = No significant health risk
	1 = Irritation or minor reversible injury possible
	2 = Temporary or minor injury possible
	3 = Major injury possible unless prompt action is taken
	4 = Life threatening, major or permanent damage possible
Flammability-	0 = Material will not burn
	1 = Material must be preheated before ignition will occur
	2 = Material must be exposed to high temperatures before ignition
	3 = Material capable of ignition under normal temperatures
	4 = Flammable gases or very volatile liquids; may ignite spontaneously
Physical Hazard-	0 = Material is normally stable, even under fire conditions
	1 = Material normally stable but may become unstable at high temps
	2 = Materials that are unstable and may undergo react at room temp
	3 = Materials that may form explosive mixtures with water
	4 = Materials that are readily capable of explosive water reaction

Abbreviations:

ACGIH	American Conference of Government Industrial Hygienists
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
CFR	Code of Federal Regulations
CPR	Controlled Products Regulations (Canada)
DOT	Department of Transportation
IARC	International Agency for Research
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TWA	Time-weighted Average
WHMIS	Workplace Hazardous Material Information System

Revision #07-01, supersedes all previous revisions.

QUIKRETE®

CEMENT & CONCRETE PRODUCTS™

Created: 10/25/2006
Last Updated: May 8, 2012

NOTE: The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to silica contained in our products.

QUIKRETE®
CEMENT & CONCRETE PRODUCTS™

Portland Cement Based Concrete Products

MATERIAL SAFETY DATA SHEET
(Complies with OSHA 29 CFR 1910.1200)

SECTION I: PRODUCT IDENTIFICATION

The QUIKRETE® Companies
One Securities Centre
3490 Piedmont Road, Suite 1300
Atlanta, GA 30329

Emergency Telephone Number
(770) 216-9580

Information Telephone Number
(770) 216-9580

MSDS J1
Revision: Aug-13

QUIKRETE® Product Name	Code #
CONCRETE MIX	1101
FENCE POST MIX	1005
FIBER-REINFORCED CONCRETE MIX	1006
CRACK RESISTANT CONCRETE MIX	1006-80
QUIKRETE 5000 CONCRETE MIX	1007
QUIKRETE 6000 CONCRETE MIX	1007
LIGHTWEIGHT CONCRETE MIX	1008
HANDICRETE CONCRETE MIX	1141-59, -60, -80
MAXIMUM YIELD CONCRETE MIX	1100-80
B-CRETE	1101-81
PRO-FINISH QUIKRETE 5000	1007-85
BASIC CONCRETE MIX	1015
RIP RAP	1129
ALL-STAR CONCRETE MIX	1121
ALL-STAR CRACK RESISTANT CONCRETE MIX	1470-03
ALL-STAR 5000 CONCRETE MIX	1470-01
RED-E-CRETE CONCRETE MIX	1101-91, -87; 1141-62, -63, -92, -93
RIP RAP SCRIM	1134-80
FIBER REINFORCED DECK MIX	1251-80, -81
PRO-FINISH CRACK RESISTANT CONCRETE MIX	1006-68
COUNTERTOP MIX	1106-80
RITEMIX CONCRETE	1171-60
GREEN CONCRETE MIX	1101-63, -73
FLOWCRETE 5000 (MIX 801)	8080026/NR80026

Product Use: Portland cement-based, aggregated products for general construction

SECTION II - HAZARD IDENTIFICATION

Route(s) of Entry: Inhalation, Skin, Ingestion

Acute Exposure: Product becomes alkaline when exposed to moisture. Exposure can dry the skin, cause alkali burns and affect the mucous membranes. Dust can irritate the eyes and upper respiratory system. Toxic effects noted in animals include, for acute exposures, alveolar damage with pulmonary edema.

Chronic Exposure: Dust can cause inflammation of the lining tissue of the interior of the nose and inflammation of the cornea. Hypersensitive individuals may develop an allergic dermatitis.

Carcinogenicity: Since Portland cement and blended cements are manufactured from raw materials mined from the earth (limestone, marl, sand, shale, etc.) and process heat is provided by burning fossil fuels, trace, but detectable, amounts of naturally occurring, and possibly harmful, elements may be found during chemical analysis. Under ASTM standards, Portland cement may contain 0.75 % insoluble residue. A fraction of these residues may be free crystalline silica. Respirable crystalline silica (quartz) can cause silicosis, a fibrosis (scarring) of the lungs and possibly cancer. There is evidence that exposure to respirable silica or the disease silicosis is associated with an increased incidence of Scleroderma, tuberculosis and kidney disorders.

Carcinogenicity Listings:		
	NTP:	Known carcinogen
	OSHA:	Not listed as a carcinogen
	IARC Monographs:	Group 1 Carcinogen
	California Proposition 65:	Known carcinogen

NTP: The National Toxicology Program, in its "Ninth Report on Carcinogens" (released May 15, 2000) concluded that "Respirable crystalline silica (RCS), primarily quartz dusts occurring in industrial and occupational settings, is *known to be a human carcinogen*, based on sufficient evidence of carcinogenicity from studies in humans indicating a causal relationship between exposure to RCS and increased lung cancer rates in workers exposed to crystalline silica dust (reviewed in IAC, 1997; Brown *et al*., 1997; Hind *et al*., 1997)

IARC: The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz or cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans (*Group 1)." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances or studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC evaluation, see IARC Monographs on the Evaluation of carcinogenic Risks to Humans, Volume 68, "Silica, Some Silicates." (1997)

Signs and Symptoms of Exposure: Symptoms of excessive exposure to the dust include shortness of breath and reduced pulmonary function. Excessive exposure to skin and eyes especially when mixed with water can cause caustic burns as severe as third degree.

Medical Conditions Generally Aggravated by Exposure: Individuals with sensitive skin and with pulmonary and/or respiratory disease, including, but not limited to, asthma and bronchitis, or subject to eye irritation, should be precluded from exposure. Exposure to crystalline silica or the disease silicosis is associated with increased incidence of scleroderma, Tuberculosis and possibly increased incidence of kidney lesions.

Chronic Exposure: Dust can cause inflammation of the lining tissue of the interior of the nose and inflammation of the cornea. Hypersensitive individuals may develop an allergic dermatitis. (May contain trace (<0.05 %) amounts of chromium salts or compounds including hexavalent chromium, or other metals found to be hazardous or toxic in some chemical forms. These metals are mostly present as trace substitutions within the principal minerals)

Medical Conditions Generally Aggravated by Exposure: Individuals with sensitive skin and with pulmonary and/or respiratory disease, including, but not limited to, asthma and bronchitis, or subject to eye irritation, should be precluded from exposure.

SECTION III - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components	CAS No.	%	PEL (OSHA) mg/M^3	TLV (ACGIH) mg/M^3
Portland Cement	65997-15-1	10-30	5	5
Lime	01305-62-0	0-5	5	5
Silica Sand, crystalline	14808-60-7	70-90	$\frac{10}{\%SiO_2+2}$	0.025 (respirable)
May contain one or more of the following ingredients:				
Amorphous Silica (From fly Ash)	07631-86-9	$\frac{80}{\%SiO_2+2}$	10	
Alumina (From Fly Ash)	01344-28-1	5	5	
Limestone Dust	01317-65-3	5	5	
Calcium Sulfate	10101-41-4 or 13397-24-5	5	5	

Other Limits: National Institute for Occupational Safety and Health (NIOSH). Recommended standard maximum permissible concentration=0.05 mg/M^3 (respirable free silica) as determined by a full-shift sample up to 10-hour working day, 40-hour work week. See NIOSH Criteria for a Recommended Standard Occupational Exposure to Crystalline Silica.

SECTION IV – First Aid Measures

Eyes: Immediately flush eye thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.
Skin: Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment if irritation or inflammation develops or persists. Seek immediate medical treatment in the event of burns.
Inhalation: Remove person to fresh air. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. Seek medical help if coughing and other symptoms do not subside. Inhalations of large amounts of Portland cement require immediate medical attention.
Ingestion: Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

SECTION V - FIRE AND EXPLOSION HAZARD DATA

Flammability: Noncombustible and not explosive.
Auto-ignition Temperature: Not Applicable
Flash Points: Not Applicable

SECTION VI – ACCIDENTAL RELEASE MEASURES

If spilled, use dustless methods (vacuum) and place into covered container for disposal (if not contaminated or wet). Use adequate ventilation to keep exposure to airborne contaminants below the exposure limit.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND STORAGE

Do not allow water to contact the product until time of use. DO NOT BREATHE DUST. In dusty environments, the use of an OSHA, MSHA or NIOSH approved respirator and tight fitting goggles is recommended.

SECTION VIII – EXPOSURE CONTROL MEASURES

Engineering Controls: Local exhaust can be used, if necessary, to control airborne dust levels.

Personal Protection: The use of barrier creams or impervious gloves, boots and clothing to protect the skin from contact is recommended. Following work, workers should shower with soap and water. Precautions must be observed because burns occur with little warning -- little heat is sensed.

WARN EMPLOYEES AND/OR CUSTOMERS OF THE HAZARDS AND REQUIRED OSHA PRECAUTIONS ASSOCIATED WITH THE USE OF THIS PRODUCT.

Exposure Limits: Consult local authorities for acceptable exposure limits

SECTION IX - PHYSICAL/CHEMICAL CHARACTERISTICS

Appearance: Gray to gray-brown colored powder; Some products contain coarse aggregates.

Specific Gravity:	2.6 to 3.15	**Melting Point:**	>2700°F
Boiling Point:	>2700°F	**Vapor Pressure:**	Not Available
Vapor Density:	Not Available	**Evaporation Rate:**	Not Available
Solubility in Water:	Slight	**Odor:**	Not Available
pH:	13 (10%)	**Volatile Organic Content (VOC):**	0 g/L

SECTION X - REACTIVITY DATA

Stability: Stable.
Incompatibility (Materials to Avoid): Contact of silica with powerful oxidizing agents such as fluorine, chlorine trifluoride, manganese trioxide, or oxygen difluoride may cause fires
Hazardous Decomposition or By-products: Silica will dissolve in Hydrofluoric Acid and produce a corrosive gas – silicon tetrafluoride.
Hazardous Polymerization: Will Not Occur.
Condition to Avoid: Keep dry until used to preserve product utility.

SECTION XI – TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, Ingestion
Toxicity to Animals:
LD50: Not Available
LC50: Not Available
Chronic Effects on Humans: Conditions aggravated by exposure include eye disease, skin disorders and Chronic Respiratory conditions.
Special Remarks on Toxicity: Not Available

SECTION XII – ECOLOGICAL INFORMATION

Ecotoxicity: Not Available
BOD5 and COD: Not Available
Products of Biodegradation: Not available
Toxicity of the Products of Biodegradation: Not available
Special Remarks on the Products of Biodegradation: Not available

SECTION XIII – DISPOSAL CONSIDERATIONS

Waste Disposal Method: The packaging and material may be land filled; however, material should be covered to minimize generation of airborne dust. This product is not classified as a hazardous waste under the authority of the RCRA (40CFR 261) or CERCLA (40CFR 117&302).

SECTION XIV – TRANSPORT INFORMATION

Not hazardous under U.S. DOT and TDG regulations.

SECTION XV – OTHER REGULATORY INFORMATION

US OSHA 29CFR 1910.1200: Considered hazardous under this regulation and should be included in the employers' hazard communication program
SARA (Title III) Sections 311 & 312: Qualifies as a hazardous substance with delayed health effects
SARA (Title III) Section 313: Not subject to reporting requirements
TSCA (May 1997): Some substances are on the TSCA inventory list
Federal Hazardous Substances Act: Is a hazardous substance subject to statues promulgated under the subject act
California Regulation: WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.
Canadian Environmental Protection Act: Not listed
Canadian WHMIS Classification: Considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations (Class D2A, E- Corrosive Material) and subject to the requirements of Health Canada's Workplace Hazardous Material Information (WHMIS). This product has been classified according to the hazard criteria of the Controlled Products Regulation (CPR). This document complies with the WHMIS requirements of the Hazardous Products Act (HPA) and the CPR.

SECTION XVI – OTHER INFORMATION

HMIS-III: Health –
0 = No significant health risk
1 = Irritation or minor reversible injury possible
2 = Temporary or minor injury possible
3 = Major injury possible unless prompt action is taken
4 = Life threatening, major or permanent damage possible

Flammability-
0 = Material will not burn
1 = Material must be preheated before ignition will occur
2 = Material must be exposed to high temperatures before ignition

	3 = Material capable of ignition under normal temperatures
	4 = Flammable gases or very volatile liquids; may ignite spontaneously
Physical Hazard-	0 = Material is normally stable, even under fire conditions
	1 = Material normally stable but may become unstable at high temps
	2 = Materials that are unstable and may undergo react at room temp
	3 = Materials that may form explosive mixtures with water
	4 = Materials that are readily capable of explosive water reaction

Abbreviations:

ACGIH	American Conference of Government Industrial Hygienists
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CPR	Controlled Products Regulations (Canada)
DOT	Department of Transportation
IARC	International Agency for Research
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TWA	Time-weighted Average
WHMIS	Workplace Hazardous Material Information System

Last Updated: August 23, 2013

NOTE: The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to silica contained in our products. END OF MSDS.