



Department of
Environmental
Conservation

**SITE MANAGEMENT PLAN
FOR
KLIEGMAN BROTHERS SITE
OPERABLE UNIT #2**

WORK ASSIGNMENT D007622-03.1

**KLIEGMAN BROTHERS SITE OU2
CITY OF GLENDALE**

**SITE NO. 241031
QUEENS (C), NY**

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 Broadway, Albany, New York
Basil Seggos, Commissioner

DIVISION OF ENVIRONMENTAL REMEDIATION
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October 2016

**KLIEGMAN BROTHERS SITE
OPERABLE UNIT NO. 2
QUEENS COUNTY
GLENDALE, NEW YORK**

SITE MANAGEMENT PLAN

NYSDEC Site Number: 241031

USEPA ID # NYR000125989

Prepared for:

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
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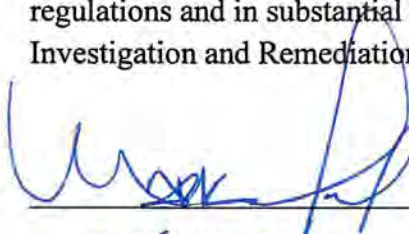
Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

OCTOBER 2016

CERTIFICATION STATEMENT

I Mark Lang certify that I am currently a NYS registered professional engineer and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



P.E.

OCT 10 2016

DATE



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OPERABLE UNIT NO. 2
QUEENS COUNTY
GLENDAL, NEW YORK

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List of Acronyms

bgs	below ground surface
CDM	Camp Dresser and McKee
COC	Certificate of Completion
CP	Commissioner Policy
DCE	dichloroethene
DER	Division of Environmental Remediation
EC	Engineering Control
FRM	Focused Remedial Investigation
IC	Institutional Control
IRM	Interim Remedial Measure
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operations and Maintenance
OM&M	Operation, Maintenance and Monitoring
OU	Operable Unit
PCE	tetrachloroethene
PRR	Periodic Review Report
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RP	Remedial Party
RSO	Remedial System Optimization
SCG	Standards, Criteria and Guidelines
SMP	Site Management Plan
SOW	Statement of Work
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
TCE	trichloroethene

USEPA	United States Environmental Protection Agency
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program
VMP	Vapor Monitoring Point
VOC	Volatile Organic Compound

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: #2-41-031 Kliegman Brothers Operable Unit #2, Glendale, NY

Institutional Controls:	There are no Institutional Controls Associated with OU2	
Engineering Controls:	1. SSD systems	
Inspections:		Frequency
1. Groundwater Monitoring Wells		Annually
Monitoring:		
1. Groundwater Monitoring Wells		Annually
Maintenance:		
1. SSD System maintenance		As needed (under separate DEC program)
Reporting:		
1. Groundwater Data		Annually
2. Periodic Review Report		Annually

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

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Kliegman Brothers Operable Unit #2 (OU2) site located in Glendale, New York (hereinafter referred to as the “Site”). See Figure 1. The Site is currently in the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program Site No. 2-41-031 which is administered by New York State Department of Environmental Conservation (NYSDEC).

A figure showing the site location and boundaries of this site are provided in Figures 1 and 2. The boundaries of the site are more fully described in Section 2.1. This SMP is prepared only for OU2.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as “remaining contamination”. Institutional and Engineering Controls (ICs and ECs) have been incorporated into the OU1 site remedy to control exposure to remaining contamination to ensure protection of public health and the environment.

This SMP was prepared to manage remaining contamination at the OU2 portion of the site until the OU1 Environmental Easement is extinguished in accordance with Environmental Conservation Law Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor’s successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and thereby subject to applicable penalties.

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

This SMP was prepared by URS Corporation (URS), on behalf of the NYSDEC in accordance with the requirements of the NYSDEC's Division of Environmental Remediation (DER)-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shut-down of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. In accordance with the Environmental Easement for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of 6NYCRR Part 375 and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant an Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

- Verbal notice by noon of the following day of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Table 1 includes current contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix A.

Table 1: Notifications

Name	Contact Information
NYSDEC Project Manager: David Chiusano	518-402-9814 / david.chiusano@dec.ny.gov
NYSDEC Regional HW Engineer: Paul John	718-482-4995 / paul.john@dec.ny.gov
NYSDOH: Stephanie Selmer	518-402-7860

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

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Kliegman Brothers site is located in Glendale, Queens County, New York. OU1 is identified as Section 59 Block 3803 and Lots 91 and 92 on the City of New York Tax Map (see Figure 2). OU1 is an approximately 0.85-acre area and is bounded by the Long Island Railroad to the north, 77th Avenue to the south, 79th Street to the east, and 76th Street to the west (see Figure 1 – Site Location). OU2, the subject of this SMP, is located in the adjacent neighborhood (Figure 2).

2.2 Physical Setting

2.2.1 Land Use

The Kliegman Brothers site consists of a two-story commercial building, is zoned manufacturing and is currently utilized for commercial uses. Its occupants include an imported food distributor and a brewery. The properties comprising OU2 are zoned residential and manufacturing.

2.2.2 Geology

Site-specific geology was obtained from boring logs. In general, beneath a fill layer (concrete or asphalt underlain by reworked native materials) of variable thickness (up to 2 feet), brown loose to dense, fine to coarse silty sand to sandy silt with localized sandy clay seams was observed to depths of approximately 10 feet below ground surface (bgs). This was underlain by brown loose to dense, fine to coarse sand with variable amounts of fine to coarse gravel to a depth of 148 feet bgs. This unit appears to correlate to the Upper Pleistocene glacial deposits and the more recent Holocene deposits. Beneath the eastern portion of the property a brown silty clay layer, with variable amounts of sand was present. This silty clay layer occurs at approximately 10 to 15 feet bgs and is approximately 5 feet thick until it appears to pinch out in the vicinity of MW-04D. Perched groundwater was observed in OU1 above the silty clay layer at a depth of 10 to 12 feet bgs. Boring logs specific to this SMP are provided in Appendix B.

2.2.3 Hydrogeology

Measurements of groundwater elevations from the network of monitoring wells were used to develop groundwater contour maps and determine the site-specific direction of groundwater flow.

The groundwater table occurs at the site at approximately 70 feet bgs within the upper glacial aquifer. No public water supplies draw water from this source. Horizontal hydraulic gradients in shallow groundwater are very gentle. Groundwater flow direction varied from northerly to southerly and therefore, in general, the groundwater flow direction in shallow groundwater was determined to be variable, possibly due to the very gentle horizontal hydraulic gradients and seasonal fluctuations in the water table. Slug test results conducted as part of the RI indicated an average hydraulic conductivity of approximately 5×10^{-2} cm/sec. However, the overall conductivity is probably much higher because data from several slug tests were not measurable due to a very fast recharge rate. Measured hydraulic conductivity values were generally one to two orders of magnitude higher in water table wells compared to wells in perched groundwater.

A groundwater contour map is shown in Figure 3, which presents groundwater elevation data. Groundwater monitoring well construction logs are provided in Appendix B.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

Soil and/or soil gas sampling has been performed from 1997 through 2007 as part of the RI and previous investigations. The initial investigations were performed by Tradewinds Environmental Restoration, Inc. and Advanced Cleanup Technologies (ACT) in 1997 and 1998, respectively. These investigations were comprised of soil gas collection and analysis in the area between the building and the railroad where the tetrachloroethene (PCE) storage tanks were located. Additional soil gas sampling was performed by EEA, Inc. (for a prospective property owner) and by URS (for NYSDEC) in 2000. All of these investigations revealed the presence of PCE, often at high concentrations. Enviroscience Consultants, Inc. performed an investigation in

2001 as part of a Voluntary Cleanup Plan (VCP) agreement with NYSDEC, and included soils and groundwater sampling as part of a Focused Remedial Investigation/Interim Remedial Measures (FRI/IRM). The objective of the FRI/IRM was to sufficiently delineate on-site soil contamination to enable the design of a soil vapor extraction (SVE) system to remediate on-site soil. As part of the study, Enviroscience Consultants, Inc. advanced nine borings, SVE-1 through SVE-5 and EB-1 through EB-4. Enviroscience also collected 26 soil samples from beneath the subfloor of the building, approximately 0-12 inches below the concrete floor/soil interface.

Between October 2000 and August 2001, the New York State Department of Health (NYSDOH) conducted ambient air sampling in 17 residences east, west, and south of the property. NYSDOH sampled on five occasions, although individual residences were sampled only one to three times each. Vapors were detected in 16 of the 17 residences tested.

In September 2002, the property owner discontinued his participation in the VCP and thus responsibility for addressing on-site subsurface contamination reverted to NYSDEC. Because of documented ongoing PCE vapor exposures to adjacent residences, NYSDEC tasked URS to implement an SVE system as an IRM.

URS completed construction of an SVE system at site as an IRM in 2004. The system utilized three extraction wells (SVE-1, SVE-6S and SVE-6D). SVE-1 is a one-inch diameter well screened from 5 to 25 feet bgs. Wells SVE-6S and 6D are two-inch diameter wells screened from 5 to 25 feet bgs (SVE-6S) and 30 to 65 feet bgs (SVE-6D). SVE-6S and SVE-6D are separate wells installed at the same location. Other wells (SVE-2 through 5), originally installed by Enviroscience as SVE wells, were not used for the IRM. The three wells are connected through a subsurface trench to the SVE system consisting of a moisture separator, an extraction blower, and vapor phase carbon vessels. The extraction blower is an approximately 250 standard cubic feet per minute (scfm), 5 horsepower regenerative blower, and the two carbon vessels each contain 1,000 pounds of carbon. Operation of the system began on August 23, 2004. Between August 23, 2004 and June 14, 2006 (the date of the last report) the SVE system removed approximately 35,800 pounds of PCE from the vadose zone.

Groundwater sampling has been performed since 2001. Enviroscience Consultants, Inc. performed groundwater sampling and analysis for volatile organic compounds (VOCs) as part of

the FRI/IRM. Groundwater samples were obtained from each of the SVE borings except SVE-1. Samples were collected from the regional water table using a hydropunch sampler just below the water table (i.e., 70 feet deep) and approximately 30 feet below the water table. URS included groundwater sampling results within the Remedial Investigation Report (URS, 2004). However, since the groundwater plume was not fully characterized, additional monitoring wells were installed in order to further delineate the extent of groundwater contamination. URS subsequently issued an RI Addendum Report in September 2005 (URS, 2005) summarizing the results of the additional fieldwork, which included the installation and sampling of 8 new monitoring wells, both on-site and off-site, as well as the sampling of 16 of the 18 existing wells. (MW-10D and MW-10H were not sampled because they were partially obstructed by new asphalt paving.)

URS conducted a residential air-sampling program from 2005 through 2007, as an additional part of the RI to determine if the PCE plume has resulted in soil vapor entering area residences. Results are presented in the Soil Vapor Intrusion Investigation Report (URS, 2006). Based on the findings of completed soil vapor intrusion pathways obtained during the initial (February 2005) sampling program, the indoor air sampling program was expanded as part of the IRM. The extent of the full program included indoor air and sub-slab sampling at 70 residences and Public School (P.S.) 119 based on their proximity to the site. Sampling followed the NYSDOH 2005 Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Based on the analytical data collected, the NYSDEC was in concurrence with the NYSDOH determined that 12 residences were eligible for installation of sub-slab depressurization (SSD) systems. Of these 12 residences, 8 locations had the systems installed and the other 4 refused the installations. O&M of SSDs continues under a separate DEC program. In 2007, URS designed an onsite full scale SVE system that added six new SVE wells and a large vacuum blower and off gas treatment system. This system was installed in 2007 and has been operating continuously, along with the IRM system, since 2007.

Between October 1, 2007 and March 10, 2008, Camp Dresser and McKee (CDM) supervised remedial efforts at OU1. These efforts included the installation and operation of several SVE and vapor monitoring point (VMP) wells, along with ancillary equipment (i.e. piping, vaults, etc.) as well as the decommissioning of three existing 1-inch SVE cluster wells

and a 1-inch shallow well. Once the SVE system was completed, there was a 14-day start-up between December 12, 2007 and January 14, 2008, followed by 10 weeks of operation and maintenance (O&M) beginning January 22, 2008. Details on the construction and initial operation can be found in the Construction Certification Report (CDM, 2008).

From July through October 2013, 12 injection well pairs were installed in the OU2 remediation area shown on Figure 4. These well pairs were subject to three (3) rounds of permanganate injections; the first round occurred on July 10 and 11, 2014, the second round occurred on November 18 and 18, 2014, and the third round occurred on June 16 and 17, 2015.

Groundwater sampling was performed prior to the first injection, in between injections, and after the final injections. The sampling events were in June 2014, October 2014, February 2015, and September 2015. Sampling was performed using low flow techniques.

Figure 5 summarizes the groundwater sampling results before, during and after permanganate injections. Section 2.5.2 of this SMP discusses these groundwater sampling results. A detailed account of the remedial efforts is presented in the Final Engineering Report (URS, 2016).

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Record of Decision dated March 28, 2008 are as follows:

Groundwater

The RAOs for OU2 are to eliminate or reduce to the extent practicable:

- Exposures of persons around the site to PCE and its degradation products (trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride) in contaminated groundwater; and,
- The release of contaminants from soil vapor into indoor air through vapor intrusion.

Further, the RAOs for the site include attaining to the extent practicable:

- Ambient groundwater quality standards

Soil

There are no soil RAOs for OU2.

Soil Vapor

There are no soil vapor RAOs for OU2.

2.5 Remaining Contamination

2.5.1 Soil

Soil contamination is addressed in OU 1 for the Former Kliegman Brothers Site.

2.5.2 Groundwater

Figure 5 summarizes the results of all samples of groundwater that exceed the NYSDEC standards, criteria, and guidance (SCGs) after completion of the remedial action. Results are discussed below.

During the most recent sampling event in September 2015, PCE exceeded Technical and Operational Guidance Series water quality standards in wells MW-03D, MW-04D, MW-05D, MW-12H, MW-14H, MW-14DR, MW-23D, MW-24H, MW-24D, MW-30M, MW-31D, MW-32D, and MW-33D. These wells are located west and south of the Site. PCE levels in these wells ranges from 5.2 µg/L in well MW-12H to 8,900 µg/L in well MW-14DR.

2.5.3 Soil Vapor

Soil vapor is addressed in OU 1 for the Former Kliegman Brothers Site.

3.0 ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the site, ECs are required to protect human health and the environment. This EC Plan describes the procedures for the implementation and management of all ECs at the site. The EC Plan is one component of the SMP and is subject to revision by the NYSDEC.

This plan provides:

- A description of all ECs on the site;
- The basic implementation and intended role of each EC;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of ECs, such as the implementation of an Excavation Work Plan for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the ECs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

No institutional controls are required for OU2.

3.3 Engineering Controls

Since remaining contaminated groundwater and hence soil vapor exists beneath the site, Engineering Controls (ECs) are required to protect human health and the environment. Engineering controls at the site consist of SSD systems at all residences above the plume whose residents consented to indoor air sampling and accepted SSD mitigation systems when vapor

concentrations exceeded the thresholds presented in Guidance for Evaluating Soil Vapor Intrusion in the State of New York (New York State Department of Health, 2006).

The installed SSD systems are subject to NYSDEC's state-wide operation O&M program.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Any work conducted pursuant to this Monitoring and Sampling Plan must also be conducted in accordance with the procedures defined in the Health and Safety Plan (Appendix C). Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan (QAPP) provided in Appendix D.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of groundwater;
- Assessing compliance with applicable NYSDEC SCGs, particularly groundwater standards; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site-Wide Inspection

Site-wide inspections are not required in this SMP. However, monitoring wells sampled as part of this SMP are to be inspected annually.

4.3 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the groundwater on a routine basis. Sampling locations, required analytical parameters and schedule are provided in Table 2 – Post Remediation Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 2: Post Remediation Sampling Requirements and Schedule

Sampling Location	Schedule	
	VOCs (Method 8260C)	Frequency
MW-03D	x	Annually
MW-04D	x	Annually
MW-05D	x	Annually
MW-12H	x	Annually
MW-14DR	x	Annually
MW-14H	x	Annually
MW-23D	x	Annually
MW-24D	x	Annually
MW-24H	x	Annually
MW-30M	x	Annually
MW-31D	x	Annually
MW-32D	x	Annually
MW-33D	x	Annually

Detailed sample collection and analytical procedures and protocols are provided in Appendix E – Field Sampling and Analysis Plan and Appendix D – QAPP. Groundwater monitoring will be performed annually to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of monitoring wells has been installed to monitor groundwater conditions at the site. Table 3 summarizes the wells identification number, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring 13

wells are sampled to evaluate the effectiveness of the remedial system. Monitoring well construction logs are included in Appendix B of this document.

Table 3: Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates (northing/easting)	Well Diameter (inches)	Elevation (feet above mean sea level)		
				Casing/Surface	Screen Top	Screen Bottom
MW-03D	Along west side of Kliegman Bros.	196749.41/ 1019146.31	2	80.98	14.48	4.48
MW-04D	Immediately southwest of Kliegman Bros.	196622.72/ 1019197.44	2	80.56	15.56	5.56
MW-05D	West of Kliegman Bros.	196677.45/ 1019126.68	2	80.61	15.61	5.61
MW-12H	Immediately southwest of Kliegman Bros.	196625.892/ 1019204.525	2	80.43	-14.57	-24.57
MW-14DR	South of Kliegman Bros.	196483.572/ 1019189.372	2	81.29	16.79	6.79
MW-14H	South of Kliegman Bros.	196486.72/ 1019188.6	2	80.90	-15.10	-30.10
MW-23D	South of Kliegman Bros.	196031.937/ 1019331.283	2	83.57	19.57	9.57
MW-24D	South of Kliegman Bros.	196382.812/ 1019218.335	2	81.91	22.91	12.91
MW-24H	South of Kliegman Bros.	196378.93/ 1019223.11	2	81.44	11.44	1.44
MW-30M	South of Kliegman Bros.	195764.51/ 1019414.54	2	86.53	8.53	-1.47
MW-31D	South of Kliegman Bros.	196158.393/ 1019289.258	2	Survey pending	Survey pending	Survey pending
MW-32D	South of Kliegman Bros.	196265.900/ 1019300.756	2	Survey pending	Survey pending	Survey pending
MW-33D	South of Kliegman Bros.	196134.188/ 1019342.657	2	Survey pending	Survey pending	Survey pending

If biofouling or silt accumulation occurs in the monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly

decommissioned and replaced, if an event renders the wells unusable. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix F - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Sampling and Analysis Plan provided as Appendix E of this document.

5.0 OPERATION AND MAINTENANCE PLAN

Operation and maintenance of the SSD systems installed by the NYSDEC as part of the IRM are the responsibility of the NYSDEC.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

Table 4 displays the vulnerability assessment performed for the Kliegman Brothers site, following the guidance of “Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments” (Center for Science in the Earth System, 2007).

Table 4: Vulnerability Assessment

Planning Areas	Current and Expected Stresses to Systems in This Planning Area	Projected Impact of Changes to Systems in This Planning Area (without preparedness action)	Vulnerability Assessment		
			Degree of Sensitivity of Systems in this Planning Area	Adaptive Capacity of Systems in this Planning Area	Vulnerability of Systems in this Planning Area
Flood Control	Increased flooding can render monitoring wells inaccessible for sampling events	Increased precipitation will raise the water table	Low	n/a	Low
Road Operation and Maintenance	Higher temperatures in winter lead to fewer travel disruptions associated with snow and ice	Higher temperatures in winter will lead to fewer travel disruptions associated with snow and ice	High (but positive)- higher temperatures will lead to fewer travel disruptions associated with snow and ice	n/a	Low

The site has a low vulnerability to increased temperatures. Higher temperatures in the winter would be a benefit, as there would be fewer travel disruptions associated with snow and ice.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the site during site management, and as reported in the Periodic Review Report (PRR).

- **Waste Generation:** Due to the use of permanganate injections, no further active remediation is necessary at the site. Therefore, there is no expected waste generation during site management.
- **Energy Usage:** Due to the use of permanganate injections, no further active remediation is necessary at this site. Therefore, there is no expected energy usage during site management.
- **Emissions:** The laboratory used for this site for groundwater samples, Hampton Clarke-Veritech Laboratories, Inc., located in Fairfield, NJ, approximately 66 miles from the site. By using a local laboratory, emissions associated with travel to and from the site are decreased. Continued use of a local laboratory during SMP activities should be utilized.
- **Water Usage:** Due to the use of permanganate injections during remediation, no further active remediation is necessary at the site. Therefore, there is no expected water usage during site management.
- **Land and/or ecosystems:** Due to the use of permanganate injections during remediation, no further active remediation is necessary at the site. Therefore, there are no expected disturbances of land and/or ecosystems during site management.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the Project Manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

6.2.2 Frequency of Groundwater Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to conduct inspections and/or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources. Monitoring well inspections and sampling will be done concurrently. Local laboratories will be utilized to the extent practicable.

6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix F – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits; a set of metrics has been developed.

6.3 Remedial System Optimization

A RSO study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of the site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

7.0 REPORTING REQUIREMENTS

7.1 Site Management Reports

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

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 5 and summarized in the Periodic Review Report.

Table 5: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection/Sampling Report	Annually
Periodic Review Report	Annually, or as otherwise determined by the Department

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

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., groundwater);

- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

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

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

- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link <http://www.dec.ny.gov/chemical/62440.html>.

7.2 Periodic Review Report

A PRR will be submitted to the Department beginning sixteen (16) months after the completion of the remediation. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted.

These will include a presentation of past data as part of an evaluation of contaminant concentration trends.

- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: <http://www.dec.ny.gov/chemical/62440.html>.
- A site evaluation, which includes the following:
 - The compliance of the remedy with the requirements of the site-specific Record of Decision;
 - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
 - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and
 - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.
 - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional or Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

“For each institutional or engineering control identified for the site, I certify that all of the following statements are true:

- The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- Use of the site is compliant with the environmental easement;*
- The engineering control systems are performing as designed and are effective;*
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program [and generally accepted engineering practices]; and*
- The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner’s/Remedial Party’s Designated Site Representative] for the site.”

7.3 Corrective Measures Work Plan

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

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the Department for approval. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, Health and Safety Plans etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

Camp, Dresser & McKee (CDM), 2008. Construction Completion Report, Kliegman Brothers OU1, Site #2-41-031, Remedial Construction Contract No. D006547.

Center for Science in the Earth System (The Climate Impacts Group) Joint Institute for the Study of the Atmosphere and Ocean, University of Washington and King County, Washington. "Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments". September 2007.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

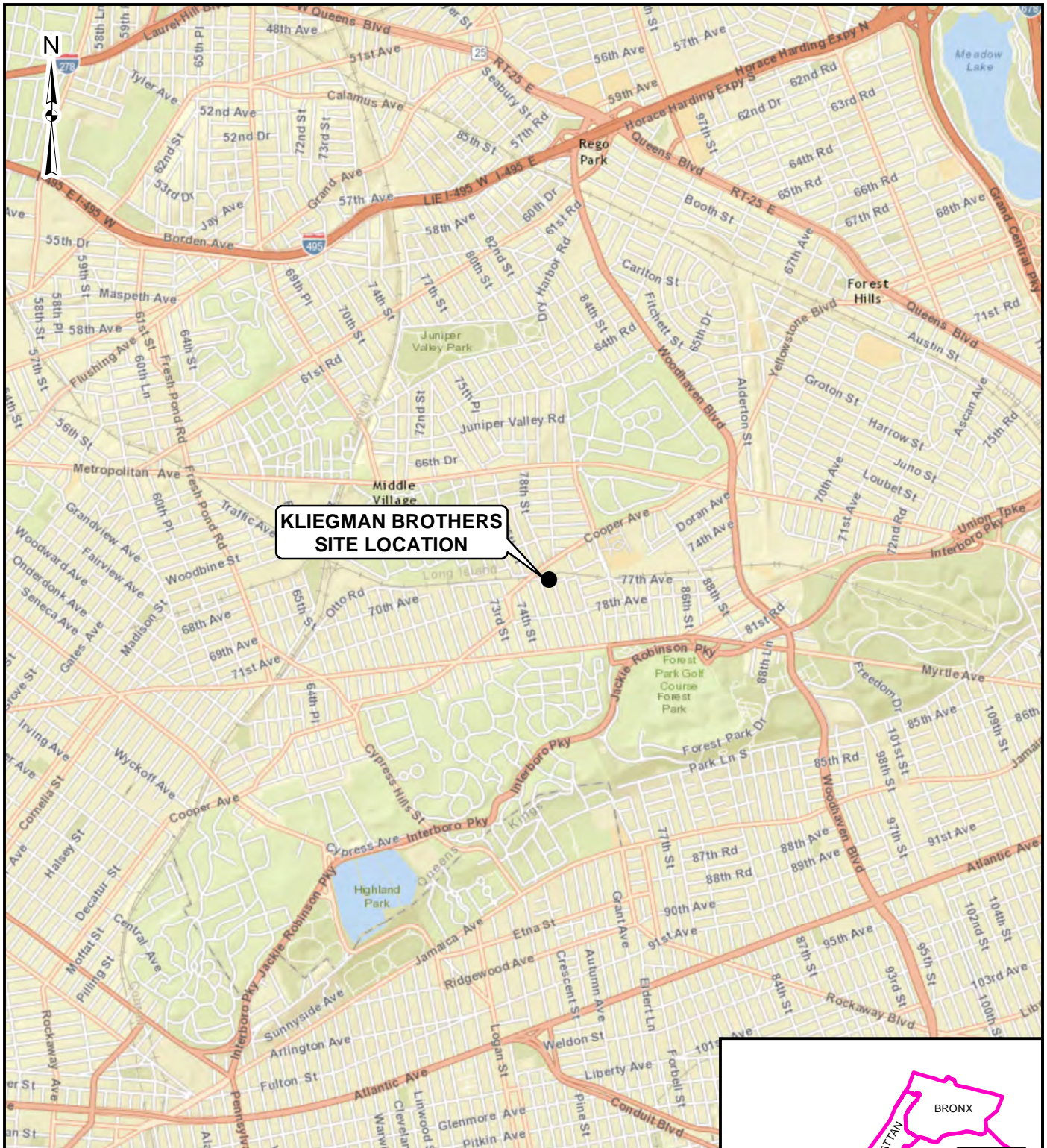
NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

URS Corporation (URS), 2004. Final Remedial Investigation Report, Kliegman Brothers Site. February

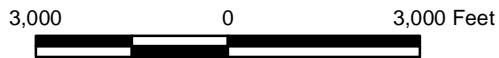
URS, 2005. Remedial Investigation Report Addendum, Kliegman Brothers Site. September

URS, 2006. Soil Vapor Intrusion Investigation Report, Kliegman Brothers Site. July

URS, 2016. Final Engineering Report, Kliegman Brothers Site Operable Unit #2. (Pending)



Source: ESRI World Street Map 2012



\\URS\Buffalo\Projects\1171964.00000\DB\GIS\ArcMap\Site Location.mxd 3/10/2016



KLEGMAN BROTHERS SITE LOCATION MAP

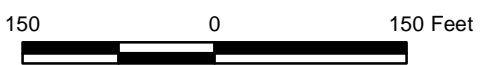
FIGURE 1



Legend

- Monitoring Well Location
- Sampling Location and Soil Vapor Extraction Well Location
- Site Boundary
- Parcels Comprising OU 2

Well Suffixes:
 D - Screened at water table
 H - Below water table (based on HP readings)
 M - Screen at highest hydropunch reading



**KLIEGMAN BROTHERS
SITE PLAN**



FIGURE 2

J:\Projects\11171964\0000\DB\GIS\ArcMap\SITE PLAN (WELLS).mxd 3/15/2016

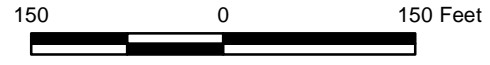


Legend

- ⊕ Monitoring Well
- ⊕ Extraction Well
- 18.00 Groundwater Elevation Contour (ft)
- ← Groundwater Flow Direction

MW-05D, 17.10

Well Location Groundwater Elevation (ft)

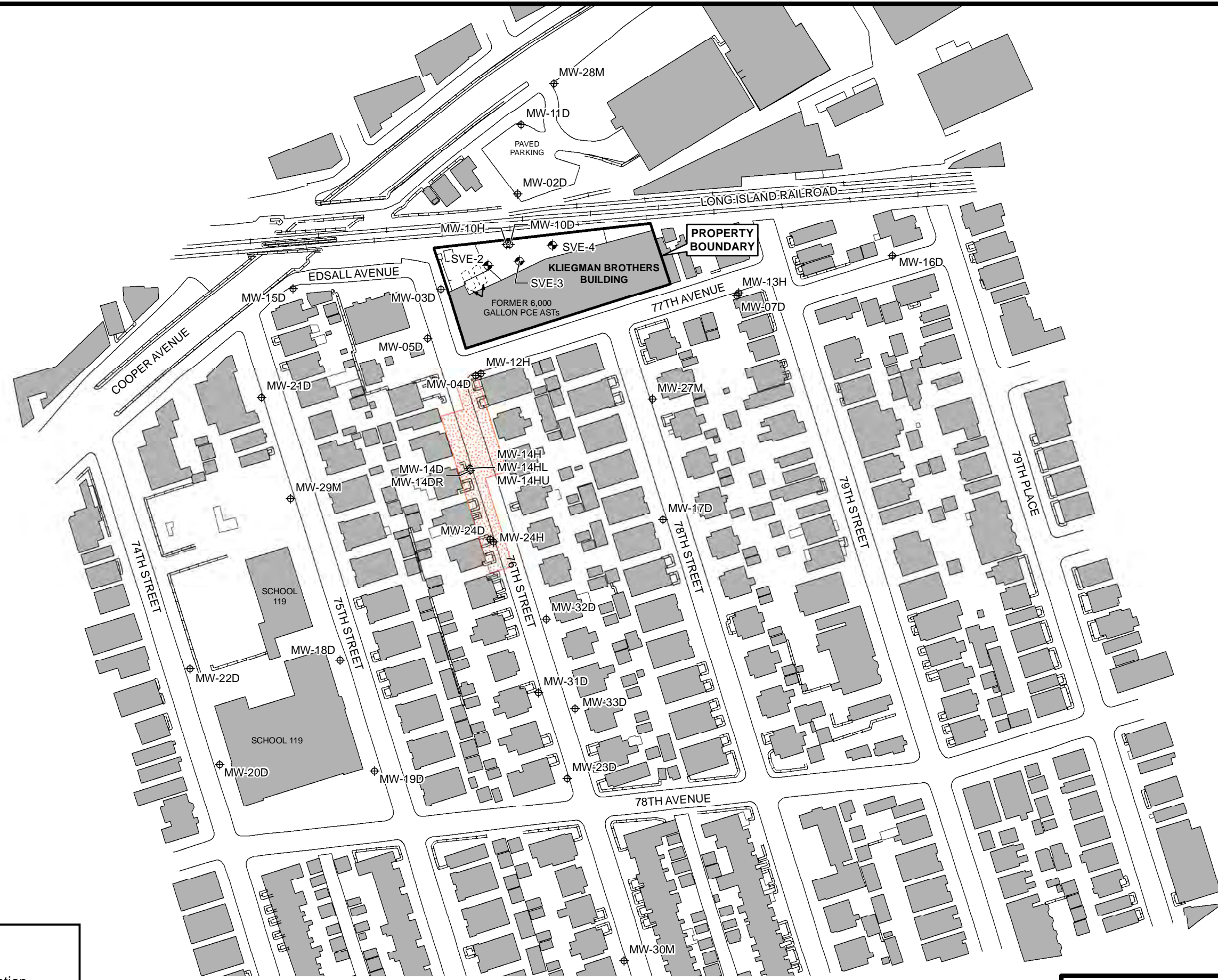


KLIEGMAN BROTHERS
GROUNDWATER ELEVATION JANUARY 2011

URS

FIGURE 3

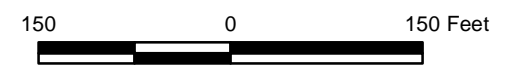
\\URS\Buffalo\Projects\1171964.00000\DB\GIS\ArcMap\GW Contours 2011_01.mxd 3/14/2016 YF



Legend

- ⊕ Monitoring Well Location
- ⊕ Sampling Location and Soil Vapor Extraction Well Location
- ⊕ Remediation Area

Well Suffixes:
 D - Screened at water table
 H - Below water table (based on HP readings)
 M - Screen at highest hydropunch reading

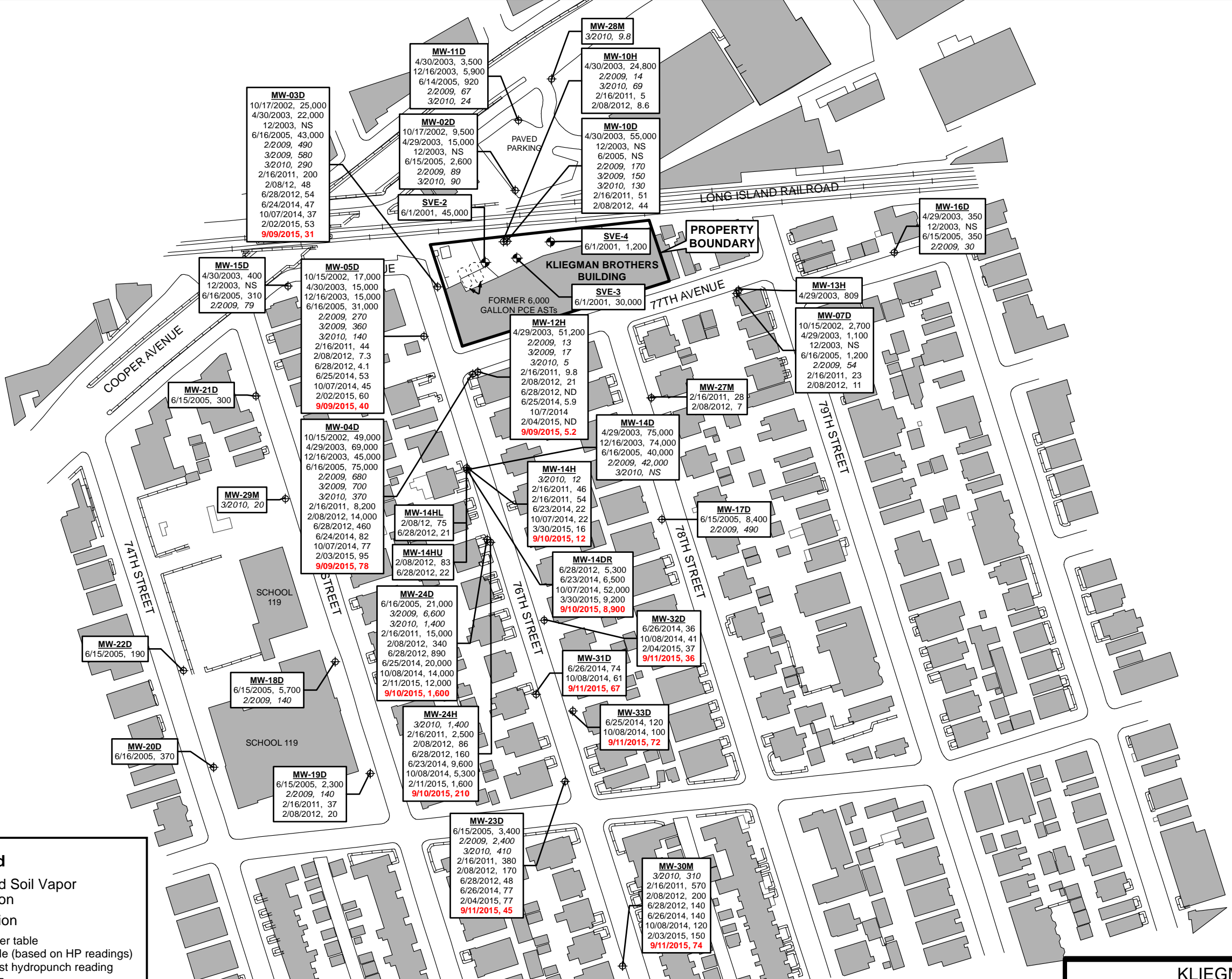


**KLIEGMAN BROTHERS
 REMEDIATION AREA**



FIGURE 4

\URSBuffalo\Projects\11171964.00000\DB\GIS\ArcMap\SITE PLAN (WELLS).mxd 3/11/2016



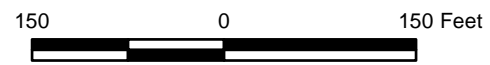
Legend

- ◆ Sampling Location and Soil Vapor Extraction Well Location
- ⊕ Monitoring Well Location

Well Suffixes: D - Screened at water table
H - Below water table (based on HP readings)
M - Screen at highest hydropunch reading

Location ID	Sample Date (Latest Sampling Round Shown in Red)	Tetrachloroethene (PCE) Concentration (µg/L)
MW-14HL	2/08/12, 75	6/28/2012, 21

NOTES:
NS - Not Sampled
ND - Not Detected



**KLIEGMAN BROTHERS
REMAINING GROUNDWATER SAMPLE
EXCEEDANCES FOR PCE**

URS

FIGURE 5

J:\Projects\11171964_00000\00\GIS\ArcMap\GW_RESULTS (SEP 2015).mxd 10/28/2015 M.D.B.

APPENDIX A – LIST OF SITE CONTACTS

Name	Phone/Email Address
Owner; None,	Not Applicable
Remedial Party – NYSDEC; Project Manager :David Chiusano	518-402-9814 / david.chiusano@dec.ny.gov
NYSDEC Regional HW Engineer: Paul John	718-482-4995 / paul.john@dec.ny.gov
NYSDEC Region 2 Attorney: Delores Twohy	518-402-9507

APPENDIX B – BORING LOGS/MONITORING WELL CONSTRUCTION LOGS

PROJECT: Kliegman Brothers OU2					BORING NO.: MW-3D		SHEET: 1 OF 3	
CLIENT: New York State Department of Environmental Conservation					JOB NO.: 11171969 (0500035971.02)			
BORING CONTRACTOR: Buffalo Drilling					BORING LOCATION: N:196749.41 E:1019146.31			
GROUNDWATER:					CASING	SAMPLE	CORE	TUBE
DATE	TIME	LEVEL	TYPE	TYPE		SS		GROUND ELEVATION: 80.98' AMSL
				DIA.		2"		DATE STARTED: 8/23/2002
				WT.		140		DATE FINISHED: 8/25/2002
				FALL		40"		DRILLER: Larry Schroeder
					* PENETROMETER READING			GEOLOGIST: Joel Siegel
								REVIEWED BY: R. Murphy

DEPTH FEET	STRATA	SAMPLE					DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"		RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.	
1	[Concrete/Fill Pattern]	1	SS	6	50/2	5			Concrete and FILL				
2				-	-								
3	[Sand Pattern]	2	SS	10	12	30	Brown	Medium Dense	Medium SAND	SP	40	Moist	
4				17	11								
5	[Silty Sand Pattern]	3	SS	7	3	40	Brown	Loose	Sandy SILT with clay	ML	100		
6				1	3								
7	[Sand Pattern]	4	SS	13	17	60	Brown-Reddish	Dense	Medium SAND, trace fine gravel and silt	SP	100		
8				23	34		Brown						
9	[No Recovery]	5	SS	50/3	-	-			NO RECOVERY				
10				-	-								
11	[Sand with Gravel Pattern]	6	SS	22	20	50	Brown-Reddish	Very Dense	Medium SAND, some medium gravel	SW	120		
12				45	20								
13	[Sand with Gravel Pattern]	7	SS	20	15		Reddish	Dense	-some fine gravel		260		
14				15	16	60	Brown						
15	[Sand with Gravel Pattern]	8	SS	50/2	-	-							
16				-	-								
17	[Sand with Gravel Pattern]	9	SS	10	7	30	Brown	Medium Dense			100		
18				8	14								
19	[Sand with Gravel Pattern]	10	SS	12	17	30		Dense			20		
20				22	30								
21	[Sand with Gravel Pattern]	11	SS	50/3	-	-							
22				-	-								
23	[Sand with Gravel Pattern]	12	SS	12	16	70	Brown	Dense	Medium SAND with silt and fine-medium gravel	SM/SW	220		
24				18	20								
25	[No Recovery]	13	SS	23	21	-			NO RECOVERY - Rock in Tip				
26				26	20								
27	[Sand with Gravel Pattern]	14	SS	23	25	70	Brown	Dense	Medium SAND with fine-medium gravel	SW	250		
28				22	14								
29	[Sand with Gravel Pattern]	15	SS	17	14	60	Brown	Medium Dense	Fine-medium SAND with fine-medium gravel and silt	SM/SW	220	Very Moist	
30				9	9								
31	[Sand with Gravel Pattern]	16	SS	20	17	60		Dense			400	Moist	
32				19	21								
33	[Sand with Gravel Pattern]	17	SS	50/3	-	20					300		
34				-	-								
35	[Sand with Gravel Pattern]	18	SS	15	20	50	Brown	Dense	Medium SAND, some fine-medium gravel	SW	150		

COMMENTS:
CME 75 Rig. Boring advance with 4 1/4" augers.

PROJECT: Kliegman Brothers OU2						BORING N MW-3 D		SHEET: 2 OF 3	
CLIENT: New York State Department of Environmental Conservation						JOB NO.: 11171969 (0500035971.02)			
BORING CONTRACTOR: Buffalo Drilling						BORING LOCATION: N:196749.41 E:1019146.31			
GROUNDWATER: Encountered @ 68' while drilling.				CASING	SAMPLE	CORE	TUBE	GROUND ELEVATION: 80.98' AMSL	
DATE	TIME	LEVEL	TYPE	TYPE		SS		DATE STARTED: 8/23/2002	
				DIA.		2"		DATE FINISHED: 8/25/2002	
				WT.		140		DRILLER: Larry Schroeder	
				FALL		40"		GEOLOGIST: Joel Siegel	
						* PENETROMETER READING		REVIEWED BY: R. Murphy	

DEPTH FEET	STRATA	SAMPLE				DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.	
36	O O O	18	SS	20	20	50	Brown	Dense	Medium SAND, some fine-medium gravel	SW	150	Moist
37		O O O	19	SS	24	24	50	Brown	Dense	Medium SAND	SP	150
38	20				200							
39	O O O	20	SS	13	14	60	Brown	Dense	Medium SAND with fine-medium gravel, trace coarse sand.	SW	150	
40				17	15							
41	O O O	21	SS	12	14	70	Brown	Dense	Medium SAND with fine-medium gravel, trace coarse sand.	SW	130	
42				17	14							
43	O O O	22	SS	50/4	-	-	Brown	Dense	Medium SAND with fine-medium gravel, trace coarse sand.	SW	-	
44				-	-							
45	O O O	23	SS	12	12	60	Brown	Medium Dense	Medium SAND with fine-medium gravel, trace coarse sand.	SW	150	
46				17	16							
47	O O O	24	SS	10	12	70	Brown	Dense	Medium SAND with fine-medium gravel, trace coarse sand.	SW	150	
48				13	13							
49	O O O	25	SS	13	14	60	Brown	Dense	Medium SAND with fine-medium gravel, trace coarse sand.	SW	200	
50				16	17							
51	O O O	26	SS	16	17	60	Brown	Dense	Medium SAND with fine-medium gravel, trace coarse sand.	SW	300	
52				20	16							
53	O O O	27	SS	19	19	70	Brown	Dense	Medium-coarse SAND, Trace fine-medium gravel	SP	300	
54				19	16							
55	O O O	28	SS	13	13	50	Brown	Loose	Medium-coarse SAND, some fine-medium gravel : 1" very coarse SAND @ 55'	SW	300	
56				14	16							
57	O O O	29	SS	16	16	80	Brown	Dense	Medium-coarse SAND, some fine-medium gravel : 1" very coarse SAND @ 55'	SW	400	
58				20	20							
59	O O O	30	SS	12	12	80	Brown	Medium Dense	Medium-coarse SAND, some fine-medium gravel : 1" very coarse SAND @ 55'	SW	280	
60				14	18							
61	O O O	31	SS	10	10	60	Brown	Medium Dense	Medium SAND	SP	320	
62				13	7							
63	O O O	32	SS	10	12	60	Brown	Dense	Medium SAND	SP	300	
64				13	12							
65	O O O	33	SS	12	13	50	Brown	Medium Dense	Medium SAND	SP	320	
66				14	13							
67	O O O	34	SS	13	15	50	Brown	Dense	Medium SAND	SP	280	Wet@ 68'
68				17	20							
69	O O O	35	SS	14	13	60	Brown	Medium Dense	Medium SAND	SP	300	Moist
70				13	10							

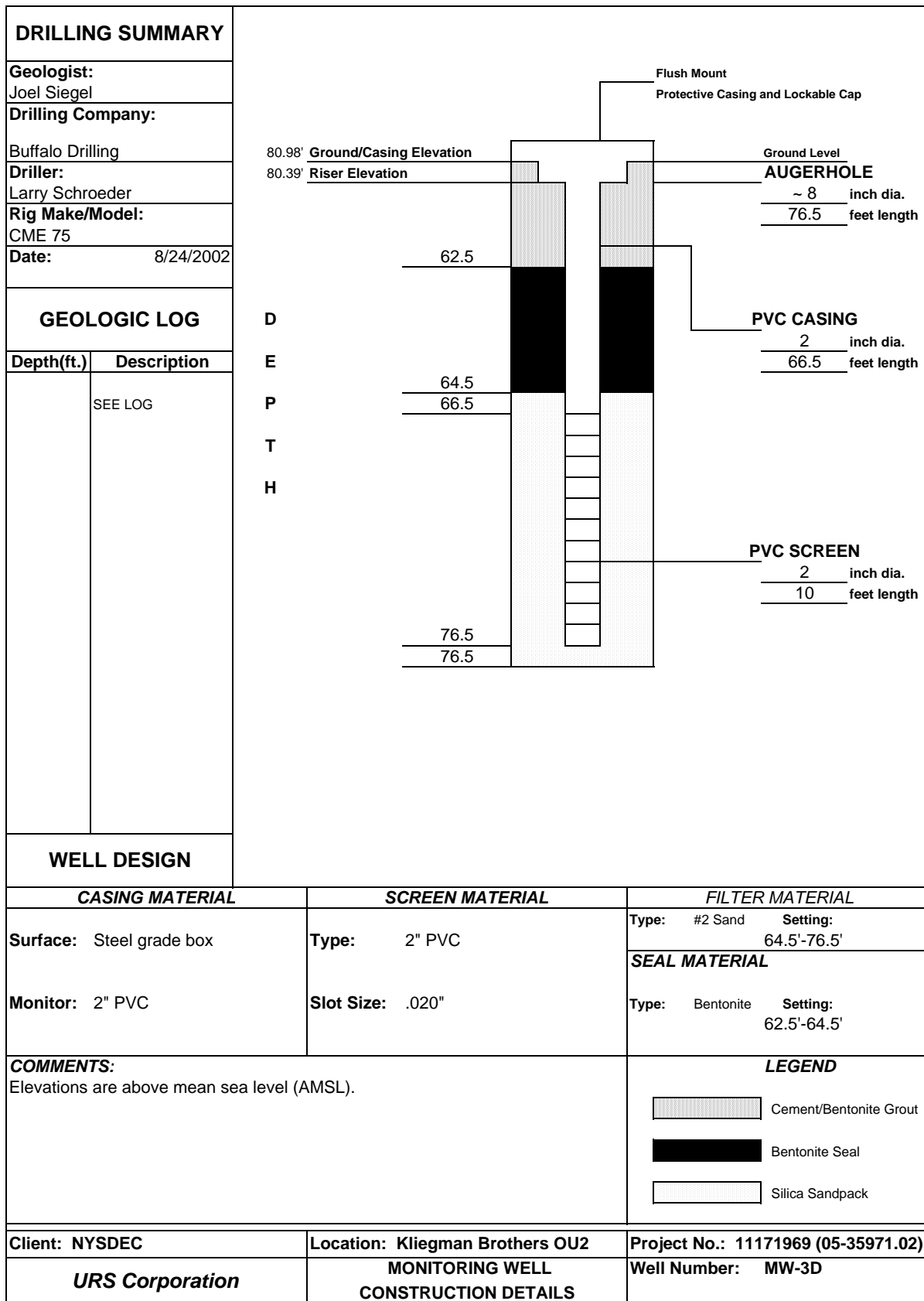
COMMENTS:
CME 75 rig. Boring Advance with 4 1/4" augers. No Odors in any samples. PID readings most likely represent soil gas. Readings taken immediately upon opening split spoon.
PID readings drop to zero rapidly. No evidence of free product (staining/discoloration/product sheen).

TEST BORING LOG

PROJECT: Kliegman Brothers OU2					BORING NO.: MW-3D		SHEET: 3 OF 3		
CLIENT: New York State Department of Environmental Conservation					JOB NO.: 11171969 (0500035971.02)				
BORING CONTRACTOR: Buffalo Drilling					BORING LOCATION: N:196749.41 E:1019146.31				
GROUNDWATER:					CASING	SAMPLE	CORE	TUBE	GROUND ELEVATION: 80.98' AMSL
DATE	TIME	LEVEL	TYPE	TYPE		SS			DATE STARTED: 8/23/2002
				DIA.		2"			DATE FINISHED: 8/25/2002
				WT.		140			DRILLER: Larry Schroeder
				FALL		40"			GEOLOGIST: Joel Siegel
					* PENETROMETER READING			REVIEWED BY: R. Murphy	

DEPTH FEET	STRATA	SAMPLE				DESCRIPTION					REMARKS		
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.		
71	[Patterned]	36	SS	7	7	80	Brown ↓	Medium Dense	Medium SAND	SP	100	Wet ↓	
72				9	10			Medium Dense ↓					
73		37	SS	12	14	60		Dense					
74				15	19			Dense ↓					
75		38	SS	12	14	70		Medium Dense					
76				16	15								
77		39	SS	16	27	100		Medium Dense					
78				50/3									
79		40	SS	8	7	50		Medium Dense					
80				6	7								

COMMENTS:
 At 76' dust and vapors emanating from inside of auger string before connecting next auger. Strong odor, PID >9999. Dissipates within 5 minutes.
 No Odors observed in any samples or cuttings.



PROJECT: Kliegman Brothers OU2					BORING NO.: MW-4D		SHEET: 1 OF 2		
CLIENT: New York State Department of Environmental Conservation					JOB NO.: 11171969 (0500035971.02)				
BORING CONTRACTOR: Buffalo Drilling					BORING LOCATION: N:196622.72 E:1019197.44				
GROUNDWATER:					CASING	SAMPLE	CORE	TUBE	GROUND ELEVATION: 80.56' AMSL
DATE	TIME	LEVEL	TYPE	TYPE		SS			DATE STARTED: 8/25/2002
				DIA.		2"			DATE FINISHED: 8/26/2002
				WT.		140			DRILLER: Larry Schroeder
				FALL		40"			GEOLOGIST: Joel Siegel
					* PENETROMETER READING			REVIEWED BY: R. Murphy	

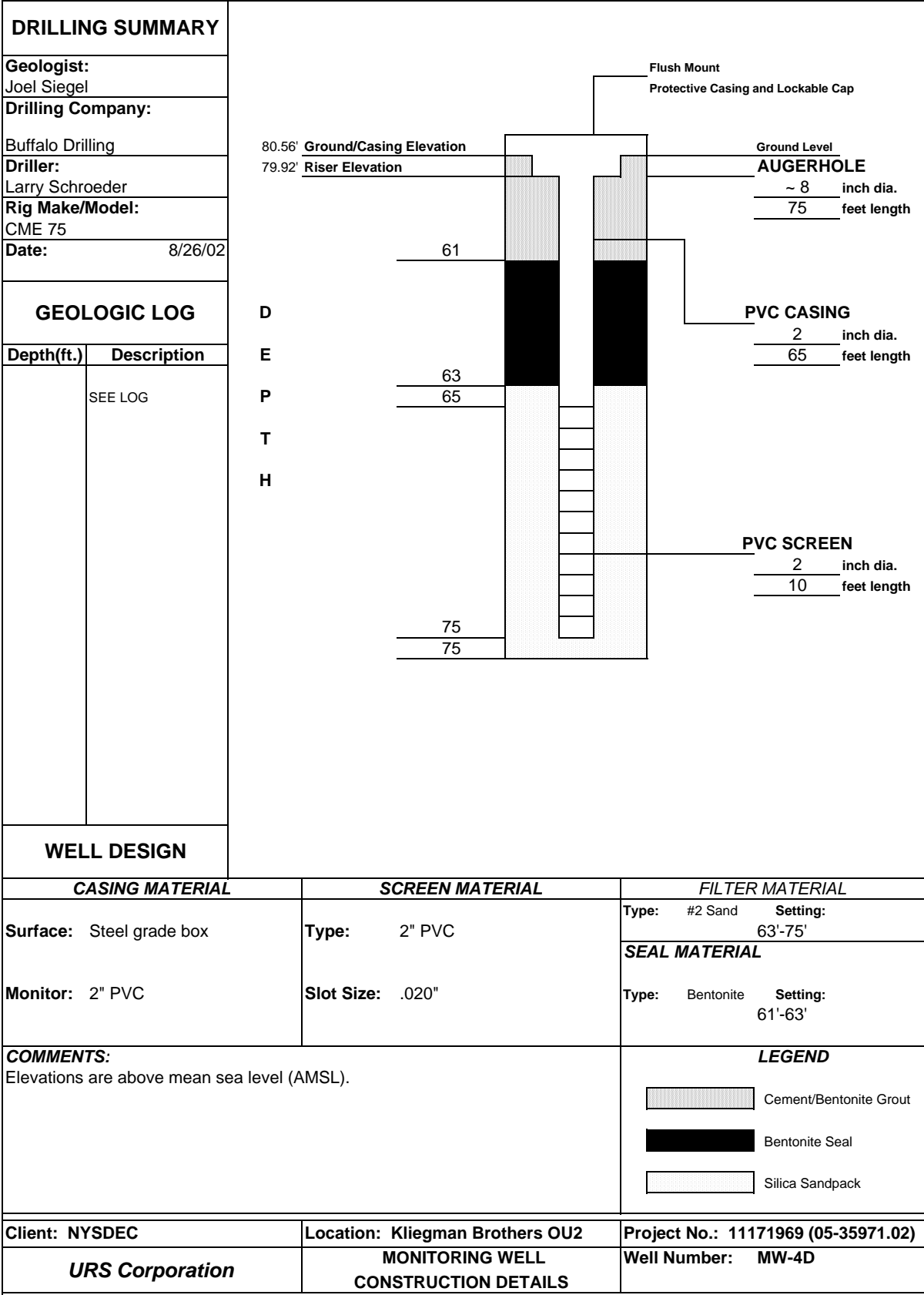
DEPTH FEET	STRATA	SAMPLE					DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.		
1	[Cross-hatched pattern]	1	SS	-	3	20	Brown	Loose	Medium SAND and FILL	-	0	Moist	
2				4	8								
3	[Wavy pattern]	2	SS	8	5	30	Brown	Medium Dense	Very fine-medium SAND, some silt	SP/SM	1		
4				7	13								
5	[Wavy pattern]	3	SS	5	12	60	↓	↓	↓	↓	1		
6				15	19								
7	[Circular pattern]	4	SS	22	15	60	Brown	Dense	Fine-medium SAND, some fine-medium gravel	SP/SW	5		
8				19	20								
9	[Circular pattern]	5	SS	10	8	50	↓	Medium Dense	↓	↓	3		
10				9	11								
11	[Circular pattern]	6	SS	6	6	40	Brown	Medium Dense	Medium SAND, trace to some coarse sand, trace gravel.	SP	5		
12				5	7								
13	[Circular pattern]	7	SS	9	7	50	↓		↓	↓	5		
14				7	8								
15	[Circular pattern]	8	SS	8	9	60	↓		↓	↓	18		
16				10	9								
17	[Circular pattern]	9	SS	9	9	70	↓	M Dense	↓	↓	10	Very Moist	
18				10	9								
19	[Wavy pattern]	10	SS	11	7	50	Brown	Very Stiff	Clayey Sandy SILT	ML	3	Saturated sand 20-20.5	
20				9	8								
21	[Wavy pattern]	11	SS	9	10	70	Brown	Medium Dense	Medium-coarse SAND, some silt	SP/SM	2	Wet	
22				12	12								
23	[Circular pattern]	12	SS	15	22	100	Brown	Dense	Medium SAND, some fine-medium gravel	SP/SW	14	Moist	
24				15	22								
25	[Circular pattern]	13	SS	12	7	70	Brown	Medium Dense	Fine SAND, some silt, some medium-coarse gravel	SP/SM SW	20		
26				8	12								
27	[Circular pattern]	14	SS	10	7	70	Brown	Medium Dense	Medium SAND, some fine-medium gravel	SP	20	Very Moist not saturated	
28				14	13								
29	[Circular pattern]	15	SS	17	15	30	↓	↓	↓	↓	40	Moist	
30				14	14								
31	[Circular pattern]	16	SS	14	15	10	↓	Dense	↓	↓	10		
32				17	26								
33	[Circular pattern]	17	SS	46	36	20	↓	Very Dense	Medium SAND	↓	7		
34				30	15								
35	[Circular pattern]	18	SS	14	15	60	↓	Dense	↓	↓	20		

COMMENTS:
CME 75 rig. Boring advanced with 4 1/4" augers.

PROJECT: Kliegman Brothers OU2						BORING N MW-4 D		SHEET: 2 OF 2	
CLIENT: New York State Department of Environmental Conservation						JOB NO.: 11171969 (0500035971.02)			
BORING CONTRACTOR: Buffalo Drilling						BORING LOCATION: N:196622.72 E:1019197.44			
GROUNDWATER: Encountered @ 67' while drilling						CASING	SAMPLE	CORE	TUBE
DATE	TIME	LEVEL	TYPE	TYPE		SS			GROUND ELEVATION: 80.56' AMSL
				DIA.		2"			DATE STARTED: 8/25/2002
				WT.		140			DATE FINISHED: 8/26/2002
				FALL		40"			DRILLER: Larry Schroeder
						* PENETROMETER READING			GEOLOGIST: Joel Siegel
									REVIEWED BY: R. Murphy

DEPTH FEET	STRATA	SAMPLE				DESCRIPTION						REMARKS																																																									
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.																																																										
36		18	SS	27	14	60	Brown	Dense	Medium SAND	SP	20	Moist																																																									
37		19	SS	19	17	40	Brown	Dense	Medium SAND, some medium-coarse gravel	SP/SW	15	↓																																																									
38				25	28																																																																
39		20	SS	12	15	80																																																															
40				15	17																																																																
41		21	SS	11	14	70							Medium Dense	-trace silt (40'-42')	↓	20	Very Moist																																																				
42				13	13																																																																
43		22	SS	20	18	30							Dense					↓	10	not saturated																																																	
44				20	16																																																																
45		23	SS	50/2	-	-							↓								↓	-	-																																														
46				-	-																																																																
47		24	SS	21	37	-																		↓	↓	-	-																																										
48				46	39																																																																
49		25	SS	18	20	40																						↓	↓	Medium-coarse SAND, some fine-medium gravel	↓	0	Moist																																				
50				24	30																																																																
51		26	SS	15	15	60																												↓	↓	↓	20	↓																															
52				16	16																																																																
53		27	SS	26	27	90																																	Very Dense	↓	↓	2	↓																										
54				34	34																																																																
55		28	SS	20	20	60																																	Brown					Dense	Medium SAND, some coarse sand.	SP	50	↓																					
56				27	23																																																																
57		29	SS	19	26	80																																	Brown					Very Dense	Medium-coarse SAND, some fine-medium gravel	SP/SW	40																						
58				24	20																																																																
59		30	SS	17	18	60																																	Brown					Dense	Medium SAND, some coarse sand.	SP	50																						
60				24	23																																																																
61		31	SS	20	20	70																																											Very Dense	↓	↓	30	↓																
62				30	35																																																																
63		32	SS	24	25	80																																											Dense					-trace fine gravel (62'-64')	↓	60	↓												
64				21	36																																																																
65		33	SS	21	25	90																																											Very Dense									Medium SAND	↓	100	↓								
66				27	27																																																																
67		34	SS	21	26	60																																											↓													↓	↓	120	Wet @ 67'				
68				25	22																																																																
69		35	SS	12	16	80																																																												Medium Dense	↓	↓	400
70	13			14																																																																	

COMMENTS:
No samples 70-75; Running sand.
PID Readings Increase at saturated Zone. Set well at 75' with 10' screen



PROJECT: Kliegman Brothers OU2						BORING NO.: MW-5 D		SHEET: 1 OF 2	
CLIENT: New York State Department of Environmental Conservation						JOB NO.: 11171969 (0500035971.02)			
BORING CONTRACTOR: Buffalo Drilling						BORING LOCATION: N: 196677.45 E:1019126.68			
GROUNDWATER: Encountered @ 67.5' while drilling						CASING	SAMPLE	CORE	TUBE
DATE	TIME	LEVEL	TYPE	TYPE		SS			GROUND ELEVATION: 80.61' AMSL
				DIA.		2"			DATE STARTED: 8/26/2002
				WT.		140			DATE FINISHED: 8/27/2002
				FALL		40"			DRILLER: Larry Schroeder
						* PENETROMETER READING			GEOLOGIST: Joel Siegel
									REVIEWED BY: R. Murphy

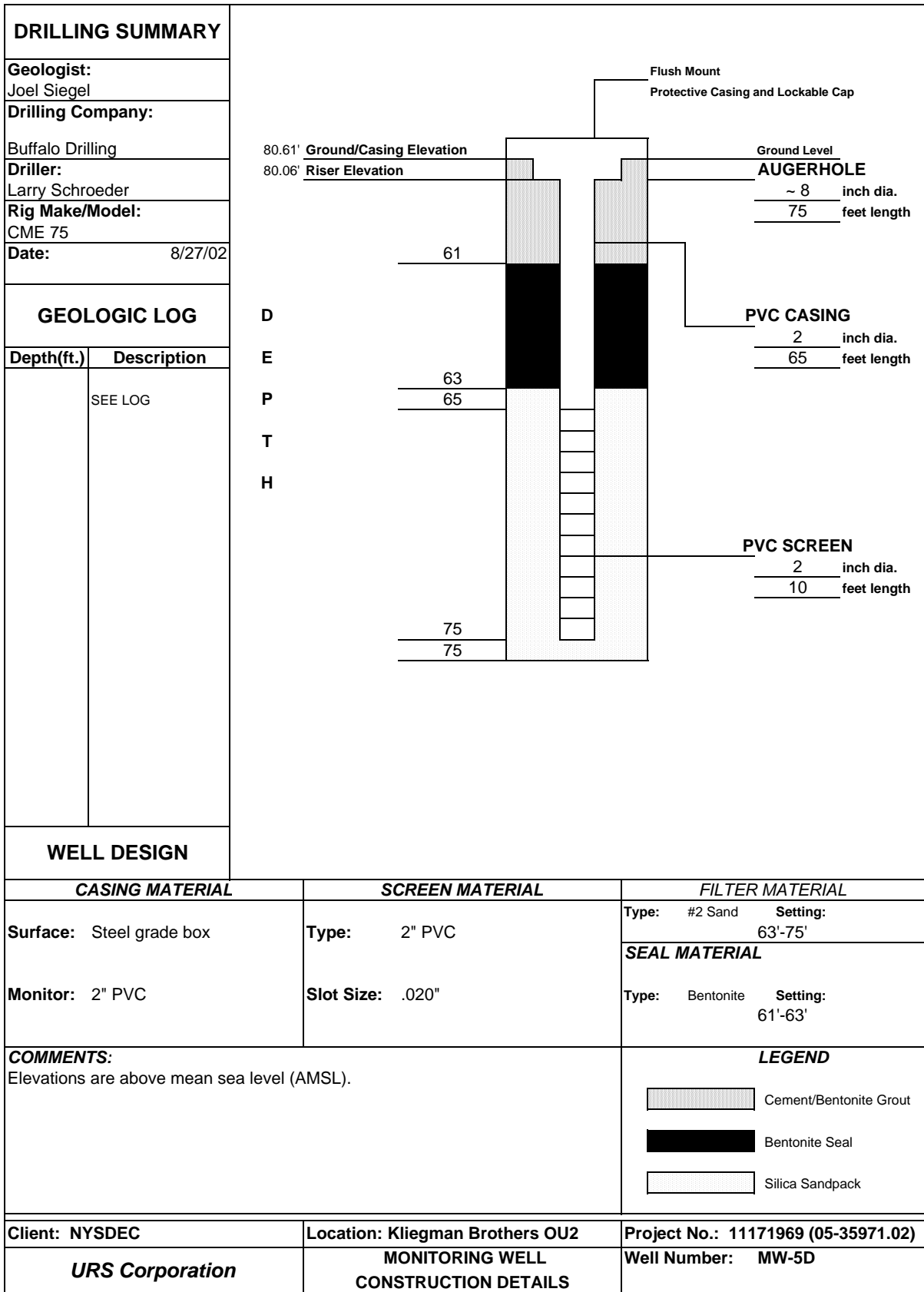
DEPTH FEET	STRATA	SAMPLE					DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.		
1	[Cross-hatch pattern]	1	SS	-	5	Tr		-	Trace of Silty SAND and FILL		-	-	
2				5	9								
3	[Blank]	2	SS	3	3	-		-	NO RECOVERY		-	-	
4				4	4								
5	[Wavy lines]	3	SS	2	4	60	Reddish Brown	Loose	Silty fine SAND, some clay	SM	1	Moist	
6				6	8								
7	[Wavy lines]	4	SS	15	12	40		Medium Dense	Fine-medium SAND, some silt		5		
8				12	15								
9	[Dotted]	5	SS	14	10	60	Reddish Brown	Medium Dense	Medium SAND, some fine-coarse gravel, some silt	SW/SM	3		
10				11	9								
11	[Dotted]	6	SS	9	6	60	Reddish Brown	Medium Dense	Medium SAND	SP	25		
12				6	6								
13	[Dotted]	7	SS	8	10	50	Reddish Brown	Medium Dense	Fine-medium SAND, some fine-medium gravel	SW	10		
14				6	3								
15	[Dotted]	8	SS	12	11	40	Lt. Brown	Medium Dense	Medium SAND	SP	25		
16				9	12								
17	[Dotted]	9	SS	18	13	20	Brown	Medium Dense	Medium SAND		20		
18				14	16								
19	[Dotted]	10	SS	10	12	10			-some medium gravel(18-20)		10		
20				14	14								
21	[Dotted]	11	SS	8	7	50			Medium-coarse SAND		100	Very Moist	
22				7	7								
23	[Dotted]	12	SS	10	12	60			-Trace fine gravel(22-24')		90	Moist	
24				13	13								
25	[Dotted]	13	SS	18	22	10	Brown	Dense	Medium SAND with Medium Gravel	SW	15		
26				27	28								
27	[Dotted]	14	SS	50/4	-	Trace					-		
28				-	-								
29	[Dotted]	15	SS	14	18	90	Brown	Dense	Fine-medium SAND, some fine-medium gravel, some silt	SM/SW	70		
30				20	11								
31	[Dotted]	16	SS	15	13	90					90		
32				22	22								
33	[Dotted]	17	SS	35	28	80		Very Dense			60		
34				32	24								
35	[Dotted]	18	SS	24	27	60	Brown	Very Dense	Fine-medium SAND, some fine-medium gravel	SW	70		

COMMENTS:
 CME 75 rig. Boring Advance with 4 1/4" augers.

PROJECT: Kliegman Brothers OU2					BORING N MW-5 D		SHEET: 2 OF 2	
CLIENT: New York State Department of Environmental Conservation					JOB NO.: 11171969 (0500035971.02)			
BORING CONTRACTOR: Buffalo Drilling					BORING LOCATION: N: 196677.45 E:1019126.68			
GROUNDWATER: Encountered @ 67.5' while drilling					CASING	SAMPLE	CORE	TUBE
DATE	TIME	LEVEL	TYPE	TYPE		SS		GROUND ELEVATION: 80.61' AMSL
				DIA.		2"		DATE STARTED: 8/26/2002
				WT.		140		DATE FINISHED: 8/27/2002
				FALL		40"		DRILLER: Larry Schroeder
					* PENETROMETER READING			GEOLOGIST: Joel Siegel
								REVIEWED BY: R. Murphy

DEPTH FEET	STRATA	SAMPLE				DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.	
36	○ ○ ○ ○	18	SS	35	16	60	Brown	Very Dense	Fine-medium SAND, some fine-medium gravel	SW	70	Moist
37		19	SS	22	25	70					90	
38				50/4								
39	○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○	20	SS	10	16	60	Brown	Medium Dense	Medium to coarse SAND	SP	100	
40				12	13							
41		21	SS	14	14	50		Dense				200
42				17	15							
43		22	SS	17	15	70						300
44				16	16							
45		23	SS	16	16	30						5
46				17	18							
47		24	SS	15	21	60		Very Dense				30
48				29	24							
49		25	SS	22	25	40						30
50				26	27							
51		26	SS	26	21	60		Dense				20
52				12	44							
53		27	SS	27	37	70		Very Dense				100
54			15	23								
55	28	SS	20	20	60		Dense		50			
56			16	18								
57	29	SS	16	18	60				70			
58			23	21								
59	30	SS	10	11	70		Medium Dense		30			
60			16	17								
61	31	SS	15	17	80		Dense		20			
62			20	18								
63	32	SS	16	17	70				100			
64			25	17								
65	33	SS	14	15	60				20			
66			19	19								
67	34	SS	21	14	80				120			
68			16	17								
69	35	SS	13	14	70		Medium Dense		100			
70			15	16								

COMMENTS:
 Drill to 75' and set well with 10' screen. No samples 70-75 due to running sands.



PROJECT: Kliegman Brothers OU2					BORING NO.: MW-12H		SHEET: 1 OF 2		
CLIENT: New York State Department of Environmental Conservation					JOB NO.: 11171969 (0500035971.02)				
BORING CONTRACTOR: Buffalo Drilling					BORING LOCATION: N:196625.892 E:1019204.525				
GROUNDWATER:					CASING	SAMPLE	CORE	TUBE	GROUND ELEVATION: 80.43' AMSL
DATE	TIME	LEVEL	TYPE	TYPE		SS			DATE STARTED: 4/1/2003
				DIA.		2"			DATE FINISHED: 4/4/2003
				WT.		140			DRILLER: Larry Schroeder
				FALL		40"			GEOLOGIST: Eric Lovenduski
					* PENETROMETER READING				REVIEWED BY: R. Murphy

DEPTH FEET	STRATA	SAMPLE				DESCRIPTION						REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.		
0								See log for MW-04D for lithologic information					
79								↓					
80	[Patterned Area]	1	SS	40	36	54%	Brown	Very Dense	Fine-coarse SAND, trace silt	SW	0	Wet	
81				36	33			↓					
82								↓					
83								↓					
84								↓					
85			2	SS	27	20	63%		Dense	Medium-coarse SAND		0	
86					27	34			↓				
87									↓				
88									↓				
89									↓				
90			3	SS	24	25	58%			Meduim SAND		0	
91				23	20			↓					
92								↓					
93								↓					
94								↓					
95		4	SS	34	32	63%		Very Dense			0		
96				26	28			↓					
97								↓					
98								↓					
99								↓					
100		5	SS	20	20	63%		Dense	-trace to little fine rounded gravel		0		
101				19	25			↓					
102								↓					
103								↓					
104								↓					
105		6	SS	20	31	83%		Very Dense			0		
106				43	36			↓					
107								↓					
108								↓					
109								↓					
110		7	SS	52	58	67%		↓			0		

COMMENTS: Boring advanced to 118' using a CME 75 Rig with 4 1/4" HSAs, 3 7/8" Mud Rotary, 2" Split Spoons, and a Hydropunch sampler.

Used 4 1/4" HSAs to 70' bgs, then switched to 3 7/8" Mud Rotary to 114'. Hydropunch samples were collected at 72', 88', 108' and 118'.

Set 2" PVC well at 105' bgs with a 10' screen.

PROJECT: Kliegman Brothers OU2					BORING NO.: MW-12H				SHEET: 2 OF 2		
CLIENT: New York State Department of Environmental Conservation					JOB NO.: 11171969 (0500035971.02)						
BORING CONTRACTOR: Buffalo Drilling					BORING LOCATION: N:196625.892 E:1019204.525						
GROUNDWATER:					CASING	SAMPLE	CORE	TUBE	GROUND ELEVATION: 80.43' AMSL		
DATE	TIME	LEVEL	TYPE	TYPE		SS			DATE STARTED: 4/1/2003		
				DIA.		2"			DATE FINISHED: 4/4/2003		
				WT.		140			DRILLER: Larry Schroeder		
				FALL		40"			GEOLOGIST: Eric Lovenduski		
				* PENETROMETER READING				REVIEWED BY: R. Murphy			

DEPTH FEET	STRATA	SAMPLE					DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"		RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.	
111		7	SS	50	52	67%	Brown	Very Dense	Medium SAND, trace rounded fine gravel	SW	0	Wet	
112							↓	↓	↓	↓		↓	
113													
114													
115			8	SS	30	35	58%					0	
116					30	35							
117													
118													
									End of boring at 118' bgs.				

COMMENTS: Boring advanced to 118' using a CME 75 Rig with 4 1/4" HSAs, 3 7/8" Mud Rotary, 2" Split Spoons, and a Hydropunch sampler.

Used 4 1/4" HSAs to 70' bgs, then switched to 3 7/8" Mud Rotary to 114'. Hydropunch samples were collected at 72', 88', 108' and 118'.

Backfilled with #0 Sand to 105'. Set 2" PVC well at 105' bgs with a 10' screen.

DRILLING SUMMARY		
Geologist: Eric Lovenduski		
Drilling Company: Buffalo Drilling		
Driller: Larry Schroeder		
Rig Make/Model: CME 75		
Date: 4/4/2003		
GEOLOGIC LOG		
Depth(ft.)	Description	
	SEE LOG	
WELL DESIGN		
CASING MATERIAL	SCREEN MATERIAL	FILTER MATERIAL
Surface: Steel grade box Monitor: 2" PVC	Type: 2" PVC Slot Size: .010"	Type: #0 Sand Setting: 93'-118' SEAL MATERIAL Type: Bentonite Setting: 89'-93'
COMMENTS: Elevations are above mean sea level (AMSL). 4 1/4" HSAs to 70' bgs, drove 4" casing to 70', then used mud rotary (3 7/8") from 70'-118' bgs.		LEGEND
Client: NYSDEC	Location: Kliegman Brothers OU2	Project No.: 11172979.00001
URS Corporation	MONITORING WELL CONSTRUCTION DETAILS	Well Number: MW-12H

PROJECT: Kliegman Brothers OU2					BORING NO.: MW-14D		SHEET: 1 OF 3	
CLIENT: New York State Department of Environmental Conservation					JOB NO.: 11171969 (0500035971.02)			
BORING CONTRACTOR: Buffalo Drilling					BORING LOCATION: N:196483.572 E:1019189.372			
GROUNDWATER:					CASING	SAMPLE	CORE	TUBE
DATE	TIME	LEVEL	TYPE	TYPE		SS		GROUND ELEVATION: 81.29' AMSL
				DIA.		2"		DATE STARTED: 3/26/2003
				WT.		140		DATE FINISHED: 3/26/2003
				FALL		40"		DRILLER: Larry Schroeder
					* PENETROMETER READING			GEOLOGIST: Eric Lovenduski
								REVIEWED BY: R. Murphy

DEPTH FEET	STRATA	SAMPLE				DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.	
1	[Dotted pattern]					Brown	Loose		SW		Moist	
2												
3												
4												
5		1	SS	6	5	67%			Fine SAND, trace fine subangular gravel		0	
6				5	4							
7												
8												
9												
10		2	SS	4	9	58%		Medium Dense	Fine SAND, little coarse rounded gravel		0	Wet
11				6	8				2" layer friable mica fragments at 10'			
12									Fine SAND			
13												
14												
15		3	SS	6	7	54%			Fine SAND, trace coarse rounded gravel		0	Moist
16				8	21							
17												
18												
19												
20		4	SS	12	9	67%					0	
21				8	7							
22												
23												
24												
25		5	SS	7	15	63%					0	
26				11	13							
27												
28												
29												
30		6	SS	22	22	50%	Brown	Dense	Fine-medium SAND, some coarse subangular gravel	SP	0	
31			18	17								
32												
33												
34												
35	7	SS	17	19	75%	Brown	Dense	Fine SAND, little coarse subangular gravel	SW	0		

COMMENTS: Boring advanced to 75' using a CME 75 Rig with 4 1/4" HSAs and 2" Split Spoons.
 Set 2" PVC well at 75' bgs with a 10' screen.

PROJECT: Kliegman Brothers OU2					BORING NO.: MW-14D		SHEET: 2 OF 3		
CLIENT: New York State Department of Environmental Conservation					JOB NO.: 11171969 (0500035971.02)				
BORING CONTRACTOR: Buffalo Drilling					BORING LOCATION: N:196483.572 E:1019189.372				
GROUNDWATER:					CASING	SAMPLE	CORE	TUBE	GROUND ELEVATION: 81.29' AMSL
DATE	TIME	LEVEL	TYPE	TYPE		SS			DATE STARTED: 3/26/2003
				DIA.		2"			DATE FINISHED: 3/26/2003
				WT.		140			DRILLER: Larry Schroeder
				FALL		40"			GEOLOGIST: Eric Lovenduski
					* PENETROMETER READING			REVIEWED BY: R. Murphy	

DEPTH FEET	STRATA	SAMPLE				RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	DESCRIPTION	CLASS USCS	REMARKS		
		NO.	TYPE	BLOWS PER 6"							PID PPM	MOIST.	
36	[Patterned Area]	7	SS	19	31	75%	Brown	Dense	Fine SAND, little coarse subangular gravel	SW	0	Moist	
37													
38													
39													
40			8	SS	20	22	71%			-trace silt		0	
41					21	30							
42													
43													
44													
45			9	SS	20	20	83%			Fine SAND, trace coarse rounded gravel		0	
46					23	28							
47													
48													
49													
50		10	SS	19	23	100%					0		
51				20	29								
52													
53													
54													
55		11	SS	9	19	83%	Lt. Brown		Medium SAND, little coarse sand, trace fine rounded gravel		0		
56				23	30								
57													
58													
59													
60		12	SS	14	15	88%			5" C SAND, some f rounded gravel		0		
61				21	21				Fine-medium SAND, trace fine rounded gravel				
62													
63													
64													
65		13	SS	9	16	83%			Medium SAND, trace fine rounded gravel		0		
66				17	22								
67													
68													
69													
70		14	SS	-	-	100%					0	Wet at 69'	

COMMENTS: Boring advanced to 75' using a CME 75 Rig with 4 1/4" HSAs and 2" Split Spoons.
 Set 2" PVC well at 75' bgs with a 10' screen.

TEST BORING LOG

PROJECT: Kliegman Brothers OU2							BORING NO.: MW-14D		SHEET: 3 OF 3			
CLIENT: New York State Department of Environmental Conservation							JOB NO.: 11171969 (0500035971.02)					
BORING CONTRACTOR: Buffalo Drilling							BORING LOCATION: N:196483.572 E:1019189.372					
GROUNDWATER:				CASING	SAMPLE	CORE	TUBE	GROUND ELEVATION: 81.29' AMSL				
DATE	TIME	LEVEL	TYPE	TYPE				DATE STARTED: 3/26/2003				
				DIA.				DATE FINISHED: 3/26/2003				
				WT.				DRILLER: Larry Schroeder				
				FALL				GEOLOGIST: Eric Lovenduski				
							* PENETROMETER READING			REVIEWED BY: R. Murphy		

DEPTH FEET	STRATA	SAMPLE				DESCRIPTION					REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	PID PPM	MOIST.	
71		14	SS	-	-	100%	Lt. Brown	Dense	Medium SAND, trace fine rounded gravel	SW	0	Wet
72							↓	↓	↓	↓		↓
73							↓	↓	↓	↓		↓
74							↓	↓	↓	↓		↓
75							↓	↓	↓	↓		↓
								End of boring at 75' bgs.				

COMMENTS: Boring advanced to 75' using a CME 75 Rig with 4 1/4" HSAs and 2" Split Spoons.
 Set 2" PVC well at 75' bgs with a 10' screen.

DRILLING SUMMARY					
Geologist: Eric Lovenduski					
Drilling Company: Buffalo Drilling					
Driller: Larry Schroeder					
Rig Make/Model: CME 75					
Date: 3/26/2003					
GEOLOGIC LOG					
Depth(ft.)	Description				
	SEE LOG				
WELL DESIGN					
CASING MATERIAL Surface: Steel grade box Monitor: 2" PVC		SCREEN MATERIAL Type: 2" PVC Slot Size: .010"		FILTER MATERIAL Type: #0 Sand Setting: 62.0'-75.0' SEAL MATERIAL Type: Bentonite Setting: 60.0'-62.0'	
COMMENTS: Elevations are above mean sea level (AMSL).				LEGEND 	
Client: NYSDEC		Location: Kliegman Brothers OU2		Project No.: 11172979.00001	
URS Corporation		MONITORING WELL CONSTRUCTION DETAILS		Well Number: MW-14D	

Boring Log

ENVIROTRAC, LTD.

5 Old Dock Road, Yaphank, NY 11980
Boring Location MW-14H

Client: New York State Department of Environmental Conservation	
Site Name & Number: Kliegman Brothers Site # 2-41-031	Address: 76-01 77th Avenue Glendale, NY
Drilling Method: 4 1/4" Hollow Stem Auger, Mud Rotary	Drilling Company: AARCO Environmental
Date Started: 12/10/2009	Date Completed: 12/17/2009
Completion Depth: 115'	ENVIROTRAC Geologist: Mike Alliegro

STRATA (NTS)	DEPTH (ft. below grade)	SAMPLES		SOIL DESCRIPTION
		Reco- very (in.)	PID (ppm)	
	0	NM	ND	<u>0'-5'</u> Hand cleared. Light brown, fine to medium SAND with some gravel and cobbles.
	5	NM	ND	<u>5'-10'</u> Light brown, medium to fine SAND with some gravel
	10	NM	ND	<u>10'-15'</u> Light brown, medium to fine SAND with some gravel. Encountered large boulder at 13'.
	15	NM	ND	<u>15'-20'</u> Hard boulder to 17'. <u>17'-20'</u> Brown, fine, silty SAND with mixed gravel and intermediate cobble layers
	20	NM	ND	<u>20'-40'</u> Brown, fine, silty SAND with some mixed gravel and intermediate cobble layers. Tight formation, slow drilling.
	40	NM	ND	<u>40'-50'</u> <u>40'-47'</u> White, fine, silty CLAY with some brown, fine, silty SAND and trace mixed gravel. Encountered large boulder from 47'-48.5' <u>48.5'-50'</u> Brown, fine, silty, clay-like SAND with trace medium SAND and mixed gravel. Hard drilling, tight formation.
	50	NM	ND	<u>50'-60'</u> Brown, fine, silty, clay-like SAND with trace medium SAND and mixed gravel
	60	NM	ND	<u>60'-70'</u> Brown, fine, silty, clay-like SAND with trace medium SAND and mixed gravel
	70	NM	ND	<u>70'-80'</u> Brown, fine, silty, clay-like SAND with trace medium SAND and mixed gravel. Slow drilling, very tight formation.
	80	NM	ND	<u>80'-90'</u> Brown, fine, silty, clay-like SAND with trace medium SAND and mixed gravel. Tight formation, moderate drilling.
	90	NM	ND	<u>90'-100'</u> Brown, fine, silty, clay-like SAND with trace medium SAND and mixed gravel
	100	NM	ND	<u>100'-110'</u> Brown, fine, silty, clay-like SAND with trace medium SAND and mixed gravel
	110	NM	ND	<u>110'-115'</u> Brown, fine, silty, clay-like SAND with trace medium SAND and mixed gravel
	115			

LEGEND:

	Concrete
	Sand
	Boulder
	Clay

Note: Refusal with augers at 13'. Switched to mud, and soils logged from screening drilling fluid.

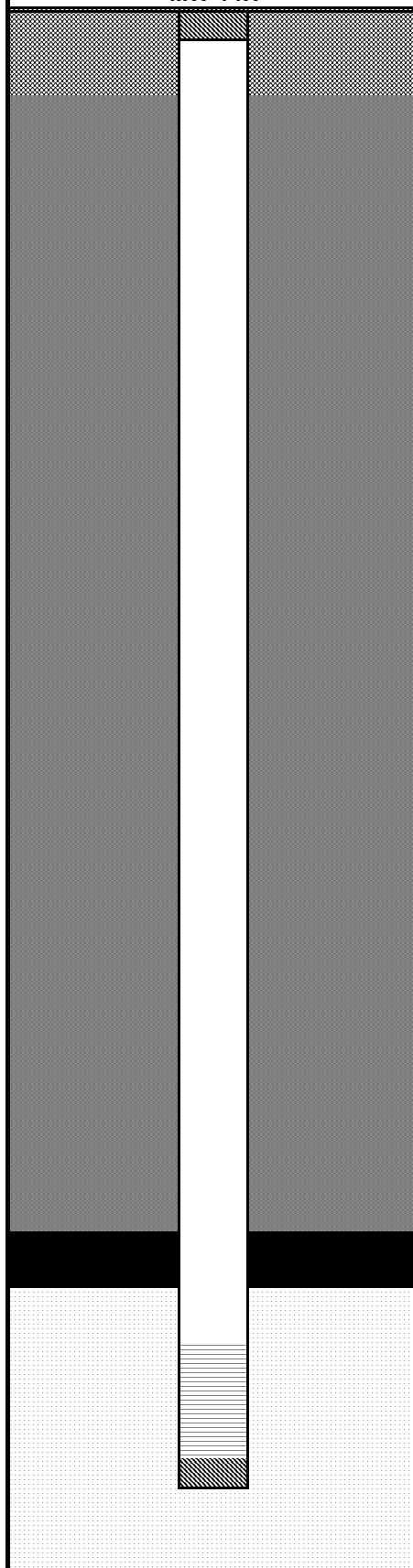
Well Construction Log

ENVIROTRAC, LTD.

5 Old Dock Road, Yaphank, NY 11980

Monitoring Well MW-14H

Client: New York State Department of Environmental Conservation		Depth to Water (ft. from measuring pt.)		Site Elevation Datum	
Site Name & Number: Kliegman Brothers Site # 2-41-031		Address: 76-01 77th Avenue Glendale, NY		NAVD 88	
Drilling Method: 4 1/4" Hollow Stem Auger, Mud Rotary		Drilling Company: AARCO Environmental		Measuring Point Elevation	
Date Started: 12/10/2009		Date Completed: 12/17/2009		80.9 ft	
Completion Depth: 111'		ENVIROTRAC Geologist: Mike Alliegro			

WELL CONSTRUCTION (NTS) MW-14H	DEPTH (ft. below grade)	WELL CONSTRUCTION DETAILS
	0	<u>0'-2'</u> Concrete
	2	<u>2'-90'</u> Grout
	90	<u>90'-93'</u> Bentonite Seal (Time Released Pellets)
	93	<u>93'-115'</u> #2 Well Gravel
	96	<u>96'-111'</u> 2" Sch 40 PVC 0.010" Slot Screen
	111	<u>111'</u> Bottom of well
	115	

LEGEND:

	Concrete
	Bentonite Seal
	Sand Pack
	Screen Zone
	End/Top Cap
	Grout

URS Corporation								TEST BORING LOG				
PROJECT: Kliegman Brothers								BORING NO: MW-23D				
CLIENT: NYSDEC								SHEET: 1 of 2				
BORING CONTRACTOR: Buffalo Drilling Co.								JOB NO.: 11174003.00000				
GROUNDWATER:								BORING LOCATION:				
CAS. SAMPLER CORE TUBE								GROUND ELEVATION:				
DATE	TIME	LEVEL	TYPE	TYPE		Split spoon			DATE STARTED: 06/01/05			
				DIA.		2"			DATE FINISHED: 06/01/05			
				WT.		140#			DRILLER: L. Schroeder			
				FALL		30"			GEOLOGIST: E. Lovenduski			
* POCKET PENETROMETER READING								REVIEWED BY: Scott McCabe				
DEPTH FEET	SAMPLE					DESCRIPTION					REMARKS	
	STRATA	NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	MOISTURE	
						Brown		Concrete				
								SILTY SAND, trace fine GRAVEL	SM		Moist	
5		1	SS	2 3	4 4	75%	Loose			0.0		
10		2	SS	5 11	22 11	72%	Dense	Medium SAND	SP	0.0		
15		3	SS	10 10	9 10	66%	Medium Dense			0.0	Dry	
20		4	SS	21 27	21 30	66%	Dense	SILTY SAND, some coarse GRAVEL	SM	0.0	Moist	
25		5	SS	23 ---	100/5 ---	100%	Very Dense			0.0	Dry	
30		6	SS	12 22	25 19	50%	Dense	Medium SAND, some SILT, trace fine GRAVEL		0.0		
35		7	SS	9 42	18 31	50%	Very Dense			0.0	Moist	
Comments: Boring advanced utilizing a truck mounted CME 75 using 4 1/4" HAS and 2" split spoon. No analytical samples collected								PROJECT NO. 11174003.00000				
								BORING NO. MW-23D				

URS Corporation						TEST BORING LOG						
PROJECT: Kliegman Brothers						BORING NO: MW-23D						
CLIENT: NYSDEC						SHEET: 2 of 2						
						JOB NO.: 11174003.00000						
DEPTH FEET	SAMPLE					DESCRIPTION					REMARKS	
	STRATA	NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	MOISTURE	
40	[Strata pattern]	8	SS	23 21	21 23	59%	Brown	Dense	Medium SAND, some SILT, trace fine GRAVEL	Scott McC	0.0	Moist
45		9	SS	9 22	19 25	53%			SILTY SAND, trace fine GRAVEL		0.0	
50		10	SS	23 27	34 30	75%		Very Dense			0.0	
55		11	SS	15 35	18 50	50%					0.0	
60		12	SS	18 11	12 11	59%		Medium Dense			0.0	Wet
65		13	SS	17 27	20 27	62%		Dense	Medium SAND	SP	0.0	Moist
70		14	SS	15 14	15 16	75%		Medium Dense	Medium to coarse SAND, trace fine GRAVEL	SW	0.0	Wet
75									End Boring at 74' BGS			

Comments: Boring advanced utilizing a truck mounted CME 75 using 4 1/4" HAS and 2" split spoon. No analytical samples collected

PROJECT NO. 11174003.00000
BORING NO. MW-23D

DRILLING SUMMARY			
Geologist: E. Lovenduski			
Drilling Company: Buffalo Drilling Co.			
Driller: L. Schroeder			
Rig Make/Model: CME-75			
Date: 6/1/2005			
GEOLOGIC LOG		D E P T H	
Depth(ft.)	Description		
	See Boring Log for Lithologic Description		
WELL DESIGN			
CASING MATERIAL		SCREEN MATERIAL	FILTER MATERIAL
Surface: Steel grade box		Type: 2" PVC	Type: #0 Sand Setting: 62.0-74.0'
Monitor: 2" PVC		Slot Size: 0.010	SEAL MATERIAL Type: Bentonite Chips Setting: 60.0-62.0'
COMMENTS:		LEGEND	
		Cement/Bentonite Grout Bentonite Seal Silica Sandpack	
Client: NYSDEC		Location: Kliegman Brothers	Project No.: 11174003.00000
URS Corporation		MONITORING WELL CONSTRUCTION DETAILS	Well Number: MW-23D

URS Corporation								TEST BORING LOG				
PROJECT: Kliegman Brothers								BORING NO: MW-24D				
CLIENT: NYSDEC								SHEET: 1 of 2				
BORING CONTRACTOR: Buffalo Drilling Co.								JOB NO.: 11174003.00000				
GROUNDWATER:								BORING LOCATION:				
DATE	TIME	LEVEL	TYPE	TYPE	CAS.	SAMPLER	CORE	TUBE	GROUND ELEVATION:			
						Split spoon			DATE STARTED: 06/02/05			
				DIA.		2"			DATE FINISHED: 06/02/05			
				WT.		140#			DRILLER: L. Schroeder			
				FALL		30"			GEOLOGIST: E. Lovenduski			
* POCKET PENETROMETER READING								REVIEWED BY: Scott McCabe				
DEPTH FEET	SAMPLE					DESCRIPTION					REMARKS	
	STRATA	NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	MOISTURE	
						Brown		Concrete				
								Medium SAND, some SILT	SP			
5		1	SS	12 20 20 28	71%		Dense			0.0	Dry	
10		2	SS	12 14 18 14	62%			Fine SAND, some SILT, trace fine to coarse GRAVEL	SM	0.0	Moist	
15		3	SS	12 14 18 25	75%					0.0		
20		4	SS	14 17 19 24	83%					0.0		
25		5	SS	15 15 15 17	79%					0.0		
30		6	SS	19 21 28 40	87%			SILTY SAND, some coarse GRAVEL		0.0		
35		7	SS	10 19 38 74	33%		Very Dense			0.0		
Comments: Boring advanced utilizing a truck mounted CME 75 using 4 1/4" HAS and 2" split spoon. No analytical samples collected								PROJECT NO. 11174003.00000				
								BORING NO. MW-24D				

URS Corporation						TEST BORING LOG						
PROJECT: Kliegman Brothers						BORING NO: MW-24D						
CLIENT: NYSDEC						SHEET: 2 of 2						
						JOB NO.: 11174003.00000						
DEPTH FEET	SAMPLE					DESCRIPTION					REMARKS	
	STRATA	NO.	TYPE	BLOWS PER 6"	RECOVERY RQD	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	USCS	PID	MOISTURE	
40	[Pattern]	8	SS	50/0	0%			No Recovery	Scott McC	0.0		
45		9	SS	47 50/2	100%	Brown	Very Dense	SILTY SAND, trace coarse GRAVEL	SM	0.0	Moist	
50		10	SS	29 39 49 35	83%					0.0		
55		11	SS	18 22 19 21	75%	Light Brown	Dense	Medium SAND	SP	0.0	Dry	
60	[Pattern]	12	SS	12 17 22 19	79%					0.0		
65		13	SS	19 22 23 22	62%	Brown		Coarse SAND, some fine GRAVEL		0.0	Moist Wet	
70												
75								End Boring at 70' BGS				

Comments: Boring advanced utilizing a truck mounted CME 75 using 4 1/4" HAS and 2" split spoon. No analytical samples collected

PROJECT NO. 11174003.00000
BORING NO. MW-24D

DRILLING SUMMARY

Geologist:
E. Lovenduski

Drilling Company:
Buffalo Drilling Co.

Driller:
L. Schroeder

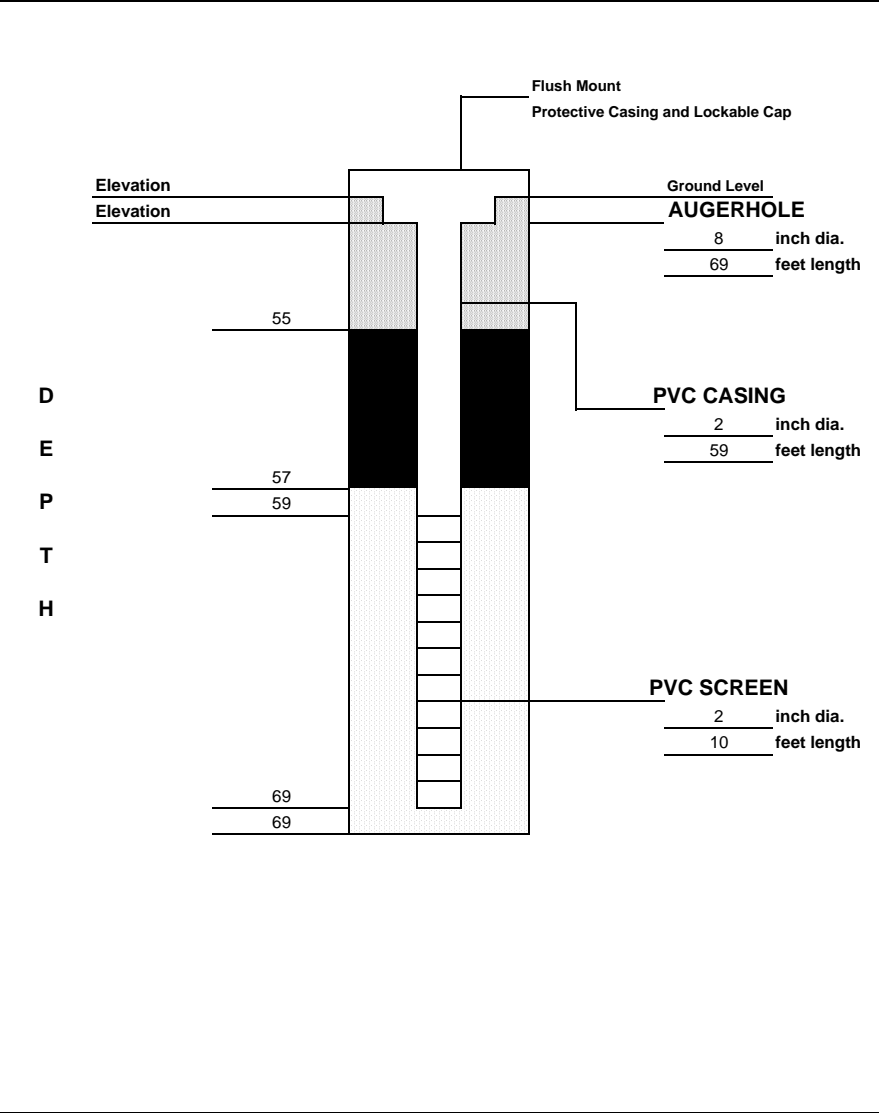
Rig Make/Model:
CME-75

Date:
6/2/2005

GEOLOGIC LOG

Depth(ft.)	Description
	See Boring Log for Lithologic Description

WELL DESIGN



CASING MATERIAL	SCREEN MATERIAL	FILTER MATERIAL
Surface: Steel grade box	Type: 2" PVC	Type: #0 Sand Setting: 57.0-69.0'
Monitor: 2" PVC	Slot Size: 0.010	SEAL MATERIAL Type: Bentonite Chips Setting: 55.0-57.0'
COMMENTS:		LEGEND <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 20px; height: 10px; background-color: #cccccc; border: 1px solid black; margin-right: 5px;"></div> Cement/Bentonite Grout </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 20px; height: 10px; background-color: black; border: 1px solid black; margin-right: 5px;"></div> Bentonite Seal </div> <div style="display: flex; align-items: center;"> <div style="width: 20px; height: 10px; background-color: #e0e0e0; border: 1px solid black; margin-right: 5px;"></div> Silica Sandpack </div>

Client: NYSDEC	Location: Kliegman Brothers	Project No.: 11174003.00000
URS Corporation	MONITORING WELL CONSTRUCTION DETAILS	Well Number: MW-24D

Boring Log
ENVIROTRAC, LTD.
 5 Old Dock Road, Yaphank, NY 11980
Boring Location MW-24H

Client: New York State Department of Environmental Conservation	
Site Name & Number: Kliegman Brothers Site # 2-41-031	Address: 76-01 77th Avenue Glendale, NY
Drilling Method: 4 1/4" Hollow Stem Auger, Mud Rotary	Drilling Company: AARCO Environmental
Date Started: 11/19/2009	Date Completed: 12/9/2009
Completion Depth: 124'	ENVIROTRAC Geologist: Mike Alliegro

STRATA (NTS)	DEPTH (ft. below grade)	SAMPLES		SOIL DESCRIPTION
		Reco- very (in.)	PID (ppm)	
	0	NM	ND	<u>0'-5'</u> Hand cleared. Large boulder 3" below concrete. Brown, medium to fine SAND with some gravel and large cobbles.
	5	NM	ND	<u>5'-10'</u> Brown, fine, silty, clay-like SAND with trace medium SAND , some gravel
	10	NM	ND	<u>10'-15'</u> Brown, fine, silty, clay-like SAND with trace medium SAND , some gravel
	15	NM	ND	<u>15'-20'</u> Brown, fine, silty SAND with some medium SAND and some gravel
	20	NM	ND	<u>20'-25'</u> Brown, fine, silty SAND with some medium SAND and some gravel
	25	NM	ND	<u>25'-30'</u> Brown, fine, silty SAND with medium SAND and some gravel. Encountered gravel layer from 28'-29'.
	30	NM	ND	<u>30'-35'</u> Brown, fine, silty SAND with some medium SAND and some gravel
	35	NM	ND	<u>35'-40'</u> Brown, fine, silty, clay-like SAND with trace medium SAND , some gravel
	40	NM	ND	<u>40'-43'</u> Brown, fine, silty, clay-like SAND with trace medium SAND , some gravel
	43	NM	ND	<u>43'-45'</u> Brown, fine, silty, clay-like SAND with trace gravel. Hard drilling, tight formation.
	45	NM	ND	<u>45'-50'</u> No mud out. Hard drilling, boulder.
	50	NM	ND	<u>50'-60'</u> Hard drilling. Boulders/cobbles.
	60	NM	ND	<u>60'-70'</u> 60'-62' Still on boulder 62'-70' Cobbles and gravel with fine, silty, brown, clay-like SAND with mixed gravel
	70	NM	ND	<u>70'-80'</u> Some brown, fine, silty, clay-like SAND . Very tight formation, slow drilling. Noted: small gravelly layers. Hydropunch sample taken 70'-74'.
	80	NM	ND	<u>80'-90'</u> Brown to tan, fine, silty, clay-like SAND with mixed gravel. Hydropunch sample taken 80'-84'.
	90	NM	ND	<u>90'-100'</u> Brown, fine, silty, clay-like SAND with some mixed gravel. Hydropunch sample taken 90'-94'.
	100	NM	ND	<u>100'-110'</u> Brown, fine, silty, clay-like SAND with mixed gravel. Encountered boulder at 105'-108'. Hydropunch sample taken 100'-104'.
	110	NM	ND	<u>110'-120'</u> Brown, fine, silty, clay-like SAND with some mixed gravel and a small cobble layer. Hydropunch sample taken 110'-114'.
	120			<u>120'-124'</u> Hydropunch sample taken 120'-124'.
	124			

LEGEND:

	Concrete
	Sand
	Gravel
	Boulder

Note: Refusal with augers at 45'. Switched to mud, and soils logged from screening drilling fluid.

Note: Bore hole collapsed to 63' with native soil and was redrilled to 80' to set well on 12/8/09

Boring Log
ENVIROTRAC, LTD.
 5 Old Dock Road, Yaphank, NY 11980
Boring Location MW-30M

Client: New York State Department of Environmental Conservation	
Site Name & Number: Kliegman Brothers Site # 2-41-031	Address: 76-01 77th Avenue Glendale, NY
Drilling Method: 4 1/4" Hollow Stem Auger, Mud Rotary	Drilling Company: AARCO Environmental
Date Started: 10/13/2009	Date Completed: 11/20/2009
Completion Depth: 128'	ENVIROTRAC Geologist: Mike Alliegro

WELL CONSTRUCTION (NTS) MW-30M	DEPTH (ft. below grade)	SAMPLES		SOIL DESCRIPTION
		Recovery (in.)	PID (ppm)	
	0	NM	ND	0'-5' Hand cleared
	5	NM	ND	5'-10' Brown, silty, fine SAND , 10 % small gravel
	10	NM	ND	10'-15' Brown, silty, fine SAND , 10 % small gravel
	15	NM	ND	15'-20' Dark brown SILTS with fine SANDS
	20	NM	ND	20'-25' Dark brown SILTS with fine SANDS , and trace small gravel
	25	NM	ND	25'-30' Dark brown SILTS with fine SANDS , and trace small gravel
	30	NM	ND	30'-33' Brown, silty SAND with trace heavy gravels
	33	NM	ND	33'-37' Hard drilling in rock (boulder), brown drilling fluid;
	37	NM	ND	37'-47' 37'-42' Layers of cobbles, boulders, and gravel with fine, silty SAND 42'-47' Brown, fine, silty CLAY with medium to small mixed gravel
	47	NM	ND	47'-55' Brown, fine, silty CLAY and mixed gravel. Hit hard boulder at 50', slow drilling to 55'.
	55	NM	ND	55'-58' Brown, silty, fine CLAY with mixed gravel, and some layers of cobbles
	58	NM	ND	58'-68' Brown, fine, silty CLAY with mixed gravel and layers of cobbles
	68	NM	ND	68'-70' Brown, fine, silty CLAY with mixed gravel and small layer of cobbles
	70	NM	ND	70'-80' Brown, fine, silty, clay-like SAND with mixed gravel. Hydropunch sample taken 70'-74'.
	80	NM	ND	80'-90' 80'-81' Brown, fine, silty, clay-like SAND with mixed gravel 81'-90' Brown, fine, silty CLAY with some mixed gravel. Hydropunch sample taken 81'-85'.
	90	NM	ND	90'-100' Brown, fine, silty, clay-like SAND with mixed gravel. Encountered boulder at 96'-98'. Hydropunch sample taken 92'-96'.
	100	NM	ND	100'-105' Brown, silty, clay-like SAND with mixed gravel. Hydropunch sample taken 100'-104'.
	105	NM	ND	105'-111' Large boulder or hard clay layer
	111	NM	ND	111'-120' Brown, fine, silty CLAY with mixed gravel. Encountered hard cobble layer from 115'-118'. Hydropunch sample taken 111'-115'.
	120			
	124			124'-128' Hydropunch sample taken 124'-128'.
	128			

LEGEND:

	Concrete
	Sand
	Boulder
	Clay
	Hard Cobble

Note: Refusal with augers at 32'. Switched to mud, and soils logged from screening drilling fluid.

Well Construction Log

ENVIROTRAC, LTD.

5 Old Dock Road, Yaphank, NY 11980

Monitoring Well MW-30M

Client: New York State Department of Environmental Conservation		Depth to Water (ft. from measuring pt.)		Site Elevation Datum
Site Name & Number: Kliegman Brothers Site # 2-41-031	Address: 76-01 77th Avenue Glendale, NY	Date 3/10/2010	DTW 70.75	NAVD 88
Drilling Method: 4 1/4" Hollow Stem Auger, Mud Rotary	Drilling Company: AARCO Environmental	Measuring Point Elevation		
Date Started: 10/13/2009	Date Completed: 11/20/2009	86.53 ft		
Completion Depth: 88'	ENVIROTRAC Geologist: Mike Alliegro			

WELL CONSTRUCTION (NTS) MW-30M	DEPTH (ft. below grade)	SOIL DESCRIPTION
0	0	0'-2' Concrete
2	2	2'-71' Grout
71	71	71'-75' Bentonite Seal (Time Release Pellets)
75	75	75'-93' #2 Well Gravel
78	78	78'-88' 2" Sch 40 PVC 0.010" Slot Screen
88	88	88' Bottom of well
93	93	93'-120' Bentonite Seal (Time Release Pellets)
120	120	

LEGEND:

- Concrete
- Bentonite Seal
- Filter Pack
- Screen Zone
- End/Top Cap
- Grout

NTS - Not to Scale ND - Not Detected NM - Not Monitored DTW - Depth to Water NA - Not Applicable

Geologic Log and Well Construction Details

MW #31D

EnviroTrac Ltd.

5 Old Dock Road, Yaphank, New York 11980

Client: NYSDEC Site #241031		Depth to Water (ft. from measuring pt.)		Site Elevation
Site Name: Kliegman Brothers		Address: 76-01 77th Ave Glendale, NY		NM
Drilling Company: ADT		Method: Sonic		Measuring Point Elevation NM
Date Started: 8/2/2013 (pre-cleared)		Date Completed: 8/22/2013		
Completion Depth: 80 feet		ENVIROTRAC Geologist: Michael Allegro/Ashley Pace		
		Date	DTW	
		10/3/2013	66.40	

WELL CONSTRUCTION (NTS)	DEPTH (feet below grade)	SAMPLES		SOIL DESCRIPTION
		Recovery (inches)	PID (ppm)	
MW #31D	0	0	NA	0'-5': (Pre-cleared): Brown fine grain sand with some gravel and cobbles. Dry, no odor.
	5	20	0.0	5'-10': Brown fine sand with some gravel. Encountered large boulder at approx. 7'. Dry, no odor.
	10	20	0.0	10'-15': (First 13") Large gravel with boulder fragments. (Remaining sample) Brown fine grain sand with trace gravel. Dry, no odor.
	15	41	3.0	15'-20': Brown fine sand with some gravel, cobbles, and boulder fragments. Dry, no odor.
	20	36	0.0	20'-25': Brown fine grain sand with silt and gravel mixed sizes and trace cobbles. Dry, no odor.
	25	42	0.5	25'-30': Brown fine grain sand with silt, gravel and cobbles mixed sizes and boulder fragments. Dry, no odor.
	30	37	0.0	30'-35': Brown fine and trace medium grain sand with silt. Gravel mixed sizes and trace cobbles. Dry, no odor.
	35	7	0.0	35'-40': Encountered boulder. Brown fine grain sand with silt and gravel mixed sizes. Dry, no odor.
	40	0	NA	40'-45': Encountered boulder. Boulder fragments of approx. 5" stuck in sampler.
	45	34	5.8	45'-50': Encountered boulder at approx. 48'. Brown fine grain sand with trace medium sand with some gravel large to small and boulder fragments. Moist, slight odor.
	50	0	NA	50'-55': No sample recovery. Boulder piece in sampler.
	55	0	NA	55'-60': No sample recovery. Boulder piece in sampler.
	60	0	NA	60'-65': No sample recovery. Boulder piece in sampler.
	65	27	5.8	65'-70': (First 13") Brown medium to coarse sand with small to large gravel and cobbles. Wet, no odor. (Remaining) Tan medium to fine sand, trace gravel. Moist, slight odor.
	70	24	0.0	70'-75': Brown coarse grain sand with trace medium sand with some gravel. Wet, no odor.
	75	31	0.0	75'-80': Brown coarse with some medium grain sand with some small gravel. Wet, no odor.
	80			
<p>LEGEND:</p> <ul style="list-style-type: none"> Grout Bentonite Seal Gravel Pack Screen End/Top Cap 				
<p>Well Construction Details:</p> <ul style="list-style-type: none"> Bottom of Well: 80' Screen material: 2", 0.010"-slot schedule 40 PVC, 65'-80' Casing material: 2" schedule 40 PVC, 1'-65' Sand Pack: #0 Cape May Sand 63'-80' Bentonite Seal: 61'-63' Surface Seal: Concrete pad with bolt-down manhole 				

NTS - Not to Scale

NA - Not Applicable

NM - Not Measured

DTW - Depth to Water

DTP - Depth to Product



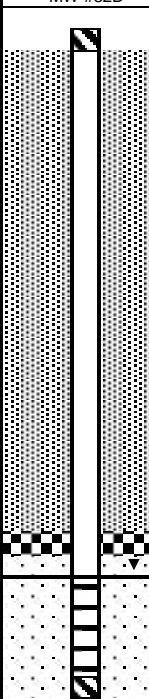
Geologic Log and Well Construction Details

MW #32D

EnviroTrac Ltd.

5 Old Dock Road, Yaphank, New York 11980

Client: NYSDEC Site #241031		Depth to Water (ft. from measuring pt.)		Site Elevation
Site Name: Kliegman Brothers		Address: 76-01 77th Ave Glendale, NY		NM
Drilling Company: ADT		Method: Sonic		Measuring Point Elevation NM
Date Started: 8/2/2013 (pre-cleared)		Date Completed: 9/24/2013		
Completion Depth: 80 feet		ENVIROTRAC Geologist: Michael Alliegro/Ashley Pace		
		Date	DTW	
		10/3/2013	65.51	

WELL CONSTRUCTION (NTS)	DEPTH (feet below grade)	SAMPLES		SOIL DESCRIPTION
		Recovery (inches)	PID (ppm)	
MW #32D	0	0	NA	0'-5': (Pre-cleared): Brown fine grain sand with some gravel. Dry, no odor.
	5	0	NA	5'-10': Sample not attainable.
	10	23	0.0	10'-15': Boulder stuck in sampler. Brown fine sand with silt, gravel and cobbles mixed sizes and boulder fragments. Dry, no odor.
	15	37	0.7	15'-20': Brown fine with trace medium sand with trace silt, gravel and cobbles mixed sizes and boulder fragments. Dry, slight odor.
	20	48	0.0	20'-25': Brown fine sand with trace silt, gravel and cobbles mixed sizes and trace boulders. Dry, no odor.
	25	47	0.5	25'-30': Brown fine sand with trace silt and gravel and cobbles mixed sizes. Dry, no odor.
	30	50	0.0	30'-35': Brown fine sand with trace silt, gravel and cobbles mixed sizes and few boulders. Dry, no odor.
	35	34	0.0	35'-40': Brown fine sand with trace silt, gravel and cobbles mixed sizes and few boulders. Dry, no odor.
	40	34	0.0	40'-45': Brown fine sand with trace silt, small gravel and small cobbles. Dry, no odor.
	45	38	0.0	45'-50': Brown fine sand with silt, small gravel and cobbles mixed sizes. Dry, no odor.
	50	42	0.0	50'-55': Brown fine with trace medium sand, small gravel and few cobbles. Dry, no odor.
	55	37	0.8	55'-60': Brown fine to medium with trace coarse sand and small gravel. Moist, slight odor.
	60	22	1.0	60'-65': Brown fine to medium sand and small gravel. Moist, no odor.
	65	24	0.1	65'-70': Brown fine, medium and coarse sand. Wet, slight odor.
	70	32	2.1	70'-75': Brown fine to medium with trace coarse sand. Wet, no odor.
	75	42	0.4	75'-80': Brown medium to coarse with trace fine sand. Moist, no odor.
	80			
<p>LEGEND:</p> <ul style="list-style-type: none"> Grout Bentonite Seal Gravel Pack Screen End/Top Cap 				
<p><u>Well Construction Details:</u></p> <p>Bottom of Well: 80'</p> <p>Screen material: 2", 0.010"-slot schedule 40 PVC, 65'-80'</p> <p>Casing material: 2" schedule 40 PVC, 1'-65'</p> <p>Sand Pack: #0 Cape May Sand 63'-80'</p> <p>Bentonite Seal: 61'-63'</p> <p>Surface Seal: Concrete pad with bolt-down manhole</p>				

NTS - Not to Scale

NA - Not Applicable

NM - Not Measured

DTW - Depth to Water

DTP - Depth to Product



Geologic Log and Well Construction Details

MW #33D

EnviroTrac Ltd.

5 Old Dock Road, Yaphank, New York 11980

Client: NYSDEC Site #241031		Depth to Water (ft. from measuring pt.)		Site Elevation
Site Name: Kliegman Brothers		Address: 76-01 77th Ave Glendale, NY		NM
Drilling Company: ADT		Method: Sonic		Measuring Point Elevation NM
Date Started: 8/2/2013 (pre-cleared)		Date Completed: 9/25/2013		
Completion Depth: 80 feet		ENVIROTRAC Geologist: Michael Alliegro/Ashley Pace		

WELL CONSTRUCTION (NTS)	DEPTH (feet below grade)	SAMPLES		SOIL DESCRIPTION
		Recovery (inches)	PID (ppm)	
MW #33D	0	0	NA	0'-5': (Pre-cleared): Brown fine sand with some gravel. Moist, no odor.
	5	0	NA	5'-10': Sample not attainable.
	10	35	0.0	10'-15': Brown fine sand with silt and small gravel. Dry, no odor.
	15	28	0.0	15'-20': Brown fine with trace medium sand with trace silt, few small gravel and few small cobbles. Dry, no odor.
	20	30	0.0	20'-25': Brown fine with trace medium sand with trace silt, gravel and cobbles mixed sizes and few boulders. Dry, no odor.
	25	36	0.0	25'-30': Brown fine sand with silt, gravel and cobbles mixed sizes and few boulders. Dry, no odor.
	30	15	3.1	30'-35': Boulder stuck in sampler. Brown fine sand with silt, gravel mixed sizes and boulder fragments. Dry, slight odor.
	35	58	0.0	35'-40': Brown fine sand with silt and gravel and cobbles mixed sizes. Dry, no odor.
	40	53	0.0	40'-45': Brown fine sand with silt and gravel and cobbles mixed sizes. Dry, no odor.
	45	47	0.0	45'-50': Brown fine sand with silt, few gravel mixed sizes and few cobbles mixed sizes. Dry, no odor.
	50	42	0.9	50'-55': Brown fine with trace medium sand with trace silt, trace small gravel and few cobbles. Dry, slight odor.
	55	32	0.3	55'-60': Brown fine sand with silt, gravel and cobbles mixed sizes and boulders. Moist, no odor.
	60	29	5.2	60'-65': Brown fine with trace medium sand with trace silt and gravel and cobbles mixed sizes. Moist, slight odor.
	65	32	0.7	65'-70': Brown medium with trace fine sand and small few gravel. Wet, slight odor.
	70	9.5	0.0	70'-75': Brown fine sand. Wet, no odor.
	75	32	0.0	75'-80': Brown fine to medium with trace coarse sand and trace small gravel. Moist, no odor.
	80			

LEGEND:

- Grout
- Bentonite Seal
- Gravel Pack
- Screen
- End/Top Cap

Well Construction Details:

Bottom of Well: 80'

Screen material: 2", 0.010"-slot schedule 40 PVC, 65'-80'

Casing material: 2" schedule 40 PVC, 1'-65'

Sand Pack: #0 Cape May Sand 63'-80'

Bentonite Seal: 61'-63'

Surface Seal: Concrete pad with bolt-down manhole

NTS - Not to Scale NA - Not Applicable NM - Not Measured DTW - Depth to Water DTP - Depth to Product



APPENDIX C – HEALTH AND SAFETY PLAN



**LOCATION SPECIFIC HEALTH AND SAFETY PLAN
REMEDATION OF KLIEGMAN BROTHERS SITE
OPERABLE UNIT 2
GLENDALE, QUEENS COUNTY, NEW YORK**

Prepared By:

**URS Corporation
77 Goodell Street
Buffalo, New York
Job No. 11175781**

JULY 2014

HEALTH AND SAFETY PLAN

FOR THE

REMEDIAL INJECTIONS

KLIEGMAN BROTHERS OU #2 SITE

SITE #2-41-031

GLENDALE, QUEENS COUNTY, NEW YORK

Prepared For

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF ENVIRONMENTAL REMEDIATION

WORK ASSIGNMENT D003825-37

Prepared By:

URS CORPORATION

77 GOODELL STREET

BUFFALO, NEW YORK

JOB NO. 11175781

JULY 2014

HEALTH AND SAFETY PLAN
KLIEGMAN BROTHERS OU #2 SITE (#2-41-031),
GLENDALE, QUEENS COUNTY, NEW YORK

		<u>PHONE</u>
URS Project Number:	11175781	
URS Project Manager:	Jon Sundquist	716-923-1207
URS Site Safety Officer:	Anders Brunelle	201-786-8488
URS Plan Preparer:	Kevin J. McGovern, PG, CPG, CHMM	716-923-1101
Preparation Date:	July 8, 2014	
Expiration Date:	July 31, 2015	

APPROVALS

Health, Safety, and Environment Representative:

Steve Moeller, CHMM (DATE)

Project Manager:

Jon Sundquist, PhD. (DATE)

Regional HSE Manager:

Ben Bertolotti, CIH (DATE)

This Health and Safety Plan is valid only for this specific project as described in Section 3.0. It is not to be used for other projects or subsequent phases of this project without the written approval of the Regional Health, Safety, and Environment Manager. A copy of this plan is to be maintained at the site at all times.

SAFETY PLAN COMPLIANCE AGREEMENT

I have read the Health and Safety Plan for the project and I understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the health and safety requirements specified in the Plan

Name	Signature	Date
URS Site Safety Officer	_____	
URS Site Personnel	_____	
URS Site Personnel	_____	
URS Site Personnel	_____	
URS Site Personnel	_____	

Subcontractors:

Company	Signature	Date

HEALTH AND SAFETY PLAN

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Figure 2	Route to Occupational Health Clinic
Figure 3	Proposed Remedial Injection Locations
Figure 4	Proposed Monitoring Well Locations

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Table 1	Job Safety Analyses
Table 2	Chemicals of Concern

ATTACHMENTS

Attachment A	URS Safety Management Standards (SMS)
Attachment B	Material Data Safety Sheets
Attachment C	NYCDOT Street Works Manual
Attachment D	Monitoring Equipment Specifications
Attachment E	Generic Community Air Monitoring Plan

GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS

°C	degrees centigrade
°F	degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienists
analyzer	field instrument described in Section 6.1
BPs	blood-borne pathogens
ANSI	American National Standards Institute
C	ceiling
Carcinogen	a substance that can cause cancer
CGI	combustible gas indicator
CO	carbon monoxide
CN	cyanide
CNS	central nervous system
CRZ	contaminant reduction zone
dBA	decibel
DOT	Department of Transportation
ESLI	End-of-Service-Life Indicator
eV	electron volts
EZ	Exclusion Zone
FDNY	New York City Fire Department
FID	flame ionization detector
HCN	hydrogen cyanide
HEPA	high-efficiency particulate air
HASP	Health and Safety Plan
H ₂ S	hydrogen sulfide
LEL	lower explosive limit
m	meter
mg	milligram
mg/m ³	milligrams per cubic meter

GLOSSARY OF TERMS, ACRONYMS AND ABBREVIATIONS (Continued)

MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
NO	nitric oxide
NO ₂	nitrogen dioxide
NYCDOT	New York City Department of Transportation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
O ₂	oxygen
OBZ	operator's breathing zone
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
OVM	organic vapor monitor
PEL	permissible exposure limit
PID	photoionization detector
PM	project manager
PPE	personal protective equipment
ppm	parts per million
REL	recommended exposure limit
RHSEM	Regional Health, Safety, and Environment Manager
SMS	Safety Management Standard
SSO	Site Safety Officer
STEL	short term exposure limit
TLV	Threshold Limit Value
TWA	time-weighted average
URS	URS Corporation and subsidiaries
VOC	volatile organic compound

1.0 PLAN-AT-A-GLANCE

HEALTH AND SAFETY PLAN SUMMARY SHEET

THIS SUMMARY SHEET IS PROVIDED AS A QUICK-REFERENCE/OVERVIEW ONLY. THE REMAINDER OF THIS SITE-SPECIFIC HEALTH AND SAFETY PLAN (HASP) IS INTEGRAL TO THE SAFE CONDUCT OF SITE OPERATIONS AND MUST BE APPLIED IN ITS ENTIRETY.

EMERGENCY INFORMATION

Ambulance: 911
Fire: 911
Police: 911
Hospital: Forest Hills Hospital (718) 830-4200
Occupational Health Clinic: Occupational Health Service (718) 334-3030

NYSDEC Project Manager:

Dave Chiusano 518-402-9814

URS Project Manager:

Jon Sundquist 716-923-1207

URS Health, Safety, and Environment Representative:

Steve Moeller 716-923-1112

URS Regional Manager Health, Safety, and Environment:

Ben Bertolotti, CIH 973-777-3003

NYSDEC Spill Response

NYSDEC Spill Hotline: (800) 457-7362

National Response Center: (800) 424-8802

NYSDOH Project Contact TBD

HOSPITAL DIRECTIONS: Forest Hills Hospital (718) 830-4200
102-01 66th Road
Flushing, NY 11375

Head south on 76th St toward 78th Ave
Go 0.2 miles and turn left onto Myrtle Ave (About 2 minutes)
Go 0.5 miles and turn left onto Union Turnpike (About 3 minutes)
Go 0.7 miles and turn left onto 71st Ave. (About 3 minutes)
Go 1.0 miles and turn left onto 108th St. (About 3 minutes)
Go 0.6 miles and turn left onto 66th Rd. (Destination will be on the right
[About 1 minute])

A map with the route to the hospital is shown on Figure 1.

OCCUPATIONAL HEALTH CLINIC DIRECTIONS:

Occupational Health Service

(718) 830-4200

7807 41st Ave.

Flushing, NY 11373

Head south on 76th St toward 78th Ave.

Turn left onto 78th Ave.

Head east on 78th Ave. towards 79th St.

(About 1 minute)

Go 0.3 miles and turn left onto 80th St.

(About 3 minutes)

Go 0.9 miles and turn left to stay on 80th St.

(About 5 minutes)

Go 1.2 miles and turn right onto Grand Ave.

(About 1 minute)

Go 0.5 miles and continue onto Broadway.

(About 5 minutes)

Go 0.9 miles and sharp right onto 41st Ave.

(At 433 ft., destination will be on the left [About 1 minute])

A map with the route to the occupational health clinic is shown on Figure 2.

CHEMICALS OF CONCERN

1. Volatile Organic Compounds (VOCs), including tetrachloroethene.
2. Sodium Permanganate

SCOPE OF WORK

- Task 1: Mobilization of equipment, site reconnaissance, preparation of work areas, establish work zones, geophysical survey; utility mark outs and clearance
- Task 2: Injection Well Installation
- Task 3: Overburden Monitoring Well Installation and Well Development
- Task 4: Sodium Permanganate Injection
- Task 5: Groundwater Monitoring
- Task 6: Surveying and Demobilization

PROJECT HAZARD ANALYSIS

Task	Chemical Hzds.	Heat/ Cold Stress	Noise	Slip/ Trip/ Fall	Lifting Hzds.	Mechanical Hzds.	Electro-cution	Explosion	Water
1.	Low	Low	Low	Med	Med	Low	N/A	N/A	N/A
2.	High	Med	High	High	Med	Med	Low	Low	N/A
3.	High	Med	High	High	Med	Med	Low	Low	N/A
4.	High	Med	High	High	Med	Med	Low	Low	N/A
5.	High	Med	Low	Med	Med	Low	Low	Low	N/A
6.	Low	Med	Low	Med	Low	Low	N/A	N/A	N/A

High - Exposure likely more than 50% of the time

Med - Exposure likely 10 to 50% of the time

Low - Exposure likely less than 10% of the time

N/A – Exposure not anticipated

Additional information concerning project hazards and their control can be found in Section 5.0 and Table 1.

Task	Task Description	Minimum Protective Clothing/Equipment Requirements
1.	Set Up, Geophysical Survey; Utility Survey, Clearance and Mark-outs	Steel-toed boots, safety glasses with attached side shields, hard hat, reflective vests, work gloves. Safety cones and/or channelized cones and poles for delineation of work areas.
2.	Injection Well Installation.	Steel-toed boots, hard hat, safety glasses with attached side shields, use face shields or goggles when using an air knife, reflective vests, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials and for handling samples. Coated Tyvek will be available for personnel to use. Safety cones and/or channelized cones and poles for delineation of work areas. Metatarsal protection when saw cutting, jack hammering, or pressure washing.
3.	Oversight of overburden monitoring well installation and well development	Steel-toed boots, hard hat, safety glasses with attached side shields, use face shields or goggles when using an air knife, reflective vests, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials and for handling samples. Coated Tyvek will be available for personnel to use. Safety cones and/or channelized cones and poles for delineation of work areas. Metatarsal protection when saw cutting, jack hammering, or pressure washing.
4.	Sodium Permanganate Injection	Steel-toed boots, hard hat, safety glasses with attached side shields, face shields or goggles when injecting, reflective vests, hearing protection, work gloves, nitrile gloves when handling potentially contaminated materials and for handling samples. Coated Tyvek will be available for personnel to use. Safety cones and/or channelized cones and poles for delineation of work areas. Metatarsal protection when saw cutting, jack hammering, or pressure washing.
5.	Groundwater Monitoring.	Steel-toed boots, hard hat, safety glasses with attached side shields, reflective vests, hearing protection, and nitrile gloves for handling samples. Coated Tyvek will be available for personnel to use. Safety cones and/or channelized cones and poles for delineation of work areas.
6.	Surveying and Demobilization	Steel-toed boots, safety glasses with attached side shields, hard hat, reflective vests, and work gloves. Safety cones and/or channelized cones and poles for delineation of work areas.

The HASP Preparer has conducted a Hazard Assessment for this project based on information provided by the Project Manager, in accordance with 29 CFR 1910.132(d).

For more information on Personal Protective Equipment (PPE) and respiratory protection requirements, see the Action Levels table (Page 4) and Section 7.0.

ENGINEERING CONTROLS TO BE USED (as applicable)

- Barricades for delineation of work areas (exclusion zones)
- Traffic control lane closures and flagmen

- Water spray for dust suppression
- Natural wind forces to reduce exposure to airborne contaminants (stay upwind of drilling activities)
- Light-colored PPE to reduce solar load for heat stress control

For more information, see Section 5.0.

INSTRUMENTATION THAT MAY BE USED

- Organic Vapor Monitor (OVM), PID
- Photovac Microtip PID w/10.6 eV lamp
- MultiRAE Plus (PID w/ 10.6 eV lamp, with an LEL sensor)
- Q-Rae Monitor (HCN sensor), (NO & NO₂ sensors) (during drilling inside buildings)
- Foxboro Organic Vapor Analyzer (OVA) Flame Ionization Detector (FID)
- Miniram Real-time Dust Monitor
- Draeger Kit – or equivalent (benzene and/or CN)
- TSI DustTrak
- Noise Meter

For more information, see Section 6.0

PERSONAL EXPOSURE SAMPLING

- Will be conducted
- Will be conducted if PID readings require the use of respiratory protection as described in the Action Level Table (page 4) and in Section 6.2
- Is not anticipated

For more information on monitoring, see Section 6.0.

HAZ-COM MATERIALS INVENTORY

Alconox (decontamination)
Sodium Permanganate (remediation media) – manufactured by Carus Corp.
Isobutylene (calibration gas)
Nitric/Hydrochloric Acid (sample preservative contained in sample bottles)
Fuel (equipment fuel – diesel or gasoline)

ACTION LEVELS (for Photoionization Detector)

Analyzer Reading (above background)	Location	Duration	Action	Personal Protective Equipment
<(5) ppm	Point of Operations/ Release Source point	-----	Continued periodic monitoring.	Minimum site ensemble of steel-toed boots, safety glasses with attached side shields, hard hat, reflective vests, and work gloves. Nitrile Outer Gloves, and Nitrile Inner gloves as necessary based upon contamination encountered. Coated Tyvek will be available for personnel to use
5-15 ppm (1 st Action Level)	Point of Operations/ Release Source point	> 1 minute	Monitor OBZ to determine whether readings are sustained or intermittent. If intermittent then don protective clothing; establish work zones as described in Sect. 9.2. If sustained, initiate PPE requirements for 2 nd action level.	Minimum Site Ensemble, PLUS: Chemical-resistant boot covers, Nitrile Outer Gloves, and Nitrile Inner gloves. Assess the potential cause of the increase in PID readings (source). If gross contamination is encountered, don polycoated Tyvek.

Analyzer Reading (above background)	Location	Duration	Action	Personal Protective Equipment
15-50 ppm (2 nd Action Level)	OBZ	> 1 minute	Stop work and provide respiratory protection; establish decon areas as described in 11.0. Contact the RHSEM to initiate personal exposure monitoring as described in Section 6.0.	Add full-face respirators with combination organic vapor cartridges P-100. Don polycoated Tyvek. Notify the RHSEM of the need for respirators.
>(50) ppm (3 rd Action Level)	OBZ	>1 minute	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind, and notify RHSEM and PM.	As specified by RHSEM

* Substitute poly-coated Tyvek[®] if there is potential for contact with liquids (groundwater, mud, etc.).

OBZ = Operator's Breathing Zone ppm = parts per million

ACTION LEVELS (for the Combustible Gas Indicator)

LEL Reading	Location	Action
<10% LEL	Point of Operations/General Work Area	Continue site operations and continue periodic monitoring
10-20% LEL	Point of Operations/General Work Area	Continue site operations and perform continuous monitoring
>20% LEL	Point of Operations/General Work Area	Shutdown operations, evaluate source, ventilate work area

LEL = Lower Explosive Limit

For additional information on Action Levels and their implementation, see Sections 6.0 and 7.0.

ACTION LEVELS (for Particulates)

Monitor Reading	Location	Action
100 µg/m ³ above background	OBZ/Downwind Location	Employ dust suppression techniques.
150 µg/m ³ above background	OBZ/Downwind Location	Shutdown operations, re-evaluate activities and dust suppression techniques.

µg/m³ = micrograms per cubic meter

ACTION LEVELS (for Noise)

Monitor Reading	Location	Action
85 dBA	Near Source	Temporary halt (to allow for assessment of noise reduction procedures).
90 dBA	Near Source	Stop work (to allow for assessment of noise reduction procedures) noise threshold

dBA = decibels

HEALTH AND SAFETY EQUIPMENT LIST

Required	Not Required	
x		URS SMSs (relevant to project - see next page)
	x	Occupational Safety and Health Administration (OSHA) "Safety on the Job" Posters
x		Hardhats – at all times on site when not in vehicles
x		Safety glasses w/attached side shields, and face shield/goggles.
x		Ear plugs or muffs -based on noise level monitoring
	x	Personal Floatation Device (PFD) – while working on boat or platform in "deep" water areas
x		Reflective safety vest
(x)		Tyvek® coveralls
(x)		Polycoated Tyvek® Q-23 coveralls
x		Steel-toed boots
(x)		Chemical-resistant steel-toed boots or chemical-resistant boot covers
x		Work gloves (as needed)
x		Nitrile outer gloves
x		Nitrile inner gloves
x		Plastic sheeting (visqueen) (as needed to reduce contamination)
x		55-gallon 17-H drums (for contaminated solids)
x		55-gallon 17-E drums (for liquids)
x		Barricade tape and barricades
x		Wash tubs and scrub brushes
x		Decontamination solution (i.e., Alconox)
x		Folding chairs
x		5- or 10-gallon portable eyewash
(x)		Respirator sanitizing equipment
x		First aid kit
x		Infection control kit
x		Drinking water
x		Gatorade or similar drink
x		Type ABC fire extinguishers (contractor supplied)
(x)		Half-face respirators approved by National Institute for Occupational Safety and Health (NIOSH)
(x)		Full-face respirators (NIOSH-approved)
(x)		Respirator cartridges (combination organic/P100)
x		MultiRAE Plus (PID w/[10.6] lamp, O ₂ , CO, H ₂ S Sensors) and calibration kit
	x	Rae Q-Rae Monitor (NO & NO ₂ sensor) with calibration kit (for used during indoor drilling/geoprobe activities)
x		Noise Meter
	x	Garden sprayers (for use in decontamination)
	x	Compressed gas horn (small pocket-size)
x		Duct tape
x		Paper towels and hand soap
x		Spill sorbent
x		Plastic garbage bags
x		Broom and/or shovel
(x)		use dictated by site conditions

Note: Metatarsal protection is required during saw cutting, jack hammering, and pressure washing, minimally.

Note: Minimally, 1 kV dielectric gloves, currently stamped/tested, with leather protective gauntlets required for jack hammering, air lance use subsurface, digging bar subsurface, minimally. Additional note – digging bar must have a non-conductive (electrically) shaft.

URS SAFETY MANAGEMENT STANDARDS REFERENCED BY THIS HASP

URS SMS	TOPIC	HASP SECTION
2	Worker Right to Know	5.1.2
3	Emergency Action Plans	13.0
9	Corrosive and Reactive Materials	5.1
12	Electrical Safety	5.2.6
14	Fire Prevention	13.0
16	Hand Tools and Portable Equipment	5.2
17	Hazardous Waste Operations	3.0
18	Heat Stress	5.2.1
26	Noise and Hearing Conservation	5.2.3
29	Personal Protective Equipment	7.0
30	Sanitation	11.1
32	Traffic Control	5.2.7
34	Utility Clearances and Isolation	5.2.6
42	Respiratory Protection	8.0
46	Subcontractor H&S Requirements	4.0
47	Biological Hazards	5.3
48	Hazardous Materials/ Dangerous Goods Shipping	12.3
49	Incident Reporting	13.6
51	Blood-borne Pathogens	5.3
56	Drilling Safety	5.2.8
57	Vehicle Safety	5.2.7
59	Cold Stress	5.2.2
69	Manual Material Handling	5.2.5
72	Behavior Based Safety	5.0

These Safety Management Standards (SMSs) are available in Attachment A.

2.0 FACILITY BACKGROUND/WORK PLAN

2.1 Site History

Kliegman Bros, Inc. formerly owned the on-site property. This property was used as a warehouse and distribution center for laundry and dry-cleaning supplies from the 1950s through the 1990s. Two 6,000-gallon above-ground storage tanks (ASTs) were used to store tetrachloroethene (PCE). The tanks have since been removed from the property. Although these tanks are the presumed source of contamination, it is unknown if, and when, product was released or, whether contamination was due to a single catastrophic release or a chronic leak problem. Kliegman Bros. ceased operation in 1999. The property was purchased by its current owners in 2000. Known contamination is unrelated to operations since 2000.

The site is situated in a densely populated, urban, mixed-use residential/light-commercial setting. The site consists of Operable Unit Number 1 (OU1) and OU2. OU1 consists of soil contamination present on the Kliegman Brothers property that is currently being remediated using a Soil Vapor Extraction (SVE) System. OU2 consists of groundwater contamination, consisting almost exclusively of tetrachloroethene (PCE), that is present onsite, and that has migrated from the site.

For the remediation of OU2, the New York State Department of Environmental Conservation (NYSDEC) has selected in situ chemical treatment of the concentrated plume area with continued vapor monitoring, and installation of residential vapor mitigation systems as required. Oxidant (Sodium Permanganate) injection wells will need to be installed to facilitate the in situ chemical treatment of the concentrated PCE plume.

2.2 Purpose and Scope of Work

The objectives of the remediation activities are to reduce the concentration of PCE in the groundwater to below NYSDEC groundwater standards. This objective will be addressed by installing injection/monitoring wells, injecting Sodium Permanganate in the injection wells and monitoring the groundwater to evaluate the progress of the remediation injections. The proposed injection wells and monitoring wells can be found in Figures 3 and 4 respectively.

The scope of work includes the following activities:

1. Installation of injection wells to facilitate the Sodium Permanganate injections;
2. Installation of overburden groundwater monitoring wells to monitor groundwater remediation progress;
3. Inject Sodium Permanganate into the groundwater, using the injection wells;
4. Monitor the groundwater for remediation progress; and
5. Survey of the sampling and well locations.

3.0 APPLICABILITY

The purpose of this HASP, which was developed specifically for operations at the Kliegman Brothers OU #2 Site (#2-41-031), is to assign responsibilities, establish personal protection standards and mandatory safety procedures, and provide for contingencies that may arise while operations are being conducted at the site. This HASP complies with, but does not replace, Federal Health and Safety Regulations, as set forth in 29 CFR 1910 and 1926, and applicable state regulations. This HASP is to be used by all on-site personnel as a supplement to these rules, regulations, and guidance. This HASP is to be augmented by the URS Health, Safety, and Environment Program and Management System; relevant standards from that program and system are required to be available on site during all activities.

The provisions of this HASP are mandatory for all onsite URS employees and URS subcontractors. URS is providing a copy of this HASP to each site subcontractor to fulfill its obligation under 29 CFR 1910.120(b) to inform subcontractors of site hazards. In turn, each subcontractor will provide documentation to URS that verifies appropriate training as required by OSHA. Subcontractor employees shall sign the Safety Plan Compliance Agreement to acknowledge receipt and adherence to this HASP. In addition, URS will provide a documented HASP review with all project participants immediately prior to commencement of site investigation activities. Should any new personnel arrive at the site after this HASP review was given, URS will give those new workers a documented HASP review. See also SMS 017 (Hazardous Waste Operations), located in Attachment A.

3.1 Management of Change

Changing and/or unanticipated site conditions may require modification of this HASP to maintain a safe and healthful work environment. Any proposed changes (addendums) to this plan must be reviewed by the URS Regional Health, Safety, and Environmental Manager (RHSEM) prior to their implementation. In addition, all HASP addenda will be reviewed and considered acceptable for use by the NYSDEC prior to its implementation. Under no circumstances will modifications to this plan conflict with federal, state, or other governmental health and safety regulations.

4.0 RESPONSIBILITIES

URS will have site safety and health oversight and coordination responsibilities for all onsite personnel; each subcontractor will be held accountable for the safe and healthful performance of work by each of its employees, subcontractors, or support personnel who may enter the site. See also SMS 046 (Subcontractor H&S Requirements) located in Attachment A.

URS will adhere strictly to the provisions of this HASP, along with applicable regulations issued by governmental entities.

4.1 Project Manager (URS)

The URS Project Manager (PM) will direct onsite operations. The PM may delegate all or part of these duties to a properly qualified URS employee who is designated as the Site Safety Officer. At the site, the PM, assisted by the Site Safety Officer (SSO), has primary responsibility for the following.

- Seeing that appropriate PPE and monitoring equipment are available and properly used by all onsite personnel.
- Establishing that all onsite personnel are aware of the provisions of this HASP, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies.
- Establishing that all onsite personnel have completed a minimum of 40 hours of health and safety training, have appropriate medical clearance, as required by 29 CFR 1910.120, and have been fit tested for the appropriate respirators.
- Seeing that all onsite personnel are aware of the potential hazards associated with site operations.
- Monitoring the safety performance of all onsite personnel to see that required work practices are employed.
- Correcting any work practices or conditions that may result in injury or exposure to hazardous substances.

- Preparing any accident/incident/investigation reports for onsite activities in conjunction with the RHSEM.
- Seeing to the completion of Safety Plan Compliance Agreements by all onsite personnel.
- Halting site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Seeing that the appropriate SMSs are available on site (see "Plan-at-a-Glance").
- Reviewing and approving this project HASP.

4.2 Site Safety Officer (URS)

For the Remedial Investigation, the SSO's duties will be carried out by the Onsite Geologist. The SSO is responsible for the following.

- Implementing the project HASP and reporting any deviations from the anticipated conditions described in that plan to the PM and, if necessary, the URS HSE Representative and/or the RHSEM.
- Determining that monitoring equipment is used properly by all onsite personnel and calibrated in accordance with manufacturer's instructions or other standards and that the results are properly recorded and filed.
- Checking with a URS HSE Representative to assure all URS onsite personnel have current medical clearance and training.
- Assuming any other duties as directed by the PM, HSE Representative, or RHSEM.
- Coordinating with the URS HSE Representative, and/or the RHSEM to identify all onsite personnel on site for whom special PPE, exposure monitoring, or work restrictions may be required.
- Conducting safety meetings for all site personnel in accordance with Section 14.0 of this HASP.
- Conducting daily site inspections prior to the start of each shift. All inspections must be documented (preferably in a bound field logbook).

- Providing ongoing review of protection level needs as project work is performed and informing the PM of the need to upgrade/downgrade protection levels, as appropriate.
- Seeing that decontamination procedures described in Section 11.0 are followed by all onsite personnel.
- Coordinating monitoring of URS onsite personnel with the HSE Representative and the RHSEM (as needed) and assuring proper recording of the results of exposure evaluations.
- Halting site operations, if necessary, in the event of an emergency or to correct unsafe work practices.

4.3 Regional Health, Safety, and Environmental Manager (URS)

The RHSEM is responsible for:

- Providing health and safety support as requested by the SSO, PM, and the HSE Representative. This includes oversight of any URS employee and subcontractor personnel exposure monitoring as described in this HASP.

4.4 Project Personnel

Project personnel involved in onsite investigations and operations are responsible for:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees;
- Performing only those tasks that they believe they can do safely and immediately reporting any accidents and/or unsafe conditions to the SSO or PM;
- Implementing the procedures set forth in the HASP and reporting any deviations from the procedures described in that HASP to the SSO or PM for action;
- Notifying the PM and SSO of any special medical problems (i.e., allergies) and seeing that all onsite personnel are aware of such problems; and
- Reviewing the project HASP and signing the Safety Plan Compliance Agreement.

4.5 Contractor

The Contractor must designate a SSO responsible for:

- Performing only those tasks that they believe they can do safely and immediately reporting any accidents and/or unsafe conditions to the SSO or PM;
- Implementing the procedures set forth in the HASP and reporting any deviations from the procedures described in that HASP to the SSO or PM for action;
- Notifying the PM and SSO of any special medical problems (i.e., allergies) and seeing that all onsite personnel are aware of such problems; and
- Reviewing the project HASP and signing the Safety Plan Compliance Agreement.

5.0 JOB HAZARD ANALYSIS

A site-specific Job Hazard Analysis is provided in Table 1, which has been developed based on SMS 072 which, may be found in Attachment A.

5.1 Chemical Hazards

Two categories of chemical hazards are associated with site activities:

- Site constituents; and
- Chemicals used to conduct the site work.

Site constituents are organic substances that may be associated with residues from the historic operations of the former distribution center for laundry and dry-cleaning supplies and which may be present and or encountered in the subsurface at the site. The chemicals that are brought on site to conduct the work may be hazardous and subject to regulation under OSHA's Hazard Communication Standard (29 CFR 1910.1200).

Byproducts from the historical operations of the distribution center for laundry and dry-cleaning supplies may include hazardous substances, such as VOCs (e.g., PCE).

5.1.1 Site Constituents

From an occupational health standpoint, given that any potential exposure to site personnel will be only for a short period of time (intermittent for several days), the levels of contaminants that have been, or could be, encountered during site activities should not represent a significant concern if the provisions of this HASP are appropriately implemented. However, given that the site is still under investigation, the potential for exposure to elevated levels of these contaminants may exist. Exposure to elevated levels of these contaminants may pose hazards. Specific constituent hazards are detailed in Table 1. Overviews of these hazards are presented here in terms of the following types of occupational exposure limits:

- PEL Permissible Exposure Limit (OSHA Standard)
- TLV Threshold Limit Value (American Conference of Governmental Industrial Hygienists [ACGIH] Guidance)

- STEL Short Term Exposure Limit
- C Ceiling

OSHA PELs, and ACGIH TLVs, are time-weighted averages (TWAs), which are defined as concentrations for a normal 8-hour work day and 40-hour work week to which almost all workers can be exposed repeatedly without suffering adverse health effects.

STEL is defined as the concentration to which workers can be exposed for short time periods without irritation, tissue damage, or narcosis sufficient to be likely to cause impairment of self-rescue or to precipitate accidental injury. The STEL is a 15-minute TWA that will not be exceeded at any time during the workday. STELs are used by OSHA, and ACGIH, for chemical exposure criteria.

A ceiling value (C) is a concentration that will not be exceeded at any time in any workday. Ceiling limits are used by OSHA, and ACGIH, for chemical exposure criteria.

Skin contact with potentially contaminated materials will be minimized by the use of personal protective clothing (as described in Sections 1.0 and 7.0). Air monitoring and the use of engineering controls will minimize inhalation of vapors or particulates during site activities, and respiratory protection will be used if the action levels described in Section 1.0 are exceeded. Ingestion of contaminated materials will be minimized by the use of appropriate personal hygiene procedures during decontamination (i.e., thoroughly washing face and hands with soap and water after leaving the work area and prior to eating or drinking). See SMS 009 (Corrosive and Reactive Materials), located in Attachment A.

5.1.2 Hazard Communication Materials

Materials that are considered hazardous materials under the OSHA Hazard Communication Standard (29 CFR 1910.1200) may be used during this project (possibly including acids for sample preservation, and solvents for equipment decontamination). In accordance with the URS Hazard Communication Program, the Material Safety Data Sheets (MSDSs) for the hazardous materials listed in Section 1.0 are included in Attachment B. The SSO will make copies of these MSDSs available to any subcontractors (i.e., drillers) on this project.

URS' written Hazard Communication Program is located in SMS 002 which, may be found in Attachment A.

5.2 **Physical Hazards**

Physical hazards at this work site include:

- Heat stress and/or cold stress, depending on the time of year the work will be performed;
- Hand tools and portable equipment (SMS 016 which, may be found in Attachment A.);
- Noise from the operation of site equipment;
- Slip-trip-fall types of accidents;
- Back/shoulder an or other injuries resulting from improper lifting (manual material handling);
- Moving vehicles;
- Being caught in or struck by moving equipment;
- Drilling activities (e.g., pinch points or struck by equipment);
- Electrocution hazards associated with *drilling or hand excavation activities*, such as contact with overhead or underground power lines or pipelines; and
- Hazards associated with using vacuum excavation equipment, if used (e.g., vacuum, dust, noise, manual material handling).

5.2.1 **Heat Stress Recognition and Control**

Heat stress monitoring will commence when personnel are wearing PPE, including Tyvek®-type coveralls, and the ambient temperature exceeds 70°F. If standard work garments (cotton coveralls) are worn, monitoring will commence at 85°F. Heat stress monitoring and control guidance can be found in SMS 018 which, may be found in Attachment A.

5.2.2 Cold Stress Recognition and Control

Protection against cold stress will be initiated when temperatures drop below 45°F. Cold stress guidance is provided in SMS 059 which may be found in Attachment A.

Exposure to cold working conditions can result in cold stress (hypothermia) and/or injury (frostbite) to hands, feet, and head. Hypothermia can result when the core body temperature drops below 36°C (96.8°F). Lower body temperature will be likely to result in dizziness, drowsiness, disorientation, slurred speech, or loss of consciousness, with possible fatal consequences. Pain in the extremities may be the first warning of danger from cold stress. Shivering develops when the body temperature falls to 35°C (95°F).

Hypothermia can be brought on by exposure to cold air, immersion in cold water, or a combination of both. The wind chill factor, which is the cooling power of moving air, is a critical factor in cold stress.

Workers must wear adequate insulating clothing if work is performed in temperatures below 4°C (40°F). At temperatures of 2°C (35.6°F or less), workers whose clothing becomes wet will be provided immediately with a change of clothing and, if necessary, treated for hypothermia. Treatment includes warming the victim (with skin-to-skin contact or by providing warm blankets or other coverings) and providing warm liquids for the victim to drink. Skin exposure will not be permitted at temperatures of -32°C (-25°F) or below.

If fine work is to be performed with bare hands for more than 10 to 20 minutes at temperatures below 16°C (60°F), provisions will be made for keeping the workers' hands warm. If equivalent chill temperatures fall below 40°F, and fine manual dexterity is not required, gloves will be worn. Metal handles of tools will be covered with insulating material at air temperatures below -1°C (30°F).

If work is to be performed continuously in the cold when the wind chill factor is at or below -7°C (19°F), heated warming shelters (tents, trailers, vehicle cabs) will be made available nearby.

5.2.3 Noise Hazards

Previous surveys indicate that heavy equipment, such as drilling equipment, may produce continuous and impact noise at or above the action level of 85 dBA. All personnel that need to enter or occupy the exclusion zone shall wear hearing protective devices (either muffs or plugs). Personnel will wash their hands with soap and water prior to inserting earplugs to avoid initiating ear infections. A full description of Noise Mitigation Measures including monitoring equipment, monitoring frequencies, monitoring distances, action levels, and mitigation measures is discussed in Section 10.0 below. See also SMS 026 (Noise and Hearing Conservation), located in Attachment A.

5.2.4 Slip/Trip/Fall Hazards

Workers shall exercise caution when walking around the site to avoid fall and trip hazards. If there are holes or uneven terrain in the work area that could cause site personnel to fall or trip, they must be covered, flagged, or marked to warn workers. If conditions become slippery, workers should take small steps with their feet pointed slightly outward to decrease the probability of slipping. Workers shall watch where they are walking and walk only in areas of good stability.

5.2.5 Lifting Hazards

The guidelines listed below will be followed whenever lifting equipment such as portable generators, coolers filled with samples, and any other objects that are of odd size or shape or that weigh over 40 pounds. Safe lifting procedures are described in SMS 069 which, may be found in Attachment A.

- Get help when lifting heavy loads. Lift portable generators using a two-person lift.
- When moving heavy objects, such as drums or containers, use a dolly or other means of assistance.
- Plan the lift. If lifting a heavy object, plan the route and where to place the object. In addition, plan communication signals to be used (i.e., “1,2,3, lift,” etc.)
- Wear sturdy shoes that are in good condition and supply traction when performing lifts.

- Keep your back straight and head aligned during the lift, and use your legs to lift the load – do not twist or bend from the waist. Keep the load in front of you – do not lift or carry objects from the side.
- Keep the heavy part of the load close to your body to help maintain your balance.

5.2.6 Underground and Aboveground Utilities

Prior to conducting any intrusive activities, a Code 753 mark-out by all utility companies with facilities in the site vicinity will be conducted to identify and locate subsurface utilities at the site, with focus on the areas where intrusive work will be performed. Utility clearance shall be performed utilizing New York City Department of Transportation's Street Works Manual (Attachment C) and in compliance with New York State Department of Transportation (NYSDOT) Dig Safely requirements. Health and Safety considerations for conducting this task shall comply with Section 5.2 of this HASP.

Following the utility survey, any utilities identified within 5 feet from the subsurface testing locations will be exposed. Prior to drilling at each proposed soil boring and well location will be pre-cleared to a depth of approximately 5 feet below grade. The pre-clearing effort will consist of removing pavement and/or concrete using a saw or jackhammer prior to removal in a 2-foot by 2-foot square. Following the removal of the pavement and/or concrete, the subsurface soil will be removed to 5-feet below ground surface using non-mechanical methods including vacuum extraction and hand digging using a posthole digger, shovel, breaker bar, and/or an air knife – all with non-electrically conductive shafts/handles. Only after all utilities have been visually located and identified and cleared at each location, subsurface testing via drilling or other mechanical means will proceed following the control measures for each specific task as described in the subsections below and in the SMSs (Attachment A). After the location has been cleared for drilling, the hole will be backfilled flush with the sidewalk using the excavated spoils. If the boring will not be immediately advanced, it will be temporarily patched with blacktop patch or concrete. See also SMSs 012 (Electrical Safety) and 034 (Utility Clearances and Isolation), located in Attachment A.

5.2.7 Work Area Protection

Project operations may be undertaken in a roadway or parking lot, causing motor vehicles to pose a hazard. Consideration should be given to parking work vehicles within the coned area between the work area and oncoming traffic. A lane closure permit will be obtained from the New York City Department of Transportation (NYCDOT) for all work conducted in the street. URS will procure a traffic control subcontractor to complete the lane closure barricades and provide flagman services during field operations. In addition, all work shall follow procedures for work zone traffic control provided in SMS 032 which, may be found in Attachment A. For all sidewalk work, URS will use NYSDOT approved barriers (e.g., channelized cones and poles) which will be set up with provisions for sight impaired members of the public. See also SMS 057 (Vehicle Safety), located in Attachment A.

5.2.8 Drilling Hazards

The primary responsibility during drilling safety is with the drilling subcontractor(s). URS employees are responsible for their own safety including recognizing and avoiding drill rig hazards. URS employees that observe a drill rig condition believed to be unsafe shall advise the drill rig operator of the unsafe condition.

URS technicians, geologists, engineers, or other field staff assigned to observe drilling operations or collect soil samples should observe the following guidelines:

- Require a meeting at project start-up regarding the drill rig operator responsibility for rig safety and any site and equipment specific safety requirements
- Set up any sample tables and general work areas for the URS field staff to the side of the drill rig (preferably 10 meters away) and not directly behind the rig.
- URS engineers, technician, and geologists shall not assist the drillers with the drilling equipment or supplies and shall not at any time operate the drill rig controls.
- URS employees should however know where the kill-switches are located and that all are operating correctly.

Before moving a rig, the operator must do the following:

- To the extent practical, walk the planned route of travel and inspect it for depressions, gullies, ruts, and other obstacles.
- Check the brakes of the truck/carrier, especially if the terrain along the route of travel is rough or sloped.
- Discharge all passengers before moving on rough or steep terrain.
- Engage the front axle (on 4x4, 6x6, etc. vehicles) before traversing rough or steep terrain.

After the rig has been positioned to begin drilling, all brakes and/or locks must be set before drilling begins. If the rig is positioned on a steep grade and leveling of the ground is impossible or impractical, the wheel of the transport vehicle shall be blocked and other means of preventing the rig from moving or tipping over employed. Procedures for drilling safety are provided in SMS 056 which, may be found in Attachment A.

5.2.9 Excavation

There are no excavation activities under the current scope of work. If for any reason it is determined that excavations are required due to a modification of the scope of work, then a separate addendum for Excavation Procedures will be made to this HASP.

5.2.10 Confined Space Procedures

Under the current scope of work, no confined spaces will be entered by URS personnel or subcontractors. If for any reason it is determined that entry into confined/enclosed spaces is required due to a modification of the scope of work, then a separate addendum for Permit Required Confined Space Procedures will be made to this HASP. Entry into confined spaces by site personnel shall be performed in accordance with 29 CFR 1910.146.

5.2.11 Vacuum Excavation Hazards and Controls

The Vac-Tron Water-Air Knife system includes vacuum components, rotating machinery, blower, and high pressure pump and associated equipment. Potential hazards include rotating equipment, heat that could result in burns from the blower casing and associated piping, suction from the vacuum equipment, and high pressure jet (see Table 1). A 2-person crew will

operate the Vac-Tron at all times. The guidelines listed below will be followed whenever the vacuum excavation equipment is used (refer also to Table 1).

- Eye protection and hearing protection must be worn when dealing with vacuum system. Keep hands and clothing an arm's length away from rotating machinery. All hose connections must be secure. Test all emergency cut-off switches for operation.
- Engage the emergency cut-off switch and release pressure from lines in the event of an emergency such as someone caught by the suction hose.
- Always keep hands and clothing an arm's length away from inlet and discharge openings. Avoid contact with blower casing and associated piping which may cause major skin burns on contact. Do not reach into any opening in the blower while it is operating and ensure guards are in place on external moving parts.
- Do not spray persons with high pressure jet. Use caution when using high pressure jet assembly around known underground utilities. Do not direct the high pressure jet at one point for long periods of time, continually rotate high pressure spray assembly. Do not use unit indoors. Drips or signs of wear on the hoses can cause injuries, check all components prior to use. Pull the trigger while turning off the machine, to make sure piping is not under pressure. Inform all personnel of restricted area and do not permit unauthorized individuals (those not properly trained [40-Hour training, etc.] or wearing appropriate PPE) access to the exclusion zone. Within a 10 foot area where high pressure jet is being utilized, a face shield and safety glasses shall be worn in addition to the level D PPE.
- When temperatures drop below 20°F or when the water used to conduct subsurface clearance freezes and impacts the safe operation of the Vac-Tron unit, subsurface clearance should stop until warmer temperatures occur or the safe operation of the machinery is no longer impacted.

5.3 Biological Hazards

Potential biological hazards include illnesses and/or injuries transmitted by plants, insects, animals, and pathogenic agents. There are many plants, animals, and insects that are potentially harmful to humans that include: ticks, poison ivy/poison oak, certain spiders, mosquitoes, and poisonous snakes. Refer to SMS 047 for specific information on these hazards which may be found in Attachment A.

Blood-borne pathogens (BPs) include diseases that can be transmitted by contact with blood or other bodily fluids as well as contaminated items which may be encountered on this urban site (e.g., used syringes, etc.). Universal precautions shall be used when administering first aid. Good hygiene practices and proper decontamination of non-disposable PPE will minimize potential for transmission of BPs. Refer to SMS 051 for additional information which, may be found in Attachment A.

6.0 WORKER EXPOSURE MONITORING PLAN

Heat and cold stress, noise, and chemical exposures may be encountered at this site. Heat and cold stress monitoring and prevention are addressed in Section 5.2.

6.1 Noise Monitoring

If required, noise measurements during investigation activities will be performed using a Quest model 2700 Type 2 Impulse SLM or equivalent. Noise measurements will be recorded on data collection tables with construction activities observed during monitoring noted. Noise exposure levels will also be concurrently assessed using a Quest NoisePro dosimeter or equivalent, which automatically measures and calculates equivalent 8-hour exposure levels. Noise measuring instruments will be operated to assess compliance with the 85 dBA action level for a hearing conservation program, and 90 dBA for assessing compliance with the OSHA 90 dBA PEL. Additional information pertaining to noise monitoring is provided in Section 10.0.

6.2 Chemical Exposure Monitoring

The field instrumentation described in this HASP has been specifically selected for the contaminants that may be reasonably anticipated to be encountered during the course of this project. Selection factors include anticipated airborne concentrations, potential interference, ionization potentials, instrument sensitivity, and occupational exposure limits. The action levels specified in Section 1.0 were established with the expectation that specific instruments will be used.

The monitoring equipment specified in Section 1.0 will be used on a regular basis, except during permanganate injection (when no exposure to VOCs is expected) to evaluate the potential for exposure to airborne contaminants, typically every five to ten minutes. Specifications for this monitoring equipment are provided in Attachment D. Monitoring will be conducted in the immediate vicinity of the contaminant source point or work area (e.g., at the borehole and cuttings adjacent to the borehole). If VOC readings with the PID exceed the first action level (1-5 ppm > one minute), continuous monitoring will start immediately in the OBZ of the person working nearest the point of operations/contaminant source, and site personnel will don protective clothing pursuant to what is specified in this plan.

A reading in the OBZ above the second action level will require the use of full-face respirators with appropriate cartridges. If the VOC monitoring instrument reads more than the fourth action level (50 ppm > one minute), work will stop, and workers will move upwind while the airborne contaminants dissipate. If elevated levels remain for more than five minutes, the source of the airborne contamination will be covered with clean soil, plastic sheeting, or foam (or be controlled in an appropriate manner), and the HSE Representative, the RHSEM, and PM will be contacted for further guidance regarding establishing a worker exposure monitoring plan.

6.3 Background Readings

All direct-reading instrument readings will be evaluated relative to background readings, not “meter zero”. Prior to the start of work at each shift, and whenever there is a significant shift in wind direction, instrument readings will be obtained upwind of the site work zone to determine the level of “background” readings from such things as local vehicle traffic or emissions from nearby operations unrelated to the site. Site readings will be evaluated against these background readings (i.e., if an action level is listed as 20 parts per million [ppm], it is evaluated as 20 ppm above background). The SSO will consult with the industrial hygienist regarding the potential health hazards associated with background readings above 5 ppm.

6.4 Data Logging

All monitoring data, including background readings, will be logged in the field logbook. The results of daily instrument calibrations can be logged in a field logbook. All monitoring instruments will be calibrated in accordance with the manufacturers’ instructions prior to the start of each shift. Calibration also will be performed when inconsistent or erratic readings are obtained.

[If an instrument cannot be calibrated to specification or becomes otherwise inoperable, all invasive site work (i.e., drilling,) will cease until the instrument is appropriately repaired or replaced, and the PM or RHSEM will be contacted for further guidance.]

6.5 Dust Control

High winds and site operations can cause airborne dust hazards. If site operations generate sustained dust (i.e. a TSI DustTrak or MiniRam reading of >100 µg/m³ above

background in the OBZ/downwind location), a water mist will be applied to reduce dust generation. If the mist is not effective in reducing dust generation, personnel will don respirators with combination organic vapor P100 cartridges (such as MSA's GMC-H cartridges).

Sand and Portland cement that may be used in groundwater piezometer/monitoring well construction may contain free silica (quartz). Airborne exposure to silica dust may occur during the handling of these materials. Half-face respirators with HEPA cartridges will be worn for operations that pose a reasonable possibility of exposure to sustained airborne dust from the pouring and mixing of dry sand or cement. Decisions concerning the required use of respirators will be made in consultation with the RHSEM.

6.6 Explosive Atmospheres

A CGI/O₂ meter will be used to monitor ambient conditions during the drilling task, and decisions will be based on the levels measured using a CGI/O₂ meter (measurements are in % of the LEL), as determined by the action level table.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The minimum Personal Protective Equipment (PPE) ensemble for all onsite personnel includes:

- Hardhat (ANSI approved);;
- Safety glasses with side shields (or impact-resistant goggles);
- Steel-toed boots or chemical-resistant steel-toed boots; (ANSI-rated)
- Hearing protection within a 25 foot radius of operating equipment and/or whenever nose monitoring equipment indicates noise levels at or greater than 85 dB;
- Work gloves and/or chemical-resistant gloves; and
- Tyvek® or coated-Tyvek® as specified in this plan.

As the various monitoring action levels are reached, additional PPE is required. Section 1.0 describes the incremental PPE requirements relative to specific action levels and the specific kinds of PPE to be used. Procedures for the use and selection of PPE are provided in SMS 029 which may be found in Attachment A.

7.1 Limitations of Protective Clothing

The protective equipment ensembles selected for this project are anticipated to provide protection against the types and concentrations of hazardous materials that may be encountered during field operations. However, no protective garment, glove, or boot is resistant to all chemicals at any concentration; in fact, chemicals may continue to permeate or degrade a garment even after the source of the contamination is removed.

To obtain optimal usage from PPE, the following procedures are to be followed by all onsite personnel.

- When using Tyvek® coveralls, don a clean, new garment after each rest break or at the beginning of each shift or when they become damaged or torn.
- Inspect all clothing, gloves and boots both prior to and during use for:

- Imperfect seams;
- Non-uniform coatings;
- Tears; and
- Poorly functioning closures.
- Inspect reusable garments, boots, and gloves prior to and during use for:
 - Visible signs of chemical permeation, such as swelling, discoloration, stiffness, or brittleness; and
 - Cracks or any signs of puncture or abrasion.

Reusable garments exhibiting any of these characteristics will be discarded.

7.2 Duration of Work Tasks

The SSO will establish the duration of work tasks in which personnel use PPE ensembles that include chemical protective clothing (including Tyvek® as specified in this plan). Variables to be considered include ambient temperature and other weather conditions, the capacity of individual personnel to work in the required level of PPE in heat and cold, and the limitations of specific PPE ensembles. Recommended rest breaks are as follows:

- Fifteen minutes midway between shift startup and lunch;
- Lunch break (30 to 60 minutes); and
- Fifteen minutes midway between lunch and shift end.

Rest breaks are to be taken in the support zone or other clean area after personnel have completed the decontamination process, including washing the hands and face with soap and water. [Additional rest breaks will be scheduled according to heat stress monitoring protocols as described in SMS 018 which, may be found in Attachment A.]

8.0 RESPIRATORY PROTECTION

8.1 Respirator Selection

Engineering controls and safe work practices (e.g., elimination of the source of contamination, ventilation equipment, working upwind, limiting exposure time, etc.) always must be the primary control for air contaminants. Respirators will be used if engineering or work practice controls are not feasible for controlling airborne exposures below acceptable concentrations and as an interim control measure while engineering or work practice controls are implemented. Respirator use will not be initiated until approved by the URS RHSEM.

Once the need for respirators has been established, the respirators will be selected on the basis of the hazards to which the worker is exposed. Only NIOSH-approved respirators will be issued. Selection criteria established in 29 CFR 1910.134 have been used by the Preparer of this HASP in determining respirator requirements for this project.

CAUTION: Air purifying respirators are not to be used where there is an oxygen deficiency. Only air-supplied respirators with an emergency escape cylinder or self-contained breathing apparatus will be worn when an oxygen deficiency exists.

CAUTION: A respirator does not protect against excessive heat or against a hazardous substance that can attack the body through the skin.

Airborne contaminants have been evaluated based on the suspected contaminants of concern. The concentration of the airborne chemical hazard will be evaluated using direct-reading instruments to determine what type of respirator will be used. Airborne readings will be compared to the action levels in the table in Section 1.0. See action level/respirator requirements in Section 6.1.

8.2 Medical Screening

URS project employees are enrolled in the URS Medical Surveillance Program and are medically evaluated in compliance with the requirements of 29 CFR 1910.134(a)(10). Employees not medically cleared to wear respirators will not be assigned to this project. The medical status of each employee is reviewed annually and as may be deemed necessary by the

examining physician if the physical status of the employee changes. URS subcontractors will be required to confirm medical screening for their personnel.

8.3 Fit Testing

A person wearing a respirator must be clean-shaven in the area of the face-piece seal. Long hair, sideburns, and skullcaps that extend under the seal are not allowed. Glasses with temple pieces extending under the seal are not allowed for full-face respirators. Persons with facial conditions that prevent a proper seal are not allowed to wear a respirator until the condition is corrected. Facial conditions that may cause a seal problem include missing dentures, scars, severe acne, etc. Contact lenses may be worn with respiratory protection.

No individual will enter an area where the use of respiratory protective equipment is required unless the person has been fit tested within the last year. Fit testing will be performed in accordance with accepted fit test procedures defined in SMS 042 which, may be found in Attachment A. A copy of current fit test results will be maintained at the site.

Records of fit testing will be maintained on site or by the employee's office and/or corporate medical surveillance program. .

Respirator wearers will perform a user seal check each time they put on the respirator. For air-purifying respirators, the positive user seal check is performed by removing the exhalation valve cover, placing the palm over the respirator exhalation valve, and exhaling gently. The respirator mask should puff out without noticeable leakage. The negative user seal check is performed by placing the palms over both of the respirator cartridges, inhaling gently, and holding the breath for 10 seconds. The respirator mask should remain collapsed on the face without noticeable leakage.

8.4 Respirator Use Instructions

Only those employees who have been properly trained and qualified on the specific type of respirator to be worn may use respirators. No individual will enter an area where the use of respiratory protective equipment is required unless the person has been trained.

All employees whose job assignments require the use of respirators are trained in accordance with 29 CFR 1910.134 during an initial 40-hour and annual refresher training for hazardous waste operations.

Hands-on training in inspecting and donning a respirator, including user seal checks, also is provided at the time of fit testing. Retraining is performed annually on each type of respirator worn by the individual. In addition, site-specific respirator training is provided during site safety briefings conducted by the SSO. Training records are kept in the employee's training file.

A particulate respirator cartridge will be changed out when the wearer has difficulty breathing through the cartridge, after each use, or if it is exceptionally humid.

The fit of a chemical gas or vapor respirator will be rechecked, and the cartridges will be changed, if the wearer detects chemical odor or feels chemical irritation on the skin, both of which are indicators of leakage or cartridge breakthrough. Where available, an End-of-Service Life Indicator (ESLI) will be used on chemical respirator cartridges. Cartridges will be changed as soon as the ESLI indicates that the cartridge is saturated and no longer effective in absorbing airborne chemicals.

8.5 Respirator Inspection

The user will inspect respirators before and after each day's use. The inspection procedure for air-purifying respirators (full-face piece and half-face piece cartridge respirators) follows.

Examine the face piece for:

- Excessive dirt;
- Cracks, tears, holes, or distortion from improper storage;
- Inflexibility;
- Cracked or badly scratched lenses (full-face only);
- Incorrectly mounted eyeglass lenses or broken or missing mounting clips (full-face only); and

- Cracked or broken air-purifying element holder, badly worn threads, or missing gaskets.

Examine the head straps or head harness for:

- Breaks or cracks;
- Broken or malfunctioning buckles; and
- Excessively worn serration on the head straps, which may permit slippage.

Examine the two inhalation valves and the exhalation valve for:

- Foreign material (e.g., hairs, particles, etc.);
- Improper insertion of the valve body in the face piece;
- Cracks, tears, or chips in the valve body, particularly in the sealing surface; and
- Missing or defective exhalation valve covers.

Examine the air-purifying cartridge for:

- Missing or worn cartridge-holder gasket;
- Incorrect cartridge/canister for the hazard;
- Incorrect cartridge installation, loose connections, or cross threading in the holder; and
- Cracks or dents in the outside case or threads of the filter or cartridge/canister.

8.6 Cleaning of Respirators

Respirators assigned and worn by one individual must be dismantled and thoroughly cleaned and disinfected after each day's use. Visitors' respirators or respirators assigned to several individuals must be cleaned and disinfected after each use. A disinfectant spray or wipe is approved as a disinfectant between uses during the day but not for cleaning and sanitizing after each day's use. Care must be taken to prevent damage from rough handling during the cleaning

procedure. After cleaning, respirators must be reassembled. The procedures for cleaning respirators follow.

- Washing: Disassemble and wash with a mild liquid detergent in warm water (not to exceed 110°F). A stiff bristle (not wire) brush may be used.
- Rinsing: Rinse in clean water (110°F maximum) to remove all traces of detergent. This is important to prevent dermatitis.
- Disinfecting: Thoroughly rinse or immerse in a sanitizer provided by the manufacturer. Alternatively, a weak chlorine bleach solution (1 milliliter of liquid bleach per liter of water) may be used.
- Final Rinsing: Rinse thoroughly in clean water (110°F maximum) to remove all traces of disinfectant. This is important to prevent dermatitis.
- Drying: Drain and dry by hanging by the straps from racks (take care to prevent damage) or by towel drying with clean, soft cloths or paper towels.

8.7 Maintenance of Respirators

Routine respirator maintenance, such as replacing missing valves, gaskets, and nose cups, must only be performed by trained respirator users or a respirator manufacturer's representative. Only approved replacement parts must be used. The substitution of parts from a different brand or type of respirator is generally not possible, invalidates the technical approval of the respirator, and is not permitted. Any respirator suspected of being defective must be removed from service and replaced.

8.8 Storage of Respirators

When not in use, respirators must be stored to protect them from dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, and physical damage. Respirators must be stored in sealable (e.g., Ziploc[®] or twist-tie) reusable plastic bags between shifts.

The respirator storage environment must be clean, dry, and away from direct sunlight. Onsite cabinets or cases are suggested. Storing bagged respirators in vehicles is discouraged because of the potential for damage from other material or equipment.

8.9 Additional Information

Additional information on the URS Respiratory Protection Program is located in SMS 042 which, may be found in Attachment A.

9.0 SITE CONTROL

9.1 General

Barricades (i.e., channelized cones and poles) will be used to delineate a work zone for safety purposes around the drilling work area. Lane closure permits will be obtained from the NYCDOT for all street work. A traffic control subcontractor will establish lane closures and provide flagmen. In addition, procedures for work zone traffic control are provided in SMS 032 which may be found in Attachment A. NYSDOT approved barriers (e.g., channelized cones and poles) will be set up with provisions for sight impaired members of the public for all sidewalk work. The barriers will be set in a 25-foot radius (as practical) around the work area to provide sufficient maneuvering space for personnel and equipment. A short piece of barricade tape can be affixed to a secure upright (e.g., a drill rig mast or a vehicle antenna) to serve as a wind direction telltale. A 5-foot opening in the barricades at the support zone (upwind of the work area) will serve as the personnel and equipment entry and exit point. Site personnel shall continuously monitor the opening at all times to prevent members of the public from entering the work area.

The personnel decontamination station will be established at this point if formal decontamination procedures are required based on the potential exposure to contaminated materials and the type of task being performed (see Section 11.0). All entry and exit from the work area will be made at this opening to control potential sources of contamination and leave contaminated soil and debris in the work area.

At the end of the shift, all boring/sampling holes and all excavations must be covered or otherwise secured. All cuttings and decontamination fluids are to be handled in accordance with relevant regulations and instructions from the PM.

The PM or SSO will determine an upwind evacuation area prior to each shift and changed based on wind direction, and all personnel will be notified of its location. Flagging tape or a small flag will be attached to the drill rig and/ or antenna of site vehicle to provide a visual indication of current wind direction. A horn or other signaling device will be used to signal an evacuation in the event of an emergency. Three blasts of the horn will be the signal to

immediately stop work and proceed to the evacuation area. All site personnel will be instructed in the use of the flagging tape and horn.

9.2 Work Zones

If monitoring instrument readings exceed the second action level (15 ppm > one minute), requiring the use of chemical protective equipment, work zones must be established as described below. Refer to Action Level Table for PPE requirements as specified in this HASP (Section 1.0).

- Exclusion Zone (EZ) – A 25-foot radius (or as practical) around the work area will be defined before work starts. The encircled area will constitute the EZ. This zone is where potentially hazardous contaminants and physical hazards to the workers will be contained. Appropriate personal protection, as described in Section 1.0, will be required in this area. Plastic sheeting (i.e., 2- or 3- mil) and/or tarps may be used as necessary to control contaminated materials spilled to the ground during site operations. The size of the EZ may be altered to accommodate site conditions and to ensure contaminant containment. Barricade tape and/or barricades (i.e., channelized cones and barriers) will be used to delineate a work zone for safety purposes around the drilling work area.
- Contaminant Reduction Zone (CRZ) – A corridor leading from the EZ will be defined using safety cones and tape; it will lead from the work area to a break area. All decontamination activities will occur in the CRZ. A waste container will be placed at the end of the corridor so that contaminated disposable equipment can be placed inside and covered. Surface/soil contamination in this area will be controlled using plastic sheeting. No one will be permitted into the CRZ or EZ unless he/she is in full compliance with the requirements of this HASP.
- Support Zone – A Support Zone, the outermost part of the site, must be defined for each field activity. Support equipment is located in this uncontaminated or clean area. Normal work clothes are appropriate within this zone. The location of this zone depends on factors such as accessibility, wind direction (upwind of work area), and resources (i.e., roads, shelter, utilities).

9.3 Runoff Mitigation

In the event that intrusive activities at the site result in the production of water runoff and/or water runoff occurs due the contact of precipitation with impacted materials, URS will ensure the protection of manholes, vaults, catch basins, etc. through one or more of the following ways.

- All solid impacted materials generated during site activities will be immediately placed into 55-gallon drums for proper disposal thus minimizing any contact with runoff water.
- Use of granular absorbent materials (i.e., speedy dry, cat litter and/or sand) and/or absorbent pads, socks, and booms to clean up any liquid materials prior to their being removed by runoff water. All used absorbent materials will be placed into 55-gallon drums for proper disposal.
- Installation of a temporary containment berm around the work area or impacted material to contain water runoff. The runoff water will be evacuated from the bermed area and placed into 55-gallon drums for proper disposal using a pump or vacuum.
- Installation of a temporary containment berm around the manholes, vaults, catches basins, etc. to prevent water runoff from entering.

10.0 NOISE MITIGATION MEASURES

10.1 Noise Sources

Noise levels are measured in units of (dBA), which matches the response of the human ear. Normal conversation produces a noise level of 60 dBA, while power tools often produce levels between 90-110 dBA. If two people standing an arm's length apart must raise their voices to talk, the noise level is over 85 dBA. Noise levels above 140 dBA cause pain immediately and produce hearing damage. Decibels are a logarithmic scale, meaning that 100 dBA is 10 times as loud as 90 dBA, 100 times as loud as 80 dBA, and 1000 times as loud as 70 dBA.

Two activities performed during subsurface investigations are the primary sources of excessive noise: borehole clearing and drilling. These are discussed below. See also SMS 026 (Noise and Hearing Conservation), located in Attachment A.

10.1.1 Borehole Clearing

One of the initial activities undertaken during a subsurface investigation is clearing the boreholes to a safe depth below buried utilities. As required by NYSDEC, all boreholes will be manually cleared to a depth of, minimally, 5-feet below grade (as detailed in Section 5.2.6).

Manually clearing boreholes typically includes the use of a pick, shovel, coring device and post-hole digger, but may also include powered equipment such as a jackhammer and compressor and/or a vacuum truck capable of removing solids. The use of these pieces of equipment creates several sources of noise including operation of the engine/motor, metal hammering on concrete (i.e., jackhammer), and the high-pitch whirring sound of the air moving into the vacuum.

10.1.2 Drilling

Drilling consists of advancing various pieces of steel into the subsurface, typically for the purpose of collecting soil samples and installing wells. Commonly, diesel-powered truck-or trailer-mounted drill rigs are used to advance hollow-stem augers (HSAs), air hammers, Macro core samplers, and/or split-spoon samplers into the subsurface. Noise associated with drilling includes noise originating from the drill rig engine, percussion as the equipment is being

hammered into the ground, metal scraping on rock and/or concrete as the drill is rotated into the ground, and other impact noises generated by hand tools.

10.2 Noise Monitoring Instrumentation and Methodology

10.2.1 Instrument Weighting and Response

Noise measurements for occupational exposure assessment are taken using the “A-weighted” frequency response function. The A-weighted frequency or dBA scale simulates the response of the human ear to sound levels (sound levels between 1,000 and 5,000 hertz) and has been given prominence as a means for estimating annoyance caused by noise. Sound measurements are often made using the “A” frequency weighting when assessing environmental noise.

10.2.2 Instrumentation

Instruments for noise measurement include sound level meters, noise dosimeters, and auxiliary equipment. The basic instrument is the Type 2 sound level meter (SLM), an electronic instrument consisting of a microphone, an amplifier, various filters, a squaring device, an exponential average, and a read-out calibrated in decibels.

OSHA recommends the use of an Integrating SLM meeting the requirements of the ANSI S1.4 standard to at least Type 2. Hearing protection and noise control decisions are usually made based on the Time Weighted Average (TWA) measurement that can be provided automatically by such a meter. Of particular use, the LAVG (Average Noise Level) is needed when measuring noise levels that are not stable.

Noise measurements during investigation activities will be performed using a Quest model 2700 Type 2 Impulse SLM or equivalent. Noise measurements will be recorded on data collection tables with construction activities observed during monitoring noted.

Noise exposure levels will also be concurrently assessed using a Quest NoisePro dosimeter or equivalent, which automatically measures and calculates equivalent 8-hour exposure levels.

Noise measuring instruments will be operated using to assess compliance with the 85 dBA action level for a hearing conservation program, and 90 dBA for assessing compliance with the OSHA 90 dBA PEL.

10.2.3 Noise Monitoring During Investigation Activities

Noise monitoring, if required, will be performed during noise generating investigation activities. The monitoring will be performed adjacent to the noise source within the work area. Concurrently, sound levels will be measured at various distances away from the work area.

All sound level measurements will be logged including exact location, activities ongoing during measurement, and relevant calibration information per manufacturer's recommended interval.

10.2.4 Data Interpretation

The key determinant during real-time noise assessment will be spot measurements with the SLM that are ≥ 85 dBA, as well as louder impact noises.

A dose $\geq 50\%$ is indicated of a required hearing conservation program or more stringent noise abatement method.

10.2.5 Hearing Protection

All onsite personnel potentially exposed to activities generating sound levels above 85 dBA will have hearing protection (disposable or reusable type) readily available. Where disposable earplugs are selected, sufficient supplies will be maintained on site to allow for multiple changeovers per day, per worker. A non-“roll-down” type earplug, such as the E-A-R Pod Plug, should be selected to reduce the potential for ear canal contamination. Hearing protection devices will be used at all times by all personnel working around the equipment.

10.3 Noise Mitigation Measures

URS will comply with the New York City Rules for Citywide Construction Noise Mitigation (http://www.nyc.gov/html/dep/pdf/noise_constr_rule.pdf). A combination of noise control and mitigation measures will be used. These are discussed below.

10.3.1 Equipment Inspection

Prior to commencing investigation activities, noise-generating equipment will be inspected to ensure the following:

- All equipment has been maintained properly and is operating at manufacturer's specifications
- Manufacturer-installed noise reduction devices, such as mufflers, are present and in good working order.

10.3.2 Noise Curtain

Where source or activity modifications do not result in noise reductions that are suitable, an acoustical curtain will be placed around the noise-generating source [e.g., borehole area]. The curtain will consist of BBC-13-2" acoustical material manufactured by Sound Seal or equivalent. Each curtain panel will be approximately 8-feet high by 4-feet wide. Panels will be joined together using Velcro strips. The curtain will surround the investigation area on at least three sides. The curtains can be mounted on movable steel frames or suspended from cables. Generally, because of the predictable nature of the noise and the inability to achieve suitable reductions through other means, the curtain will be required to be in place during any activities generating steady-state noise (e.g., engine running) activities that are observed to exceed 85 dBA, or any activity involving impact noise.

10.3.3 Noise Monitoring and Implementation of Mitigation Procedures

Where time-weighted sound levels in the immediate work area exceed 85 dBA time weighted average [TWA], URS staff and subcontractors will immediately don suitable hearing protection and assure that additional noise control measures are implemented, where suitable and feasible.

Where measurements of investigation noise generating activities indicate probable exceedances of the 85 dBA PEL or impact noises are demonstrated by dosimetry to likely contribute to exceedances to the PEL, URS will implement noise mitigation measures, such as erecting a noise curtain. If these mitigation measures are not successful in sufficiently reducing noise to acceptable levels, URS will notify NYSDEC that noise mitigation measures are unable to

control sound levels sufficiently and that hearing protection use and/or other administrative controls may be necessary.

10.4 Action Levels

The following action noise level threshold values will be used:

- Temporary halt (to allow for assessment of noise reduction procedures) noise threshold value of 85 dBA near source
- Stop work (to allow for assessment of noise reduction procedures) noise threshold value of 90 dBA near source

These action levels are described below.

10.4.1 Temporary Halt Noise Level

If this action level is exceeded, then work will be temporarily halted, if necessary, while the apparent cause is investigated and corrections made. If actions taken to mitigate the noise source are unsuccessful, work will resume with a noise curtain installed. URS will assess sound levels outside of the barrier, and at 15-minute intervals to document control below 85 dBA.

10.4.2 Stop Work Noise Level

If this action level is exceeded outside of the noise barrier, then work will halt and will not resume until the source, effectiveness of noise mitigation, and other measures are reviewed. Where noise mitigation measures cannot be affected to reduce sound levels to below 90 dBA, URS will contact NYSDEC to discuss options for continuing site work.

During all field tasks, the use of engineering and administrative controls will be the preferred means of controlling exposure, with hearing protection to be used only where those preferred methods are not effective in reducing exposure to below 85 dBA.

11.0 DECONTAMINATION PROCEDURES

The following steps will be followed whenever personnel leave the exclusion zone/work area:

1. Remove all equipment, sample containers, and notes to the CRZ. All waste and spent decontamination solutions will be properly contained.
2. Scrub boots with a stiff bristle brush and a solution consisting soap (Alconox) and water. Washtubs and chairs will be provided.
3. Remove outer gloves.
4. Remove Tyvek[®] coverall; discard in provided container.
5. Remove hardhat and eye protection.
6. Remove inner gloves.
7. Wash hands and face

The decontamination area will be covered with plastic sheeting that will be replaced when torn or heavily soiled and at the end of each shift.

Each worker will be responsible for cleaning, sanitizing, and storing his/her own respirator in accordance with the manufacturer's guidance (i.e., washing in warm water and detergent or sanitizing solution, air drying, and storing in a plastic storage bag).

All spent decontamination fluids (rinse waters, etc.) will be handled as directed by the PM and in accordance with relevant regulations.

11.1 Sanitation

Potable water will be made available at the site, either from a pressurized source or as commercially available bottled water. Drinking cups will be supplied; personnel will not drink directly from the source of water or share drinking cups. Sources of non-potable water will be labeled clearly.

Washing facilities will be provided on site and be located in the decontamination area or in the support area. Soap, clean water, wash basins, and/or single-use towels will be available for personnel use. Sanitation standards may be found in SMS 030, a copy of which may be found in Attachment A.

11.2 Decontamination – Medical Emergencies

In the event of physical injury or other serious medical concerns, immediate first aid is to be administered in lieu of further decontamination efforts.

See the Emergency Decontamination chart for a decision tree for emergency decontamination.

11.3 Decontamination of Tools

When all work activities have been completed, contaminated tools used by URS personnel and subcontractors will be appropriately decontaminated or properly disposed of based on analytical data and/or visual evidence of contamination. In the event that a pressure washer is used for decontaminating equipment, personnel will wear a full face shield and the Pressure Washing Operator will wear metatarsal protection when operating the pressure washer equipment.

All soil cuttings, decontamination water, and development water will be contained in new USDOT-approved 55-gallon drums and temporarily staged at an approved location. If a temporary staging area is available, URS will collect representative samples of the investigation-derived wastes (IDW) for proper waste characterization (as determined by the disposal facility). If a temporary staging area is not available, URS will have the drums picked up on a daily basis. If a temporary staging area is not available, the IDW subcontractor performing the daily pick up will collect representative samples of the IDW for proper waste characterization with analysis to be performed with a three-day turnaround time. All waste will be disposed of at a permitted off-site disposal facility.

It is expected that all tools will be constructed of non-porous, non-absorbent materials. This will aid the decontamination process. Any tool or part of a tool that is made of a

porous/absorbent material will be discarded and properly disposed of based on analytical data if it cannot be properly decontaminated.

12.0 SAFE WORK PRACTICES

12.1 General Site Rules

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited during sampling and drilling activities or where the possibility for the transfer of contamination exists.
- All personnel will enter designated work areas only through the CRZ. All personnel leaving an EZ/work zone must exit through the CRZ and pass through the decontamination station, as described in Section 11.0.
- Personnel will wash their hands and faces thoroughly with soap and water prior to eating, drinking, or smoking.
- Personnel will avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling, leaning, or sitting on contaminated surfaces. Do not place monitoring equipment on potentially contaminated surfaces (i.e., the ground, etc.)
- Field survey instruments, such as PIDs, will be covered with plastic or similar coverings to minimize the potential for contamination.
- Contaminated protective equipment, such as respirators, hoses, boots, and disposable protective clothing, will not be removed from the work area/EZ or decontamination area until it has been cleaned or properly packaged and labeled.
- Field crew members shall be familiar with the physical characteristics of the site operations including:
 - Wind direction in relation to the contaminated area;
 - Accessibility to equipment and vehicles;
 - Areas of known or suspected contamination;
 - Site access; and
 - Nearest water sources.
- All wastes generated by URS activities at the site will be disposed of as directed by the PM.
- All personal protective equipment will be used as specified and required.

- The buddy system will be used at all times.
- Personnel are to immediately notify the SSO of any accidents or injuries.
- No engines idling for more than 3 minutes unless required by operation (e.g., drill rig). Should work occur adjacent to a school the idling time is reduced to one-minute maximum.

12.2 Sampling Practices

For all sampling activities, the following standard safety procedures will be employed:

- All sampling equipment will be cleaned before proceeding to the site.
- At the sampling site, sampling equipment will be disposed of or cleaned after each use.
- Work in “cleaner” areas will be conducted first, where practical.
- All unauthorized personnel will remain outside the EZ at all times.

12.3 Hazardous Materials Shipment

If equipment or materials that will be used during the course of the field investigation (i.e., calibration gasses, sample preservatives, lithium batteries, etc.) need to be shipped but fall under criteria that define them as hazardous materials under Department of Transportation (DOT) regulations 49 CFR Parts 171-177 (see URS guidelines for determination), then they must be shipped in accordance with those regulations by an individual who is certified as having been “function-specific” trained, as required under the DOT regulations. Hazardous Materials/ Dangerous Goods Shipping standards may be found in SMS 048 which, may be found in Attachment A.

13.0 EMERGENCY RESPONSE PLAN

The route map to the nearest hospital – Forest Hills Hospital – (718) 830-4200 is located in Figure 1. The route map to the nearest occupational health clinic – Occupational Health Services – (718) 334-3030 is located in Figure 2.

It is URS policy to evacuate personnel from areas of hazardous material emergencies and to summon outside assistance from agencies with personnel trained to respond to the specific emergency. This section outlines the procedures to be followed by URS personnel in the event of a site emergency and has been written in accordance with SMS 003 which, may be found in Attachment A. These procedures are to be reviewed during the onsite safety briefings conducted by the SSO.

In the event of a fire (SMS 014 which, may be found in Attachment A.) or medical emergency, the emergency numbers identified in Section 1.0 can be called for assistance.

13.1 Places of Refuge

In the event of a site emergency requiring evacuation, all personnel will evacuate to a pre-designated area a safe distance from any health or safety hazard. The primary assembly area will be determined prior to the start of work each day.

During any site evacuation, all workers will be instructed to observe wind direction indicators. During evacuation, employees will be instructed to travel upwind or crosswind of the area of influence.

13.2 Communication

A communication network must be set up to alert site personnel of emergencies and to summon outside emergency assistance. All team members should maintain the list of emergency phone numbers. At least one team member shall have a cell phone, on, and in good working order.

In the event of an emergency, personnel will use the following hand signals where voice communications are not feasible:

Signal	Definition
Hands clutching throat	Out of air/can't breathe
Hands on top of head	Need assistance
Thumbs up	OK/I'm all right/I understand
Thumbs down	No/negative
Arms waving upright	Send back support
Grip partner's wrist	Exit area immediately

13.3 Emergency Response Procedures

The emergency response team will consist of workers who assume the following roles:

- Emergency care provider(s)
- Provide first aid/CPR as needed
- Communicator

The role of the communicator is to maintain contact with appropriate emergency services and to provide as much information as possible, such as the number injured, the type and extent of injuries, and the exact location of the accident scene. The communicator will be located as close to the scene as possible to transmit to the emergency care providers any additional instructions that may be given by emergency services personnel in route.

- Site Supervisor

The site supervisor (usually the SSO) will survey and assess existing and potential hazards, evacuate personnel as needed, and contain the hazard. Follow up responsibilities include replacing or repairing damaged equipment, documenting the incident, and notifying appropriate personnel/agencies described under Incident Reporting. Responsibilities also include reviewing and revising site safety and contingency plans as necessary.

The Emergency Response Checklist can be used to help remember the things to do in an emergency.

13.4 Medical Emergency Response Plan

At least one URS employee on site will hold a current certificate in American Red Cross Standard First Aid. This training provides six and one-half hours of instruction in adult CPR and basic first aid. If a medical emergency exists, personnel should:

- Consult the emergency phone number list and request an ambulance immediately;
- Perform First Aid/CPR as necessary;
- Stabilize the injured; decontaminate if necessary, and extricate *only* if the environment the injured/ill person is in is dangerous or unsafe and **ONLY** if the rescuers are appropriately protected from potential hazards that might be encountered during the rescue.
- When emergency services personnel arrive, communicate all first aid activities that have occurred.
- Transfer responsibility for the care of the injured/ill to the emergency services personnel.

The following items and emergency response equipment will be located within easy access at all times:

- First aid kit and infection control kit;
- Eyewash – A 15 minute eyewash (required if corrosives are present), or an appropriate amount of portable sterile eyewash bottles, will be available on site for flushing foreign particles or contaminants out of eyes. The SSO will demonstrate the proper operation of the unit(s) prior to the start of work. The eyewash station or portable eyewash bottles will be kept in the onsite vehicle until needed to prevent freezing under cold weather conditions;
- Emergency telephone numbers list; and
- Portable radios for emergency communications in remote areas.

13.5 Fire and/or Explosive Conditions

Contingency procedures will immediately be implemented upon notification that any of the following scenarios involving fire and/or explosion is imminent or has occurred:

- a fire that causes, or could cause, the release of toxic fumes;
- a fire that could possibly ignite nearby flammable materials or could cause heat-induced explosions;
- a fire that could possibly spread to off-site areas;
- a danger exists that an explosion could occur causing a safety or health hazard; and
- an explosion has occurred.

When fire or explosion appear imminent or have occurred, all normal activity in affected areas will cease. The SSO will make an assessment of the potential risk and severity of the situation to decide whether the emergency event will or will not be readily controllable with existing portable fire extinguishers or site equipment and materials at hand. Firefighting will not be done at the risk to site workers. The New York City Fire Department (FDNY) will be contacted in all situations in which fires and/or explosions have occurred. The following steps will be taken for localized fire.

- contact FDNY (dial 911);
- move all personnel to an upwind location at an appropriately safe distance away;
- determine if fire is within on-site personnel capabilities to attempt initial firefighting;
- determine if smoke and/or fumes from fire are potentially impacting offsite areas;
- if the fire is not impacting offsite areas and is within on-site personnel capabilities, utilize most appropriate means of extinguishing fire (e.g., fire extinguishers, water, covering with soil, etc.); and
- once fire is extinguished, containerize and properly dispose of any spilled material, runoff, or soil.

If the situation appears uncontrollable and poses a direct threat to human life, FDNY will be contacted and the Evacuation Plan will be implemented. If the chances of an impending explosion are high, the entire area within a 1,000-foot radius of the fire source will be evacuated. The SSO will alert personnel when all danger has passed, as determined by the chief fire fighter from FDNY. All equipment used in the emergency will be cleaned and refurbished as soon as possible after the emergency has passed so that it will be ready for use in the event of any future emergency.

13.6 Incident Report

ALL site injuries and illnesses must be reported to the SSO and PM immediately following first-aid treatment. The SSO will notify the URS RHSEM (**Ben Bertolotti – 973-777-3003**) or the URS HSE Representative (**Steve Moeller 716-923-1112**). Any near miss, injury or illness, regardless of severity, is to be reported (see SMS 049 which, may be found in Attachment A).

13.7 Spill or Hazardous Materials Release

All spills are immediately reported to the SSO and the NYSDEC and are dealt with according to the chemical manufacturer's recommended procedures, which are found on the MSDS. Steps will be taken to contain and/or collect spills for approved storage and disposal.

EMERGENCY RESPONSE CHECKLIST

In an Emergency	Yes	No
Confirm the reported incident	_____	_____
Evacuate and secure the area	_____	_____
Render first aid/emergency medical care	_____	_____
Notify promptly:		_____
URS HSE Representative and/or URS RHSEM	_____	_____
Project Manager	_____	_____
Fire Department	_____	_____
Police Department	_____	_____
Nearest Hospital or Medical Care Facility	_____	_____
Start Documentation	_____	_____
If spill or leak occurs:		
Notify the NYSDEC	_____	_____
Don the proper PPE	_____	_____
Stop the source	_____	_____
Contain the spill	_____	_____
Clean up the spill	_____	_____
Upon evacuating, take attendance at the assembly area	_____	_____
Authority given:		
Leave the site	_____	_____
Restart the operations	_____	_____
Debrief and document the incident	_____	_____
Submit a copy of the document to the Health and Safety Manager	_____	_____

14.0 TRAINING, MEDICAL SURVEILLANCE, SITE INSPECTIONS

14.1 Training and Medical Surveillance

All URS site personnel and subcontractor workers will have met the requirements of 29 CFR 1910.120(e), including:

- Forty hours of initial off-site training or its recognized equivalent
- Eight hours of annual refresher training for all personnel (as required);
- Eight hours of supervisor training for personnel serving as SSOs; and
- Three days of work activity under the supervision of a trained and experienced supervisor.

All onsite personnel are participating in medical surveillance programs that meet the requirements of 29 CFR 1910.120(f). Current copies of training certificates and statements of medical program participation for all URS personnel and subcontractor workers are maintained by the local office.

In addition, all URS site personnel and subcontractor workers will be involved in a review of this HASP and sign a copy of the Safety Plan Compliance Agreement. The PM will maintain these agreements at the site and place them in the project file at the conclusion of the operation. URS will provide a documented HASP review with all project participants prior to commencement of site investigation activities. Should any new personnel arrive at the site after this HASP review was given, URS will also provide new workers a documented HASP review.

Prior to the start of operations at the site, the SSO will conduct a site safety briefing, which will include all personnel involved in site operations. At this meeting, the SSO will discuss:

- Contents of this HASP;
- Types of hazards at the site and means for minimizing exposure to them;
- The type of monitoring that will be performed;
- Action levels for upgrade and downgrade of PPE;

- PPE that will be used;
- Site-specific respiratory protection requirements;
- Decontamination protocol;
- Site control measures, including safe operating practices and communication;
- Location and use of emergency equipment; and
- Evacuation signals and procedures.

All site personnel, including subcontractor personnel, are to attend the briefings and sign the briefing form.

Subsequent site safety briefings will be conducted at least weekly, or whenever there is a change in task or significant change in task location. Briefings also will be conducted whenever new personnel report to the site. Daily documented pre-job briefings will be held prior to the start of each shift. These briefings will discuss the scope-of-work for that shift, the hazards associated with that scope, the controls to be used (Engineering, Administrative, PPE) to mitigate those hazards. The documentation will include the items discussed in the pre-job briefing as well as signatures of those in attendance.

14.2 Site Inspections

The URS SSO is to conduct a daily site inspection prior to the start of each shift. It is the responsibility of the PM or SSO to resolve discrepancies immediately, contacting the RHSEM if necessary for assistance. Inspections are to be documented and maintained on site until the completion of the project, at which time they are placed in the project files.

15.0 RECORDKEEPING

The PM and SSO are responsible for site recordkeeping. Prior to the start of work, they will review this HASP; if no changes are needed, they will sign the approval form (PM) or acceptance form (SSO) and forward a copy to the RHSEM.

All URS personnel and subcontractor workers will be involved in a HASP review session, given by the Contractor (URS) and sign the Safety Plan Compliance Agreement; copies of these forms will be maintained in the project file.

The SSO will conduct a Site Safety Briefing in accordance with Section 14.1 and have all attendees sign the Safety Plan Compliance Agreement; copies will be maintained in the project file.

Any incident or exposure incident will be investigated and the Incident Report form (SMS 049 which, may be found in Attachment A.) will be completed and forwarded to the Office H&S Representative or the RHSEM.

All instrument readings and calibrations, PPE use and changes, health and safety-related issues, and deviations from or problems with this HASP will be recorded in the field log. Should a change occur in the Scope-of-Work, hazards on site, or any other item that would require a revision to the HASP, the revisions, hereafter called HASP Addenda, shall be submitted to NYSDEC review/acceptance before commencement with that new condition on site.

16.0 WORK AREA AIR MONITORING PLAN

Real time air monitoring for VOCs and particulates will be conducted at the perimeter of the Exclusion Zone during the drilling program. Only VOC monitoring will be conducted during the injection project.

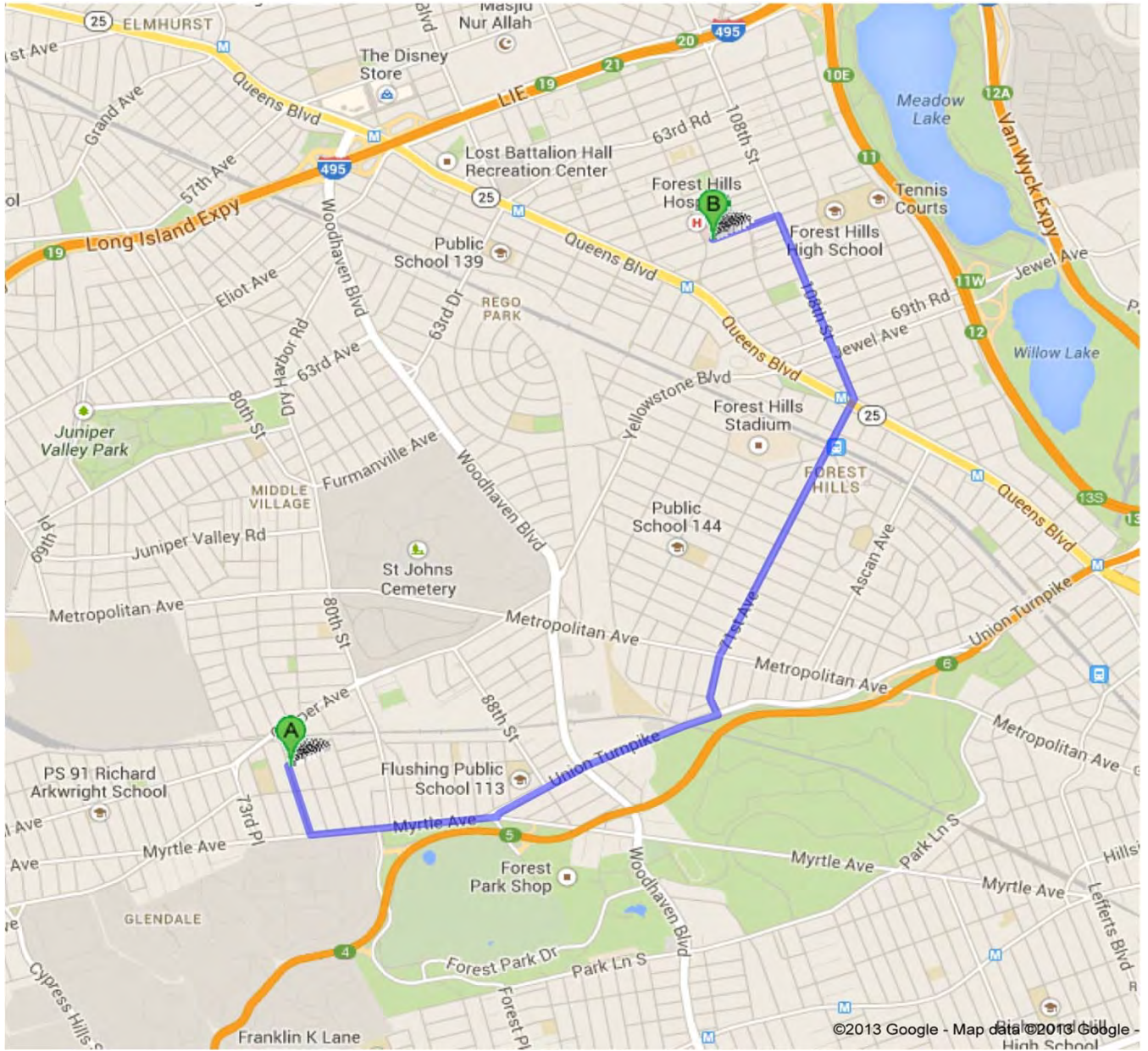
The same monitoring equipment specified in Section 6.0 of this HASP will be utilized to document work area levels of VOCs. Measurements will be obtained generally on 15-minute intervals at various locations both upwind and downwind of the working areas. The on-site Geologist will document the locations of the monitoring points on a site sketch and in a field book.

If total organic vapor levels exceed 5 ppm above background, work activities will be temporarily halted. After a pause, work will continue. If levels exceed 5 ppm again, the work will be halted and corrective measures will be implemented.

If particulates levels measured downwind of the work area exceed particulate levels upwind by more than 100 micrograms per cubic meter (mg/m^3), work activities will be halted and appropriate dust suppression measures will be employed.

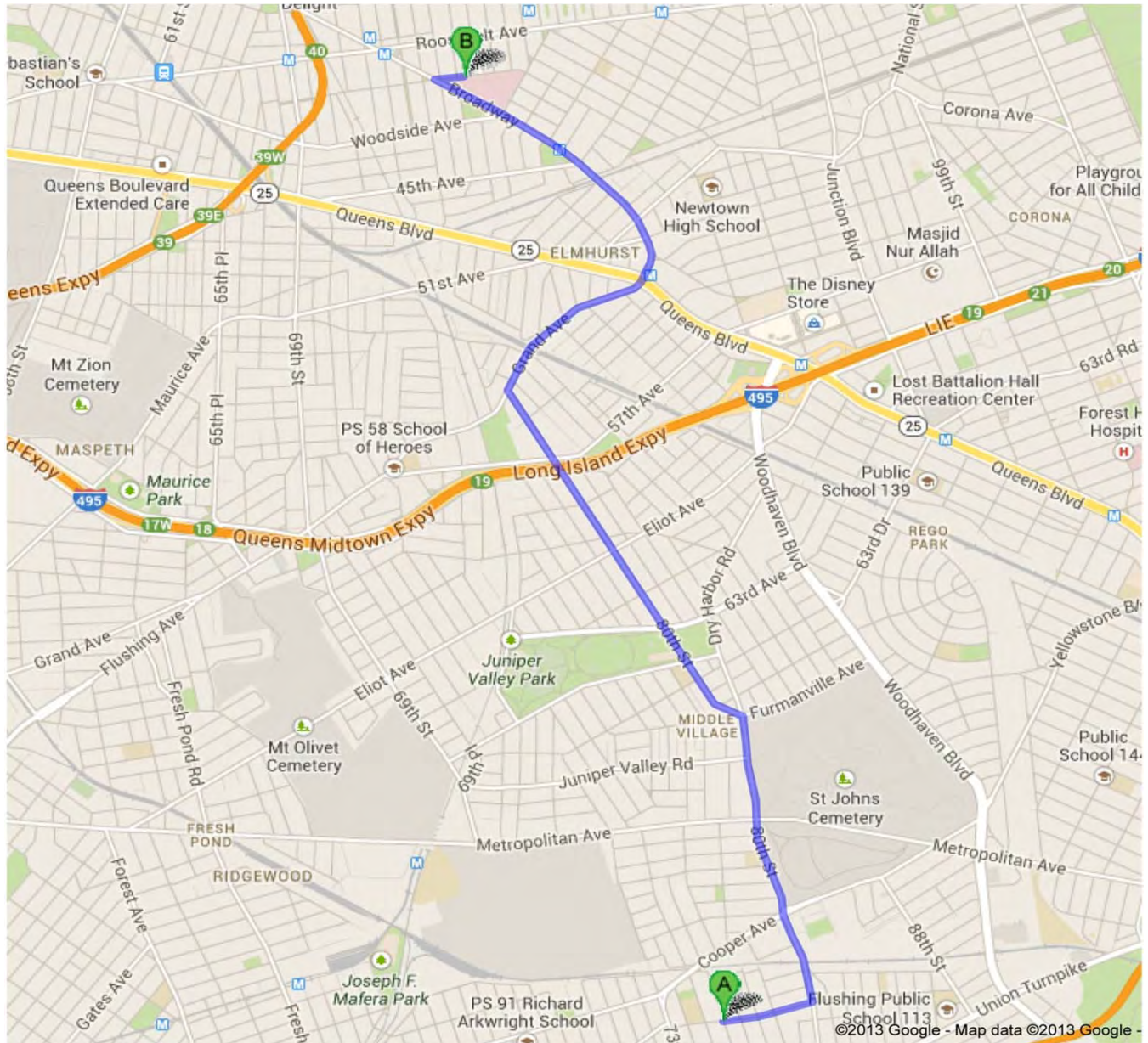
Community air monitoring will be conducted in general compliance with the New York State Department of Health's (NYSDOH's) Generic Community Air Monitoring Plan (CAMP) which, maybe found in Attachment E. On-site personnel will implement the requirements of the CAMP during the proposed investigation utilizing one set of air monitoring equipment at the perimeter of the Exclusion Zone.

FIGURES



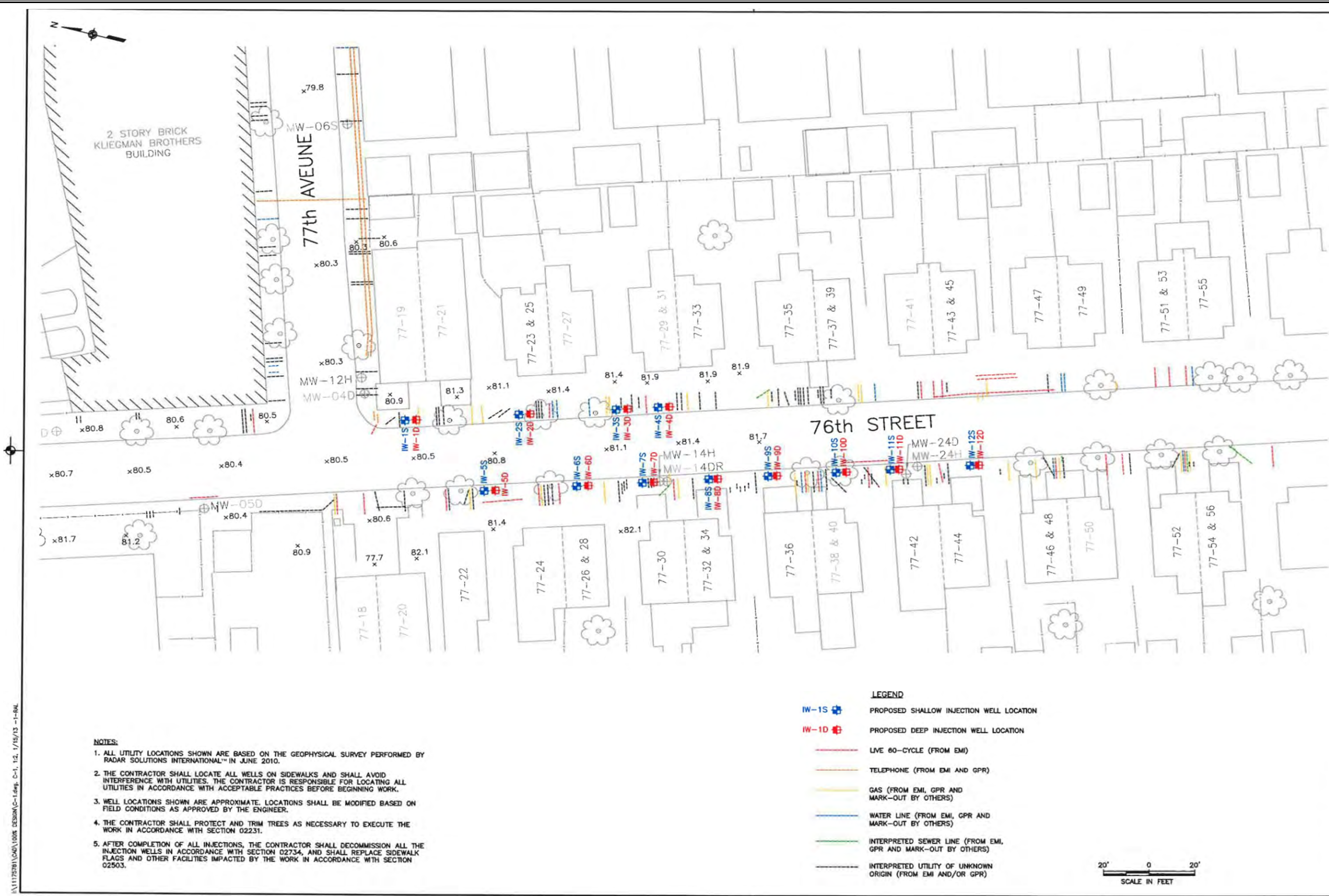
Route to the Hospital
Kliegman Brothers OU #2 Site
Glendale, Queens County, New York

Figure 1



Route to the Occupational Health Clinic
Kliegman Brothers OU #2 Site
Glendale, Queens County, New York

Figure 2



WARNING:
 IF IT IS A VIOLATION OF SECTION 2206, SUBSECTION 5 OF
 THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON
 OTHER THAN WHOSE SEAL APPEARS ON THIS DRAWING,
 TO SIGN IN ANY MANNER AND SEAL ON THIS DRAWING,
 AFTER TO THE FIRM HIS SEAL, AND THE PROVISION
 "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE
 DATE OF SUCH ALTERATION, AND A SPECIFIC
 DESCRIPTION OF THE ALTERATION.

NO.	DATE	BY	DESCRIPTION

REVISIONS



URS Corporation
77 Country Street, Buffalo, New York 14203
 (716) 835-5038 phone (716) 836-2543 fax

**NEW YORK STATE
 DEPARTMENT OF
 ENVIRONMENTAL
 CONSERVATION**
625 BROADWAY
 ALBANY, NEW YORK 12233

**KLIEGMAN BROTHERS
 OPERABLE
 UNIT 2
 GLENDALE
 QUEENS COUNTY
 SITE NO. 241031**

**REMEDIAL
 CONSTRUCTION**

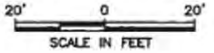
**INJECTION WELL
 LOCATION PLAN**

OWNER'S PROJECT NUMBER:	PROJECT NUMBER:
DATE: JANUARY 2013	SCALE: AS SHOWN
DRAWN BY: RAL	C-1
CHECKED BY: CWP	
APPROVED BY: CWP	

- NOTES:**
1. ALL UTILITY LOCATIONS SHOWN ARE BASED ON THE GEOPHYSICAL SURVEY PERFORMED BY RADAR SOLUTIONS INTERNATIONAL™ IN JUNE 2010.
 2. THE CONTRACTOR SHALL LOCATE ALL WELLS ON SIDEWALKS AND SHALL AVOID INTERFERENCE WITH UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES IN ACCORDANCE WITH ACCEPTABLE PRACTICES BEFORE BEGINNING WORK.
 3. WELL LOCATIONS SHOWN ARE APPROXIMATE. LOCATIONS SHALL BE MODIFIED BASED ON FIELD CONDITIONS AS APPROVED BY THE ENGINEER.
 4. THE CONTRACTOR SHALL PROTECT AND TRIM TREES AS NECESSARY TO EXECUTE THE WORK IN ACCORDANCE WITH SECTION 02231.
 5. AFTER COMPLETION OF ALL INJECTIONS, THE CONTRACTOR SHALL DECOMMISSION ALL THE INJECTION WELLS IN ACCORDANCE WITH SECTION 02734, AND SHALL REPLACE SIDEWALK FLAGS AND OTHER FACILITIES IMPACTED BY THE WORK IN ACCORDANCE WITH SECTION 02503.

LEGEND

- IW-1S ■ PROPOSED SHALLOW INJECTION WELL LOCATION
- IW-1D ■ PROPOSED DEEP INJECTION WELL LOCATION
- LIVE 60-CYCLE (FROM EMI)
- TELEPHONE (FROM EMI AND GPR)
- GAS (FROM EMI, GPR AND MARK-OUT BY OTHERS)
- WATER LINE (FROM EMI, GPR AND MARK-OUT BY OTHERS)
- INTERPRETED SEWER LINE (FROM EMI, GPR AND MARK-OUT BY OTHERS)
- INTERPRETED UTILITY OF UNKNOWN ORIGIN (FROM EMI AND/OR GPR)



Proposed Remedial Injection Locations
 Kliegman Brothers OU #2 Site
 Glendale, Queens County, New York

Figure 3



NOTES:

1. AS PART OF THE WORK, THE CONTRACTOR WILL BE REQUIRED TO SAMPLE MONITORING WELLS FOR ANALYTICAL AND FIELD PARAMETERS TO EVALUATE PERFORMANCE OF THE REMEDIATION. PERFORMANCE MONITORING SHALL BE IN ACCORDANCE WITH SECTION 02223.
2. THE CONTRACTOR SHALL CONSTRUCT THREE WELLS (MW-31D, MW-32D, AND MW-33D) TO BE USED FOR PERFORMANCE MONITORING (SEE DWG. C-2).

SEALING
IT IS A VIOLATION OF SECTION 7206, SUBSECTION 5, OF
THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON
OTHER THAN WHOSE SEAL APPEARS ON THIS DRAWING
TO ALTER IN ANY MANNER AN INSTRUMENT OR SEAL
AN INSTRUMENT OR SEAL IS ALTERED, THE ALTERING ENGINEER SHALL
APPLY TO THE SEAL HIS SEAL AND THE REASON:
"ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE
DATE OF SUCH ALTERATION, AND A SPECIFIC
DESCRIPTION OF THE ALTERATION.

NO.	DATE	BY	DESCRIPTION OF REVISION

REVISIONS



URS Corporation
77 Clovekill Street, Buffalo, New York 14203
(716)256-1630 phone, (716)256-2242 fax

**NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL
CONSERVATION**
625 BROADWAY
ALBANY, NEW YORK 12233

**KLIEGMAN BROTHERS
OPERABLE
UNIT 2
GLENDALE
QUEENS COUNTY
SITE NO. 241031**

**REMEDIAL
CONSTRUCTION**

**EXISTING AND PROPOSED
PERFORMANCE
MONITORING WELL
LOCATIONS**

DATE	SCALE
JANUARY 2013	AS SHOWN
DRAWN BY	
CHKD BY	
APPROVED	

C-5

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URS Proposed Monitoring Well Locations
Kliegman Brothers OU #2 Site
Glendale, Queens County, New York Figure 4

TABLES

**TABLE 1
JOB HAZARD ANALYSES**

<p align="center">URS Corporation NYSDEC, Kliegman Brothers OU #2 Site (#2- 41-031), Glendale, Queens County, NY</p>	<p align="center">DATE 7/22/13</p>	<p align="center"><input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED</p>	<p align="center">PAGE 1 of 5</p>
<p align="center">WORK ACTIVITY (Description): Mobilization of Equipment, Site Reconnaissance, Well Mark-outs, Geophysical Survey and Utility Clearance</p>			
<p align="center">DEVELOPMENT TEAM</p>	<p align="center">POSITION/TITLE</p>	<p align="center">REVIEWED BY:</p>	<p align="center">POSITION/TITLE</p>
<p align="center">Jon Sundquist</p>	<p align="center">Project Manager</p>	<p align="center">Steve Moeller</p>	<p align="center">HSE Representative</p>
<p align="center">TBD</p>	<p align="center">Site Geologist (SSO)</p>	<p align="center">Ben Bertolotti, CIH</p>	<p align="center">RHSEM</p>
<p align="center">MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)</p>			
<p><input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Level D with long pants or as required by changing conditions as determined by SSO</p>	<p><input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input type="checkbox"/> HEARING PROTECTION Metatarsal protection for saw cutting, jack hammering, and pressure washing</p>	<p><input type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in SMSs and determined by SSO</p>	<p><input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA</p>
<p align="center">JOB STEPS</p>	<p align="center">POTENTIAL HAZARDS</p>	<p align="center">CRITICAL ACTIONS TO MITIGATE HAZARDS</p>	
<p align="center">Mobilization, Equipment Lay Down, Boring/Well Mark-outs Geophysical Survey and Utility Clearance</p>	<p align="center">Vehicular traffic</p>	<p align="center">Reflective vests required</p>	
		<p align="center">Use cones or other barricades as necessary</p>	
		<p align="center">Be aware of traffic and site traffic patterns. Try and place borings away from heavy traffic routes.</p>	
	<p align="center">Underground Utilities</p>	<p align="center">Contact Dig-Safe and Obtain Permit from NYCDOT</p>	
		<p align="center">Mark utility locations in the field prior to drilling</p>	
		<p align="center">Coordinate with NYSDEC personnel and obtain approval for drilling locations</p>	
	<p align="center">Adjacent Site Activities</p>	<p align="center">Keep aware of any adjacent activities and traffic</p>	
	<p align="center">Spray Paint</p>	<p align="center">Keep can pointed away from face</p>	
		<p align="center">Do not use damaged cans.</p>	
		<p align="center">Wear gloves</p>	
<p align="center">Wear appropriate PPE (safety glasses/goggles) to prevent flying debris from causing eye or other injuries</p>			

**TABLE 1 (CONT.)
JOB HAZARD ANALYSES**

URS Corporation NYSDEC, Kliegman Brothers OU #2 Site (#2-41-031), Glendale, Queens County, NY	<p align="center">DATE 7/22/13</p>	<p align="center"><input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED</p>	<p align="center">PAGE 2 of 5</p>
<p align="center">WORK ACTIVITY (Description): Injection and Monitoring Well Installation</p>			
<p align="center">DEVELOPMENT TEAM</p>	<p align="center">POSITION/TITLE</p>	<p align="center">REVIEWED BY:</p>	<p align="center">POSITION/TITLE</p>
<p align="center">Jon Sundquist</p>	<p align="center">Project Manager</p>	<p align="center">Steve Moeller</p>	<p align="center">HSE Representative</p>
		<p align="center">Ben Bertolotti, CIH</p>	<p align="center">RHSEM</p>
<p align="center">TBD</p>	<p align="center">Site Geologist (SSO)</p>	<p align="center">Andreas Papaneocleous</p>	<p align="center">SSO</p>
<p align="center">MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)</p>			
<input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Level D with long pants or as required by changing conditions as determined by SSO	<input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input checked="" type="checkbox"/> HEARING PROTECTION Metatarsal protection for saw cutting, jack hammering, and pressure washing	<input checked="" type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in SMSs and determined by SSO	<input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA
<p align="center">JOB STEPS</p>	<p align="center">POTENTIAL HAZARDS</p>	<p align="center">CRITICAL ACTIONS TO MITIGATE HAZARDS</p>	
Drilling Injection Well Installation and Monitoring Well Installation (may include sonic, air rotary, hollow stem auger, and/or direct push drilling techniques)	Vehicular traffic	Reflective vests required	
		Use cones, caution tape, or other barricades as necessary	
		Wear appropriate PPE, monitor particulates with appropriate and calibrated particulate monitors	
	Particulates (airborne dust) and flying debris	Adhere to action limits as specified in the HASP. Implement dust suppression measures.	
	Potential explosive/flammable or ignitable conditions	Use appropriate and calibrated monitoring equipment including: PID, particulate monitors, LEL	
	Chemical exposure to site contaminants (VOCs) (dermal and inhalation)	Wear nitrile gloves and other PPE as necessary.	
		Adhere to action limits as specified in HASP	
	Noise (>85 dB)	Hearing protection required.	
	Heavy Equipment	Avoid blind spots designated by operator	
		Check back-up alarms	
		Reflective vests required. Wear appropriate PPE (hard hat safety glasses, steel-toed boots)	
	Vac-Tron or Air Knife	Face Shield	
	Steam Cleaner		
Hot/ Cold Weather Exposure	Wear appropriate clothing		
	Take frequent breaks		
	Drink cool/hot liquids		

**TABLE 1 (CONT.)
JOB HAZARD ANALYSES**

<p>URS Corporation NYSDEC, Kliegman Brothers OU #2 Site (#2-41-031), Glendale, Queens County, NY</p>	<p align="center">DATE 7/22/13</p>	<p align="center"><input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED</p>	<p align="center">PAGE 3 of 5</p>
<p>WORK ACTIVITY (Description): Well Development, Fluid Level Gauging, Slug Testing, Groundwater Monitoring</p>			
<p align="center">DEVELOPMENT TEAM</p>	<p align="center">POSITION/TITLE</p>	<p align="center">REVIEWED BY:</p>	<p align="center">POSITION/TITLE</p>
<p align="center">Jon Sundquist</p>	<p align="center">Project Manager</p>	<p align="center">Steve Moeller</p>	<p align="center">HSE Representative</p>
		<p align="center">Ben Bertolotti, CIH</p>	<p align="center">RHSEM</p>
<p align="center">TBD</p>	<p align="center">Site Geologist (SSO)</p>	<p align="center">Andreas Papaneocleous</p>	<p align="center">SSO</p>
<p align="center">MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)</p>			
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<p align="center">JOB STEPS</p>	<p align="center">POTENTIAL HAZARDS</p>	<p align="center">CRITICAL ACTIONS TO MITIGATE HAZARDS</p>	
<p align="center">Well Development, Fluid Level Gauging, Slug Testing, Groundwater Monitoring</p>	<p align="center">Vehicular traffic</p>	<p align="center">Reflective vests required</p>	
		<p align="center">Use cones, caution tape, or other barricades as necessary</p>	
		<p align="center">Be aware of traffic and site traffic patterns.</p>	
	<p align="center">Chemical exposure to site contaminants (VOCs,) (dermal and inhalation)</p>	<p align="center">Use appropriate and calibrated monitoring equipment including: PID</p>	
		<p align="center">Wear nitrile gloves (inner and outer), Tyvek and other PPE as necessary.</p>	
		<p align="center">Adhere to action limits as specified in HASP</p>	
	<p align="center">Hot/Cold Weather Exposure</p>	<p align="center">Wear appropriate clothing</p>	
		<p align="center">Take frequent warming breaks</p>	
		<p align="center">Drink cool/hot liquids</p>	
	<p align="center">Potential Electrical Hazards</p>	<p align="center">If using extension cords and powered sampling equipment, check cords and equipment before use.</p>	
<p align="center">Injury during lifting</p>	<p align="center">Lift with knees</p>		
	<p align="center">Ask for assistance with heavy objects</p>		
	<p align="center">Keep back straight and do not twist</p>		
<p align="center">Manage contaminated purge water and materials</p>	<p align="center">Keep generation of excess contaminated purge water and materials to a minimum and manage according to work plan.</p>		

**TABLE 1 (CONT.)
JOB HAZARD ANALYSES**

<p>URS Corporation NYSDEC, Kliegman Brothers OU #2 Site (#2-41-031), Glendale, Queens County, NY</p>	<p align="center">DATE 7/22/13</p>	<p align="center"> <input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED </p>	<p align="center">PAGE 4 of 5</p>
<p align="center">WORK ACTIVITY (Description): Sodium Permanganate Injection</p>			
<p align="center">DEVELOPMENT TEAM</p>	<p align="center">POSITION/TITLE</p>	<p align="center">REVIEWED BY:</p>	<p align="center">POSITION/TITLE</p>
<p align="center">Jon Sundquist</p>	<p align="center">Project Manager</p>	<p align="center">Steve Moeller</p>	<p align="center">HSE Representative</p>
<p align="center">TBD</p>	<p align="center">Site Geologist (SSO)</p>	<p align="center">Ben Bertolotti, CIH Andreas Papaneocleous</p>	<p align="center">RHSEM SSO</p>
<p align="center">MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)</p>			
<p> <input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Level D with face shield/goggles and long pants or as required by changing conditions as determined by SSO </p>	<p> <input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input checked="" type="checkbox"/> HEARING PROTECTION Metatarsal protection for saw cutting, jack hammering, and pressure washing </p>	<p> <input checked="" type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in SMSs and determined by SSO </p>	<p> <input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA </p>
<p align="center">JOB STEPS</p>	<p align="center">POTENTIAL HAZARDS</p>	<p align="center">CRITICAL ACTIONS TO MITIGATE HAZARDS</p>	
<p align="center">Sodium Permanganate Injection</p>	<p align="center">Vehicular traffic</p>	<p align="center"> Reflective vests required Use cones, caution tape, or other barricades as necessary Be aware of traffic and site traffic patterns. </p>	
	<p align="center">Potential explosive/flammable or ignitable conditions</p>	<p align="center">Monitor with O₂/LEL meter; adhere to action limits as specified in the HASP. Use non-sparking equipment.</p>	
	<p align="center">Chemical exposure to site contaminants (VOCs) and Sodium Permanganate (dermal and inhalation)</p>	<p align="center">Use appropriate and calibrated monitoring equipment including: PID</p>	
	<p align="center">Chemical exposure to site contaminants (VOCs) and Sodium Permanganate (dermal and inhalation)</p>	<p align="center">Wear nitrile gloves, Tyvek and other PPE as necessary.</p>	
	<p align="center">Heavy Equipment</p>	<p align="center">Adhere to action limits as specified in HASP</p>	
	<p align="center">Heavy Equipment</p>	<p align="center">Avoid blind spots designated by operator.</p>	
	<p align="center">Heavy Equipment</p>	<p align="center">Check back-up alarms</p>	
	<p align="center">Heavy Equipment</p>	<p align="center">Reflective vests required while working near heavy equipment.</p>	
	<p align="center">Heavy Equipment</p>	<p align="center">Wear appropriate PPE (hard hat safety glasses, steel-toed boots)</p>	
	<p align="center">Hot/Cold Weather Exposure</p>	<p align="center">Wear appropriate clothing</p>	
	<p align="center">Hot/Cold Weather Exposure</p>	<p align="center">Take frequent warming breaks</p>	
	<p align="center">Hot/Cold Weather Exposure</p>	<p align="center">Drink cool/hot liquids</p>	
	<p align="center">Manage excess Sodium Permanganate</p>	<p align="center">Keep generation of excess Sodium Permanganate to a minimum and manage according to work plan.</p>	

**TABLE 1 (CONT.)
JOB HAZARD ANALYSES**

<p>URS Corporation NYSDEC, Kliegman Brothers OU #2 Site (#2- 41-031), Glendale, Queens County, NY</p>	<p align="center">DATE 7/22/13</p>	<p align="center"> <input checked="" type="checkbox"/> NEW <input type="checkbox"/> REVISED </p>	<p align="center">PAGE 5 of 5</p>
<p align="center">WORK ACTIVITY (Description): Survey of Well and Sampling Locations</p>			
<p align="center">DEVELOPMENT TEAM</p>	<p align="center">POSITION/TITLE</p>	<p align="center">REVIEWED BY:</p>	<p align="center">POSITION/TITLE</p>
<p align="center">Jon Sundquist</p>	<p align="center">Project Manager</p>	<p align="center">Steve Moeller</p>	<p align="center">HSE Representative</p>
<p align="center">TBD</p>	<p align="center">Site Geologist (SSO)</p>	<p align="center">Ben Bertolotti, CIH</p>	<p align="center">RHSEM</p>
<p align="center">TBD</p>	<p align="center">Site Geologist (SSO)</p>	<p align="center">Andreas Papanecoleous</p>	<p align="center">SSO</p>
<p align="center">MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT (SEE CRITICAL ACTIONS FOR TASK-SPECIFIC REQUIREMENTS)</p>			
<p> <input checked="" type="checkbox"/> REFLECTIVE VEST <input checked="" type="checkbox"/> HARD HAT <input checked="" type="checkbox"/> SAFETY GLASSES <input checked="" type="checkbox"/> PPE CLOTHING Level D with long pants or as required by changing conditions as determined by SSO </p>	<p> <input checked="" type="checkbox"/> SAFETY SHOES Steel-toe <input type="checkbox"/> HEARING PROTECTION Metatarsal protection for saw cutting, jack hammering, and pressure washing </p>	<p> <input type="checkbox"/> AIR PURIFYING RESPIRATOR required as specified in SMSs and determined by SSO </p>	<p> <input checked="" type="checkbox"/> GLOVES nitrile/leather as required by task-specific critical actions of JSA <input checked="" type="checkbox"/> OTHER All PPE must be worn as specified in task-specific critical actions of JSA </p>
<p align="center">JOB STEPS</p>	<p align="center">POTENTIAL HAZARDS</p>	<p align="center">CRITICAL ACTIONS TO MITIGATE HAZARDS</p>	
<p align="center">Survey of Well and Sampling Locations</p>	<p align="center">Vehicular traffic</p>	<p align="center">Reflective vests required</p>	
		<p align="center">Use cones or other barricades as necessary</p>	
		<p align="center">Be aware of traffic and site traffic patterns. Try and place borings away from heavy traffic routes.</p>	
	<p align="center">Hot/Cold Weather Exposure</p>	<p align="center">Wear appropriate clothing</p>	
		<p align="center">Take frequent warming breaks</p>	
		<p align="center">Drink cool/hot liquids</p>	
	<p align="center">Adjacent Site Activities</p>	<p align="center">Keep aware of any adjacent activities and traffic</p>	
	<p align="center">Spray Paint</p>	<p align="center">Keep can pointed away from face</p>	
		<p align="center">Do not use damaged cans.</p>	
		<p align="center">Wear gloves</p>	
		<p align="center">Wear appropriate PPE (safety glasses/goggles) to prevent flying debris from causing eye or other injuries</p>	

TABLE 2
CHEMICALS OF CONCERN

Specific Contaminant Known or Suspected	PEL, or TLV (ppm)	IDLH (ppm)	Acute Effects	Ionization Potential (eV)	Appropriate Monitoring Instrument
<u>VOCs</u> (CAS number)	0.5 TLV 1.0 OSHA PEL		Human Carcinogen		
Tetrachloroethylene (C) (127-18-4)	100	150	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage;	9.32	PID
Sodium Permanganate	5 mg/m ³		STRONG OXIDIZER Causes burns, irritation to respiratory system. Symptoms include coughing, shortness of breath, high concentrations can cause pulmonary edema	N/A	

NOTES:

TLV = Threshold Limit Value

IDLH = Immediately Dangerous to Life and Health

mg = milligrams

ppm = parts per million

eV = Electron Volt

PEL = Permissible Exposure Limit

m³ = cubic meters

NA = Not Applicable

C = Carcinogen

ATTACHMENT A

URS SAFETY MANAGEMENT STANDARDS (SMS)

URS SAFETY MANAGEMENT STANDARD

Hazard Communication (Worker Right-to-Know)

1. Applicability

This procedure applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this Hazard Communication standard (also known as worker right-to-know program) is to provide URS personnel with information and training about safety and health hazards associated with the chemicals they may encounter in the workplace. This procedure describes how chemical safety hazards are communicated to URS personnel and how information is to be provided to employees of other companies working at the location. The requirements include steps to acquire this information, maintain the information, and train personnel in the hazard communication program.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 002 NA](#) – North America; Australia / New Zealand

[SMS 002 INT](#) – International Operations (including Europe, Asia, South America and Africa)

URS SAFETY MANAGEMENT STANDARD

Hazard Communication (Worker Right-to-Know)

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

This standard is not applicable to chemical laboratory operations that are covered under 29 Code of Federal Regulations (CFR) 1910.1450 (Occupational Exposure to Chemicals in Laboratories).

2. Purpose and Scope

The purpose of this Hazard Communication standard (also known as worker right-to-know program) is to provide URS personnel with information and training about safety and health hazards associated with the chemicals they may encounter in the workplace. This procedure describes how chemical safety hazards are communicated to URS personnel and how information is to be provided to employees of other companies working at the location. The requirements include steps to acquire this information, maintain the information, and train personnel in the hazard communication program.

3. Implementation

Implementation of this standard is the responsibility of the URS manager who directs activities at the facility, site, or project location. For office locations and large projects, this program may be incorporated into the general site orientation and training program or administered by project management.

Note: Manufacturers are permitted to ship chemicals under existing classification systems until December of 2015. As such, many of the requirements listed here may be gradually phased in by the manufacturers until that time. Where noted within the SMS, deviations from the existing procedure are allowed until December 2015 or until otherwise noted by URS.

4. Requirements

A. Hazardous Material Inventory

Maintain a hazardous material inventory that lists all of the hazardous materials used at each workplace (i.e., office, field location). Use chemical identifiers consistent with and referenced on the applicable safety data sheet (SDS). (Note that the terms material safety data sheet (MSDS) and SDS may be used interchangeably until December 2015.)

URS SAFETY MANAGEMENT STANDARD
Hazard Communication (Worker Right-to-Know)

B. Site-Specific Written Program

A site-specific written program may be prepared as a stand-alone document or included within a site-specific health and safety plan. The program must cover hazardous materials in all physical forms (liquids, solids, gases, vapors, fumes, and mists), regardless of whether they are “contained.”

C. Safety Data Sheets (SDSs)

1. The safety representative will obtain an SDS for each chemical before it is used. SDSs will generally be received by the person ordering the product. SDSs for products frequently used should be kept on file because additional copies may not be included in repeat shipments.
2. The safety representative will review each SDS when it is received to evaluate whether the information is complete and to determine whether existing protective measures are adequate.
3. Each office or project location will assign a responsible person or department to maintain a collection of all applicable and relevant SDSs in an area that is accessible by all employees at all times. An electronic database is an acceptable method of maintaining the SDSs.
4. The assigned person or department will replace SDSs when updated sheets are received and will communicate any significant changes to those who work with the chemical.
5. SDSs are required for all hazardous materials brought on site by project personnel.
6. General consumer products to be used for their specific purpose, as well as food, drugs, cosmetics, and tobacco products brought into the workplace for employee consumption, are exempt, as are supplies in the first aid kit, such as isopropyl alcohol and antibacterial wipes.
7. Subcontractors bringing hazardous materials onto a site or project must submit SDSs to the safety representative. The safety representative may restrict the use of certain hazardous materials on a site or project due to occupational health risk, hazardous

URS SAFETY MANAGEMENT STANDARD
Hazard Communication (Worker Right-to-Know)

physical properties of the material, or potential employee sensitivity to odor or irritating properties of the material.

D. Labels

Unless each container has appropriate labeling, label all chemical containers with the following information:

1. Product identifiers (codes or product names matching those on the SDS).
2. Signal word (key words used to emphasize hazards and indicate the relative severity of the hazard).
3. Appropriate hazard statements (standard phrases assigned to a hazard class and category which describe the nature of the hazard).
4. Pictograms (graphic elements intended to convey specific information about the hazard).
5. Precautionary statements (supplement the hazard statements by briefly providing measures to be taken to minimize or prevent adverse effects from the hazard).
6. Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

Labels on incoming containers of hazardous materials will not be removed or defaced.

Labels are also required when a hazardous substance is transferred from a primary container to a secondary container. Labels on secondary containers must indicate the product identifier, as well as words, pictures, or symbols, or combination thereof, which will provide general information about the hazards of the chemical, including the physical and health hazards.

Note that until December 2015, manufacturers will be in a transitional period as they gradually meet the requirements of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). As such, the labels on incoming containers from the manufacturer are only required to indicate product names and identities of the hazardous chemicals, appropriate hazard warnings, and the name and address of the manufacturer, importer, or other responsible party, rather than the items

URS SAFETY MANAGEMENT STANDARD
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listed above in D.1 through D.6. Labels may incorporate words, pictures, symbols, or combinations thereof to ensure the appropriate information is provided to the end user. Examples of acceptable labeling systems include the National Fire Protection Association (NFPA) Diamond, the Hazardous Materials Identification System (HMIS), the Chemical Hazard Identification and Training (CHIT) system, or similar.

E. Hazardous Non-routine Tasks

Periodically, employees are required to perform hazardous non-routine tasks. Prior to starting work on such projects, each employee must be provided with information about hazards to which they may be exposed, as follows:

1. Specific chemical and physical hazards.
2. Protective/safety measures that must be taken.
3. Measures that have been taken to lessen the hazards, including ventilation, respirators, presence of another employee, and emergency procedures.

F. Informing Contractors/Subcontractors

Provide other contractors/subcontractors working in the same area with the following information on chemicals used by or provided to URS personnel:

1. Identification of hazardous chemicals to which they may be exposed while on the jobsite.
2. Precautionary measures the contractors/subcontractors need to take to protect their employees during both normal operating conditions and foreseeable emergencies.
3. Location of SDSs.
4. Applicable labeling systems in use in the workplace.

G. Training

1. Provide training to all employees who have the potential to be exposed to hazardous materials, on the following schedule:
 - a. At the time of the initial task assignment,

URS SAFETY MANAGEMENT STANDARD
Hazard Communication (Worker Right-to-Know)

- b. Whenever new chemicals are introduced into the workplace,
or
 - c. More frequently where required by site-specific conditions or
client-specific requirements.
2. This training will include the following:
- a. Applicable regulatory requirements.
 - b. Any operations in the work area where hazardous chemicals
are present.
 - c. Location of the program, inventory, and SDS.
 - d. Site-specific chemicals used and their hazards (chemical,
physical, and health), including:
 - 1. General characteristics of chemicals
 - 2. Signs and symptoms of exposure
 - e. How to detect the presence or release of chemicals including
the location, types, and usage of any portable and fixed
monitoring or detection equipment and their associated
alarms, where applicable.
 - f. Safe work practices and methods employees can take to
protect themselves from chemical hazards, including work
practices, emergency procedures, and the use of personal
protective equipment.
 - g. How to read an SDS.
 - h. Site- or project-specific information on hazard warnings and
labels in use at the location, if applicable.
 - i. Site-specific evacuation and rescue procedures in the event
of chemical release, including the location of staging areas
and personnel accounting procedures.
3. Document the training.
4. Arrange provisions for training in the language of the user.
International Chemical Safety Cards (see Section 6, ILO) may be

URS SAFETY MANAGEMENT STANDARD

Hazard Communication (Worker Right-to-Know)

used in conjunction with SDS information to provide non-English-language information. SDSs are required to be on site, but there is no requirement for the SDSs to be in a language other than English.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Hazardous Material Inventory.
- B. SDSs.
- C. Training records.
- D. Contractor/Subcontractor notifications.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) General Industry Standards – Hazard Communication – 29 Code of Federal Regulations (CFR) [1910.1200](#)
- B. U.S. OSHA Construction Standards – Hazard Communication – [29 CFR 1926.59](#)
- C. Mine Safety and Health Administration – Hazard Communication – [30 CFR 47](#)
- D. OSHA Administration Technical Links – <http://www.osha.gov/dsg/hazcom/index.html>
- E. International Labour Organization (ILO) – International Chemical Safety Cards (information about 1613 chemicals in 18 languages). <http://www.ilo.org/public/english/protection/safework/cis/products/icsc/index.htm>
- F. Agency for Toxic Substances and Disease Registry (ATSDR) – Tox FAQs and Tox FAQs en Espanol, 2003. <http://www.atsdr.cdc.gov/toxfaqs/index.asp>
- G. United Nations – Globally Harmonized System of Classification and Labeling of Chemicals (GHS). http://www.unece.org/trans/danger/publi/ghs/ghs_rev04/04files_e.html

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Hazard Communication (Worker Right-to-Know)

7. Supplemental Information

- A. [Hazard Communication Program – Template](#)
- B. [Hazard Communication Employee Training Program](#)



HAZARD COMMUNICATION PROGRAM

Table of Contents

- A. Purpose
- B. Identification of Hazardous Substances
- C. Container Labeling
- D. Safety Data Sheets (SDS)
- E. Employee Training and Information
- F. Non-Routine Task Training
- G. Access to Information by Other Employees

Appendices

- I. Hazard Communication Checklist
- II. Potentially Hazardous Substances
- III. List of Jobsite Hazardous Substances
- IV. Sample Letter to Suppliers to Obtain SDS

A. PURPOSE

A-1 To protect the health and safety of our employees, URS Corporation has developed this Hazard Communication program.

1. As an organization we intend to provide information about chemical hazards and other hazardous substances, and the control of hazards via our comprehensive Hazard Communication Program, which includes container labeling, Safety Data Sheets (SDS), and training.
2. This written Hazard Communication Program applies to all operations that MAY expose employees to hazardous substances because of normal work conditions (including non-routine tasks) or as the result of a reasonably foreseeable emergency.
3. This written Hazard Communication Program is available, upon request, to employees, their designated representatives and to appropriate representatives of state and/or federal safety and health agencies.

A-2 Scope

This program is part of URS Corporation's comprehensive health and safety program and shall be applied in conjunction with that overall program.

A-3 Responsibilities

1. The Project Manager is responsible for implementing and ensuring compliance with this written hazard communication program. The Hazard Communication checklist found in Appendix I is provided to assist the Project Manager in carrying out this responsibility.
2. The designated Project Safety Representative is responsible for coordinating and administering the program, in developing and assisting in the presentation of training materials and in providing technical assistance to project supervision.
3. Each Project Supervisor shall become familiar with the hazard communication procedures and shall supervise the application of these procedures to tasks for which they are responsible.
4. The Safety Manager is the designated safety professional for the project or office location and is responsible for providing technical assistance to the Project Supervisor or Safety Representative to implement the hazard communication program.

B. IDENTIFICATION OF HAZARDOUS SUBSTANCES

- B-1 "Hazardous Substances" are materials or mixtures that are or have physical or health hazards (See Appendix II for examples of potentially hazardous materials).
- B-2 "Exposure" is any situation arising from work conditions where an employee may ingest, inhale, absorb or otherwise come in contact with a hazardous substance.
- B-3 An inventory of all hazardous substances to which employees may be exposed on this jobsite, as well as an accompanying SDS, shall be maintained in the project office (see Appendix III).

C. CONTAINER LABELING

- C-1 When hazardous substances are received, the Project Safety Representative shall examine the containers to determine if the labels provide the following information (primary containers):
1. A product identifier;
 2. Signal words;
 3. Appropriate hazard statements;
 4. Pictograms;
 5. Precautionary statements; and
3. The name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.
- C-2 When hazardous substances are transferred into portable or secondary containers, the responsible Project Supervisor shall ensure that these containers are labeled with an extra copy of the manufacturer's label or with a printed label that includes the information above.

EXCEPTION: When an employee transfers a hazardous substance into a portable container for his/her own immediate use, the portable container need not be labeled.

- C-3 Each Project Supervisor shall ensure that the labels on containers of hazardous substances are not removed or defaced, unless the containers are immediately relabeled with the information in C-1 above. The labels shall be written legibly in English. However, for non-English speaking employees information may be presented in their native language as well.

- C-4 Containers without complete labels or with defaced labels will not be used on the job.
- C-5 The Project Supervisor or Safety Representative shall review the jobsite labeling procedure at least quarterly and update as required.

D. SAFETY DATA SHEETS (SDS)

- D-1 Safety Data Sheets (SDSs) are documents that supply information about a particular hazardous substance or mixture. Manufacturers are required to provide SDSs when the hazardous substances are sold to distributors or purchasers. In most cases, SDSs are sent to the purchaser of the project (e.g., the procurement department or Project Supervisor), not the safety department.
- D-2 The Safety Manager / Project Safety Representative or Project Supervisor in coordination with the purchasing agent or project business manager, will be responsible for obtaining and maintaining the master sets of SDSs and other information on all hazardous substances used (see sample letter in Appendix IV).
- D-3 The Project Safety Representative will review SDSs for completeness. If an SDS is missing or obviously incomplete, a new SDS will be requested from the manufacturer. In some cases, SDSs may be obtained on-line through the manufacturer's web site. The Project Safety Representative should review products for highly toxic or dangerous constituents prior to use and consult with the Safety Manager for any items considered hazardous or toxic.
- D-4 SDSs are available to all employees in their work area for review during each work shift. If SDSs are not available or new hazardous substance(s) in use do not have SDSs, contact the Project Safety Representative immediately. Additional information such as chemical safety cards and the NIOSH Pocket Guide to Chemical Hazards may be used for additional information.
- D-5 Project Supervisors shall be alert to other employees (such as subcontractors) whose work on the jobsite may expose employees to additional hazardous substances. When it appears such exposure will occur, SDSs for the substances must be obtained.
- D-6 When doing renovation or remodeling work, the Project Supervisor shall coordinate SDSs of hazardous materials used by contractors. Contractors bringing hazardous materials on to a site or project must submit SDSs to the Project Supervisor. The Project Supervisor should consult with the Safety Manager if there are any questions regarding hazardous constituents of products.

E. EMPLOYEE TRAINING AND INFORMATION**E-1 Initial Orientation**

Before starting work, each new employee must attend a health and safety orientation. URS Corporation's on-line training program on Hazard Communication may be used as a component of the initial training but employees still require site specific information on hazards of chemicals in use, site specific spill and emergency procedures, and site specific labeling systems as described below.

E-2 Training shall be provided before employees are assigned duties that may cause exposure to hazardous substances. Training shall also be given when new hazardous substances are introduced into the work area or when an SDS is changed. In general, this training shall include:

1. Information on which hazardous substances are in the work area.
2. How to read and interpret information on SDSs and labels.
3. Any physical or health hazards associated with the use of a hazardous substance or mixture being used in the work area.
4. Proper precautions for handling hazardous substances, including specific procedures the company has implemented to protect workers from exposure such as personal protective equipment and work practices.
5. Proper procedures for reporting of releases or threatened releases of hazardous substances.
6. Emergency procedures for spills, fires, disposal and first aid.
7. The methods and observations that can be used to detect the presence of a hazardous substance in the work place (odor, visual appearance or monitoring).
8. The right of employees, their physicians or their collective bargaining agents to receive information on hazardous substances to which they may be exposed.
9. The right against discharge or discrimination due to an employee's exercise of the rights afforded by law.
10. The details of this written Hazard Communication Program; the availability and location of this written Hazard Communication Program and of SDSs or other information.

E-3 Hazard communication training must be documented.

E-4 Additional training shall be provided as needed during the weekly safety and health training ("toolbox") meetings in order to emphasize the safe handling, use and storage of onsite hazardous substances.

F. NON-ROUTINE TASK TRAINING

- F-1 When employees are assigned to a non-routine task that may expose them to a hazardous substance for which they have not been trained, they shall be trained in the manner required by Section E.
- F-2 Some examples of non-routine tasks are:
- Confined space entry.
 - Tank cleaning.
 - Repair of pipes or tanks containing hazardous substances.

Prior to starting work on such projects, each affected employee will be given information about the hazardous substances he or she may encounter during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps the jobsite is using to reduce the hazards, including ventilation, respirators, presence of another employee and emergency procedures including site specific warnings, evacuation routes, and assembly points.

G. ACCESS TO INFORMATION BY OTHER EMPLOYERS

- G-1 It is the responsibility of the Project Safety Representative or Project Supervisor to provide contractors and subcontractors with information about hazardous chemicals their employees may be exposed to on a jobsite and suggested precautions for the contractor's employees to follow to avoid exposure to hazardous conditions.
- G-2 Contractors and subcontractors on the job site with potential exposure or risk will be contacted before work is started, to gather and distribute information concerning any chemical hazard that they may bring or be exposed to, in areas that are under URS Corporation control.

APPENDIX I**HAZARD COMMUNICATION CHECKLIST**

- _____ 1. Have we prepared a list of all the hazardous substances in our workplace?
- _____ 2. Are we prepared to update our hazardous substance list?
- _____ 3. Have we obtained or developed a safety data sheet for each hazardous substance we use?
- _____ 4. Have we developed a system to ensure that all incoming hazardous substances are checked for proper labels and data sheets?
- _____ 5. Do we have procedures to ensure proper labeling or warning signs for containers that hold hazardous substances?
- _____ 6. Are our employees aware of the specific information and training requirements of the Hazard Communication Standard?
- _____ 7. Are our employees familiar with the different types of chemicals and the hazards associated with them?
- _____ 8. Have our employees been informed of the hazards associated with performing non-routine tasks?
- _____ 9. Do our employees understand how to detect the presence or release of hazardous substances in the workplace?
- _____ 10. Are employees trained about proper work practices and personal protective equipment in relation to the hazardous substances in their work area?
- _____ 11. Does our training program provide information on appropriate first aid, emergency procedures and the likely symptoms of overexposure?
- _____ 12. Does our training program include an explanation of labels and warnings that are used in each work area?
- _____ 13. Does the training describe where to obtain safety data sheets and how employees may use them?
- _____ 14. Have we worked out a system to ensure that new employees are trained before beginning work?
- _____ 15. Have we developed a system to identify new hazardous substances before they are introduced into a work area?
- _____ 16. Do we have a system for informing employees when we learn of new hazards associated with a chemical we use?
- _____ 17. Have the employees been advised of the consequences for failure to follow established procedures?
- _____ 18. Do we have a system to ensure subcontractors are sharing information with one another, concerning the hazardous substances they have brought to the site?

APPENDIX II**EXAMPLES OF POTENTIALLY HAZARDOUS MATERIALS THAT MAY BE
FOUND ON URS CORPORATION CONSTRUCTION/GENERAL INDUSTRY
PROJECTS**

Acetone	Kerosene
Acetylene gas	Lead
Adhesives	Lime (calcium oxide)
Aluminum etching agent	Limestone
Ammonia	Lubricating oils
Anti-freeze	Lye (sodium hydroxide, potassium hydroxide)
Arsenic compounds	Magnesium
Asbestos	Metals (aluminum, nickel, copper, zinc, cadmium, iron, etc.)
Asphalt (Petroleum) fumes	Methanol (methyl alcohol)
Battery Fluids	Methyl ethyl ketone (2-butanone)
Benzene (and derivatives)	Motor oil additives
Bleaching agents	Muriatic acid (hydrochloric acid)
Carbon black	Naptha (coal tar)
Carbon monoxide (in cylinders)	Nitroglycerin
Caulking, sealant agents	Oxalic acid
Caustic soda (sodium hydroxide)	Ozone
Chromate salts	Paint remover
Chromium	Paint stripper
Cleaners	Paints/lacquers
Cleaning agents	Particle board
Coal tar pitch	Pentachlorophenol
Coal tar epoxy	Pesticides
Coatings	Photographic developers and fixers
Cobalt	Photogravure ink (copy machine)
Concrete curing compounds	Plastics
Creosol	Polishes for metal floors
Cutting oil (oil mist)	Propanol
De-emulsifier for oil	Putty Resins, epoxy/synthetics
Diesel gas, diesel oil	Sealers
Drywall	Shellac
Dusts (brick, cement block)	Solder, flux (zinc chloride, fluorides, etc.)
Enamel	Solder, soft (lead, tin)
Etching agents	Solvents
Ethyl alcohol	Sulfuric acid
Fiberglass, mineral wool	Thinner, paint/lacquer
Foam insulation	Tin
Freon 20, R20 (and others)	Transite
Gasoline (petrol, ethyl)	Turpentine, gum spirit, oil of turpentine
Glues	Varnishes
Graphite	Waterproofing agents
Greases	Waxes
Helium (in cylinders)	Welding Rods
Hydraulic brake fluid	Wood alcohol (methanol)
Hydrochloric acid	Wood preservative
Hydrogen (in cylinders)	Xylene
Inks	Zinc
Insulations	
Iron	

	<p style="text-align: center;">Health, Safety and Environment HAZARD COMMUNICATION PROGRAM - TEMPLATE</p>	<p style="text-align: right;">SMS 002 NA Supplemental Information A Issue Date: February 2009 Revision 3: September 2012</p>
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APPENDIX III

LIST OF PROJECT SPECIFIC HAZARDOUS SUBSTANCES

On the following page(s) is a current list of the specific hazardous substances, along with the manufacturer's product identifier, known to be present at this jobsite.

This list uses the product identifier referenced on the SDS. Specific information on each substance may be found on the SDSs located in the project office.

	<p style="text-align: center;">Health, Safety and Environment HAZARD COMMUNICATION PROGRAM - TEMPLATE</p>	<p style="text-align: right;">SMS 002 NA Supplemental Information A Issue Date: February 2009 Revision 3: September 2012</p>
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APPENDIX IV

(PROJECT LETTERHEAD)

Date

Product Manufacturer's (Importer/Distributor/Responsible Party) Name
Product Manufacturer's (Importer/Distributor/Responsible Party) Address

Subject: Safety Data Sheet Requisition

Dear Manufacturer (Importer/Distributor/Responsible Party):

Please provide the following safety data sheet(s):

Thank you for your support and assistance in this matter.

Sincerely,

Requestor's Name
Requestor's Address

This document presents information that can be used for hazard communication training.

This information has been developed based on groups (types) of hazardous substance(s) used and the common hazards associated with them.

For specific hazard information on each brand of material the Safety Data Sheets (SDS) must be reviewed.

OVERVIEW OF THE HAZARD COMMUNICATION REGULATION

The Hazard Communication Regulation is intended to ensure that both employers and employees are aware of the dangers associated with hazardous substances in their workplaces. The following information is a review of the specific requirements of a hazard communication program, including container labeling, SDS and training.

WRITTEN HAZARD COMMUNICATION PROGRAM

We have a written program that outlines how we will provide information and control your exposure to hazardous substances. This plan is available for your review during our training and at the project office for review during your work shift.


HAZARDOUS SUBSTANCES USED IN OUR WORKPLACE

On this job, we use a variety of products. Many of these products contain one or more hazardous substances. Let's review the hazardous substance inventory in your work area.

READING LABELS AND SDS

LABELS: A product label on both the original and secondary containers should be reviewed prior to working with the material. Each label will have several important pieces of information you should be familiar with:

1. Product identifier (codes or product names matching those on the SDS).
2. Signal word (key words used to emphasize hazards and indicate the relative severity of the hazard).
3. Appropriate hazard statements (standard phrases assigned to a hazard class and category which describe the nature of the hazard).
4. Pictograms (graphic elements intended to convey specific information about the hazard).
5. Precautionary statements (supplement the hazard statements by briefly providing measures to be taken to minimize or prevent adverse effects from the hazard).

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6. Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party.

The label should act as a visual reminder of the information we have presented in this training session and of the information found in more detail on the SDS. It is essential for your safety that you read the label only use the hazardous substance(s) within the guidelines prescribed. Questions concerning the label should be directed to your supervisor/foreman.

SAFETY DATA SHEETS (SDS): The SDS is the primary means we will use to convey the necessary information about the hazards of the substances we use. The manufacturers and importers are responsible for providing us with the SDS. The manufacturer must provide us with adequate information to use the substance safely.

PHYSICAL AND HEALTH HAZARDS OF THE HAZARDOUS SUBSTANCE(S) USED

Employees are to be trained specifically about the hazards of the substances in their work areas. This may be done by specific hazardous substances or by categories of hazards, but in any case, the employee is to be aware that information is available on the specific hazards of individual hazardous substances through SDSs.

Employees may be trained using the common type or generic chemical group or by reviewing the specific SDS as long as the training includes the following information:

1. Measures to protect employee from the hazards (i.e., work practices, engineering controls and the use of personal protective equipment).
2. The physical and health hazards of the hazardous substances.
3. Detection of release of the substance; emergency and first aid procedures.

EXAMPLE OF GENERAL HAZARDOUS SUBSTANCE GROUP TYPE TRAINING

Product/Chemical Group: Hydrocarbon Solvents.

Health Effects – Effect of Overexposure: High concentrations of solvent vapors are irritating to the eyes, nose, throat and lungs, may cause headaches and dizziness and sleepiness. Even higher levels may cause unconsciousness and may have other brain and central nervous system effects.

Prolonged or repeated liquid contact with the skin may cause defatting of the skin, leading to dryness, possible irritation and dermatitis (reddening and inflamed skin). Some solvents are absorbed right through the skin and the health effects are just as if the solvent vapor was inhaled.

Each organic solvent's possible long term health effects will vary; however, prolonged solvent exposures are related to possible liver, kidney and central

nervous system and brain damage (Note: The variety of solvent types should be reviewed).

Physical Hazards: Hydrocarbon solvents are flammable and combustible and represent fire and explosion hazards if the materials are not handled correctly. Hydrocarbon solvents are generally stable and will not react violently with water. Review the SDS section on Physical and Chemical Properties. Most solvents will vaporize rapidly and become airborne.

Detection of Release: Odor – Solvent vapor may produce an odor or cause your nose or eyes to be irritated, but do not depend on odor to warn you. Odor thresholds (lowest level that can be detected) for most solvents vary widely from person to person. Also, some solvents produce “olfactory fatigue” - the rapid loss of ability to smell the odor. However, odor can warn you of exposure to some solvents (confirm this with industrial hygiene monitoring).

Appearance – Most solvent vapors are invisible so do not rely on appearance to warn you for exposure.

Instrumentation – A variety of industrial hygiene instruments can be used to measure employee exposure. This equipment should be operated only by qualified personnel.

Emergency Response – For Flammable Solvents: If the material is spilled or leaks, shut-off and eliminate all sources of ignition. Recover the free product by adding absorbents to the spill. Minimize breathing vapors and skin contact. Ventilate the area by opening windows and doors. Follow the established hazardous waste disposal procedures.

Exposure Control: Protective Equipment, Engineering Controls and Proper Work Practices:

- Protective Equipment – Use chemical-resistant gloves, aprons or clothing if prolonged or repeated skin contact may occur. Use splash goggles and face shield when eye or face contact may occur. Use approved respiratory protective equipment as established by our Safety Program (Note: If needed, a review of the respiratory protective program may be appropriate).
- Engineering Controls/Work Practices – Ventilation is to be used when it is necessary to prevent build-up of vapors from both a health or fire and explosion concern. Keep containers closed when not in use. Do not handle or store near heat or sources of ignition or strong oxidants. No smoking, burning or welding is permitted near the flammable vapors. Use the bonding and/or grounding system when transferring materials. Most solvents will vaporize rapidly and become airborne.

APPROPRIATE EMERGENCY AND FIRST AID PROCEDURES

Eye contact – If splashed into the eyes, flush with water for 15 minutes or until irritation subsides. If irritation continues, call a physician.

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Skin contact – In case of skin contact, remove any contaminated clothing and wash skin thoroughly with water and soap.

Inhalation – If overcome by vapors, remove from exposure and call a physician immediately. If breathing is irregular or has stopped, start resuscitation.

Ingestion – If ingested, DO NOT induce vomiting, call emergency medical aid immediately.



Health, Safety and Environment
HAZARD COMMUNICATION
EMPLOYEE TRAINING PROGRAM

SMS 002 NA
Supplemental Information B
Issue Date: February 2009
Revision 3: September 2012

HAZARD COMMUNICATION TRAINING

Date: _____

I have received hazard communication training as described in the URS Corporation Hazard Communication Program.

Employee Name (Print)	Employee Signature	Employee Number

I hereby certify that the above named employees have been provided with hazard communication training.

Supervisor/Instructor's Name

Supervisor/Instructor's Signature

HAZARDOUS PROPERTIES OF CHEMICALS TRAINING

Chemicals are a part of every aspect of our lives. A minute does not go by that we do not use something that contains chemicals, or chemicals were used in the manufacturing process. The chemicals you use in the work place only present potential health and physical hazards when they are mishandled, improperly used, incompatible mixtures combined, improperly stored or labeled.

Depending upon the chemical and the level of exposure, health hazards can vary from minor skin irritations to serious chemical burns, nerve damage, different forms of cancer and even death. Physical damage may include fires, explosions, property and environmental damage.

Hazard awareness is recognizing and understanding the potential injuries and illnesses or physical damage the chemicals can cause. The communication of this information is essential for your being aware of, understanding and respecting the potential hazards. This knowledge is important for the decisions you make concerning how you use the chemicals and the safe work practices you follow.

Remedial action response personnel may be exposed to a number of substances that are hazardous because of their properties. These properties can be summarized into three broad categories:

- a. Physical/chemical
- b. Biological
- c. Radiological

It should be noted that many hazards may be present at any one time. It is important to understand the fundamentals of each of these properties and their relationships so that effective safety practices may be employed to reduce the risk to the public and remedial response personnel. Some hazards that may be encountered at this work site are toxic substances, flammable materials, explosive materials, corrosive materials, biological agents, excessive noise, heat or cold stress, oxygen deficient work areas, and radioactive materials.

PHYSICAL/CHEMICAL PROPERTIES

Physical hazards. Chemical compounds possess inherent properties, which determine the type and degree of the hazard they represent. Evaluating risks of an incident depends on understanding these properties and their relationship to the environment.

- a. Solubility. The ability of a solid, liquid, gas or vapor to dissolve in a solvent is solubility. An insoluble substance can be physically mixed or blended in a

solvent for a short time but is unchanged when it finally separates. The solubility of a material is important when determining its reactivity, dispersion, mitigation and treatment.

- b. Density. The density of a substance is its mass per unit volume, commonly expressed in g/cc.
- c. Specific gravity. Specific gravity is the ratio of the density of a substance to the density of water. If the specific gravity of a substance is greater than 1 it will sink in water. The substance will float in water if its specific gravity is less than 1.
- d. Vapor density. The vapor density is the density of a gas compared to the density of air. If the density of a gas is greater than that of air then the gas will tend to pocket and settle into the lowest points. If the vapor density is close to air or lower than air then the gas will disperse. If the vapor or gas displaces oxygen in the low spots then it can become an asphyxiant problem. If the gas or vapor is an explosive, when it pockets it will become an explosive hazard.
- e. Flashpoint. If the ambient temperature in relation to the material of concern is right, then it may give off enough vapor at its surface to allow ignition by an open flame or spark. The minimum temperature at which a substance produces sufficient flammable vapors to ignite is its flashpoint. If the vapor does ignite, combustion can continue as long as the temperature remains at or above the flashpoint. The relative flammability of a substance is based on its flashpoint. An accepted relation between the two is:
- | | |
|-------------------------|----------------------------|
| Highly flammable: | Flashpoint <100°F |
| Moderately flammable: | Flashpoint >100°F & <200°F |
| Relatively inflammable: | Flashpoint >200°F |
- f. Chemical Hazards. Hazardous conditions that may exist because of the chemical nature of substances may be summarized as fire hazards, explosive hazards, corrosive hazards, and chemical reactivity.

Fire Hazards

- a. Combustibility: Combustibility is the ability of a material to act as a fuel, that is, to burn. Materials that can be readily ignited and sustain a fire are considered to be combustible, while those that cannot are called noncombustible. Three elements are required for combustion to occur: fuel, oxygen, and heat. The concentration of the fuel and the oxygen must be high enough to allow ignition and maintain the burning process. Combustion is a chemical reaction that requires heat to proceed. Heat is supplied by the

ignition source and is maintained by the combustion, or it must be supplied from an external source. The relationship of these three fire components can form a triangle. If one leg of the triangle is removed, then the fire can be extinguished. For example, water applied to a fire removes the heat, thereby extinguishing the fire. When a material generates enough heat by itself to self-ignite and combust, spontaneous combustion occurs, either as a fire or explosion (e.g., diesel greater than 140 degrees Fahrenheit is combustible.)

- b. **Flammability:** Flammability is the ability of a material (liquid or gas) to generate a sufficient concentration of combustible vapors under normal conditions to be ignited and produce a flame. It is necessary to have a proper fuel-to-oxygen (oxygen) ratio (% fuel in air) to allow combustion. A flammable material is considered highly combustible if it can burn at ambient temperatures. However, a combustible material is not necessarily flammable because it may not be easily ignited or the ignition maintained. Pyrophoric materials will ignite at room temperature in the presence of a gas or vapor or when a slight friction or shock is applied.

The substances listed below are easily ignited (pyrophorics), require little oxygen to support combustion, have low flammability limits and explosive limits and a wide flammable and explosive range.

Flammable liquids

Aldehydes
Ketones
Amines
Ethers
Aliphatic Hydrocarbons
Aromatic Hydrocarbons
Alcohols
Nitroaliphatics

Flammable solids

Phosphorus
Magnesium Dust
Zirconium Dust
Titanium Dust
Aluminum Dust
Zinc Dust

Water Reactive Flammable Solids

Potassium
Sodium
Lithium

Pyrophoric Liquids

Organometallic compounds
Dimethyl Zinc
Tributyl Aluminum

Some of the hazards related to fires and explosions can cause physical destruction due to shock waves, heat, and flying objects. Secondary fires can be created as well as other flammable conditions. Toxic or corrosive compounds may also be released to the surrounding environment as well.

Explosives

An explosive is a substance, which undergoes a very rapid chemical transformation producing large amounts of gases and heat. The gases

produced, for example, nitrogen, oxygen, carbon monoxide, carbon dioxide, and steam, due to the heat produced, rapidly expand to velocities exceeding the speed of sound. This creates both a shockwave (high pressure front) and noise. The main categories of explosives are listed below.

High or detonating – produces a shock wave followed by combustion.

Primary high explosive – detonation occurs in a short time. Examples: lead azide, mercury fulminate, and lead styphnate.

Secondary high explosive – needs a booster to detonate. Examples: Tetryl, cyclonite, dynamite and TNT

Low or deflagrating – Explosive rate very fast. Combustion followed by a shock wave. Examples: smokeless powder, magnesium, and molotov cocktail.

Corrosive Hazards

Corrosion is a process of material degradation. Upon contact, a corrosive material may destroy body tissues, metals, plastics, and other materials. Corrosivity is the ability of material to increase the hydrogen ion concentration of a material or to transfer electron pairs of or from itself or another material. A corrosive material is a reactive compound or element that produces a destructive chemical change in the material it is acting on. Common corrosives are:

Halogens

Bromine
Chlorine
Fluorine
Iodine

Acids

Acetic acid
Hydrochloric acid
Hydrofluoric acid
Nitric acid
Sulfuric acid

Bases (Caustics)

Potassium Hydroxide
Sodium Hydroxide

Skin irritation and burns are typical results when the body contacts an acidic or basic corrosive material.

The measure of an acid or a base is the pH scale. The pH scale ranges from 0 to 14 with a pH <7 being acidic and a pH >7 being basic. The lower the pH of the acid the more acidic is the material, and the higher the pH of the base the more basic the material. A pH of 7 is considered neutral.

Chemical Reactivity

- a. Reactivity hazards. A reactive material is one that undergoes a chemical reaction under specified conditions. Generally, the term “reactive hazard” is used to refer to a substance that undergoes a violent or abnormal reaction in

the presence of water or under normal ambient atmospheric conditions. Among this type of hazard are the pyrophoric liquids that will ignite in air at or below normal room temperature in the absence of added heat, shock, or friction, and the water-reactive flammable solids that will spontaneously combust upon contact with water.

The most common reactive mixture in construction is found in gas welding or brazing. Acetylene gas mixes with oxygen to provide an extremely powerful reaction in the form of a very intense flame.

- b. Compatibility. If two or more hazardous materials remain in contact indefinitely without reaction, they are compatible. Incompatibility, however, does not necessarily indicate a hazard. For example, acids and bases (both corrosive) react to form salts and water, which may not be corrosive.

The compatibility of materials must be determined before the materials are used or stored. Some examples of incompatibilities are sulfuric acid and plastics (toxic gas or vapor is produced), acids and metal (flammable gas or vapor is produced), chlorine and ammonia (chlorine gas is created, toxic gas). There are many other incompatibilities that may be found. Check to make sure that the materials used for a project are compatible.

All of the hazards listed above will be found on the safety data sheet (SDS). The SDS is a short technical report that provides you with the known hazards of a specific material. The SDS explains how to properly use the material, handle any problems related to the material and how to store the material. Know what the SDS says for the materials that you work with.

All materials should have a label on them. This is the first and easiest place to look to see if a material is hazardous. Labels should tell you any precautions that must be taken when handling the material. Read the label on the materials that you use and abide with the cautions and warnings. If a material is not properly labeled, notify your supervisor so that the problem is corrected.

BIOLOGICAL HAZARDS

Biological agents are living organisms that can cause sickness or death to exposed individuals. Biological hazards can cause infection or disease to persons who are exposed.

Biological hazards may involve plants or animals including microorganisms. Biological hazards, such as disease causing agents, may be present at a hazardous waste site or involved in a spill. Like chemical hazards, they can be dispersed throughout the environment via wind and water.

Many biological agents require a carrier to inoculate a person. For instance, rabid rodents at a landfill may be a biological hazard. Deer carry ticks may have Rocky Mountain Spotted fever; prairie dogs will not.

The same personnel protective requirements for a response to a chemical hazard apply to biological hazards. Body coverings and respiratory protective equipment might have to be utilized. Especially important is the need to maintain personnel cleanliness. Before eating, drinking or smoking residual contamination should be washed off.

BIOHAZARDS

Biohazard training will be provided to employees as per the blood borne pathogen program (SMS 051).

HAZARDOUS MATERIAL PROTECTION

The routes of exposure for hazardous materials include the following:

- Inhalation – Breathing contaminated air (e.g., welding fumes.)
- Skin Absorption – Contact with harmful liquids, gases, solids or contaminated clothing, equipment, medications, cosmetics, etc. A good example is solvents. Materials can also enter through an open wound.
- Ingestion – Eating or drinking contaminated foods, water or medications. (Remember food and cigarettes can become contaminated by your unwashed hands, gloves, equipment. Good hygiene practices are very important.)
- Injection – A contaminated material can be injected into some part of the body.

Protection from potentially hazardous materials includes the following:

- Use good personal hygiene. This is the simplest control measure to chemical hazards.
- Know what protective equipment is required for the specific job you are doing. Ask your supervisor what risks you might encounter and what hazardous substances you are working with.
- Know what potential explosive and or flammable conditions may exist with the job you are doing.
- Have all confined spaces checked for explosives, hydrogen sulfide, carbon monoxide, and oxygen deficiency. Know what hazards are involved with confined spaces.
- Know where emergency equipment is located and how to use it. For example, know where the nearest fire extinguisher is from your work area.

- Know the standard operating procedures for rescue and emergency situations.
- Know the proper method for decontamination when working with hazardous materials.
- Use the buddy system when at all possible. Keep communication lines open when working with hazardous materials.
- Stay out of contaminated areas if you are not properly trained, equipped, or authorized to enter. Do not take chances with life-threatening materials or situations.

PERSONAL PROTECTIVE EQUIPMENT

Different types of protective equipment will be required depending on the substances to be handled, the existing conditions, and the particular situation. Personal protective equipment includes a variety of special suits, hard hats, goggles, face shields, aprons, boots, gloves, and respirators. Each is designed to protect you from certain hazards. It is important for you to know the advantages and disadvantages of all the equipment you may use or need. Use all equipment as instructed and follow all written procedures for the specific equipment.

STANDARD OPERATING PROCEDURES FOR EMERGENCY SITUATIONS

Standard operating procedures exist for any unexpected event such as an accident, fire, explosion, etc.

If you know or suspect that you have been contaminated with a hazardous substance, **TELL YOUR SUPERVISOR**. You should know the general symptoms of over-exposure to toxic substances. These include:

- Irritation of skin, eyes, nose, throat, or respiratory tract
- Changes in complexion or skin discoloration
- Headache
- Difficulty in breathing
- Nausea
- Dizziness or light-headedness
- Excessive salivation (drooling)
- Lack of coordination
- Blurred vision
- Cramps and/or diarrhea
- Changes in behavior patterns

You should know the location of emergency eyewash and shower facilities.

Before you enter, and periodically while you are working in confined spaces such as tanks, crawl spaces, ditches, etc., the air in the space should be tested by a qualified individual for oxygen content, explosive levels, toxic gases, and other hazardous materials.

Understand the site emergency response procedures and know the locations of response equipment before the need arises. If you must rescue someone, use proper precautions and protective equipment. **DO NOT BECOME A CASUALTY YOURSELF**. Move the affected person from the hazardous exposure if possible. Get help and follow emergency rescue procedures.

For spills and leaks of hazardous materials limit the leak or spill as quickly as possible. Small spills should be cleaned up immediately. If a valve must be closed to prevent a spill from continuing then do so. If the spill is large, or your skin, eyes or clothing are contaminated, leave the work area immediately. Wash eyes, skin, and clothes off with lots of water to remove the material. Get to fresh air. Notify your foreman or supervisor as soon as it is safe for you to do so. Unless you have special training and the proper protective equipment, do not try to clean up large spills yourself.

If a corrosive material is splashed in your eyes or on your skin and clothes, deal with it immediately. Wash the affected area with plenty of water (at least 15 minutes with a continuous stream). Remove any contaminated clothing. Get to fresh air if you feel burning in the nose, throat or lungs. Do not vomit if you have swallowed a corrosive material. Drink large quantities of water to dilute the material, and seek immediate medical attention.

EXAMPLES OF HAZARDOUS MATERIALS POSSIBLY FOUND ON SITE

SOLVENTS

Solvents are among the most common toxic materials in the workplace. Many processes, mixing and cleaning, use or give off solvent vapors. They are also used as thinners in paints and adhesives. Solvents vary in their toxicity from practically non-toxic materials such as the alcohols, ketones, halogenated solvents, to the very toxic such as dimethyl acetamide, methyl acrylate and other materials. Some solvents are also flammable or reactive.

Solvents can cause irritations to the eyes and skin when in high concentrations. Most will dissolve the protective layer of oils on the skin and leave it looking white in the small cracks. They should never be used to clean the skin; if there is a problem with contamination, some form of glove or barrier cream should be used to protect the skin. The early signs of overexposure often include headaches, dizziness, nausea and other related symptoms.

METALS AND SOLID PARTICULATES

Examples: Babbitt metal, cadmium, galvanized metal, lead, manganese, nickel, zinc

Metals and other particulate solids can be toxic and are usually given off when welding or grinding. Some, like gypsum dust are only nuisance dusts, while others, like zinc fume from welding cause flu-like symptoms. Others, like asbestos have been linked to cancer and other chronic diseases. Dusts can irritate the skin and be ingested with food, drinks or smoking materials if they aren't washed off the hands and removed from clothing. They may also be carried home to family members and cause problems there if they are not washed off before leaving the work area.

When the welding, brazing, grinding or cutting of metal is performed, care should be taken to avoid breathing the fumes or dusts. Local exhaust ventilation should be used to reduce your exposure. If fumes and dust cannot be controlled with exhaust ventilation, appropriate approved respirators should be used. Approved safety goggles and gloves should be worn when working with metals. Gloves may be necessary to prevent skin sensitization and dermatitis.

ACIDS

Examples of acids found on URS Corporation sites are sulfuric acid (used in water treatment plants and found in batteries), hydrochloric acid, and nitric acid. Acids are considered corrosives and cause material degradation. Acids destroy tissues, metals and other materials. Acids can cause skin irritations in the form of rashes or other types of dermatitis, and more severe problems such as skin or eye burns. When working with acids proper eye and face protection should be worn as well as hand protection.

LUBRICANTS, COOLANTS AND MACHINE OILS

Lubricants, coolants and machine oils are common in construction sites. There are three types: petroleum based (straight oils), water based, and synthetic fluids that contain no oils. Many cutting oils contain additives to inhibit corrosion, prevent bacterial growth and permit high temperature operation. The fumes and mist from cutting operations can be irritating to the eyes and lungs. Skin exposure can result in acne-like conditions and can cause other problems. Avoid breathing mist and fumes and use gloves and aprons to minimize contact with materials.

GASES

Examples: Acetylene, ammonia, carbon dioxide, carbon monoxide, freon, oxygen, hydrogen, liquefied petroleum gas, propane

Gases present a range of problems. Some, like nitrogen, are simple asphyxiates. They prevent the body from getting enough oxygen by displacing it from the air stream. Some are chemically hazardous, like carbon monoxide, or nitrous oxide, which cause poisoning of the body systems. Some are very toxic, like arsine and phosphine. Some are very reactive and should be dealt with in very careful manners. Other gases, like hydrogen, oxygen and acetylene are explosives and must be treated with great care. Chains and stands should secure all compressed gas cylinders at all times, and only the proper fittings should be used. Liquefied and petroleum gases are extremely flammable and considered simple asphyxiates.

PLASTICS, EPOXIES AND POLYMERS

Plastics, epoxies and polymers are a growing group of industrial chemicals. Materials such as polystyrene, polypropylene, acrylates, vinyl, and polyurethane are but a few. Although most of these materials are not toxic in their final form, where they are being molded, extruded, laid up, there can be significant hazards. When burned, these materials can be very hazardous.

CLEANERS

Cleaners contain acid, alkalis, aromatics, surfactants, petroleum products, ammonia and hypochlorite. Because of these ingredients these materials are considered to be irritants, and can be harmful to you if swallowed or inhaled. Many may cause eye, nose, throat, and skin and lung irritation. Some cleaners are flammable and burn easily. Others may be caustic or corrosive and cause severe skin burns. Because many cleaners used in the job area are consumer products commonly found in our homes, you may underestimate the hazard they pose. Protect yourself from these hazards by reading the labels and following the recommended precautions. Wear gloves and eye protection. Avoid inhaling the vapors and mists. Wash your hands and face thoroughly before eating, drinking or smoking.

Specific emergency procedures for each chemical will be detailed on that cleaner's safety data sheet. In general, if a cleaning chemical gets into your eyes, flush the eyes with clean running water for at least 15 minutes, then seek medical attention. If the chemical gets on your skin, wash the area of contact and seek medical attention.

Do not mix two cleaning chemicals together, unless specifically told to do so by your supervisor. For example, the dangerous gas, chlorine, will be created if you mix bleach and ammonia or bleach and drain cleaner together.

Examples: Abrasive cleaners, bleach, drain cleaner, general purpose cleaning spray, germicide, and glass cleaner, metal cleaner, rug and upholstery cleaners, stain remover.

FUELS

Examples: Diesel oil, gasoline, propane, kerosene

The primary hazard posed by fuels is obviously, fire. Fuels are either flammable or combustible. Whether flammable (a material which is easily ignited and burns with extreme rapidity) or combustible (a material capable of fueling a fire), they should be handled with care.

Proper storage and transport of fuels in approved, self-closing, safety containers is extremely important and should be strictly adhered to at all times. When filling portable containers with flammable materials they should be properly grounded and bonded to the container to prevent ignition from static electricity.

Store gasoline in containers marked "gasoline". Store kerosene in containers marked "kerosene". Never use kerosene containers for the transport or storage of gasoline.

Excessive skin contact with fuels can result in dermatitis. Some petroleum products have been shown to cause skin tumors. Inhalation of fuel vapors over a long period of time can cause central nervous system depression, and may aggravate any existing respiratory problems that may exist. Ingestion of fuels can cause poisoning. Do not induce vomiting. If fuels get in your eyes, rinse with clean water for at least 15 minutes and seek medical attention.


LABELING

Proper labeling of all chemical containers is another excellent control measure to chemical hazards. Container labels give a code or name identifying the chemical in the container, the name, address, and telephone number of the manufacturer, importer, or distributor; and symbols, signal words, and hazard statements that warn you of possible dangers. Read the label on all materials with which you work.

Examples of signal words and hazard statements:

- Danger, fatal if swallowed
- Danger, toxic if swallowed
- Warning, may be harmful if swallowed

Labels and their warnings should be taken seriously since they provide you with the first clue to the hazards posed to your health and safety. They also give information on personal protective equipment required, emergency response and first-aid steps in case of an exposure, proper procedures in case of a spill and emergency phone numbers.

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">HAZARD COMMUNICATION EMPLOYEE TRAINING PROGRAM</p>	<p style="text-align: right;">SMS 002 NA Supplemental Information B</p> <p style="text-align: right;">Issue Date: February 2009 Revision 3: September 2012</p>
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SDS

Safety data sheets, if read and followed, are a powerful means of controlling chemical exposures. Chemical manufacturers are required to provide SDSs for the chemicals they produce or import. The purpose of the SDS is to communicate information on the recommended safe use and handling procedures for that chemical.

All SDS must provide certain categories of information about the chemical substance or mixture:

- Identification of the substance or mixture and of the supplier
- Hazards identification
- Composition/information on ingredients
- First aid measures
- Firefighting measures
- Accidental release measures
- Handling and storage
- Exposure controls/personal protection
- Physical and chemical properties
- Stability and reactivity
- Toxicological information
- Ecological information
- Disposal considerations
- Transport information
- Regulatory information
- Other information including information on preparation and revision of the SDS

HAZARD COMMUNICATION TRAINING QUESTIONS

NAME: _____ LOCATION: _____

1. Container labels must:
 - A. Give directions to the manufacturing plant.
 - B. Give price of the product.
 - C. Notify the user of the physical and health hazards.
 - D. Provide translation in Spanish.
2. What is an SDS?
 - A. Main Statistical Data Service.
 - B. Safety Data Sheet.
 - C. New accident reporting system.
 - D. Both A and C.
3. What are the requirements of the Hazard Communication Standard?
 - A. Chemical inventories.
 - B. Container labeling.
 - C. Negotiations for purchase price of chemicals.
 - D. SDSs.
 - E. Employee Training.
 - F. All of the above except C.
4. What is one way to determine if a chemical has been spilled or released in your work area?
 - A. When you smell something out of the ordinary.
 - B. By reading the SDS and being knowledgeable of the chemical appearance and odor.
 - C. Call somebody.
 - D. Both A & B.
5. How can you protect yourself from chemical exposures?
 - A. Personal protective equipment and proper work practices.
 - B. Stay upwind of vapors and gases.
 - C. Use proper ventilation.
 - D. All of the above.
6. What are the main examples of chemicals found on site?
 - A. Solvent, fuel, metals, lubricants, gases.
 - B. Toxic, flammable, corrosive, reactive, pressurized.
 - C. Physical properties and health effects.
 - D. The good, the bad and the ugly.
7. New and transferred employees must be trained on the hazards of their new work area.
 - A. True
 - B. False

8. An SDS provides what?
 - A. Supervisor guide to acid unloading.
 - B. Engineering data.
 - C. Health, safety and first-aid information.
 - D. Chemical process checklist.

9. Where is your site-specific Hazard Communication program located?
 - A. Accident Prevention Manual.
 - B. Employee Handbook.
 - C. Budget Manual.
 - D. SDS Book.

10. A new chemical used in your area is always considered a new hazard.
 - A. True
 - B. False

11. If an SDS is not available for the chemical you are using, you should?
 - A. Notify your supervisor.
 - B. Call the manufacturer.
 - C. Contact the Safety Department.
 - D. Nothing, most chemicals are safe.
 - E. Both A & C.

12. Labeling systems use words, graphics, geometric shapes, and colors to warn you of any possible danger to your health and safety, and to tell you about safe work practices you need to follow when handling chemicals.
 - A. True
 - B. False

13. A flammable liquid is a liquid with a flashpoint:
 - A. Of 2,000 degrees Fahrenheit
 - B. Below 200 degrees Fahrenheit
 - C. At freezing
 - D. All of the above

14. Which Signal Word represents the most serious hazard?
 - A. Caution
 - B. Warning
 - C. Danger
 - D. Beware

15. Chemicals can enter the body through:
 - A. Breathing them in
 - B. Contact with body openings
 - C. Both A and B
 - D. None of the Above

16. If you are not familiar with a chemical, you should check the Safety Data Sheets.
- A. True
 - B. False
17. A primary/original container label for a chemical must include:
- A. A code or name identifying the chemical
 - B. The chemical manufacturers or importer's name, address, and telephone number
 - C. Warnings of its hazardous content
 - D. All of the above
18. A container label should be checked only if you do not know the contents of the container.
- A. True
 - B. False
19. If a label is torn or missing, you should report it right away to the proper personnel at your facility.
- A. True
 - B. False
20. The Hazard Communication Standard is also referred to as the Right to Know Standard.
- A. True
 - B. False
21. A Safety Data Sheet is required for all hazardous materials in your facility.
- A. True
 - B. False
22. Safe work practices require a complete understanding and respect for the potential hazards.
- A. True
 - B. False
23. The written emergency response plan contains the procedures to take in the event of an emergency.
- A. True
 - B. False

**HAZARD COMMUNICATION TRAINING QUESTIONS
ANSWER SHEET**

1. Container labels must:
 - A. Give directions to the manufacturing plant.
 - B. Give price of the product.
 - C. Notify the user of the physical and health hazards.**
 - D. Provide translation in Spanish.

2. What is an SDS?
 - A. Main Statistical Data Service.
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 - C. New accident reporting system.
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10. A new chemical used in your area is always considered a new hazard.
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- A. True**
 - B. False
13. A flammable liquid is a liquid with a flashpoint:
- A. Of 2,000 degrees Fahrenheit
 - B. Below 200 degrees Fahrenheit**
 - C. At freezing
 - D. All of the above
14. Which Signal Word represents the most serious hazard?
- A. Caution (note not a signal word for HAZCOM but is used by EPA)
 - B. Warning
 - C. Danger**
 - D. Beware (note not a signal word for HAZCOM)
15. Chemicals can enter the body through:
- A. Breathing them in
 - B. Contact with body openings
 - C. Both A and B**
 - D. None of the Above

16. If you are not familiar with a chemical, you should check the Safety Data Sheets.
- A. **True**
 - B. **False**
17. A primary/original container label for a chemical must include:
- A. A code or name identifying the chemical
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 - C. Warnings of its hazardous content
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18. A container label should be checked only if you do not know the contents of the container.
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22. Safe work practices require a complete understanding and respect for the potential hazards.
- A. **True**
 - B. **False**
23. The written emergency response plan contains the procedures to take in the event of an emergency.
- A. **True**
 - B. **False**

URS SAFETY MANAGEMENT STANDARD

Emergency Preparedness Plans & Crisis Management Plans

1. Applicability

This procedure applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

This standard establishes policy, assigns responsibilities, and provides guidance to URS offices/field projects regarding emergency preparedness. It includes general information on actions to be taken by URS management and employees in the event of an emergency that may endanger life or property.

The objectives of this procedure are to:

- A. Promote a fast, effective reaction in coping with emergencies.
- B. Save lives, and avoid injuries and panic.
- C. Restore order and conditions to normal levels with a minimum of confusion and as promptly as possible.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 003 NA](#) – North America

[SMS 003 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP10-003](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Emergency Preparedness & Crisis Management Plans

1. Applicability

This standard applies to URS Corporation and its subsidiary companies. Each location shall establish a site-specific emergency preparedness/incident management plan. In addition, each division will maintain a Crisis Management Plan to operate under the organizational structure and manage emergency operations.

2. Purpose and Scope

This standard establishes policy, assigns responsibilities, and provides guidance to URS offices/field projects regarding emergency preparedness. It includes general information on actions to be taken by URS management and employees in the event of an emergency that may endanger life or property.

The objectives of this standard are as follows:

- A. Promote a fast, effective reaction in coping with emergencies.
- B. Save lives, and avoid injuries and panic.
- C. Restore order and conditions to normal levels with a minimum of confusion and as promptly as possible.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility or project location. For EC projects and offices the EC Crisis Management Team is responsible for the overall management of Emergency Planning and the local Incident Management Team Leader is responsible for local implementation and management of the program.

4. Requirements

- A. Emergency Preparedness Plan (also known as Emergency Action Plan) Development

- 1. Gather Information

- Each URS office and field office must develop an Emergency Preparedness Plan (EPP) tailored to its specific location. Office Managers will check with their building manager or landlord regarding evacuation procedures they may have in place and incorporate these procedures into the EPP. Field office EPPs must

URS SAFETY MANAGEMENT STANDARD
Emergency Preparedness & Crisis Management Plans

comply with client requirements and specifications. The EPP must contain the following:

a. Reporting Procedures for Fires and Other Emergencies

Describe the procedures that personnel should follow to report emergencies (fires, hazardous substance release, etc.). List emergency telephone numbers for fire, paramedics, and police. Include local prefixes on emergency numbers, if required, such as 9-911.

b. Alarm System and Security Measures

Describe the emergency alarm system and security measures for the building/site as applicable. Include the description and location of fire alarm pull boxes and visual and audible alarms, security personnel, and secured access points. If a public address (PA) system is used to notify occupants of emergencies, include the procedures to activate the PA system, such as calling the receptionist or building manager's office, and a description of the announcements that will be made.

c. Evacuation Routes and Procedures

Develop a map or description of the evacuation routes and emergency exits to be used. A description of the building emergency lighting system, exit signs, and available fire suppression systems may also be included. Evacuation route maps may be posted in the offices. There should be a primary and alternate evacuation route and exit from each work area.

Describe procedures regarding the use of elevators, if applicable. In most cases, elevator use is prohibited during an emergency. The building manager should be consulted for these procedures.

Include procedures to determine that no employees have been inadvertently left behind.

d. Severe Weather Planning

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Emergency Preparedness & Crisis Management Plans

Describe potential severe weather that may impact the location and shelter areas that are available. Shelter areas should be designated on evacuation route maps.

If performing outdoor activities and thunder is heard, lightning is seen, or dark threatening clouds are observed overhead, take cover immediately in a safe location including a building or vehicle. Do not stay in (or on) convertibles, golf carts, riding mowers, open cab construction equipment or boats without cabins. Remain in the safe location until at least 30 minutes after the last thunder clap is heard.

e. Critical Equipment/Operations Procedures

Designate personnel responsible for shutting down and restarting critical equipment and the procedures for doing so, if applicable. Refer to SMS 098 - Management of Change prior to restarting operations.

f. Assisting Disabled Personnel

Describe the provisions that have been made for notifying and assisting personnel with disabilities during an emergency. Such provisions are to accommodate personnel in wheelchairs, those who are temporarily disabled (such as personnel on crutches), and those with impaired vision or hearing.

g. Personnel Accounting Procedures

Designate a primary and alternate assembly area for personnel who are evacuating. Require sufficient distance so that personnel will not be exposed to fire, debris, or traffic, nor interfere with emergency responders.

Designate an individual and an alternate to be responsible for taking a headcount in the assembly area and reporting missing personnel to emergency responders.

Define procedures on how employees will be informed that it is safe to re-enter the building or to leave for home.

Define emergency procedures for employees who remain on site.

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Emergency Preparedness & Crisis Management Plans

h. Rescue and Medical Duties

In some situations, URS personnel are in job positions that require the employees to engage in firefighting, medical treatment, rescue or other emergency response. Employees must be properly trained to perform these functions and must be identified in the EPP.

When applicable, include the following statement: "URS does not expect or encourage its employees to engage in firefighting, medical treatment, rescue, or other emergency response. Such activities should only be performed by properly equipped and trained emergency responders. URS recognizes that some of its personnel may have received training in first aid and cardiopulmonary resuscitation (CPR) and may wish to perform these duties on injured personnel."

Require that no employees leave the facility until all employees are accounted for.

i. Resources

The location or project/site specific EPP must include the name/title of staff who can respond to questions about the plan and/or the expectations of the individual employees in an emergency situation.

2. Develop EPPs based on the information gathered as described previously. EPPs may be stand-alone documents for office locations or may be included within site-specific health and safety plans.

B. Posting

1. Post the Emergency Preparedness Plan where it is available to all site employees.
2. Post evacuation maps at all exits and points of egress.

C. Training

1. Train all employees regarding the requirements of the Emergency Preparedness Plan for their office or facility location and his/her role in an emergency situation.

URS SAFETY MANAGEMENT STANDARD

Emergency Preparedness & Crisis Management Plans

2. Conduct evacuations drills and, where required, rescue procedures at office and facility locations at least annually.
3. Training will be conducted initially and as needed due to changes in procedures.

D. Coordination

During development and after implementation, it is critical to work with and coordinate emergency preparedness plan activities with local authorities, clients, representatives, building managers, property managers, security personnel, and designated office or project safety staff, and with local rescue and medical facilities.

E. Visitor and Crowd Control

When an emergency occurs at URS offices or field offices, it is important to ensure the safety of visitors or members of the public. Remember that visitors and members of the public are probably not familiar with the emergency procedures and may need to be escorted by URS personnel during the emergency.

F. Security

1. Keep visitors and unnecessary personnel from entering an office or jobsite after an emergency has occurred.
2. Safeguard property, equipment, and/or materials during an emergency. The in-house or contract security personnel should be integrated into the emergency preparedness plan and their expected response and areas of responsibility in response to emergencies should be designated. If not, it may be necessary to assign company employees to act as watchmen during and after the emergency.

G. Community Relations

If an emergency at a URS office, field office, or jobsite may place a community at risk, the appropriate local and/or community emergency response personnel should be notified and given pertinent information on the occurrence.

H. Division Emergency Preparedness/Crisis Management Plans

The division-specific Emergency Preparedness and Crisis Management Plan (CMP) is established for the purpose of protecting employees,

URS SAFETY MANAGEMENT STANDARD

Emergency Preparedness & Crisis Management Plans

property, assets, reputation, the general public, the environment, and the communities in which URS operates. The CMP provides an overview of emergency preparedness and its importance to URS. This CMP provides guidance to division management regarding roles and responsibilities in the event of a crisis requiring coordinated corporate and/or division response. This CMP also provides guidance for making decisions during natural or man-made emergencies or crises. The FS and IE CMPs are included in Attachment 003-1. Contact the EC Security Department regarding the EC CMP.

5. Documentation Summary

The following documentation will be maintained in the office/project files:

- A. Emergency Preparedness Plan.
- B. Evacuation maps.
- C. Training records.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Emergency Action Plans](#) – 29 Code of Federal Regulations (CFR) 1910.38
- B. U.S. OSHA – [Emergency Exit Routes Fact Sheet](#)
- C. [Attachment 003-1 FS](#) – Federal Services Emergency Preparedness and Crisis Management Plan
- D. [Attachment 003-1 IE](#) – Infrastructure & Environment Emergency Preparedness and Crisis Management Plan
- E. Energy & Construction Crisis Management Plan (contact Security)

7. Supplemental Information

- A. Federal Services - [Emergency Preparedness and Incident Management Plan Template](#)



Health, Safety and Environment

Attachment 003-1 IE

**EMERGENCY PREPAREDNESS &
CRISIS MANAGEMENT PLANS**

Issue Date: September 2012

URS Infrastructure & Environment

**Emergency Preparedness &
Crisis Management Plan**

URS INFRASTRUCTURE & ENVIRONMENT
Emergency Preparedness & Crisis Management Plan

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Emergency Preparedness & Crisis Management Plan

LIST OF ACRONYMS AND ABBREVIATIONS

ACCC	Alternate Crisis Command Center
CCC	Crisis Command Center
CMP	Emergency Preparedness and Crisis Management Plan
CMT	Crisis Management Team
EP/CM	Emergency Preparedness and Crisis Management
EPP	Emergency Preparedness Plan
HSE	Health, Safety, and Environment
HR	Human Resources
ICC	Incident Command Center
IMT	Incident Management Team
IE	URS Infrastructure & Environment
IT	Information Technology
POC	Point of Contact
SMS	Safety Management Standard

URS INFRASTRUCTURE & ENVIRONMENT

Emergency Preparedness & Crisis Management Plan

1.0 GENERAL INFORMATION

1.1 Introduction

The URS Infrastructure & Environment (IE) Emergency Preparedness and Crisis Management Plan (CMP) is established for the purpose of protecting employees, property, assets, reputation, the general public, the environment, and the communities in which URS IE operates. The CMP provides an overview of emergency preparedness and its importance to URS IE. This CMP provides guidance to IE management regarding roles and responsibilities in the event of a crisis requiring coordinated corporate and/or IE response. This CMP also provides guidance regarding decisions during natural or man-made emergencies, and addresses the approach to providing assistance to employees and their families following a crisis that results in an employee fatality.

1.2 Approach Summary

Most IE incidents are properly managed at the Project, Office, or Regional level. These incidents may involve property damage, temporary office closure due to weather, employee injuries, project performance concerns, or similar events. Although managed locally/regionally, these events are to be communicated to IE management through the appropriate channels.

Certain events have the potential for creating a crisis situation, with significant impacts on employee or public safety, continuity of IE operations, or URS reputation. The activation of the IE Crisis Management Team (CMT) is designated for those events that are at the crisis level, or have the potential to reach the crisis level.

1.3 Document Control

The IE Vice President for Health, Safety, and Environment (HSE) will maintain responsibility for consistency and currency of the CMP, and notify the appropriate level of managers to ensure proper dissemination to all the stakeholders. This CMP will be reviewed at least annually, and updated as necessary.

1.4 Applicability

This CMP applies to all URS IE operations, and as guidance for the IE CMT for its use in directing activities in preparing for and responding to emergency and crisis situations.

1.5 Scope

This document describes IE emergency preparedness policies and procedures, and covers crisis management organization and responsibilities.

URS INFRASTRUCTURE & ENVIRONMENT

Emergency Preparedness & Crisis Management Plan

2.0 DEFINITIONS

Crisis: Any global, regional, or local natural or human-caused event or business interruption that runs the risk of (1) escalating in intensity; (2) causing wide-scale harm to people, property, or the environment; (3) adversely impacting shareholder value or the organization's financial position; (4) falling under close media or government scrutiny; (5) interfering with a company critical function; (6) jeopardizing the organization's reputation, products, or offices, therefore negatively impacting its future.

Crisis Management: Intervention and coordination by individuals or teams before, during, and after an event to resolve the crisis, minimize loss, and otherwise protect the organization.

Incident Command Center (ICC): A specific room or facility staffed by IE CMT personnel charged with commanding, controlling, and coordinating the use of resources and personnel in response to a crisis. Not all crises require the use of the ICC.

Crisis Management Team: A group identified by IE senior management and comprised of personnel from such functions as Operations, Human Resources (HR), Information Technology (IT), Facilities, Security, Legal, Administration, Communications, HSE, as well as other business-critical support functions that will lead crisis response efforts when the incident is of such magnitude that it requires senior management involvement. The duties and responsibilities of the CMT are considered collateral duties.

Critical Function: Business activity or process that cannot be interrupted or unavailable for several business days without having a significant negative impact on the organization or its ability to meet contractual deliverables.

Damage Assessment: The process used to appraise or determine the number of injuries and human loss, damage to public and private property, and the status of key facilities and services resulting from a natural or human-caused disaster.

Disaster: An unanticipated occurrence that causes widespread destruction, loss, or distress to an organization, including natural catastrophes, technological accidents, or human-caused events that may result in injuries or fatalities to employees or the public, or significant property damage.

Disaster Recovery: Immediate intervention taken by an organization to minimize further losses brought on by a disaster; and beginning the process of recovery, including activities and programs designed to restore critical business functions, and return the organization to an acceptable condition.

Emergency: An unforeseen occurrence or situation that happens unexpectedly and demands immediate action and intervention to minimize potential injury, loss of life, property, or profitability.

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Emergency Preparedness & Crisis Management Plan

Evacuation: Organized, phased, and supervised dispersal of people from dangerous or potentially dangerous areas.

Incident Management Team (IMT): A Regional, Country, Office, or Project-level group directed by the IE CMT who will lead incident response for incidents occurring in their respective offices or projects, domestically or internationally. The IMT is comprised of personnel from such functions as HR, IT, Facilities, Security, Legal, Administration, HSE, and other business-critical support functions at the office or project level.

Mitigation Strategies: Implementation of measures to lessen or eliminate the occurrence or impact of a crisis event or incident.

Point of Contact (POC): A person or team that has been designated by the URS IE office or business groups to be contacted any time an incident occurs.

Recovery/Resumption: Plans and processes to bring an organization out of a crisis that resulted in an interruption. Recovery/resumption steps should include damage and impact assessments, prioritization of critical processes to be resumed, and return to normal operations, or to reconstitute operations to a new condition.

Response: Executing the CMP and resources identified to perform those duties and services to preserve and protect life and property, as well as provide services to the surviving population. Response steps should include potential crisis recognition, notification, situation assessment, and crisis declaration, CMP execution, communications, and resource management.

Tabletop Exercise: A test method in which participants review, discuss, and practice the actions they will take in the event of CMP activation.

3.0 CRISIS MANAGEMENT ORGANIZATION

3.1 Purpose

The IE President will designate and assign a CMT to conduct and manage Emergency Preparation and Crisis Management activities. The CMT is the central POC for information collection, support, and distribution for official correspondence and information during all hours of operation, and is typically comprised of members of the Executive Management Team or their designees. The CMT will communicate with and provide support to all domestic and international offices and projects on all matters related to an emergency crisis situation in their respective areas. Operations may be called upon by the CMT to assist, support, and respond as necessary.

3.2 CM Roles and Responsibilities

3.2.1 IE President

The outcomes of incidents and problems encountered by the CMT and the IMT may influence future policies and strategies. Therefore, the IE President will be kept informed and updated at all times in the

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Emergency Preparedness & Crisis Management Plan

event of any significant incidents. The IE President should be updated daily at pre-determined times on the progress of response efforts in the event of an incident activating the requirements of this CMP. The CMT Lead will keep the IE President informed, and coordinate communications internal to URS Corporate.

3.2.2 Crisis Management Team

The CMT is led by the designated Crisis Management Team Leader. The CMT Lead manages IE incidents falling under the purview of this CMP, and reports to the IE President.

Responsibilities include:

- Monitoring and managing any incident reported to them.
- Ensuring implementation of IE policies consistent with this CMP.
- Reporting to the IE President on a daily basis, or at a frequency warranted by the situation throughout the incident.
- Maintaining accurate records of CMT proceedings.
- Providing and/or directing crisis management training, in coordination with Human Resources and HSE.

3.3 CMT Purpose and Scope

The CMT has overall responsibility for overseeing the development, maintenance, and implementation of the CMP. All CMT members ensure that current copies of the CMP are kept in secure locations, and that all authorized CMT personnel are trained to use and implement it as needed. The responsibilities of the CMT are:

- Establish, define, and implement IE policies, plans, and procedures.
- Distribute EP/CM policies, plans, procedures, and guidance to domestic and international offices/projects.
- Activate the IE Incident Command Center and implement the CMP when necessary.
- Manage emergencies to resolution.
- Authorize/implement domestic and international support as required.
- Assist offices/project with necessary resources for incident response.

3.3.1 CMT Leader

The CMT Leader will:

- Oversee the IE Crisis Management program.
- Direct the implementation of EP/CM policy decisions.
- Activate the CMT when warranted.
- Identify and assign CMT members with concurrence from the IE President.
- Convene CMT meetings as required.

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- Establish primary objectives for the CMT in management of the incident.
- Establish communications and meeting schedules for the CMT.
- Maintain situational awareness of the incident for use in planning, operational support, and briefings.
- Respond and track responsiveness to resource needs from the IMT members.
- Identify costs for incident management and potential impacts.
- Require that all offices and projects conduct emergency preparedness and response training and exercises.
- Release approval for communicating emergency announcements to employees, in coordination with Corporate Communications.
- Release approval for communicating with the media or general public in an emergency.
- Review and approve debriefing meeting minutes and critique emergency response reports following an emergency drill or actual incident.
- Oversee lessons-learned reports of drills or incidents, and implement correction actions.
- Establish and communicate the location/time for CMT meetings to key personnel.
- Brief individual CMT members as needed.
- Keep the IE President informed and coordinate communications internally between IE and URS Corporate.

3.3.2 Group General Managers/Vice Presidents

The Group Vice Presidents will:

- Ensure that each Office, Region, and Country has implemented an emergency/crisis notification system; the notification system will provide for reporting of significant incidents from offices/project sites through to the Regional Managers and Group Vice President.
- Notify the CMT Leader and IE President as appropriate of significant incidents.
- Ensure that all operations have an effective system for informing employees regarding emergencies/crises, and the status of the employees' work location.

3.3.3 Communications

The Communications Lead will perform the following tasks through the CMT or Incident Command Center:

- Assess and identify communication needs.
- Establish and control communications between the CMT and the projects.
- Identify and establish a liaison with influential members of the local communities and media personalities who may help control incident coverage, and assist in releasing public statements.
- Monitor national and international media coverage.
- Control media responses related to any emergency/crisis.

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- Discuss and approve media-release information with the IE President.
- Prepare press release(s), media advisories, and statement(s).
- Manage release of information to internal and external sources.
- Ensure confidentiality and verify accuracy of sensitive information before dissemination.
- Monitor and record external and third-party media coverage.
- Maintain records of any/all notifications of media, government representatives, and internal sources.

3.3.4 Security

The security role will vary with the type of crisis. Security will provide primary support in regard to crises involving political instability, personnel evacuation, and kidnap/hostage situations. The Security Lead will perform the following tasks as a member of the CMT:

- Provide information regarding the ongoing security situation at the crisis location.
- Recommend best practices in minimizing security risks to employees/subcontractors.
- Serve a lead role in communications with local law enforcement.
- Coordinate/obtain crisis location security contractors (if needed).
- Provide evacuation options for crises involving political unrest.

3.3.5 Health, Safety, and Environmental

The HSE Lead will:

- Provide assistance and support to the CMT Leader for all health, safety, and/or environmental-related activities.
- Review the safety plan for incident response activities involving IE staff or subcontractors.
- Coordinate with the IE Occupational Health Nurse and workers' compensation provider regarding the management of injured IE employees.
- Lead or assist in incident investigations/root-cause analyses of incidents involving serious employee injuries or fatalities.
- Lead the communications with safety or environmental regulatory agencies (e.g., U.S. Occupational Safety and Health Administration, UK HSE Executive) in coordination with IE Legal and Operations.

3.3.6 Finance and Administration

The Administration Lead reports to the CMT Leader, and will:

- Provide financial support to the CMT Leader.
- Provide financial impact data to the CMT Leader.
- Provide logistical support to the CMT Leader.
- Provide facilities, space, and infrastructure (telephone, computer network, power, water, food, etc.) for emergency operations.

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- Maintain records of all costs associated with a crisis.

3.3.7 Human Resources

HR is responsible for:

- Providing HR support to the CMT Leader.
- Providing access to the employee database.
- Obtaining additional internal or external HR resources.
- Managing family notifications.
- Maintaining POC for impacted employees/families.
- Coordinating employee benefits (e.g., medical, life insurance).
- Coordinating and activating the Employee Assistance Program.

3.3.8 Legal

The Legal Lead will provide legal counsel to the CMT Leader, including:

- Assessing the legal impact of the actions to be taken by the CMT.
- Providing a legal review of communications related to the crisis.
- Arranging external legal support as needed.
- Coordinating notification of insurance broker and insurer of possible claims.
- Managing any legal proceedings resulting from the incident.

3.3.9 Information Technology

The IT Lead will:

- Provide IT support to the CMT Leader.
- Oversee continuity of IT operations.
- Ensure the IT Disaster Recovery Plan is developed and tested.

3.4 Crisis Management Team Meetings

- The CMT Leader will initiate meetings with members of the team when it is determined there is a crisis or potential crisis.
- Due to the physical locations of team members, the CMT meetings will typically be held via conference call or video conference. For many crisis situations, daily calls or twice-daily calls are effective.
- The Central Command Center (CCC) will be activated for longer-term crisis situations, incidents with extensive media attention, and crises managed most effectively from one location.
- The meeting content will change as the crisis progresses. Initially, the focus will be on basic incident information (listed in Attachment A).

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4.0 TRAINING

All IE employees involved in emergency and/or crisis management will be trained for their specific responsibilities. Annual exercises will be conducted to ensure our ability to respond appropriately to emergencies/crises that affect our employees, customers, and property.

5.0 CENTRAL COMMAND CENTER

The CCC is a centralized management center for emergency operations. The CCC will be established in an area with sufficient workspace for the CMT to operate.

5.1 Primary Location

The primary CCC is at the URS Corporate office in San Francisco, California.

5.2 Alternate Location

The Alternate Crisis Command Center (ACCC) is at the URS New York City office, in the event that the primary CCC is impacted by the crisis event.

5.3 CCC Requirements

The Command Centers will have the following capabilities:

- Communications – an emergency communications system that will not be incapacitated by internal or external system demands. The center will have backup communications (e.g., Blackberry, cellular telephones, satellite telephones, etc.).
- Adequate Displays.
- Cable or satellite TV connection.
- Workstations – enough computer laptops to accommodate the CMT. CMT members should bring laptops to the CCC or ACCC to support response operations.
- Personnel – at least three support personnel to update displays, prepare reports, and provide messenger services. One support person per 8-hour shift is adequate.

6.0 INCIDENT RESPONSE

6.1 Planning

6.1.1 Office Locations

Each IE office will maintain a current Emergency Preparedness Plan (EPP), in compliance with URS Safety Management Standard (SMS) 003. The EPP will include the alarm system, reporting procedures for fire and medical emergencies, evacuation routes, personnel assembly points, and coordination with the building operator. The EPP will also include procedures for the most likely natural disasters in the area (e.g., earthquake, hurricane, flooding).

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The site-specific EPP will provide details on the communication of incidents to on-site management, including incidents that occur in the office, during travel, or on field projects. The EPP will also provide the plan for management communication to employees in case of temporary office closure, or other critical communication.

6.1.2 Field Projects

Emergency planning will be incorporated into all field project Health and Safety Plans/Safe Work Plans. The level of emergency planning will vary with the project scope, but must include basic incident notification procedures, including contact phone numbers of the appropriate URS supervisor/project manager. The emergency plan will also contain phone numbers for the appropriate emergency response organizations (e.g., fire department, ambulance, spill response).

6.1.3 International Regions

Each International Region will maintain an Incident Management Plan outlining the local role for response to significant incidents within the region or country.

6.1.4 International Travel Security Plan

If an employee is planning to travel to any country not listed in the “Low Risk” countries, an International Travel Security Plan must be prepared in compliance with Policies and Procedures Policy 074.021.

6.2 Incident Notification

URS SMS 049 “Injury/Illness/Incident Reporting & Notifications” provides the initial steps to be taken by employees and line management in regard to incidents, including notifications.

Significant incidents (potential crisis situations) require immediate notification up through the management organization to the CMT Leader. Initial notification of potential crisis-level incidents must include direct voice contact (not voicemail or email); alternates must be contacted if the primary contact is not reached.

6.3 Response Procedures

Response procedures are part of the protocols for each type of emergency. The procedures spell out how the facility will respond to emergencies. Whenever possible, these procedures are bulleted so they can be quickly accessed by senior management, department heads, response personnel, and employees. The procedures describe the actions necessary to:

- Assess the situation.
- Establish objectives, strategies, and tactics to protect employees, customers, visitors, equipment, vital records, and other assets, particularly during the first 3 days.
- Plan for the management of the incident, and the return to normal operations.

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Also included in the procedures are the following instructions:

- Warn employees and customers.
- Conduct an evacuation and account for all persons in the facility.
- Manage response activities.
- Activate and operate an ICC.
- Only fight fires if they are small enough to be handled with a fire extinguisher.
- Sound alarm.
- Shut down operations.
- Protect vital records.
- Restore operations.

7.0 COMMUNICATIONS

The Communications Lead will perform the following tasks through the CMT or ICC.

- Ensure that each operating unit has implemented an emergency/crisis notification system to ensure that all employees are informed of emergencies/crisis, and provide for notification of supervisors, managers, and senior IE Management.
- Prepare and maintain current IE profile, history, and historical incident information.
- Plan for and implement the communications systems necessary for the incident response and management.
- Organize internal emergency communications within IE.
- Assess and identify communication needs.
- Establish and control communications between the CMT and IE Operations.
- Identify and establish a liaison with influential members of the local communities and media personalities who may help control incident coverage, and assist in releasing public statements.
- Monitor national and international media coverage.
- Control media responses related to any emergency/crisis.
- Discuss and approve media-release information with the IE President and URS Corporate Communications.
- Prepare press release(s), media advisories, and statement(s).
- Manage release of information to internal and external sources.
- Ensure confidentiality and verify accuracy of sensitive information before dissemination.
- Monitor and record external and third-party media coverage.
- Establish a diary of events and take minutes of CMT meetings through a recorder (administrative employee).
- Maintain records of any/all notifications of media, government representatives, and internal sources.

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8.0 POST-INCIDENT RECOVERY

8.1 Resuming Operations

The recovery of facility operations and services will depend on the extent of damage suffered by the operating unit or facility. The IMT will need to prioritize activities that can be accomplished with available staff and resources. Immediately following the emergency phase of the incident, the IMT and facility management will begin the implementation of the facility-specific business continuity/recovery plan.

8.1.1 Documentation Requirements

Documentation of emergency activities is of critical importance following the emergency situation. All records and forms used during the incident to document activities must be retained for future reference.

8.1.2 Responsibility for Incident Documentation

Following an emergency situation, the IMT will have the responsibility for collecting all records and forms used during the incident. The emergency situation must be investigated as soon as possible following its occurrence. The investigation is designed to determine why the incident occurred, and what precautions can be taken to prevent a recurrence.

8.2 Investigation Responsibilities

Each IMT Leader is responsible for ensuring that an incident investigation is conducted following emergency situations that occur at their facility.

8.2.1 Damage Assessment

Following the incident, an assessment of damage to facility properties and equipment must be conducted. The major goal of this assessment will be to determine the extent of damage to facilities, safety hazards resulting from the incident, and repairs that must be initiated to minimize further damage and restore the facility for operational use. The IMT Leader will have the primary responsibility for conducting the damage assessment following an incident.

8.2.2 Critique

The critique of the incident is a review of what actions took place during the incident—both good and bad. A critique is not designed to place blame, but rather to allow for the flow of ideas and recommendations to improve the emergency action plan and the facility policies and procedures. After a crisis, an IMT meeting is required to ensure all necessary actions have been taken to control, resolve, and end the crisis. The IMT members will identify additional actions required to eliminate/minimize the development of a similar future crisis. The IMT members will prepare a full report of the crisis, which will include:

- A listing of incidents and activities.
- Incident response activities.
- Major decisions.
- Overall summary of activities and critique of the total operation.

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- Recommendations for reducing the risk of a repeat event.

The incident report will be shared with senior management in URS IE.

The critique should serve to improve the ability of IE to plan for and respond to emergency situations. "Lessons Learned" should be considered in planning and practice simulations by the CMT and IMTs.

9.0 EMPLOYEE/FAMILY SUPPORT

Some employees and family members may be profoundly impacted by the events surrounding the incident, especially those involving injuries or loss of life. It may be necessary to provide critical-incident stress-debriefing sessions following such incidents, using services provided by either our Emergency Assistance Program provider, or another qualified subcontractor. The CMT will determine if a requirement exists to activate the ACCC in Las Vegas, Nevada, from which trained Family Assistance personnel can respond. The ACCC will coordinate with Human Resources and provide or arrange for:

- Services to aid in the resolution of personnel problems and emergency situations as they arise (i.e., suicide and homicide threats, hostile expressions, demonstrations of irrational behavior).
- Establishing counseling services for employees, family members, and groups affected by the crisis.
- Arranging transportation for employees/family members as necessary to hospitals where injured family members may be hospitalized.
- Repatriation of remains.
- Return of personal property to family members.
- Restoration and return of personal effects to family members.

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ATTACHMENT A – INITIAL RESPONSE CHECKLIST

- Briefly assess the magnitude of the incident (e.g., injuries, fire, environmental spill, earthquake).
- Follow the available Emergency Preparedness Plan; contact needed emergency services: (e.g., police, fire, ambulance).
- Initiate site control as appropriate: shutting down operations/evacuation from hazardous areas.
- Provide first aid to injured.
- Make certain all employees are accounted for.
- Ensure that any incident evidence is protected.
- Communicate situation to Operations Management and HSE.
- Contact URS support organization as needed: HR, Corporate Communications, Legal, Security, HSE, IT, Occupational Nurse.
- Project Manager/Client Account Manager to notify client (as appropriate).
- Assure Regional Manager is aware of significant incidents.
- Incident documentation (i.e., witness statements, photos).
- Update employees: incident status, return to work schedule, not communicating with the media, employee questions.
- Recovery/Restore Operations.

NOTES:

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Emergency Preparedness & Crisis Management Plan

ATTACHMENT B – TELEPHONE THREAT CHECKLIST

Exact time of call: _____ AM PM

Date of call: _____

Exact words of caller
 (use back if necessary): _____

How long did the conversation take? _____

Did they say they would call back? _____

When? _____

On what number? _____

Questions to ask if for a bomb threat:

When is the bomb going to explode? _____

Where is the bomb? _____

What does it look like? _____

What kind of bomb is it? _____

What will cause it to explode? _____

Did you place the bomb? _____

Why? _____

Where are you calling from? _____

What is your address? _____

What is your name? _____

Caller's Voice (check box)

Calm	<input type="checkbox"/>	Disguised	<input type="checkbox"/>	Nasal	<input type="checkbox"/>	Angry	<input type="checkbox"/>
Broken	<input type="checkbox"/>	Stutter	<input type="checkbox"/>	Slow	<input type="checkbox"/>	Sincere	<input type="checkbox"/>
Lisp	<input type="checkbox"/>	Rapid	<input type="checkbox"/>	Giggling	<input type="checkbox"/>	Deep	<input type="checkbox"/>
Crying	<input type="checkbox"/>	Squeaky	<input type="checkbox"/>	Excited	<input type="checkbox"/>	Stressed	<input type="checkbox"/>
Accent	<input type="checkbox"/>	Loud	<input type="checkbox"/>	Slurred	<input type="checkbox"/>	Normal	<input type="checkbox"/>

If the voice is familiar, who does it sound like? _____

Describe background noises: _____

Remarks: _____

Person receiving call: _____

Telephone number call received at: _____

Incoming telephone number (if available): _____

Report call immediately to the Incident Management Team (IMT) Leader

Building evacuated? : YES NO

Police notified? : YES NO

URS INFRASTRUCTURE & ENVIRONMENT
Emergency Preparedness & Crisis Management Plan

ATTACHMENT C – IE CRISIS MANAGEMENT TEAM CONTACT LIST

[Contact List maintained by Vice President HSE]

URS SAFETY MANAGEMENT STANDARD

Corrosive and Reactive Materials

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to protect employees from the hazards of corrosive and reactive materials. Information is provided regarding the proper methods to store, handle and work with corrosive and reactive materials. This procedure considers a corrosive material as one that has a pH less than 2.0 (acid), or greater than 12.5 (base). A reactive material is a chemical that may be sensitive to shock, or may react with air or water depending upon its makeup.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 009 NA](#) – North America

[SMS 009 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-009](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Corrosive and Reactive Materials

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies where corrosive and/or reactive materials are used or stored.

2. Purpose and Scope

The purpose of this standard is to protect employees from the hazards of corrosive and reactive materials. This procedure considers a corrosive material as one that has a pH less than 2.0 (acid), or greater than 12.5 (base). A reactive material is a chemical that may be sensitive to shock, or may react with air or water depending upon its makeup.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Appoint a responsible person who will:

1. Inspect storage areas periodically.
2. Monitor the quantity of corrosive and reactive materials on site, as well as that of incoming materials.
3. Review work practices that involve corrosive and reactive materials.

B. Require that all employees working with corrosive or reactive materials, or who may be exposed to such materials, are trained in accordance with SMS 002 – Hazard Communication.

C. Control the use of corrosive and reactive materials by URS personnel.

1. Order only those materials and quantities that are needed to complete a job.
2. Check incoming corrosive and reactive materials for proper labeling in accordance with SMS 002 – Hazard Communication.
 - a. Label materials, if needed, as they arrive on site.
 - b. Mark reactive materials containers with the date of receipt of the chemical.

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Corrosive and Reactive Materials

3. Check incoming corrosive and reactive materials for material safety data sheets (MSDS). If MSDSs are not provided or are already on file, order them from the manufacturer, distributor, or vendor.
 4. Add incoming corrosive and reactive chemicals to the hazardous materials inventory, if not already present, following procedures set forth in SMS 002 – Hazard Communication.
 5. Do not store any quantity of corrosive or reactive materials in an office (with the exception of limited quantities of consumer products). These materials are to be stored off site, or at an on-site laboratory or storage area.
- D. Store corrosive and reactive materials as indicted in the MSDS:
1. In a cool, dry environment, free from extremes of temperature and humidity.
 2. In a manner that separates them from other materials (including flammables and oxidizers) and from each other.
 - a. Separate acids and bases.
 - b. Separate reactive materials from acids and bases, and protect from contact with water.
 3. On materials that are acid-resistant (Teflon-coated, plastic, etc.) for small containers.
 4. Covered, not stacked on one another, on acid-resistant material for carboys (approximately 5 gallons/22 liters).
 5. On individual racks or securely blocked on skids, with closure (plug) facing upward to prevent leakage from drums.
- E. Require that labeling and signage are in place.
1. Label containers with the appropriate warning word to indicate the hazard, such as: DANGER; WARNING; CAUTION; CORROSIVE; OXIDIZER.
- F. Use corrosive and reactive materials appropriately.
1. Prior to use and in accordance with MSDS, safe-handling procedures must be developed for each operation, and type and

URS SAFETY MANAGEMENT STANDARD

Corrosive and Reactive Materials

concentration of the chemical. In all cases, review the MSDS and product information before use.

2. Follow SMS 029 – Personal Protective Equipment when working with or around corrosive and reactive materials. Review the MSDS for the chemical used to determine the specific type of PPE needed, to include at a minimum:
 - a. Chemical-splash goggles
 - b. Chemical-resistant gloves
 - c. Chemical-resistant apron
3. Obtain medical care immediately in the event of:
 - a. Skin or eye exposure (e.g., splash) to corrosive liquids
 - b. Inhalation of vapors of corrosive liquids that cause respiratory discomfort.
4. Require an eyewash station to be located in all areas where acids or bases are used. Safety showers must be near by if significant acid or base quantities are involved.
 - a. Place emergency eyewashes and showers in accessible locations that require no more than 10 seconds to reach, and are in a travel distance no greater than 25 feet (7.5 meters) from the hazard.
 - b. Keep the areas surrounding eyewashes and safety showers free of stored materials or debris at all times.
 - c. Mark emergency eyewashes and showers with a highly visible sign.
 - d. Require the area around emergency eyewashes and showers to be well lighted and visible.
 - e. Where portable eyewash units are used, a process must be in place to change the water and clean the unit, as required by the manufacturer's instructions.
 - f. Require emergency showers and shower/eyewash combinations connected to a self-contained water supply to

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Corrosive and Reactive Materials

deliver a minimum 20 gallons (85 liters) per minute for 15 minutes.

- g. Require emergency showers and shower/eyewash combinations permanently connected to a potable water supply to deliver at least 30 gallons (127.5 liters) per minute continuously.
- h. Require emergency eyewashes to be capable of delivering to the eyes not less than 0.4 gallon (1.5 liters) per minute for 15 minutes.

G. Be prepared to clean up spills of corrosive and reactive materials.

- 1. Have a written spill response plan in place before materials are stored on site.
- 2. Have commercial spill kits available for cleanup of small quantities of materials. At a minimum, kits should contain appropriate protective clothing (including full-body suits, gloves, and boots) and spill control equipment (including absorbents, pillows, shovels, containers, etc.).
- 3. Where necessary, ensure that appropriate respiratory protection equipment is provided to spill responders. For additional information, see SMS 042 – Respiratory Protection.
- 4. Clean up or respond to spills promptly.
- 5. Ensure that personnel responding to a spill have been trained in the hazards associated with the spilled material, as well as use of the spill control equipment, including PPE required for the task.
- 6. Do not use combustible organic materials such as sawdust, excelsior, wood chips and shavings, paper, rags, or burlap bags to absorb or clean up spills.

H. Develop a waste management plan and procedures, including procedures for collection, storage, labeling, pick-up and transport, and final disposal.

I. Dispose of corrosive and reactive materials appropriately.

- 1. Segregate organic acids, inorganic acids, and basic wastes.

URS SAFETY MANAGEMENT STANDARD

Corrosive and Reactive Materials

2. Contract hazardous waste disposal services should be obtained, as necessary, to dispose of waste materials. All waste must be appropriately packaged for off-site transportation, if applicable.
 3. Wastes must be marked, labeled, and shipped in accordance with regulatory requirements. For additional information, see SMS 048 – Hazardous Materials/Dangerous Good Shipping.
- J. Inspect corrosive and reactive storage and use areas periodically.
1. Inspect office, laboratory, and project settings quarterly.
 2. Use the inspection sheet provided as Attachment 009-1 NA to inspect sites.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Completed Corrosive and Reactive Material Inspection Sheets.
- B. Worker Right-to-Know training documentation.
- C. Written Spill Response Plan.
- D. Waste Management Plan.
- E. Documentation of training for spill response personnel.
- F. Documentation of hazard communication training for personnel exposed to corrosive and/or reactive materials.

6. Resources

- A. [ANSI Z358.1-2004](#) – American National Standard for Emergency Eyewash and Shower Equipment
- B. U.S. Occupational Safety and Health Administration (OSHA) Technical Links – [Personal Protective Equipment](#)
- C. U.S. OSHA Technical Links – [Hazard Communication](#)
- D. Australian Standards AS 3780 – 1994. [The Storage and Handling of Corrosive Substances](#)
- E. [SMS 002](#) – Hazard Communication

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Corrosive and Reactive Materials

- F. [SMS 029](#) – Personal Protective Equipment
- G. [SMS 042](#) – Respiratory Protection
- H. [SMS 048](#) – Hazardous Materials/Dangerous Goods Shipping
- I. [Attachment 009-1 NA](#) – Corrosive and Reactive Materials
Inspection Sheet



Health, Safety and Environment
**CORROSIVE AND REACTIVE MATERIALS
INSPECTION SHEET**

Attachment 009-1 NA

Issue Date: June 1999
Revision 3: February 2009

Location: _____

Name of Inspector: _____ **Date Inspected:** _____

Labeling

1. Original containers are labeled with: Yes No NA
- Name of chemical
 - Signal word (e.g., DANGER; WARNING; CAUTION, etc.)
 - Manufacturer

Pre-Job Activities

2. Corrosives and reactives are stored in a cool, dry environment, free from temperature extremes Yes No NA
3. Corrosives and reactives are stored in their properly labeled original containers, cushioned against shock, and stored to prevent leaks Yes No NA
4. Corrosives are not stored in the vicinity of oxidizers Yes No NA
5. Hydrofluoric acid is stored only in acid-proof polyethylene- or ceresin-lined containers Yes No NA
6. Corrosives are stored on acid-resistant material Yes No NA
7. Chromic acid, nitric acid, perchloric acid, and potassium permanganate (all oxidizers) are stored separately from other corrosives and flammables Yes No NA

Handling

8. The following minimum required PPE is used when working with corrosives: Yes No NA
- Chemical splash goggles
 - Chemical resistant gloves
 - Chemical resistant apron
9. Bottles or carboys are opened slowly to guard from splashes. Yes No NA
10. The outside of the container is washed off with water after use to clean off any droplets of material. Yes No NA
11. An eyewash is located in all areas where corrosives are used. Yes No NA
12. An eyewash is:
- Within 25 feet (7.62 meters) or 10 seconds of travel Yes No NA
 - Marked with a highly visible sign Yes No NA
 - Well lit and visible Yes No NA
 - Working and delivering a minimum of 1.5 liters of water per minute for 15 minutes Yes No NA
13. Where substantial quantities of corrosives and/or reactives are stored, access to an emergency shower is available. Yes No NA
14. Spill control materials compatible with chemicals are available for emergency use. Yes No NA

Waste Disposal

15. Organic acid, inorganic acid, and basic waste are kept segregated. Yes No NA
16. Corrosive waste is disposed in accordance with regulatory and client requirements. Yes No NA
17. A waste management plan or procedure is in place. Yes No NA
18. Arrangements for waste collection, transport, and disposal are in place. Yes No NA

Comments:

URS SAFETY MANAGEMENT STANDARD

Electrical Safety

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies, where electricity is used, electrical systems are installed or maintained, or where live electrical circuits are accessed. For work around overhead or underground utilities, see SMS 034 – Utility Clearances.

2. Purpose and Scope

This procedure describes requirements for working on electrical circuits with voltage greater than 50 volts. The primary hazards related to electricity are shock, burns, arc-blast, fire and explosions. This procedure is intended to reduce worker risk to electrical hazards.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 012 NA](#) – North America

[SMS 012 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-012](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Electrical Safety

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies for those projects where electricity is used, electrical systems are installed or maintained, or live electrical circuits are accessed. For work in close proximity to overhead or underground utilities, see SMS 034 – Utility Clearances and Isolation.

2. Purpose and Scope

The purpose of this standard is to describe requirements for working on electrical circuits and to reduce worker risk from electrical hazards. The primary hazards related to electricity are shock, burns, arc-blast, fire, and explosions.

Work on live electrical circuits presents hazards of injury due to electrocution and arc flash exposure. Electrocution is a function of voltage (the energy potential) and amps (the amount of energy absorbed through the circuit). The human body can absorb 3 amps with survivable damage to the tissue. At 5 amps, tissue death is nearly immediate. Electrocution may occur with voltage of less than 50 volts. Below that level, electrocution may not cause death. However, even 0.1 amp across the heart (or across the chest or arms, which correlates to current across the heart) can interfere with the heart's function. Individuals who are electrocuted across the chest may be injured in such a way as to stop the heart's function, or stop respiration. If not immediately treated; the heart of an electrocution victim can fail. Electrocution at higher voltages may cause tissue damage or burns. In either mode of electrocution, injury is nearly instantaneous, and death is a frequent outcome.

Arc-flash injury is a result of exposure to the radiation emitted from an electrical spark. An arc flash is typically a very short-duration event (on the order of microseconds), but the heat generated may be four times as hot as the surface of the sun. The radiation emitted by arc flash will cause instant tissue damage. If the eyes are unprotected, the radiation will cause instant blindness.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

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4. Requirements

- A. Any work performed on live electrical systems of 50 volts or more must be done by a qualified licensed or journeyman electrician or HVAC mechanics. Other personnel who may be exposed to electrical hazards must be trained in and be familiar with safe working practices.
- B. Arc-flash protection protocols (see Section L) must be in place any time electricians are working on or near live circuits of 50 volts or more.
- C. Personnel must follow established lockout/tagout procedures when performing work on electrical equipment or machinery unless power must be applied for the purpose of adjustment or electrical trouble-shooting. Refer to SMS 023 – Lockout and Tagout Safety.
 - 1. Consider all electrical systems as live until verified as de-energized and grounded.
 - 2. Do not work on or in close proximity to electrical circuits unless the circuit is de-energized, grounded, or guarded.
- D. General Safe Work Practices
 - 1. Use rated-load switches or circuit breakers to disconnect electric power and lighting circuits. Non-electrical workers may reset a tripped single-pole convenience outlet or lighting circuit breaker *one time*, provided it is not located in a designated emergency panel, and when, based on their knowledge, it is safe to do so. If the circuit breaker trips again, contact a supervisor to authorize and initiate the next appropriate course of action. Other types of circuit breakers may only be reset by personnel with training and knowledge of the affected systems.
 - 2. Strictly prohibit use of pocket knives and standard box cutters – use wire strippers and cable strippers to strip wire and cable, including high-voltage cable.
 - 3. Equipment must meet the requirements of the National Fire Protection Association (NFPA) and/or National Electric Code (NEC) for these locations, if electrical equipment is used near sources of flammable vapors, such as those identified in Class 1, Division 1 or Class 1, Division 2.
 - 4. Guard and secure lamps and fixtures to preclude injury. Open fluorescent fixtures must have wire guards, lenses, tube guards and

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- locks, or safety sockets that require force in the horizontal axis to remove the lamp.
5. Protect lamps for general illumination from inadvertent contact or breakage either with a suitable guard or by separation of at least 7 feet from normal working surfaces.
 6. Double-insulated portable electric hand tools shall be inspected prior to use for any damage or defects and tagged out of service if the protection is compromised by damage or excessive wear. Double-insulated tools must be marked (usually with standard double-insulated mark on casing).
 7. Use low voltage battery powered tools when feasible and practical.
 8. Unplug portable electrical hand tools when not in use.
 9. Do not use electrical cords to raise or lower equipment.
 10. Do not use equipment with frayed cords or three-wire cord ends that have had the grounding prong removed.
 11. Use the proper power receptacle for each application. Do not manipulate the cord-end prongs to fit the wrong receptacle.
 12. Avoid the use of temporary wiring. Employ appropriate ground-fault circuit interrupters with any temporary wiring, including extension cords used for portable electrical equipment and tools.
 13. Do not use extension cords in place of permanent wiring (affixed to structure, run-around poles, under doors, through holes in walls or structure, etc.).
 14. Always plug high-current–draw items such as coffee pots, refrigerators, microwaves, toaster ovens, and toasters directly into an approved outlet, never into extension cords or power strips.
 15. Plug power strips (surge protectors) directly into an approved outlet, not into other power strips or into extension cords. Only use surge protectors listed by a nationally or internationally recognized testing laboratory. Do not plug loads into these devices that exceed the maximum recommended by the manufacturer.

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16. Inspect extension cords and cords on electrical equipment before each use. Take equipment or extension cords with damaged wiring or missing plug prongs out of service until the damage is repaired.
17. Electrical safety interlocks may be defeated only by trained and qualified personnel, and then only temporarily, when directed to do so by an approved procedure or work practice, while working on the equipment. Return the interlock to its operable condition as soon as possible.
18. De-energize circuits immediately if an electrical shock victim is still in contact with electrical energy. If not possible to de-energize the circuit, only trained and qualified employees may attempt to remove the victim. Note: Electrical shocks are medically serious regardless of the voltage. Even if the victim shows no apparent signs of injury, they must be seen by a qualified health care professional.
19. Avoid installing conductors in or removing conductors from raceways containing energized or potentially energized conductors, as a general rule, because of the possibility of conductor damage. If this type of work is unavoidable, identify and lock out/tag circuits, or the task will be considered energized work, and an Energized Work Permit (Attachment 012-1) must be secured.
20. Personnel must remain alert at all times when working near exposed electrical parts or in situations where electrical hazards may exist. Personnel must never reach blindly into areas that may contain live circuits. Personnel must not be permitted to work in areas containing electrical hazards if alertness is recognizably impaired due to illness, fatigue, or other reasons.
21. Employees must not enter an area containing exposed electrical circuits unless adequate illumination is provided. When the illumination or obstructions affect visibility and the employee might contact the exposed circuits or equipment, employee will not perform the task.
22. Do not perform tasks within the Limited Approach Boundary of energized electrical components if lack of illumination or obstructions precludes observation of the work to be performed.
23. Handle conductive materials and equipment in contact with an employee's body carefully so they do not come into contact with

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exposed conductors. Conductive material and equipment include, but are not limited to ducts, pipes, tubes, conductive hoses or ropes, metal-lined rules and scales, and steel tapes or chains.

24. Use protective shields, barriers, or insulating materials to protect workers from exposed energized parts that might be inadvertently contacted, or where dangerous electric heating or arcing is likely to occur.
25. Take precautions when work is performed in a confined or enclosed space, such as a manhole or vault, to avoid contact with the energized part. Special training in confined spaces and a confined space entry permit must be obtained before entry.
26. Housekeeping and custodial duties will not be performed adjacent to energized parts where such parts present an electrical contact hazard. Cleaning materials such as water, steam, conductive cleaning fluid, steel wool, metalized cloth, or silicon carbide will not be used in the proximity of energized parts.
27. Workers will not wear conductive apparel (e.g., watches, rings, bracelets, key chains, necklaces, metalized aprons, cloth with conductive thread, metal head gear, wire/metal-rimmed glasses, etc.).
28. Report to supervisor potential electrical hazards or unexpected occurrences during electrical renovation or construction.
29. Do not use equipment that does not meet the requirements of this standard.

E. Hazardous Locations

1. Determine whether electrical equipment and wiring will be installed in locations where any of the following may be present: flammable vapors, liquids, or gases; combustible dusts or fibers; or a concentration or quantity of flammable or combustible material. See Supplemental Information A – Hazardous Locations, for definitions of hazardous locations.
2. Use protective barriers or insulating materials if electrical systems in a confined space cannot be de-energized.
3. If an employee must handle long dimensional conductive objects (e.g., ducts and pipes) in areas with exposed energized systems,

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attempts will be made to de-energize the systems. If the systems cannot be de-energized, site procedures will be developed (e.g., use of insulation, guarding, and material handling techniques) which will minimize the hazard.

F. Circuit Interrupters and Grounding

1. Ground-Fault Circuit Interrupters (GFCI)

- a. Provide GFCI protection in wet or extremely damp areas.
- b. Employ GFCI to protect personnel when using portable electric tools and portable electric equipment, including portable lights.
- c. Locate GFCI protection between extension cords and the electrical outlets into which they are plugged.
- d. Provide GFCI for all 120-volt, single-phase, 15- and 20-ampere receptacle outlets on construction sites.
- e. Provide GFCI for all 120-volt, single-phase, 15- and 20-ampere receptacle outlets within garages, bathrooms, kitchens, and shops.
- f. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5 kilowatts, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with GFCI.
- g. Test portable GFCI devices by pushing the test button on the device before each use. Permanently mounted GFCI will be tested monthly by pressing the test button.

2. Grounding

Effectively ground all wiring, electrical circuits, and equipment, except portable tools and appliances protected by an Underwriter's Laboratory (UL)-approved system of double insulation. Note that an equipment conductor grounding program that meets regulatory requirements can be used in lieu of GFCIs. Examples of equipment requiring grounding include:

- a. Portable and vehicle- or trailer-mounted generators.

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- b. Electrically powered arc welders.
 - c. Switches.
 - d. Motor-controller cases.
 - e. Fuse boxes.
 - f. Distribution cabinets.
 - g. Frames.
 - h. Non-current-carrying rails used for travel, and motors of electrically operated cranes.
 - i. Electric elevators.
 - j. Metal frames of non-electric elevators to which electric conductors are attached.
3. Assured Grounding

Whenever possible, use GFCI instead of assured grounding. Assured grounding programs must be approved by the Regional HSE Manager or HSE Director. Develop a site-specific assured grounding program. Supplemental Information C – Assured Grounding Guidelines, may be used to develop a site-specific program.

G. Circuits

1. Require that there are no missing blanks.
2. Close doors to circuit and fuse boxes when not in use.
3. Label every circuit located on a circuit breaker/fuse box, and/or motor-control center (MCC).

H. Temporary Wiring, Electrical Tools, and Extension Cords

1. Require that temporary wiring is installed and used in accordance with regulatory requirements; specifically:
 - a. Guard, bury, or isolate temporary wiring by elevation to prevent accidental contact by workers and equipment.

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- b. Require that vertical clearance above walkways is not less than 10 feet (3 meters) from circuits carrying 600 volts or less.
 - c. Support all exposed temporary wiring on insulators.
 - d. Protect temporary wiring from accidental damage.
 - e. Guard live parts of wiring.
 - f. Mark temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment to indicate the maximum operating voltage.
2. Require that lighting strings are installed and used in accordance with regulatory requirements; specifically:
- a. Provide adequate light throughout the building and in all work areas throughout the project, particularly passageways and stairways, and wherever necessary to avoid a hazard due to lack of light. Consideration should be given to the selection and placement of lights that will provide minimum glare, eliminate harsh shadows, and provide adequate illumination to work efficiently and safely. Ensure lighting is available at all times when employees are in the work area.
 - b. Use nonconductive lamp sockets and connections permanently molded to the conductor insulation.
 - c. Require that lighting strings have lamp guards, except where the construction of the reflector is such that the bulb is deeply recessed.
 - d. Promptly replace all broken or defective bulbs. Exposed empty light sockets are prohibited.
 - e. Protect all lights used for illumination from accidental contact or breakage.
 - f. Ground metal-case sockets.
3. Require that extension cords are installed and used in accordance with regulatory requirements, specifically:

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- a. Use only 3-wire grounded-type extension cords designated for hard service or extra hard service and listed by UL.
 - b. Check cords for damage before use and daily thereafter.
 - c. Do not exceed the rated load.
 - d. Use extension cords of adequate length. "Daisy chaining" of cords is prohibited unless specifically allowed by the cord manufacturer.
 - e. Do not use spliced cords.
 - f. Destroy and discard worn, damaged or frayed cords and cords with the ground prong removed or rendered ineffective shall be removed from service for repair and retesting.
 - g. Cord set repairs shall be performed by a qualified electrician using only UL-listed attachment plugs and receptacle ends of equal service rating. The repaired cord set shall be tested using a three prong circuit tester, a tension tester and an ohm meter prior to being returned to service.
 - h. Do not fasten extension cords with staples, hang them using non-metallic insulating hangers such as zip-ties.
 - i. Do not wrap cords or cables around any conductive materials.
 - j. Protect electrical cords and trailing cables from damage that could create a hazard to employees or other persons in the area.
4. Inspect portable electric tools brought onto the site to ensure that they are in good condition. Inspect portable cord- and plug-connected equipment for external defects and evidence of possible internal damage before use on any shift.
- I. Work On or Near Energized Hazards
1. Two qualified personnel and an Energized Work Permit (Attachment 012-1) must be present for work on or near energized hazards, except for authorized troubleshooting with approved testing equipment or verifying de-energization during lockout/tagout.

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- a. Work is considered to be “on or near” whenever any of the following conditions occur:
 - i. Any part of the body, regardless of the level of PPE protection, enters or is inadvertently placed within the Restricted Approach Boundary, based on the maximum potential voltage involved.
 - ii. Any tool or piece of equipment (insulated or not) enters or is inadvertently placed within the Restricted Approach Boundary, based on the maximum potential voltage involved.
 - b. If URS retains a subcontractor to perform work on live electrical systems, the subcontractor will advise URS (or URS’ client) of:
 - i. Any unique hazards presented by the contract employer’s work.
 - ii. Any unanticipated hazards found during the contract employer’s work that the host employer did not mention.
 - iii. The measures the contractor took to correct any hazards reported by URS to prevent such violation from recurring in the future.
2. Obtain an Energized Work Permit (Attachment 012-1) for all work, even non-electrical work, within the restricted approach boundary.
- a. Work “on or near” live equipment as defined above is permitted only when it is impossible to shut off the equipment or circuits; or when de-energizing the equipment would introduce additional or increased hazards; or is infeasible due to equipment design or operational limitations. Examples of situations that would meet the requirements of “increased or additional hazards” include interruption of life safety equipment, deactivation of emergency alarm systems, shutdown of hazardous location ventilation equipment, or removal of illumination from a large area.
 - b. Retain a copy of the Energized Work Permit both at the work site until work is completed in the office/project file. The Energized Work Permit provides documentation of the

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justification for working the circuit or equipment energized; identifies the specific personnel who are to perform the work and the specific PPE requirements for the task; defines the scope of the task; and details additional special protective and work practices required to protect both the workers and other personnel in the area. The permit must be authorized by a member of management.

- c. ANSI-approved voltage-rated tools must be used any time the plane of the cabinet, vault, box, or opening is breached if *all* exposed live components of 50 volts or greater in a cabinet, vault, box, or other piece of electrical equipment are not completely de-energized through lockout/tagout.
- d. Full PPE must be worn, based on maximum potential voltages as defined in Section 3 below, as well as the use of ANSI-approved and voltage-rated tools, which are rated for maximum voltages, that may be encountered during metering, even though metering during authorized troubleshooting is not considered “working on or near.”

3. Approach Boundaries for Live Parts

The approach boundaries listed below will be used to define Energized Work Permit requirements, tool and equipment requirements, and PPE requirements by employees:

- a. Flash Protection Boundary: Workers within this boundary must use arc-flash protection for all parts of the body when work is being performed that could lead to an arc flash. Arc-flash protection boundaries are presented in the table below. Flash-protection boundaries at voltages above 600 volts will be calculated following NFPA 70E on a case-by-case basis using the formula found in NFPA 70E, paragraph 130.3 (A), or applying the maximum level of protection recommended in Table 130.7(C)(9)(a), based on the work being performed.
- b. Limited Approach Boundary: The limited approach boundary establishes an area around exposed energized hazards of 50 volts or greater where unqualified employees must be escorted and directly supervised by a qualified employee. Use insulated, voltage-rated, ANSI-approved tools based on the maximum voltage within this boundary. Limited

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approach boundaries are presented in the table below (refer to NFPA 70E for higher voltages).

- c. **Restricted Approach Boundary:** The restricted approach boundary establishes an area around exposed energized hazards of 50 volts or greater where unqualified employees are prohibited, and insulated tools and full PPE are required, based on the maximum voltage. A worker is considered to be working “near” energized systems when any part of the body or tool could approach an energized component closer than the distances discussed below. An Energized Work Permit is always required in these cases, except during troubleshooting with approved testing equipment. Restricted approach boundaries are presented in the table below (refer to NFPA 70E for higher voltages).

- d. **Prohibited Approach Boundary:** The prohibited approach boundary establishes an area around exposed energized hazards of 50 volts or greater where approach within the boundary is considered “working on” an energized system. A worker is considered to be “working on” energized systems when any part of the body or tool could approach an energized component closer than the distances discussed below. Unqualified workers are prohibited, and full PPE is required, based on the maximum voltage. An Energized Work Permit is always required in these cases, except during troubleshooting with approved testing equipment. Prohibited approach boundaries are presented in the table below (refer to NFPA 70E for higher voltages).

Nominal System Voltage Range, Phase to Phase¹	Flash Protection Boundary	Limited Approach Boundary	Restricted Approach Boundary	Prohibited Approach Boundary
Less than 50 volts	Not Specified	Not Specified	Not Specified	Not Specified
50 volts – 240 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	Avoid Contact	Avoid Contact
240 volts – 300 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	Avoid Contact	Avoid Contact
301 volts – 500 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	1 ft / 0.3 m	1 in / .03 m
501 volts – 599 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	1 ft / 0.3 m	1 in / .03 m

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Nominal System Voltage Range, Phase to Phase ¹	Flash Protection Boundary	Limited Approach Boundary	Restricted Approach Boundary	Prohibited Approach Boundary
600 volts	4 ft / 1.22 m	3 ft, 6 in / 1.1 m	1 ft / 0.3 m	1 in / .03 m
601 volts – 750 volts	CN	3 ft, 6 in / 1.1 m	1 ft / 0.3 m	1 in / .03 m
751 volts – 1 kV	CN	5 ft / 1.5 m	2 ft, 2 in / 0.67 m	7 in / 0.12 m
1.1 kV – 7.5 kV	CN	5 ft / 1.5 m	2 ft, 2 in / 0.67 m	7 in / 0.12 m
7.51 kV – 15 kV	CN	5 ft / 1.5 m	2 ft, 2 in / 0.67 m	7 in / 0.12 m
15.1 kV – 17 kV	CN	6 ft / 1.83 m	2 ft, 7 in / 0.82 m	10 in / 0.25 m
17.1 kV – 26.5 kV	CN	6 ft / 1.83 m	2 ft, 7 in / 0.82 m	10 in / 0.25 m
26.51 kV – 36 kV	CN	6 ft / 1.83 m	2 ft, 7 in / 0.82 m	10 in / 0.25 m
36.1 kV – 46 kV	CN	6 ft / 1.83 m	2 ft, 9 in / 0.88 m	1 ft, 5 in / 0.46 m

¹ For single-phase systems, select the range that is equal to the system's maximum phase-to-ground voltage multiplied by 1.732.

CN = Calculation Needed. See NFPA 70E, Annex D – Incident Energy and Flash Protection Boundary Calculation Methods; and choose the appropriate method out of the 5 listed. These calculations must be used only under qualified engineering supervision.

4. Establishing an Electrically Safe Work Condition

- a. Establish an electrically safe work condition before performing work (other than authorized metering as a part of troubleshooting) within the Limited Approach Boundary of exposed electrical hazards.
- b. Performing complete lockout/tagout of all electrical potentials of 50 volts or greater within the cabinet, vault, box, or work area is considered establishing an electrically safe work condition, as long as the lockout/tagout process accomplishes all of the following:
 - i. Provides a documented hazard evaluation at the site, including the identification of the person in charge of the lockout/tagout.
 - ii. Identifies every source of electrical energy of 50 volts or greater remaining inside the cabinet, vault, and

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- box, and completely eliminates them through lockout/tagout.
- iii. Tests every phase conductor or circuit part with an approved meter (phase-to-phase and phase-to-ground) to verify they are de-energized (meter will be checked before and after each test to confirm it is operating properly).
 - iv. Applies ground-connecting devices to any part or circuit where there is a possibility of induced voltages or stored electrical energy, including grounding-out of capacitors or similar devices that may hold stored energy.
- c. If both locks and tags cannot be installed, employ a second alternative method such as removal of a fuse in addition to a tag. Consider all circuits and equipment energized until an electrically safe work condition has been established and verified.
- d. Follow these work practices if an electrically safe work condition as described above has not been established:
- i. If the Restricted and/or Prohibited Approach Boundary may be breached, an Energized Work Permit will be secured, and work practices will comply with those required for “working on or near” energized hazards
 - ii. If the Limited Approach Boundary may be breached, a qualified person must be present and directly supervise the work.
 - iii. If the Arc-Flash Boundary may be breached and any work is performed that has the possibility of causing an arc flash, all personnel within the flash boundary will be protected with appropriate levels of arc-flash protection.

5. Insulated Tools and Equipment

- a. Use ANSI-approved insulated tools and/or handling equipment when working near exposed energized conductors or circuit parts. Protect the insulating materials

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on these items during storage or transportation. Use fuse-handling equipment capable of withstanding the circuit voltage when removing or installing fuses from an energized fuse terminal. Allow *only* nonconductive ropes and hand lines near exposed parts.

- b. Inspect insulated tools and equipment prior to each use. Include an examination for damage to the insulation or damage that may limit the tool from performing its intended function, or which could increase the potential for an incident. Immediately remove any defective tools and equipment from service.
- c. Use insulated tools and insulated equipment when:
 - i. Breaking the plane (or opening) of an electrical fixture (cabinet, vault, panel, etc.) where any live voltage of 50 volts or greater remains (including metering for troubleshooting). Cabinet will be considered as containing live voltage until all sources of 50 volts or greater have been completely de-energized through lockout/tagout, and confirmed to be de-energized through metering.
 - ii. Any part of the body or a tool or piece of equipment may cross the Limited Approach Boundary for the maximum voltage present.
 - iii. All tools used in either case above will be voltage-rated, ANSI-approved tools rated to the maximum voltage hazard present.
- d. Insulated tools and equipment will also comply with the following:
 - i. Grounding and testing devices will be stored in a clean, dry area and properly inspected and tested before each use.
 - ii. Use fuse or fuse-holding equipment to remove or install a fuse if the fuse terminals are energized. Fuse or fuse holder will be rated and insulated for the circuit voltage.

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- iii. Ropes or hand lines used near exposed live parts operating at 50 volts or greater will be non-conductive.
- iv. Fiberglass-reinforced plastic rod and tube tools used for live line work will meet the requirements of ASTM F 711.
- v. Portable ladders will have non-conductive side rails. Metal ladders are prohibited in areas where electrical hazards exist.

6. Personal Protective Equipment Requirements

- a. Protective equipment requirements outlined in the table below are mandatory when any part of the body or a tool or piece of equipment may be placed within the Restricted-Approach Boundary (Section 1):
 - i. All personnel must wear the required PPE as outlined in this section until all energy sources of 50 volts or greater within the Restricted Approach Boundary have been completely eliminated through lockout/tagout, and de-energization has been confirmed through metering. The ratings in this section of cal/cm² represent arc-flash protection ratings. If protective equipment is not marked with these ratings, it does not meet the requirements of NFPA 70E, and will not be used. Exceptions to these requirements are limited to those specifically addressed under each type of protective equipment.
 - ii. Maintain protective equipment in a safe, reliable condition, and visually inspect before each use. Gloves shall be leak tested before use. Store protective equipment in a manner to prevent physical damage, and damage from moisture, dust, or other deteriorating agents.
 - iii. Do not use arc-flash clothing that is contaminated with grease, oil, or flammable liquids or combustible materials or is damaged to an extent where the protective qualities are impaired. Store arc-flash clothing to avoid physical damage; damage from

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moisture, dust, or other deteriorating agents; and contamination from flammable or combustible material. Clean following the manufacturer's instructions to avoid loss of protection. If necessary, make repairs using the same flame-retardant materials used in the original garment.

- iv. When body protection is required, use all-cotton underclothing (never nylon, polyester or rayon) that contains no metal.
- v. Trim, name tags, or logos affixed to flame-retardant clothing must also be flame-retardant rated.
- vi. Hairnets and/or beard nets must be of non-melting, flame-resistant design.
- vii. Wear Class E hardhats rated for electrical protection when inside any substation or other power transmission and distribution equipment area. Inspect hardhats before use.

Voltage	Required PPE
Less than 50	<p><u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles</p> <p><u>Body</u>: Long sleeve cotton shirt and cotton pants</p> <p><u>Hand</u>: Leather gloves</p> <p><u>Foot</u>: Leather, EH rated footwear</p> <p><u>Head/Ears</u>: Hard hat, hearing protection (ear canal inserts)</p>
50 to 240 volts	<p><u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles and Arc-Flash Face Shield or Arc-Flash Suit Hood (4 cal/cm²)</p> <p><u>Body</u>: Flame Retardant long sleeve shirt/pants or coverall (4 cal/cm²)</p> <p><u>Hand</u>: EH gloves (Class 00 with leather protectors)</p> <p><u>Foot</u>: EH rated footwear</p> <p><u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts)</p>

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Voltage	Required PPE
Above 240 to 480 volts	<p><u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles and Arc-Flash Face Shield and Sock Hood (8 cal/cm²) or Arc-Flash Suit Hood (8 cal/cm²)</p> <p><u>Body</u>: Flame Retardant long sleeve shirt pants or coverall (8 cal/cm²)</p> <p><u>Hand</u>: EH gloves (Class 00 with leather protectors)</p> <p><u>Foot</u>: EH rated footwear</p> <p><u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts)</p>
480 to 600 volts	<p><u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles and Arc-Flash Suit Hood (8 cal/cm²)</p> <p><u>Body</u>: Flame-Retardant long sleeve shirt pants or coverall (8 cal/cm²)</p> <p><u>Hand</u>: EH gloves (Class 0 or higher with leather protectors)</p> <p><u>Foot</u>: EH rated footwear (carbon fiber recommended)</p> <p><u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts)</p>
600 volts or above	<p><u>Eye/Face</u>: ANSI approved safety glasses (non-metallic) with side shields or goggles and Arc-Flash Suit Hood (25 cal/cm²)</p> <p><u>Body</u>: 2 Layer Flame-Retardant long sleeve shirt pants or coverall (25 cal/cm²)</p> <p><u>Hand</u>: EH gloves (Class 0 or higher with leather protectors)</p> <p><u>Foot</u>: EH rated footwear (carbon fiber recommended)</p> <p><u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts)</p>

7. Hazard Alerting/Control Requirements

- a. Employ special precautions to warn employees of unusual electrical hazards until they are corrected or eliminated. For example, if breakers or breaker blanks are found missing inside a breaker panel, a warning sign will be placed on the panel door that limits access to qualified electricians only until the electrical hazard is returned to compliance with the electrical code.
- b. Use barricades in conjunction with safety signs where it is necessary to prevent or limit employee access to work areas containing live parts. Make barricades of non-conductive design and place so as to prevent access to the Limited Approach Boundary by non-qualified personnel (10 feet for

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exposed movable conductors, and 3½ feet for non-movable conductors up to 750 volts).

- c. Do not leave exposed energized components unattended and/or unprotected. If signs or barricades cannot assure warning and protection from electrical hazards, station an attendant to warn and protect personnel. Attendants will remain in the area as long as there is the potential for personnel to be exposed to the electrical hazards. Their primary duty is to keep unqualified personnel outside a work area where the unqualified employee might be exposed to the electrical hazard; which at an absolute minimum, is outside the Limited Approach Boundary.
- d. Employ additional alerting methods such as signs, barricades, or attendants where work is performed on equipment that is de-energized and placed in an electrically safe condition in a work area with *other* energized equipment that is similar in size, shape, and construction, to prevent employees from entering look-alike equipment.

B. Electrical Protective Equipment Requirements

- 1. Insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber must meet the following requirements:
 - a. Produce blankets, gloves, and sleeves by a seamless process.
 - b. Mark each item clearly with its Class number.
 - c. Markings must be non-conductive and not impair the insulating qualities of the equipment.
 - d. Confine markings on gloves to the cuff-portion of the glove.
- 2. Equipment must also meet the specifications contained in the governing ASTM standard outlined in the following table.

Item	Standard
Insulating matting	ASTM D 178-93 (or D 178-88)
Insulating blankets	ASTM D 1048-93 (or D 1048-88a)
Insulating covers	ASTM D 1049-93 (or D 1049-88)

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Insulating line hose	ASTM D 105-90
Insulating sleeves	ASTM D 1051-87

3. Do not use insulating equipment with any of the following defects:
 - a. Holes, tears, punctures, or cuts.
 - b. Embedded foreign objects.
 - c. Texture changes, swelling, softening, hardening, or becoming sticky or inelastic.
 - d. Any other defect that may damage insulating properties.
4. Clean insulating equipment as needed to remove foreign substances, and store in a location and manner that protects it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions. A thorough visual examination by the worker is always required immediately before each use.
5. Inspect and test rubber insulating equipment as outlined in the following table.

Item	Inspection	Testing by Qualified Agency	Governing Standard for Test Voltage
Rubber insulating line hose	Before each use	Upon indication that the insulating value is suspect	ASTM F 478
Rubber insulating covers	Before each use	Upon indication that the insulating value is suspect	ASTM F 478
Rubber insulating blankets	Before each use	Before first issue and every 12 months thereafter	ASTM F 479
Rubber insulating gloves	Before each use	Before first issue and every 6 months thereafter	ASTM F 496
Rubber insulating sleeves	Before each use	Before first issue and every 12 months thereafter	ASTM F 496

NOTE: In the case of blankets, gloves, and sleeves, if the equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the past 12 months. In all cases, a process or procedure will be deployed that assures identification and confirmation of inspection currentness for individual pieces of equipment by both the worker and an inspecting/auditing agency.

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C. Warning Sign and Marking Requirements

1. A summary of the warning signs and marking requirements for electrical systems and areas contained in industry standards is provided in the table below. Projects must comply with these requirements or provide alternate and equally effective warnings for the Company personnel.

Warning Signs and Markings	
Condition	Requirements
Entrance to rooms or other guarded locations containing exposed live parts (600 volts nominal or less).	Post conspicuous warning sign forbidding unqualified persons from entering.
Entrance to buildings, rooms, or enclosures containing exposed live parts (over 600 volts nominal).	Post warning sign reading Danger-High Voltage – Keep Out or similar language. Entrance must remain locked.
All electrical equipment.	Mark equipment with the manufacturer's name, trademark, or other marking indicating the organization responsible for the product. Additional requirements for marking voltage, current, wattage, or other ratings maybe specified by the NEC.
Disconnection of power sources (including circuit breakers).	Mark each disconnection required for motors, appliances, and each service feeder or branch circuit at the point where it originates to indicate its purpose, unless located and arranged so that the purpose is evident.
Circuit breakers or fuses applied in compliance with Series Combination Ratings.	Mark equipment enclosure to indicate the equipment has been applied with Series Combination Rating. Markings must state Caution–Series Rated System Amps Available: Identified Replacement Component Required.
Exposed live parts of transformers.	Mark with operating voltage.
Fused cutouts not interlocked with the switch to prevent opening of the cutouts under load.	Post conspicuous sign at the cutouts reading Warning – Do Not Open Under Load.
More than one switch is installed with interconnected load terminals to provide for alternate connection to different supply conductors.	Post conspicuous sign reading Warning – Switch May be Energized by Backfeed at each switch.
Fuses potentially energized by backfeed.	Post sign on enclosure door reading Warning – Fuses May Be Energized By Backfeed.

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D. Power Transmission/Distribution Requirements

1. Develop additional location-specific written procedures that cover site-specific systems and define work practices that meet the spirit and intent of 29 Code of Federal Regulation (CFR) 1910.269 for locations that perform work on power transmission and distributions systems. This Safety Management Standard does not cover all of the work practices necessary to protect personnel in these highly unique and hazardous work conditions.

E. Training

1. Train affected personnel, both those qualified to perform electrical work and those not qualified who may still work on or near energized systems, in the safe work practices outlined in this section on an annual basis. Training may be at different levels for qualified and unqualified, but must be sufficient to afford the electrical safe work practices and hazard recognition knowledge required to safely perform their respective tasks. Training will also cover how a GFCI operates, hazards associated with portable electric power extension cord use, and when GFCI use is required. Affected personnel will also be instructed on how to inspect the specialized PPE required for electrical work prior to being placed in a position where this PPE is required. All personnel will receive training on electrical hazards as part of the job orientation which shall qualify as documentation for unqualified workers. Qualified workers will receive additional training specific to the job and hazards as required.
2. Document all training. Train affected personnel either as “qualified” or “unqualified,” with qualified being at a level sufficient to afford protection during actual electrical work.
3. Qualified personnel are personnel who have also been trained, at a minimum, in the following:
 - a. The skills and techniques necessary to distinguish exposed live parts from other parts of electrical equipment.
 - b. The skills and techniques necessary to determine the nominal voltage of exposed live parts.
 - c. Clearance distances for working near live circuits or equipment.

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- d. The decision-making process necessary to determine the degree and extent of the hazard, and the PPE and job planning necessary to perform the task safely.
4. Personnel who perform work on electrical circuits must also meet the following minimum requirements:
 - a. Have experience servicing the electrical components of the equipment they are assigned to service.
 - b. Have experience working on energized electric circuit parts or equipment.
 - c. Meet any governing statute or regulatory requirement, host nation, or customer requirement for special certifications or licenses.
 5. Personnel who work on power transmission/distribution systems must have additional training and experience that meets or exceeds the spirit and intent outlined in 29 CFR 1910.269. This includes the requirement to identify hazardous tasks not routinely performed, and establish procedures to ensure personnel have performed these tasks within the past 12 months, or that they are re-trained or supervised before performing them. These additional requirements are mandatory before exposure to the hazards. This additional training must be documented.
 6. Additional training (retaining) will be performed when personnel are not complying with safety-related procedures or when workplace changes necessitate the use of safety-related procedures that are different than those that the employee would normally perform.

F. Job Briefings

1. Before starting each job, the employee in charge will conduct a job briefing with other personnel involved. The briefing will cover such subjects as a pre-job hazard review associated with the job, work procedures involved, special precautions, energy source controls, and PPE requirements. Use Supplemental Information B – PPE, Tools, and Equipment, as a guide for proper PPE, as applicable. Use SMS 086 NA procedures and appropriate forms in Supplemental Information for conducting Job Safety Analysis or Job Hazard Analysis for each job.

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2. If the work or operations to be performed during the work day or shift are repetitive and similar, at least one job briefing will be conducted before the start of the first job of the day or shift. Conduct additional job briefings if significant changes might affect the safety of employees during the course of the work. A brief discussion will be satisfactory if the work involved is routine, and if the employee, by virtue of training and experience, can reasonably be expected to recognize and avoid the hazards involved in the job. A more extensive discussion must be conducted if:
 - a. The work is complicated or particularly hazardous; or
 - b. The employee cannot be expected to recognize and avoid the hazards involved in the job.
- G. Inspect the job site periodically using Attachment 012-2 NA – Electrical Hazard Checklist, to evaluate compliance with this standard.

5. Documentation Summary

The following information will be maintained in the project file:

- A. A copy of license for licensed/journeyman electrician for project (as necessary).
- B. Completed audits of electrical hazards.
- C. Documented communications between URS, contractors, licensed/journeyman electricians, or others.
- D. Records of all pertinent electrical work performed on a project, including as-built design updates.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [General Industry Electrical Safety](#) – 29 CFR 1910, Subpart S
- B. U.S. OSHA Standard – [Construction Electrical Safety](#) – 29 CFR 1926, Subpart K
- C. U.S. OSHA Standard – [Design Safety Standards for Electrical Systems](#) – 29 CFR 1910, Subpart S

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- D. American National Standards Institute/Institute of Electrical and Electronics Engineers – [National Electrical Safety Code](#) (NESC), ANSI/IEEE C2-2002
 - E. [National Fire Protection Association](#), National Electric Code, NFPA-70
 - F. [SMS 023](#) – Lockout and Tagout Safety
 - G. [SMS 034](#) – Utility Clearances and Isolation
 - H. [SMS 086](#) – Managing Health, Safety and Environment Related Risks
 - I. [Attachment 012-1 NA](#) – Energized Work Permit
 - J. [Attachment 012-2 NA](#) – Electrical Hazard Checklist
- 7. Supplemental Information**
- A. [Hazardous Locations](#)
 - B. [PPE, Tools, and Equipment Needed During Electrical Work](#)
 - C. [Assured Grounding Guidelines](#)

URS	Health, Safety, and Environment	Attachment 012-1 NA
	ENERGIZED WORK PERMIT	Issue Date: June 1999 Revision 6: September 2012

INSTRUCTIONS: An Energized Work Permit is required for any work within the Restricted Approach Boundary (1 foot for 50 to 750 volts; 2 feet, 2 inches for 751 to 15kV; see NFPA 70E for higher voltages). An energized electrical work permit is not required under the following two conditions:

- 1) Work is limited to metering as a part of troubleshooting and the maximum voltage is less than 600 volts; or
- 2) All potential sources of electrical energy of 50 volts or greater are completely eliminated within the cabinet, vault, or panel through lockout/tagout.

TO BE COMPLETED BY THE PERMIT REQUESTER			
Project/Site Name:		Work Location:	
Description of circuit/equipment:			
Description of work to be done:			
Justification of why circuit/equipment cannot be de-energized, or the work be deferred until scheduled outage:			
Requestor Name:		Requestor Title:	
Requestor Signature:		Date:	
TO BE COMPLETED BY THE ELECTRICAL QUALIFIED PERSONS DOING THE WORK			
1 – Maximum voltage of energized components:			
2 – Required PPE (check range based on maximum voltage)			
<input type="checkbox"/> 50 to 240 volts	<ul style="list-style-type: none"> • <u>Eye/Face</u>: Safety glasses with side shields or goggles and Arc-Flash Face Shield or Arc-Flash Suit Hood (4 cal/cm²) • <u>Body</u>: Flame-Retardant long-sleeved shirt/pants or coverall (4 cal/cm²) • <u>Hand</u>: EH gloves (Class 00 with leather protectors) • <u>Foot</u>: EH-rated footwear • <u>Head/Ears</u>: Class E hard hat, hearing protection (ear canal inserts) • <u>Tools</u>: ANSI-approved, voltage-rated 		
<input type="checkbox"/> Above 240 to 480 volts	<ul style="list-style-type: none"> • <u>Eye/Face</u>: Safety glasses with side shields or goggles and Arc-Flash Face Shield and Sock Hood (8 cal/cm²) or Arc-Flash Suit Hood (8 cal/cm²) • <u>Body</u>: Flame-Retardant long-sleeved shirt/pants or coverall (8 cal/cm²) • <u>Hand</u>: EH gloves (Class 00 with leather protectors) • <u>Foot</u>: EH-rated footwear • <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts) • <u>Tools</u>: ANSI-approved, voltage-rated 		
<input type="checkbox"/> 480 to 600 volts	<ul style="list-style-type: none"> • <u>Eye/Face</u>: Safety glasses with side shields or goggles and Arc-Flash Suit Hood (8 cal/cm²) • <u>Body</u>: Flame-Retardant long-sleeved shirt/pants or coverall (8 cal/cm²) • <u>Hand</u>: EH gloves (Class 0 or higher with leather protectors) • <u>Foot</u>: EH-rated footwear (carbon fiber recommended) • <u>Head/Ears</u>: Class E Hard hat, hearing protection (ear canal inserts) • <u>Tools</u>: ANSI-approved, voltage-rated 		



ENERGIZED WORK PERMIT

- 600 volts and above
 - Eye/Face: Safety glasses with side shields or goggles and Arc-Flash Suit Hood (25 cal/cm²)
 - Body: 2-Layer Flame-Retardant long-sleeved shirt/pants or coverall (25 cal/cm²)
 - Hand: EH gloves (Class 0 with leather protectors)
 - Foot: EH-rated footwear (carbon fiber recommended)
 - Head/Ears: Class E Hard hat, hearing protection (ear canal inserts)
 - Tools: ANSI-approved, voltage-rated

3 – Description of job procedure to be used in performing the work:

4 – Description of safe work practices to be employed:

5 – Method to be employed to restrict access of unqualified persons from the work area:

ELECTRICAL QUALIFIED PERSONS CERTIFICATION

I/we agree to, and certify the following:

- Work on energized circuits and components will be limited to conditions outlined on this permit.
- Required ANSI-certified tools and equipment are available and will be used.
- Required PPE is available and will be used/worn.
- A pre-task briefing has been held that included all personnel involved with this work.
- An on-site hazard assessment has been/will be conducted before work is started.
- Work described on this permit can be done safely.
- If conditions or work requirements change, or hazards not previously identified are encountered, work will stop until a new permit is issued or the new hazards have been eliminated.

Electrically Qualified Persons:

Print Name	Signature	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPROVAL TO PERFORM THE WORK WHILE ELECTRICALLY ENERGIZED

Project/Site Manager:	Date:
HSE Manager/Representative:	Date:
Date & Time Permit Valid:	Date & Time Permit Expires:



ELECTRICAL HAZARD CHECKLIST

Location Inspected: _____ **Job No.:** _____

Date Inspected: _____ **Name of Inspector:** _____

Check Yes, No, or NA for Not Applicable. If a comment is required, circle the number, and see Page 3.

Electrical Equipment Markings

- 1. Disconnecting switches and circuit breakers are labeled to indicate their use or equipment served. Yes No NA
- 2. The necessary voltage, wattage, or current ratings are labeled. Yes No NA
- 3. Circuit breakers clearly indicate whether they are in the "on" or "off" position. Yes No NA
- 4. Markings for arc flash hazards per NFPA 70E are on each panel or distribution box. Yes No NA

Electrical Grounding

- 5. Extension cords used have a grounding conductor (third plug). Yes No NA
- 6. Ground-fault circuit interrupters are installed as required. Yes No NA
- 7. Portable electrical tools and equipment are of the double-insulated type. Yes No NA
- 8. Ground-fault circuit interrupters open the circuit on a ground current of 5 milliamperes or greater, and are equipped with an integral push-button test circuit. Yes No NA
- 9. Ground-fault circuit interrupters are installed in accordance with the manufacturer's instructions. Yes No NA
- 10. Ground-fault circuit interrupters are tested prior to initial use, and periodically thereafter. Yes No NA
- 11. Grounding rods are at least 5/8-inch- (0.625-centimeter)-diameter steel or iron rods, 1/2-inch- (1.27-centimeter)-diameter copper-clad steel, or 3/4-inch-(1.9-centimeter)-diameter galvanized pipe. Yes No NA
- 12. Grounding rods are in 8-foot (2.5-meter) lengths and driven to full depth. Yes No NA
- 13. The paths from circuits, equipment, structures, and conduits or enclosures to ground are:
 - Permanent and continuous. Yes No NA
 - Have ample carrying capacity for the current likely to be imposed on them. Yes No NA
 - Have resistance sufficiently low to permit current flow to operate circuit breakers and similar overcurrent devices on the circuit. Yes No NA
- 14. Driven ground-rod electrodes have a resistance to ground not exceeding 25 ohms. Yes No NA
- 15. Upon installation of the driven ground-rod electrode, the resistance was tested and recorded. Yes No NA
- 16. Conductors, used for bonding and grounding circuits, are of sufficient size to carry the anticipated current. Yes No NA
- 17. Grounds are not removed until all work is complete. Yes No NA

ELECTRICAL HAZARD CHECKLIST**Electrical Guarding**

18. Switches, receptacles, etc., are provided with tight-fitting covers or plates. Yes No NA
19. All energized parts of electrical circuits and equipment are guarded against accidental contact by approved cabinets or enclosure. Yes No NA
20. All unused openings (including conduit knockouts) in electrical enclosures and fittings are enclosed with appropriate covers, plugs, or plates. Yes No NA
21. Ground-fault circuit interrupters are installed on each temporary 15- or 20-ampere, 120-volt AC circuit at locations where construction, demolition, modifications, alterations, or excavations are being performed. Yes No NA
22. Electrical switches and breakers (rated 440 volts or greater) are provided with a means for locking them out in the OFF position. Yes No NA

Electrical Systems

23. Circuit breakers accessible to personnel are protected from physical damage, and located away from ignitable material. Yes No NA
24. Weatherproof cabinets or enclosures are used when switches, circuit breakers, fuse panels, and motor controllers are in a wet or outside location. Yes No NA
25. A readily accessible, manually operated switch is provided for each incoming service or supply circuit rated less than 5 kilovolts. Yes No NA
26. Electrical raceways and enclosures are securely fastened in place. Yes No NA
27. Overcurrent protection is provided for fuses or circuit breakers for each feeder and branch circuit. Yes No NA
28. Insulating fuse tongs or extractors are used when removing fuses from circuits rated 50 to 600 volts. Yes No NA
29. Fuse cabinets have close-fitting doors that can be locked. Yes No NA

Extension Cords

30. Clamps or other securing means are provided on flexible cords or cables at plug receptacles, tools, equipment, etc., and the cord jackets are securely held in place. Yes No NA
31. Flexible cords and cables are free of splices and taps. Yes No NA
32. Only 3-wire grounded-type extension cords, designated for hard or extra-hard service, are used. Yes No NA
33. Extension cords are listed by Underwriters Laboratories, Inc. Yes No NA
34. Extension cords are checked for damage before use. Yes No NA
35. The rated load on extension cords is not exceeded. Yes No NA
36. Extension cords are not fastened with staples, hung by nails, or suspended by wire. Yes No NA

Temporary Wiring

37. Temporary wiring is guarded, buried, or isolated by elevation to prevent accidental contact by workers and equipment. Yes No NA
38. A vertical clearance above walkways for temporary wiring is not less than 10 feet (3 meters) from circuits carrying 600 volts or less. Yes No NA
39. All exposed temporary wiring is supported on insulators. Yes No NA
40. Temporary wiring is protected from accidental damage. Yes No NA



ELECTRICAL HAZARD CHECKLIST

- 41. Nonconductive lamp sockets and connections are permanently molded to the conductor insulation on lighting strings. Yes No NA
- 42. Lighting strings have lamp guards. Yes No NA
- 43. Broken or defective bulbs are replaced promptly. Yes No NA
- 44. Lights are protected from accidental contact or breakage. Yes No NA
- 45. Wiring installed in conduit is equipped with bushings at outlets and terminals. Yes No NA
- 46. Receptacles are of the grounding type, and electrically connected to the equipment-grounding conductor. Yes No NA

Worker Practices

- 47. Personnel performing electrical repairs are properly trained and qualified. Yes No NA
- 48. Workers de-energize, ground, or guard electrical circuits before working in close proximity to them. Yes No NA
- 49. Workers consider all electrical systems as live until verified de-energized and grounded. Yes No NA
- 50. Proper lockout/tag-out procedures are used for de-energizing electric circuits. Yes No NA
- 51. Arc flash protection protocols are in place for work on circuits of 50 volts or higher. Yes No NA


Equipment

- 52. Only fiberglass or wood ladders are used when working near electrical hazards. Yes No NA
- 53. Insulation mats are placed on floors and on frames of equipment when working on energized equipment. Yes No NA
- 54. Only voltage-rated tools are used on or near live circuits. Voltage rating is appropriate for the work being performed. Yes No NA

Personal Protective Equipment

- 55. Rubber matting, blankets, insulated sleeves, and rubber gloves are inspected before use. Yes No NA
- 56. Workers use safety glasses and face shields during work activities where there is a reasonable probability of eye injury (and on systems with 50 or more volts). Yes No NA
- 57. Workers wear arc flash protective clothing, hoods, face shields, and gloves when working on live circuits greater than 50 volts (per NFPA 70E). Yes No NA

COMMENTS:

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">HAZARDOUS LOCATIONS</p>	<p style="text-align: right;">SMS 012 NA Supplemental Information A</p> <p style="text-align: right;">Issue Date: February 2009 Revision 2: January 2011</p>
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“Class I Locations”

Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures. Class I locations include the following:


- A. Class I, Division 1 location is a location:
 - 1. In which ignitable concentrations of flammable gases or vapors may exist under normal operating conditions; or
 - 2. In which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or
 - 3. In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment.

- B. Class I, Division 2 location is a location:
 - 1. In which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the hazardous liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in case of abnormal operation of equipment; or
 - 2. In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operations of the ventilating equipment; or
 - 3. That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

“Class II Locations”

Class II locations are those that are hazardous because of the presence of combustible dust. Class II locations include the following:

- A. Class II, Division 1 location is a location:

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">HAZARDOUS LOCATIONS</p>	<p style="text-align: right;">SMS 012 NA Supplemental Information A</p> <p style="text-align: right;">Issue Date: February 2009 Revision 2: January 2011</p>
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1. In which combustible dust is or may be in suspension in the air under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures; or
 2. Where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes, or
 3. In which combustible dusts of an electrically conductive nature may be present.
- B. Class II, Division 2 location is a location in which:
1. Combustible dust will not normally be in suspension in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus; or
 2. Dust may be in suspension in the air as a result of infrequent malfunction of handling or processing equipment, and dust accumulations resulting therefrom may be ignitable by abnormal operation or failure of electrical equipment or other apparatus.

“Class III Locations”

Class III locations are those that are hazardous because of the presence of easily ignitable fibers or flyings but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures. Class III locations include the following:


- A. Class III, Division 1 location is a location in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.
- B. Class III, Division 2 location is a location in which easily ignitable fibers are stored or handled, except in process of manufacture.



Health, Safety and Environment
PPE, TOOLS AND EQUIPMENT NEEDED
DURING ELECTRICAL WORK

SMS 012 NA
Supplemental Information B
Issue Date: February 2009
Revision 2: January 2011

If there is a danger of:	Then use the following:
<ul style="list-style-type: none">• Head injury from electric shock, or• Burns due to contact with exposed energized parts	<ul style="list-style-type: none">• Nonconductive head protection – Type II, E nonconductive hard hat
Injury to the eyes or face from: <ul style="list-style-type: none">• Electric arcs or flashes; or• Flying objectives resulting from electrical explosion	<ul style="list-style-type: none">• Protective equipment for the eyes and face – face shield and safety glasses
<ul style="list-style-type: none">• Shock to hands while handling energized wires	<ul style="list-style-type: none">• Lineman’s rubber insulated gloves rated for the voltage exposed to. Leather overgloves may be needed if exposure to abrasive surfaces is possible.
<ul style="list-style-type: none">• Shock while working in areas where high voltage electrical systems are present, or• Shock when performing electrical repairs	<ul style="list-style-type: none">• Non-conductive protective foot wear
Exposure to electric arcing or flashing from: <ul style="list-style-type: none">• Circuits of more than 50 volts;• Opening or closing 2400 volt oil cutout switching devices;• Removing or installing links in high voltage able tap boxes; or• Removing or installing fuses in high voltage circuits.	<ul style="list-style-type: none">• Protective arc flash clothing (levels 0-40 to address energy potential as specified in NFPA 70E).
IF	THEN
<ul style="list-style-type: none">• Energized parts are exposed.	<ul style="list-style-type: none">• Use nonconductive ropes and handlines near the exposed energized part.
<ul style="list-style-type: none">• Working near exposed energized conductors or circuit parts.	<ul style="list-style-type: none">• Use insulated tools or handling equipment if the tools or handling equipment might make contact with such conducts or parts.
<ul style="list-style-type: none">• The insulating capability of insulated tools or handling equipment is subject to damage.	<ul style="list-style-type: none">• Protect the insulating material.
<ul style="list-style-type: none">• Removing or installing fuses when the fuse terminals are energized.	<ul style="list-style-type: none">• Use fuse-handling equipment insulated for the circuit voltage.
<ul style="list-style-type: none">• Working near exposed energized parts that might be accidentally contacted or where dangerous electric heating or arcing might occur.	<ul style="list-style-type: none">• Use protective shields, protective barriers, or insulating materials to protect from shock, burns, or other electrically related injuries.
<ul style="list-style-type: none">• Normally enclosed live parts are exposed for maintenance or repair.	<ul style="list-style-type: none">• Guard the parts to protect unqualified persons from contact with the live parts.

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">ASSURED GROUNDING GUIDELINES</p>	<p style="text-align: right;">SMS 012 NA Supplemental Information C Issue Date: January 2011</p>
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OSHA (29 CFR 1926.404) requires that employers use either ground-fault circuit interrupters (GFCIs) or an Assured Equipment Grounding Conductor Program to protect employees on construction sites. This Plan consists of the two elements described below.

1. Ground-Fault Circuit Interrupters

All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites that are not part of the permanent wiring of the building or structure, and that are in use by employees will have approved GFCIs for personnel protection. *Temporary electrical service GFCIs will be tested weekly by depressing the "Test" button and ensuring receptacle functionality.*

Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5 kilovolts, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with GFCIs.

2. Assured Equipment Grounding Conductor Program

URS has established and implemented this Assured Equipment Grounding Conductor Program on construction sites covering all cord sets, receptacles that are not a part of the building or structure, and equipment connected by cord and plug that are available for use, or used by employees and volunteer construction workers.

Each cord set, attachment cap, plug, and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles that are fixed and not exposed to damage, ***must be visually inspected before each day's use*** for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage. Equipment found damaged or defective will not be used until repaired.

URS will designate one or more competent person at each construction site to implement this program. *"Competent person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.*

Tests

The following two tests will be performed on all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded.

Continuity Test

The continuity test ensures that the equipment-grounding conductor is electrically continuous. Perform this test on all cord sets, receptacles that are not part of a building or structure's permanent wiring, and cord- and plug-connected equipment required to be grounded. Use a simple continuity tester, such as a lamp and battery, bell and battery, an ohmmeter, or a receptacle tester.

Terminal Connection Test

The terminal connection test ensures that the equipment-grounding conductor is connected to its proper terminal. Perform this test with the same equipment used in the first test.

Each receptacle and attachment cap or plug will be tested for correct attachment of the equipment-grounding conductor. The equipment-grounding conductor will be connected to its proper terminal.

All required tests will be performed:

1. Before first use and visually inspected daily thereafter.
2. Before equipment is returned to service following any repairs.
3. Before equipment is used after any incident that can be reasonably suspected to have caused damage; such as when a cord set is run over, “pinched” in a doorway, or “crushed” in a window.
4. Perform monthly continuity tests.

The employer will neither make available nor permit any employees to use equipment that has not met the four requirements listed above.

Records will be kept of the tests performed, as required. These test records will identify each receptacle, cord set, and cord- and plug-connected equipment piece that passed the test, and will indicate the last date it was tested or the interval for which it was tested. This record will be kept by means of logs, color coding, or other effective means, and will be maintained until replaced by a more current record. The record will be made available on the job site for inspection by OSHA and any affected employee.

Part of the URS recordkeeping task, and the method preferable to OSHA, color coding is used for marking cord sets and cord- and plug-connected equipment. The table below lists a color code that is widely used. Colored plastic or vinyl electrical tape is placed on one or both ends of cords and cord- and plug-connected equipment to denote the month that the tests were performed.

Assured Equipment Grounding Conductor Program Color Code		
Month #	Month Tested	Color of tape(s) to apply to cord
1	January	White
2	February	White + Yellow
3	March	White + Blue
4	April	Green
5	May	Green + Yellow
6	June	Green + Blue

Assured Equipment Grounding Conductor Program Color Code		
Month #	Month Tested	Color of tape(s) to apply to cord
7	July	Red
8	August	Red + Yellow
9	September	Red + Blue
10	October	Orange
11	November	Orange + Yellow
12	December	Orange + Blue

To remember the color of tape to place on the newly tested cord, keep in mind the color for the start of each calendar quarter by season:

White → January → Winter
 Green → April → Spring
 Red → July → Summer, or the 4th of July
 Orange → October → Fall, or pumpkin

Then add:
 Yellow for the second month in each quarter
 Blue for the third month of each quarter

URS SAFETY MANAGEMENT STANDARD

Fire Protection and Prevention

1. Applicability

This standard applies to URS Corporation, and its subsidiary companies, office and project locations.

2. Purpose and Scope

The purpose of this standard is to reduce/eliminate potential fire hazards in the workplace and to provide for a rapid, effective response should a fire occur.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 014 NA](#) – North America; Australia / New Zealand

[SMS 014 INT](#) – International Operations (including Europe, Asia, South America and Africa)

URS SAFETY MANAGEMENT STANDARD

Fire Protection and Prevention

1. Applicability

This standard applies to URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to reduce/eliminate potential fire hazards in the workplace and to provide for a rapid, effective response should a fire occur.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location. At project sites controlled by contractors or building owners, some of these responsibilities may be covered by building/facility owners or owner agents.

4. Requirements

A. Fire Protection

1. A fire protection program will be developed and followed throughout all phases of work.
 - a. Access to available firefighting equipment will be maintained at all times.
 - b. Firefighting equipment will be inspected monthly and maintained in operating condition. Defective equipment will be immediately replaced.
 - c. Fire extinguishers that out of service or discharged will be immediately tagged, removed from service, and replaced.
 - d. Firefighting equipment will be conspicuously located and not obstructed from view in the workplace.
 - e. Where and when required or necessary, the project manager will provide a trained and equipped firefighting organization (fire brigade) to assure adequate protection.
2. A temporary or permanent water supply (sufficient volume, duration, and pressure) required to properly operate the firefighting equipment will be made available as soon as combustible materials accumulate.

URS SAFETY MANAGEMENT STANDARD
Fire Protection and Prevention

- a. Where underground water mains are to be provided, they will be installed, completed, and made available for use as soon as practicable.
- b. Fire Hose and Connections
 - i. One hundred feet, or less, of 1.5-inch (3.75-cm) hose, with a nozzle capable of discharging water at 25 gallons (95 liters) or more per minute, may be substituted for a fire extinguisher rated not more than 2A 20BC in the designated area, provided the hose line can reach all points in the area.
 - ii. If fire hose connections are not compatible with local firefighting equipment, the project manager will provide adapters or equivalent to permit connections.
 - iii. During demolition involving combustible materials, charged hose lines supplied by hydrants, water trucks with pumps, or equivalent will be made available.
- c. Fixed Firefighting Equipment
 - i. Sprinkler Protection
 - Where URS is involved in the construction of a facility in which automatic sprinkler protection is required, the installation of the sprinklers will closely follow the construction, and sprinklers will be placed into service as soon as practicable.
 - Where URS is involved in the demolition or alteration of a facility, existing automatic sprinkler installations should be retained in service as long as reasonable. Only authorized persons will permit the operation of sprinkler control valves. Modification of sprinkler systems to permit alterations or additional demolition should be expedited so that the automatic protection may be returned to service as quickly as possible. Sprinkler control valves will be checked daily, at the close of work/business, to ascertain that the protection is in service.

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Fire Protection and Prevention

ii. Standpipes

In all structures requiring standpipes or where standpipes exist in structures being altered, they will be maintained to always be ready for fire protection use. Conspicuously marked standpipes will be provided with connections on the outside of the structure (at the street level). Each floor will be equipped with at least one standard hose outlet.

iii. Fire Alarm Devices

- An alarm system (e.g., telephone system, siren) will be established to alert both the employees on the site and the local fire department of an emergency.
- The alarm code and reporting instructions will be conspicuously posted at phones and at all employee entrances.

iv. Fire Cutoffs

- In new construction, firewalls and exit stairways required for the completed buildings will be given construction priority. Fire doors, with automatic closing devices, will be hung on openings as soon as practicable.
- Fire cutoffs will be retained in buildings undergoing alterations or demolition until operations necessitate their removal.

d. Jobsite Requirements

- i. Material storage areas will be equipped with fire extinguishers adequate for their size, construction, and the material stored therein.
- ii. Welding, cutting, grinding, and burning will not be done within 25 feet (7.6 meters) of any material fuel storage area. Fire extinguishers will be provided at the site of welding operations.

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- iii. Flammable materials will be stored as far as possible from the working area, at least 25 feet (7.6 meters). Safety cans will be used when handling and transporting fuel, gas, and other flammables.
- iv. Extinguishers are to be adequately maintained.
- v. The telephone number of the nearest organized firefighting group is to be displayed at jobsite telephones.

3. Fire Extinguishing Equipment

a. Extinguisher Requirements

Use only UL-listed extinguishers. Mark extinguishers and extinguisher locations, indicating the suitability of each extinguisher for a particular classification of fire.

b. Building and Occupancy Hazard Protection

Requirements for fire extinguisher protection are divided into two categories: building protection and occupancy hazard protection. Provide for extinguishing equipment to protect both the building structure (if it is combustible) and the occupancy hazards inside it.

- i. For building protection, provide fire extinguishers rated for Class A fires or greater, as required by applicable building codes.
- ii. For protection against occupancy hazards, provide fire extinguishers rated for Class A, B, C, or other fire potential as appropriate. Requirements may vary from section to section within a single building. Determine the occupancy hazards, as well as the proper ratings of necessary fire extinguishers, of each room or section. Classify rooms or sections as light hazard, ordinary hazard, or extra hazard. See Supplemental Information B for additional details and assistance in determining extinguisher requirements.

c. Extinguisher Placement

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Fire Protection and Prevention

- i. Place extinguishers in conspicuous locations, along normal paths of travel, and near exits. If the extinguishers are not readily visible, use wall markings, signs, or lights to identify their locations.
- ii. Ensure that extinguishers are readily accessible. Keep the space in front of and below extinguishers clear at all times. The floor area beneath extinguishers may be marked as a reminder to keep the area clear.
- iii. Hang extinguishers on hangers, brackets, or other equipment furnished by the manufacturer, or place them on shelves. If an extinguisher weighs less than 40 pounds (18.1 kg), the top of the extinguisher will not be more than 5 feet (1.5 meters) above the floor. If an extinguisher weighs equal to or more than 40 pounds (18.1 kg), it will not be more than 3.5 feet (1.1 meters) above the floor. The clearance between the bottom of the extinguisher and the floor will never be less than 4 inches (10.2 cm).
- iv. Provide the appropriate number and types of fire extinguishers for operations being performed. Refer to Supplemental Information A for guidance.

d. Inspection

Properly trained personnel will inspect extinguishers at least monthly. The monthly inspection will include the following items at a minimum:

- i. Location.
- ii. Rating.
- iii. Access.
- iv. Visibility.
- v. Operating instructions.
- vi. Seals.
- vii. Tamper indicators.

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viii. Fullness.

ix. Physical condition.

Attach inspection tags to each extinguisher indicating the dates of purchase, inspection, testing, and recharging, and the initials of the inspector. In addition to the tag, a colored tape may be used to indicate that an extinguisher has been inspected.

Fire extinguishers must be inspected annually by a qualified fire services contactor.

e. Testing and Maintenance

- i. Establish periodic testing programs to ensure that extinguishers are in proper operating condition. Only properly trained personnel (preferably fire extinguisher vendors) should maintain extinguishers.
- ii. At the conclusion of testing or maintenance work, attach a tag to the extinguisher showing the date and the signature of the person who performed the service.

f. Testing Intervals

- i. Each year, recharge soda acid and foam extinguishers, and weigh others according to the manufacturer's instructions. Inspect the body, hose, and nozzle of the extinguisher, and examine the dry powder. Note: Testing is not necessary for stored pressure units unless a loss of pressure or other conditions indicates a need; however, units mounted in vehicles or otherwise subject to mechanical packing should have their powder examined.
- ii. Every five years, test the pressure parts of all extinguishers except Halon 1301 extinguishers; dry chemical extinguishers with braised-brass, mild steel, or aluminum shells; and dry-powder extinguishers for metal fires.

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- iii. Every six years, empty dry-chemical, stored-pressure extinguishers and examine working parts for operability.
- iv. Every 12 years, test the pressure parts of Halon 1301 extinguishers; dry-chemical extinguishers with braised-brass, mild steel, and aluminum shells; and dry-powder extinguishers for metal fires.

g. Employee Training

- i. Where fire extinguishers are provided for employee use, training will be provided on general principles of portable fire extinguishers, including stages of fires and classes of fire extinguisher. The emphasis should be on hazards of fighting a fire during the initial phases of a fire.
- ii. Personnel designated to use firefighting as part of a site Emergency Action Plan must have training in the use of appropriate equipment. Training must be conducted prior to initial assignment and annually thereafter or whenever there is a change in the Emergency Action Plan or new equipment is introduced.

B. Fire Prevention

1. General

- a. Develop an Emergency Preparedness Plan as outlined in SMS 003 – Emergency Preparedness Plan.
- b. Conduct evacuation drills at least annually.
- c. Maintain good housekeeping to reduce fire hazards and to provide safe routes of egress should a fire occur.
- d. Conduct periodic workplace inspections to identify fire hazards such as unnecessary accumulation of combustibles (including paper and boxes), unnecessary storage of flammables, and sources of ignition.

2. Ignition Hazards

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- a. Electrical wiring and equipment for light, heat, or power purposes will be properly installed.
 - b. Equipment powered by internal combustion will be located with the exhausts positioned away from combustible materials. When the exhausts are piped outside the building under construction, a clearance of at least 6 inches (15 cm) will be maintained between piping and combustible material.
 - c. Smoking is prohibited at or in the vicinity of operations that constitute a fire hazard. Such areas will be conspicuously posted as follows: "NO SMOKING OR OPEN FLAME."
 - d. Portable, battery-powered lighting equipment, used in connection with the storage, handling, or use of flammable gases or liquids, will be approved for the hazardous locations. For more information, see SMS 015 – Flammable and Combustible Liquids and Gases.
 - e. The nozzles of air, inert gas, and steam lines or holes used in the cleaning or ventilation of tanks and vessels containing hazardous concentrations of flammable gases or vapors will be bonded to the tank or vessel shell. Bonding devices will not be attached or detached while hazardous concentrations of flammable gases or vapors exist.
3. Temporary Buildings
- a. Temporary buildings will not be erected where the location adversely affects any means of employee exit.
 - b. Temporary buildings, located within another building or structure, will be of noncombustible construction or combustible construction having a fire resistance rating of not less than 1 hour.
 - c. Temporary buildings, located other than inside another building and not used for handling and storage of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, will be located at a distance of not less than 10 feet (3 meters) from another building or structure. Groups of temporary buildings, not exceeding 2,000 square feet (186 square meters) in total, will be considered a single temporary building.

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4. Open Yard Storage

- a. Combustible materials will be stored with regard to the stability of piles and in no case higher than 10 feet (3 meters).
- b. Driveways between and around combustible storage piles will be at least 15 feet (4.6 meters) wide and maintained free of accumulations of rubbish, equipment, or other articles or materials. Driveways will be spaced to produce a maximum grid system unit of 50 feet (15.2 meters) by 150 feet (45.7 meters).
- c. The entire storage site will be kept free from accumulations of unnecessary combustible materials. Weeds and grass will be maintained, and procedures will be established for periodic cleanup of the entire area.
- d. The method of piling combustible materials will be solid and in orderly regular piles. No combustible material will be stored outdoors within 10 feet (3 meters) of a building or structure.
- e. Portable fire extinguishing equipment, suitable for the fire hazard involved, will be provided at convenient, conspicuously accessible locations in the yard area. Portable fire extinguishers, rated not less than 2A:20BC, will be placed to assure that the maximum travel distance to the nearest unit will not exceed 100 feet (30.5 meters).

5. Indoor Storage

- a. Storage will not obstruct, or adversely affect, means of exit.
- b. Materials will be stored, handled, and piled with regard to their fire characteristics.
- c. Noncompatible materials, which may create a fire hazard, will be segregated by a barrier having a fire resistance of at least 1 hour.
- d. Materials will be piled to minimize the spread of fire internally and to permit convenient access for firefighting. Stable piling will be maintained at all times. Aisle space will be

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maintained to safely accommodate the widest vehicle used within the building for firefighting purposes.

- e. A clearance of at least 36 inches (90 cm) will be maintained between the top level of the stored material and the sprinkler deflectors.
- f. Clearance will be maintained around lights and heating units to prevent ignition of combustible materials.
- g. A clearance of 24 inches (60 cm) will be maintained around the fire door's path of travel, unless a barricade is provided, in which case no clearance is needed. Material will not be stored within 36 inches (90 cm) of a fire door.

C. Temporary Heating Devices

1. Ventilation

- a. Fresh air will be supplied in sufficient quantities to maintain the health and safety of employees. Where natural means of fresh air supply are inadequate, mechanical ventilation will be provided.
- b. Heaters used in confined spaces necessitate that special care be taken to provide sufficient ventilation to ensure proper combustion, maintain the health and safety of workmen, and limit temperature increase in the area.

2. Clearance and Mounting

- a. Temporary heating devices will be installed to provide clearance to combustible materials not less than the amount shown in the following table:

Minimum Clearance in inches (cm)			
Heating Appliance	Sides	Rear	Chimney Connector
Room heater, circulating type	12 (30)	12 (30)	18 (45)
Room heater, radiant type	36 (90)	36 (90)	18 (45)

- b. Temporary heating devices that are listed for installation with lesser clearance than specified in the previous table must be

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installed in accordance with the manufacturer's specifications.

- c. Heaters not suitable for use on wood floors will not be set directly upon them or other combustible materials. When such heaters are used, they will rest on suitable heat-insulating material or concrete at least 1 inch (2.5 cm) thick or equivalent. The insulating material will extend beyond the heater 2 feet (60 cm) or more in all directions.
- d. Heaters used near combustible tarpaulins, canvas, or similar coverings will be located at least 10 feet (3 meters) from the coverings. The coverings will be securely fastened to prevent ignition or upsetting of the heater due to wind action on the covering or other material.

3. Stability

When in use, heaters will be set horizontally level, unless otherwise permitted by the manufacturer's instructions.

4. Solid Fuel Heaters

Solid fuel heaters are prohibited in buildings and on scaffolds.

5. Oil Fired Heaters

- a. Flammable liquid-fired heaters will be equipped with a primary safety control to stop the flow of fuel in the event of flame failure. Barometric or gravity oil feed will not be considered a primary safety control.
- b. Heaters designed for barometric or gravity oil feed will be used only with integral tanks.
- c. Heaters specifically designed and approved for use with separate supply tanks may be directly connected for gravity feed, or an automatic pump, from a supply tank.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Emergency Action Plans.

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- B. Fire extinguisher inspection logs.
- C. Employee training documentation.
- D. Site audits.
- E. Evacuation drills.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Means of Egress](#) – 29 Code of Federal Regulations (CFR) 1910, Subpart E
- B. U.S. OSHA Standard – [Exit Routes, Emergency Action Plans, and Fire Prevention Plans](#) – 29 CFR 1910.38
- C. U.S. OSHA Standard – [Fire Protection](#) – 29 CFR 1910, Subpart L
- D. U.S. OSHA Software – [Fire Safety Advisor](#)
- E. U.S. OSHA Construction Standard – [Fire Protection and Prevention](#) – 29 CFR 1926.150, Subpart F
- F. National Fire Protection Association – Standard for Portable Fire Extinguishers – [NFPA 10](#)
- G. International Code Council – [International Fire Code](#)
- H. [SMS 003](#) – Emergency Preparedness Plan
- I. [SMS 015](#) – Flammable and Combustible Liquids and Gases

7. Supplemental Information

- A. [Fire Classifications](#)
- B. [General Fire Extinguisher Requirements](#)

	Health, Safety and Environment FIRE CLASSIFICATIONS	SMS 014 NA Supplemental Information A Issue Date: February 2009
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A. Fire Classifications


Fires are classified as Class A, B, C, D, or Special, depending upon the types of materials involved. These classifications are defined as follows:

1. Class A – Fires in ordinary combustible materials such as wood, cloth, paper, trash, rubber, and plastic.
2. Class B – Fires in flammable liquid, oil, grease, tar, oil-base paint, lacquer, and flammable gas.
3. Class C – Fires involving energized electrical equipment or systems, resulting in the extinguishing media conducting electricity. When electrical equipment or systems are de-energized, extinguishers for Class A or B fires can be used safely.
4. Class D - Fires involving combustible metals such as magnesium, titanium, zirconium, lithium, potassium, and sodium. Specialized techniques, extinguishing agents, and extinguishing equipment have been developed to control and extinguish fires of this type. Generally, do not use normal extinguishing agents on metal fires. In such fires, there is the danger of increasing the intensity of the fire because of a chemical reaction between some extinguishing agents and the burning metal.
5. Special - Fires that involve certain combustible metals or reactive chemicals require, in some cases, special extinguishing agents or techniques.

B. Extinguisher Classifications and Ratings

All types of extinguishers are not equally effective against all classifications of fires. Therefore, extinguishers are rated according to the classification and size of the fires against which they are effective. Extinguisher ratings are found on the extinguisher label. A rating consists of a letter indicating the classification of fire on which the extinguisher is effective and a rating number indicating the relative extinguishing effectiveness. The significance of the rating number varies with the classification of fire for which the extinguisher is rated. The following rating criteria are used:

1. For extinguishers rated for Class A fires, the rating number indicates relative effectiveness, the higher the number, the more effective the extinguisher. The minimum recommended rating for extinguishers rated for Class A fires is 2A.

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">FIRE CLASSIFICATIONS</p>	<p style="text-align: right;">SMS 014 NA Supplemental Information A Issue Date: February 2009</p>
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2. For extinguishers rated for Class B fires, the rating number represents the average size (in square feet) of the fire the extinguisher could put out.
3. No number is used for extinguishers rated for Class C fires, because Class C fires are essentially either Class A or B fires involving energized electrical wiring and equipment.

C. Hazard Classifications

The materials in a building or area present hazards of varying potential. These hazards are classified. As follows:

1. Light or Low Hazard – A room or area where, considering the amount of combustible material or flammable liquids present, fires of small size should be anticipated (e.g., change trailers, toilet trailers, and general storage).
2. Ordinary or Moderate Hazard – A location where, considering the amount of combustibles or flammable liquids present, fires of moderate size should be anticipated (e.g., temporary construction offices and most shops).
3. Extra or High Hazard – A location where, considering the amount of combustibles or flammable liquids present, fires of severe magnitude should be anticipated (e.g., carpenter shops and storage areas for flammable liquids and lumber).

1. Fire Extinguishers – General

The following are **minimum** requirements for fire extinguisher placement in office buildings, construction facilities, support buildings, and/or buildings under construction. In some cases, client requirements may be more stringent, in which case the client's requirements supersede the guidelines below.

Extinguisher Requirements for Class A Hazards

Rating Shown on Extinguisher	Maximum Travel Distance to Extinguishers in Feet (m)	Maximum Area to be Protected per Extinguisher		
		Light Hazard sq. ft. (m ²)	Ordinary Hazard sq. ft. (m ²)	Extra Hazard sq. ft. (m ²)
1-A	-	-	-	-
2-A	75 (23)	6,000 (557)	3,000 (279)	-
3-A	75 (22.9)	9,000 (836)	4,500 (418)	3,000 (279)
4-A	75 (22.9)	11,250 (1,045)	6,000 (557)	4,000 (372)
6-A	75 (22.9)	11,250 (1,045)	9,000 (836)	6,000 (557)
10-A	75 (22.9)	11,250 (1,045)	11,250 (1,045)	10,000 (929)
20-A	75 (22.9)	11,250 (1,045)	11,250 (1,045)	11,250 (1,045)
40-A	75 (22.9)	11,250 (1,045)	11,250 (1,045)	11,250 (1,045)

Extinguisher Requirements for Class B Hazards

Type of Hazard	Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers in Feet (m)
Light	5-B	30 (9.1)
	10-B	50 (15.2)
Ordinary	10-B	30 (9.1)
	20-B	50 (15.2)
Extra	40-B	30 (9.1)
	80-B	50 (15.2)

Extinguisher Requirements for Class C Hazards

Class C extinguishers are required wherever energized electrical equipment is located. Since a Class C fire itself is either Class A or Class B (involving ordinary combustible material, flammable liquids, or flammable gases), the extinguishers are sized and located as for a Class A or B hazard.

Types of Extinguishers Approved for Types of Hazards

Class A Hazards	Class B Hazards	Class C Hazards
Cartridge-operated water or antifreeze	Carbon dioxide*	Carbon dioxide
Stored pressure water or antifreeze	Dry chemical	Dry chemical
Wetting Agent Foam	Multipurpose dry chemical (ABC)	Multipurpose dry chemical (ABC)
Loaded stream	Halon 1301	Halon 1301
Multipurpose dry chemical (ABC)	Halon 1211	Halon 1211
Pump tank water or antifreeze (Halon 1211)		

*Certain sizes are not classified or acceptable to meet requirements.

2. Hot Work

A minimum of one fire extinguisher, rated at least 20BC, must be provided for each hot work location. The extinguisher should be conspicuously positioned no more than 10 feet (3.04 meters) from the hot work. Refer to SMS 020- Hot Work”.

3. Motorized Construction Equipment

At least one portable fire extinguisher, rated at least 20BC, must be provided on each piece of motorized construction equipment.

4. Temporary Construction/Work Trailer

A minimum of one fire extinguisher, rated at a minimum of 2A, must be provided for each temporary construction/work trailer.

URS SAFETY MANAGEMENT STANDARD

Hand Tools and Portable Equipment

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to provide procedures for the safe use and handling of hand tools and power equipment. Additional information on hand safety is provided in SMS 064 – Hand Safety.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 016 NA](#) – North America

[SMS 016 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP6-016](#) –Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Hand Tools and Portable Equipment

1. Applicability

This standard applies to URS Corporation and its subsidiary companies in which hand tools and/or portable powered equipment, including chain saws; brush cutters, powder-actuated tools, and similar high-hazard implements are used.

2. Purpose and Scope

The purpose of this standard is to provide procedures for the safe use and handling of hand tools and portable powered equipment. SMS 064 – Hand Safety provides additional information on the safe use of hand tools.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site or project location.

4. Requirements

A. General

1. Keep hand and power tools in good repair and use them only for the task for which they were designed. Use tools only in accordance with the manufacturer's recommendations.
2. Remove damaged or defective tools from service. Affix a "Do Not Use" tag (or similar) to the tool until repairs are made or the tool is destroyed.
3. Provide employees using hand tools or portable powered equipment with personal protective equipment (PPE) and train employees in the use of PPE required for the operation being undertaken.
4. Keep surfaces and handles clean and free of excess oil and grease to prevent slipping.
5. Do not carry sharp tools in pockets; this practice may cause puncture wounds.
6. Clean tools and return to a suitable toolbox, room, rack, or other storage area upon completion of a job.
7. Before applying pressure, ensure that wrenches have a good bite.

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Hand Tools and Portable Equipment

- a. Brace yourself by placing your body in the proper position so that that you will not fall in case the tool slips.
 - b. Make sure hands and fingers have sufficient clearance in the event the tool slips.
 - c. Always pull on a wrench, never push.
8. When working with tools overhead, place tools in a holding receptacle or secure when not in use to prevent them from falling.
 9. Do not leave tools in or on passageways, access ways, walkways, ramps, platforms, stairways, or scaffolds where they can create a tripping hazard.
 10. Do not throw tools from place to place or from person to person, or drop tools from heights.
 11. Use nonsparking tools in atmospheres with fire or explosive characteristics.
 12. Inspect all tools prior to start-up or use to identify any defects.
 13. Powered hand tools should not be capable of being locked in the ON position, except as noted elsewhere in this standard.
 14. Require that all power-fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.
 15. Ensure that all portable powered tools designed to accommodate guards are equipped with such when in use.
 16. Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools.
 17. Do not use cheater pipes.
 18. Make provisions to prevent machines from automatically restarting upon restoration of power (see SMS 023 – Lockout and Tagout Safety).
 19. Where URS issues tools to its employees, the supervisor is responsible for the safe condition of tools and equipment.

URS SAFETY MANAGEMENT STANDARD
Hand Tools and Portable Equipment

20. Where workers furnish their own tools, their tools must conform to the requirements demanded for safety and efficiency. The supervisor has the responsibility to regularly inspect these tools for defects.

B. Electrical Power Tools

1. Electric-power-operated tools will be either of the approved double-insulated type or grounded in accordance with the National Electric Code.
2. The use of the electric cord for hoisting or lowering electric tools is an unsafe practice and will not be permitted.
3. All handheld powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels greater than 2 inches (5.1 centimeters) in diameter, disc sanders, belt sanders, reciprocating saws, saber saws, and other similar operating powered tools will be equipped with a momentary contact ON/OFF control and may have a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.
4. All other handheld powered tools such as circular saws, chain saws, and percussion tools without positive accessory holding means will be equipped with a constant pressure switch that will shut off the power when the pressure is released (i.e., "dead man" switch).

C. Grinding Tools

1. Inspect work rests and tongue guards for grinders.
 - a. Work rest gaps should not exceed $\frac{1}{8}$ inch (3 mm).
 - b. Tongue guard gaps should not exceed $\frac{1}{4}$ inch (6 mm).
2. Do not adjust work, guards, or tool rests while the grinding wheel is moving.
3. Inspect the grinding wheel for cracks, chips, defects, or excessive wear. Remove from service if any defects are found.
4. Wear goggles when grinding. A clear full face shield may be worn with the goggles.

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5. Do not use the side of a grinding wheel unless the wheel is designed for side grinding.
6. Always stand to the side of the blade, never directly behind it.
7. Use grinding wheels only at their rated speed.
8. Grinding aluminum is prohibited.
9. For operations in the United Kingdom:
 - a. No grinding wheels exceeding 55 mm are to be used.
 - b. All wheels are to be marked with their safe maximum speed.
 - c. Abrasive wheels will be operated only by personnel who have been specifically trained and specified competent by URS.
 - d. Abrasive wheels will be operated only by persons specified as competent, under the abrasive wheel regulations.
 - e. Abrasive wheels must be operated only if the manufacturer's guard is fitted and they are in good working order.

D. Power Saws

1. Require that circular saws are fitted with blade guards.
2. Inspect each day prior to use. Remove damaged, bent, or cracked saw blades from service immediately.
3. Require that table saws are fitted with blade guards and a splitter to prevent the work from squeezing the blade and kicking back on the operator.
4. Require guards that cover the blade to the depth of the teeth on hand-held circular saws. The guard should freely return to the fully closed position when withdrawn from the work surface.

E. Woodworking Machinery

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1. Do not leave woodworking tools running when unattended.
2. Keep the operating table and surrounding area clear of debris.
3. Do not use compressed air to remove dust and chips from woodworking machinery.
4. Locate the ON/OFF switch to prevent accidental start-up. The operator must be able to shut off the machine without leaving the workstation. Safety goggles and kickback aprons should be provided for and worn by operators. Respirators or local exhaust ventilation may also be necessary based on the type of material being cut or sanded.
5. Guard planers and joiners to prevent contact with the blades throughout the full length of the cutting area.
6. Ensure that band saw blades are fully enclosed except at the point of operation.
7. Require that swing cut-off saws have a guard completely covering the upper half of the saw.
8. Require that circular cross-cut and rip saws are provided with a hood guard, splitter, and anti-kickback device. The hood should adjust itself automatically to the thickness of and remain in contact with the material being cut. All circular saws will be provided with a hood guard.
9. Ensure that exposed parts of the saw blade under the table are properly guarded.
10. Equip all swing cutoff and radial saws that are drawn across a table with limit stops to prevent the saw from traveling beyond the edge of the table.
11. Hold the material being cut firmly against a back guide or fence and cut with a single, steady pass.
12. Cut green or wet material slowly and with caution. Check all material being cut for nails, hard knots, etc.
13. Use a push stick when:

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- a. The cutting operation requires the hands of the operator to come close to the blade.
 - b. Small pieces are being machined.
14. When cutting long stock, provide extension tables and a helper to assist the operator.
15. Adjust saw blades so they clear only the top of the cut.
16. Automatic feed devices should be used whenever feasible.
17. When drills are used:
- a. Take care to prevent clothing from being wound around the drill. Wear sleeves buttoned at the wrist or short-sleeved shirts.
 - b. Clamp or hold down material being drilled to prevent spinning with the drill.
 - c. If the bit is long enough to pass through the material, provide against damage and injury.
 - d. Secure magnetic drills with a chain or rope to prevent falling. Label cord connections to prevent unplugging.
18. When sanders are used:
- a. Move sanders away from the body.
 - b. Because dust may create an explosion hazard, guard against open flames and sparks.

F. Pneumatic Tools and Equipment

1. Require that pneumatic tools have:
- a. Tool retainers to prevent the tool from being ejected from the barrel during use.
 - b. Safety clips, chains, tie wires, or other retaining devices to secure connections between tool/hose/compressor to prevent whipping in case of disconnection or failure.

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2. Do not lay hose in walkways, on ladders, or in any manner that presents a tripping hazard.
3. Never use compressed air to blow dirt from hands, face, or clothing.
4. Do not use compressed air for cleaning purposes unless the pressure is reduced to 30 pounds per square inch (psi) or less. This rule does not apply for concrete form, mill scale, green cutting, and similar cleaning operations. Proper respiratory, hand, eye, and ear protection must be worn.
5. Never raise or lower a tool by the air hose.
6. Shut off the pressure and exhaust from the line before disconnecting the line from any tool or connection.

G. Powder-Actuated Fastener Tools

1. Use powder-actuated tools that comply with the requirements of the American National Standards Institute (ANSI)/American Society of Safety Engineers (ASSE) Standard A10.3 – 2006 – Powder-Actuated Fastening Systems.
2. Assess local and state regulations governing the use of these tools to ensure compliance.
3. Use only individuals who have been trained by a manufacturer's representative and possess the proper license to operate, repair, service, and handle powder-actuated tools.
4. With each tool, the manufacturer or supplier should furnish a detailed instruction manual covering the application, operation, and maintenance of the tool. The manufacturer's recommendation for size of charge, stud unit, or pin, and for specific application must be followed explicitly by the operator.
5. Keep cartridges or shells in the original containers, in separate metal containers, or in the carrying case provided with the tool, and then stored in locked containers. Keep cartridges of varied charges or forces segregated from each other.

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6. Take precaution, as defined by the manufacturer, in the event of a misfire.
7. Provide information from the manufacturer on the safe use, testing, and maintenance of each type of tool in each tool kit.
8. Never use a powder-actuated tool in a flammable or explosive atmosphere.
9. Require the use of goggles or a full face shield as well as safety glasses during operation of powder-actuated tools.
10. Use only tools that are provided with a shield or muzzle guard. This shield or guard should be of a size, design, and material that will effectively confine flying particles and prevent escape of ricocheting studs and pins.
11. Ensure that powder-actuated tools are not able to be fired unless the tool is pressed against the work surface.
12. Always handle powder-actuated tools like firearms, with hands clear of the muzzle and barrel pointed away from all persons, especially when the tool is being closed or assembled after loading.
13. Ensure that the tool is not able to fire if the tool is dropped when loaded.
14. Ensure that firing the tool requires two separate operations, with the firing movement being separate from the motion of bringing the tool to the firing position.
15. Provide signs and barricades when shooting into walls or floors with personnel working on the other side.
16. Never fire into easily pierced or soft substrates or into materials of unknown resistance to piercing. In these situations, there is potential for the fastener to penetrate and pass through, creating a flying projectile hazard. If penetration of these materials is required, the material should be backed with a box of wood or sand at least four inches (10 cm) thick and of adequate area.
17. Do not use powder-actuated tools in reinforced concrete if there is the possibility of striking the rebar.

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18. Do not use powder-actuated tools on cast iron, high carbon, heat treated steel, or armor plate, thin slate, marble, glass, live rock, glazed brick or tile, terra cotta, or other brittle substances, or where the composition is unknown.
19. Do not fire studs closer than three inches (7.5 cm) from the edge or corner when being used on brick or concrete. Do not fire studs closer than ½ inches (1.25 cm) from the edge when being used on steel.
20. Never load and leave a powder-actuated tool unattended. It should be loaded only prior to its intended firing. Use only studs or pins specifically designed for the tool.
21. Test tools each day prior to loading by testing safety devices according to the manufacturer's recommended procedure.
22. Inspect, clean, and store powder-actuated tools in a safe place at the end of each day. No tool will be stored loaded. Store tools with the barrels removed or breech open.
23. At the manufacturer's recommended intervals, the tool will be completely dismantled and carefully inspected for wear on the safety devices by a qualified person familiar with the tool. Worn parts will be replaced before the tool is used again. It is recommended that factory-authorized service representatives be utilized for inspection, repair, and parts replacement, where possible.

H. Chain Saws

1. Approval by the HSE manager is required for all use of chain saws.
2. Inspect the saw prior to each use and periodically during daily use.
3. Never cut above chest height.
4. Require that the idle is correctly adjusted on the chain saw. The chain should not move when the saw is in the idle mode.
5. Start cutting only after a clear escape path has been made.

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6. Shut the saw off when carrying through brush or on slippery surfaces. The saw may be carried no more than 50 feet (15 meters) while idling.
 7. Require applicable protective gear. This will include, but is not limited to:
 - a. Logger's safety hat.
 - b. Safety glasses and face shield.
 - c. Steel-toed boots.
 - d. Protective leggings.
 - e. Hearing protection.
 - f. Work gloves.
 8. Inspect saws to ensure that they are fitted with an inertia break and hand guard.
 9. *Never* operate a chain saw when fatigued.
 10. Do not allow others in the area when chain saws are operated.
 11. Make sure there are no nails, wire, or other imbedded material that can cause flying particles.
 12. Do not operate a chain saw that is damaged or improperly adjusted, or is not completely and securely assembled. Always keep the teeth sharp and the chain tight. Worn chains should be replaced immediately.
 13. Keep all parts of your body away from the saw chain when the engine is running.
 14. For all operations, only personnel specifically trained and certified as competent by URS may operate chain saws.
- I. Hand-Operated Pressure Equipment
1. Direct pressure equipment such as grease guns, and paint and garden sprayers away from the body and other personnel in the area. The person operating any equipment

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such as this, which has a potential for eye injury, must wear protective goggles.

2. The noise produced when using certain types of pressure equipment may require the use of hearing protection.
3. Never allow the nozzle of a pressurized tool to come in contact with any body parts while operating. There is potential for injection of a chemical directly into the user's body, resulting in severe injury or death.

J. Gasoline-Powered Tools

1. Never pour gasoline on hot surfaces.
2. Never fuel around an open flame or while smoking.
3. Shut down the engine before fueling.
4. Provide adequate ventilation when using in enclosed spaces.
5. Use only Underwriters Laboratories (UL) - or FM-approved safety cans to transport flammable liquids. The use of unapproved containers for gasoline is strictly prohibited.
6. Label gasoline containers in compliance with Hazard Communication requirements, indicating the chemical and physical hazards of the product.

K. Inspection

Inspect all hand tools on a regular basis. Immediately remove defective tools from service, and tag or destroy them to prevent further use.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Site briefings regarding tool use.
- B. Records of tools removed from service.
- C. Copies of powder-actuated tool licenses (as applicable).

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D. Tool inspection documentation.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Hand and Portable Power Tools](#) – 29 Code of Federal Regulations (CFR) 1910, Subpart P
- B. U.S. OSHA Standard – [Construction Tools – Hand and Power](#) – 29 CFR 1926, Subpart I
- C. American National Standards Institute ([ANSI](#))/[American Society of Safety Engineers \(ASSE\) Standard A10.3 – 2006](#) – Powder-Actuated Fastening Systems
- D. [National Association of Demolition Contractors](#)
- E. United Kingdom – ['Provision and Use of Work Equipment' Regulations 1998](#)
- F. Australia/New Zealand Standards – Powder-Actuated Handheld Fastening Tools - AS/NZS 1873.1:2003 Australian/New Zealand Standards – [Hand-held Motor-operated Electric Tools – AS/NZS 60745.1:2003](#)
- G. [SMS 023](#) – Lockout and Tagout Safety
- H. [SMS 064](#) – Hand Safety

URS SAFETY MANAGEMENT STANDARD

Hazardous Waste Operations

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies involving the investigation or remediation of sites impacted with hazardous wastes or hazardous materials including those associated with underground storage tanks.

Normally, investigation projects for real estate transactions conducted to confirm that a site is "clean" are not covered under this standard. If the Project Manager reasonably expects that there is the potential for a "clean" site to actually have some level of contamination, it should initially be treated as contaminated and subject to this standard. Reference related URS Safety Management Standards for such operations.

2. Purpose and Scope

The purpose of this standard is to minimize the risks to URS personnel and subcontractors while conducting hazardous waste field operations.

Investigation techniques included under this standard include, but are not limited to, hand auger, soil gas evaluation, groundwater monitoring, test pits, and all types of power drilling, including direct push. Remediation techniques included under this standard include, but are not limited to, excavation, groundwater treatment, soil gas treatment, containment, and land farming.

The applicability of the HAZWOPER standard to URS activities is primarily in the areas of site investigation and remediation.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 017 NA](#) – North America

[SMS 017 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-017](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Hazardous Waste Operations

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies involving the investigation or remediation of sites impacted with hazardous wastes or hazardous materials, including those associated with underground storage tanks.

Normally, investigation projects for real estate transactions conducted to confirm that a site is "clean" are not covered under this standard. If the Project Manager reasonably expects that there is the potential for a "clean" site to actually have some level of contamination, it should initially be treated as contaminated, and be subject to this standard.

2. Purpose and Scope

The purpose of this standard is to minimize the risks to URS personnel and subcontractors while conducting hazardous waste field operations.

Investigation techniques discussed in this standard include, but are not limited to, hand augering, soil gas evaluation, groundwater monitoring, test pits, and all types of power drilling, including direct-push. Remediation techniques discussed under this standard include, but are not limited to, excavation, groundwater treatment, soil gas treatment, containment, and landfarming.

The applicability of the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard to URS activities is primarily in the areas of site investigation and remediation. URS relies on outside vendors or clients to provide emergency response teams (HazMat Teams) at our project sites and locations. On a project-specific basis, if the need arises for URS to provide an emergency response team, then the HAZWOPER requirements specific to that activity will be developed and incorporated into the project health and safety plan (HASP). This includes specific chemical protective clothing, equipment, and post-emergency response operations.

3. Implementation

Implementation of this standard is the responsibility of the URS Manager directing activities of the facility, site, or project location.

4. Requirements

The URS Health, Safety and Environment Management System and Safety Management Standards were designed to help employees to identify, evaluate, and control safety and health hazards and to provide for emergency response.

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Hazardous Waste Operations

Site/project hazards and scope of work dictate the specifics, which are covered in Facility Emergency Action Plans and Project HASPs.

A. Project Evaluation

Assess the technical and field aspects of every hazardous waste site project to evaluate:

1. Risk of exposure to hazardous chemicals, with particular attention to suspected or known human carcinogens.
2. Personal protective equipment requirements.
3. Air monitoring requirements.
4. Emergency services requirements.
5. Hazards addressed by other URS Safety Management Standards (e.g., SMS 010 – Confined Space Entry).
6. Hazardous materials shipping and disposal responsibilities.
7. Other safety and health hazards associated with site operations.

B. Client/Contract Evaluation

1. Review contract documents to determine whether the client has any special internal or regulatory requirements for hazardous waste site operations.
2. Implement client requirements in addition to those of this standard. Those requirements that are the most protective (e.g., most stringent) will be used.

C. Site-Specific Health and Safety Plan

1. Prepare a site-specific HASP for every project under this standard.
2. HASPs must be written or approved by the appropriate Health, Safety, and Environment (HSE) Manager, or a safety professional specifically approved by the HSE Manager, and by the project manager. Modifications and addendums to the HASP require approval by the HSE Manager and project manager.

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3. Evaluate client and agency requirements prior to preparing the HASP, particularly if the client or an agency will approve the HASP prior to implementation.
4. On a site-/project-specific basis, conduct a hazard assessment and identify appropriate engineering controls, work practices, and personal protective equipment (PPE) requirements. This assessment and the mitigations and controls must be documented in site-/project-specific HASP(s) and Job Safety Analysis (or equivalent).
5. On a site-/project-specific basis, conduct a hazard assessment for potential physical and chemical exposures and identify monitoring equipment, frequency, action levels, and actions. These must be incorporated into project-/site-specific HASP(s). Guidance on monitoring is provided in SMS 043 – Personal Monitoring/Industrial Hygiene.
6. On a site-/project-specific basis and based on the potential chemical exposures and work activities, develop specific decontamination procedures that include instructions on materials, decontamination steps, and location of decontamination. The purpose of these procedures will be to ensure personnel leaving contaminated areas are appropriately decontaminated, and all equipment is disposed or decontaminated.
7. PPE selection, use, and maintenance are presented in SMS 029 – Personal Protective Equipment. This information is documented on a site/project specific basis in the site/project HASP. The HASP may include PPE requirements that vary by task and project conditions. The Site Safety Officer (SSO) will implement these PPE changes included in the HASP, but may not modify the HASP PPE requirements. Work may not proceed unless the PPE required by the HASP is available and properly used.

The HASP shall include the following minimum PPE: hard hat, safety glasses, high visibility vest, and safety-toe shoes/boots.

8. Remove any non-impermeable PPE clothing that becomes contaminated with hazardous substances in accordance with the decontamination procedures noted above.

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9. Provide regular showers, change rooms, and sanitation facilities for employees, as necessary. Unauthorized personnel shall not remove protective clothing or equipment from change rooms.

D. Training – Remediation and Investigation Activities

Verify that each assigned URS employee has completed the following required training.

1. 40-hour initial training from an approved training provider, (24 hours of initial training for operations outside of North America).
2. 3 days of on-the-job training (1 day is required for operations outside of North America).
3. 8-hour refresher training completed within 12 months of the initial or subsequent refresher training. If the time lapse since the 40 hour training or 8 hour refresher (whichever is later) is greater than two years, contact a Division, Regional, or Business Unit HSE Manager or Director. The HSE Manager/Director may require additional training (e.g., on-line modules) including the 40 hour class to be re-taken.
4. 8-hour Site Safety Officer (Supervisor) training for directing the activities of any other URS employee or subcontractor.
5. Additional training for the Site Safety Officer as described below.

E. Training – Emergency Response

The HAZWOPER standard is primarily applicable to URS operations involving remediation and investigations at hazardous waste sites or sampling at Treatment, Storage, and/or Disposal Facilities (TSDFs). URS typically contracts emergency response or relies on client or local emergency response teams. On an as-needed basis, if a project requires URS to provide a HAZMAT emergency response team, the following training requirements must be met.

1. Operations Level – a minimum of 8 hours of initial and refresher training for those responsible for acting defensively in the case of a release, attempting to contain the release from a safe distance.
2. HAZMAT Technician – at least 24 hours of initial training and 8 hours of refresher training. They will participate in operations-level

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Hazardous Waste Operations

training and know how to implement the emergency response plan for the facility/site/project location.

3. HAZMAT Specialist – at least 24 hours of initial training and 8 hours of refresher training. They will be trained in the same content as the HAZMAT Technician, as well as in how to develop a site safety and control plan.
4. Incident Commander – will have at least 40 hours of training covering the Operations Level training and techniques for implementing the emergency response plan and directing the incident. They will be knowledgeable in relevant regulations.

F. Site Safety Officer

1. Appoint a Site Safety Officer (SSO) with appropriate qualifications for the specific hazardous waste project.
2. Assure that the SSO for complex projects, such as those with complicated remediation activities, has no duties other than site safety and health.
3. Verify that the SSO has completed basic supervisor training, and has additional required training and experience as applicable:
 - a. Additional respiratory protection training is required for projects where supplied air respirators may be used.
 - b. Heavy equipment/construction safety.
 - c. Personal air monitoring.
4. The SSO will monitor decontamination and other site activities for effectiveness.

G. Exposure Monitoring

Require that exposure monitoring is conducted in accordance with the HASP on all hazardous waste projects.

H. Project Equipment

1. Provide all health and safety equipment as described by the project HASP.

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2. Provide all personal protective equipment as described by the project HASP.

I. Medical Surveillance

Verify that each URS employee assigned to the project meets the minimum requirements of the URS Medical Surveillance Program (refer to SMS 024 – Medical Screening and Surveillance). This typically includes:

1. Baseline examination
2. Annual examination
3. Appropriate clearance for respirator use.

J. Compliance Assurance

SMS 068 – Compliance Assurance is a tool for use in determining the effectiveness and compliance of a hazardous waste site operation.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Completed Health and Safety Plan
- B. Completed and signed HASP approval form
- C. Signed HASP acceptance form (or equivalent)
- D. Completed health and safety field forms that are included in each HASP
- E. Training and Medical Surveillance Clearance documentation for project personnel

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) – [Hazardous Waste Operations](#)
- B. European Agency for Safety and Health at Work, Dangerous Substances http://europe.osha.eu.int/good_practice/risks/dangerous_substances/
- C. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities – [National Institute for Occupational Safety and Health \(NIOSH\) 85-115](#)

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- D. [SMS 010](#) – Confined Space Entry
- E. [SMS 024](#) – Medical Screening & Surveillance
- F. [SMS 043](#) – Personal Monitoring
- G. [SMS 029](#) – Personal Protective Equipment
- H. [SMS 068](#) – Compliance Assurance

URS SAFETY MANAGEMENT STANDARD

Heat Stress

1. Applicability

This standard applies to URS field projects where ambient (not adjusted) temperatures exceed 70 °F (21 °C) for personnel wearing chemical protective clothing, including Tyvek™ coveralls, and 90 °F (32 °C) for personnel wearing normal work clothes.

2. Purpose and Scope

The purpose of this standard is to protect project personnel from the effects of heat related illnesses.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 018 NA](#) – North America; Australia / New Zealand

[SMS 018 INT](#) – International Operations (including Europe, Asia, South America and Africa)

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Heat Stress

1. Applicability

This standard applies to URS Corporation and its subsidiary companies on projects where ambient (not adjusted) temperatures exceed 70 degrees Fahrenheit (°F) (21 degrees Celsius [°C]) for personnel wearing chemical-protective clothing, including impermeable protective clothing such as Tyvek or Saranex coveralls, and 90°F (32°C) for personnel wearing standard permeable work clothes. Permeable clothing refers to clothes of standard cotton or synthetic materials. Note that certain governmental entities require heat stress prevention techniques be implemented at lower temperatures or whenever outdoor work is conducted. Always consult local regulations to determine if more stringent standards apply.

2. Purpose and Scope

The purpose of this standard is to protect project personnel from the effects of heat-related illnesses.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. The project Health and Safety Plan will address heat stress control when temperatures identified in Section 1 of this standard are anticipated.

This standard introduces three different means of monitoring for heat stress conditions: Wet Bulb Globe Temperature (WBGT), Humidex Based Heat Response and Physiological Monitoring. These methods can be used separately or in conjunction. For employees wearing chemical-protective clothing, physiological monitoring (Section D) is the most effective approach, because evaporative cooling capability is limited.

B. Heat stress is influenced by air temperature, radiant heat, and humidity. The WBGT is a useful index of the environmental contribution to heat stress. Because WBGT is only an index of the environment, the contributions of work demands, clothing, and state of acclimatization must also be accounted for, as described in the following steps.

1. Monitor ambient temperatures and conduct heat stress monitoring in accordance with the project Health and Safety Plan. Revise the heat

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Heat Stress

stress monitoring and controls if there are any reports of discomfort due to heat stress.

2. Monitor temperatures in each unique environment in which workers perform work (e.g., take WBGT measurements inside truck cabs for truck drivers, and take separate WBGT measurements in the outdoor area where field employees work, etc.). Follow manufacturer’s instructions on proper use of the WBGT.
3. Determine if individual workers are acclimatized or un-acclimatized. Full heat acclimatization requires up to 3 weeks of continued physical activity under heat-stress conditions similar to those anticipated for the work. Its loss begins when the activity under those heat-stress conditions is discontinued, or when there is a sustained increase in temperatures of 10 °F (5.6 °C) or more, and a noticeable loss occurs after 4 days. A worker can be considered acclimatized for the purpose of this procedure when they have been exposed to the site conditions (including level of activity) for 5 of the last 7 days.
4. Determine the approximate workload of each worker or group of workers. The following examples can be used for comparison:

Table 1
Examples of Activities within Workload Categories

Categories	Example Activities
Resting	Sitting quietly
	Sitting with moderate arm movements
Light	Sitting with moderate arm and leg movements
	Standing with light work at machine or bench while using mostly arms
	Using a table saw
	Standing with light or moderate work at machine or bench and some walking about
Moderate	Scrubbing in a standing position
	Walking about with moderate lifting or pushing
	Walking on level at 6 Km/hr while carrying 3 Kg weight load
Heavy	Carpenter sawing by hand
	Shoveling dry sand
	Heavy assembly work on a non-continuous basis
	Intermittent heavy lifting with pushing or pulling (e.g., pick-and-shovel work)
Very Heavy	Shoveling wet sand

5. Determine the approximate proportion of work within an hour during a typical shift. Typically, the initial work schedule will be 60 minutes of work

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Heat Stress

per hour (100 percent work) with a small break in the morning and afternoon, as appropriate, and a 30-minute lunch break mid-day.

6. Compare the WBGT values measured in 4.B.1 to the screening criteria values in the following table, using the determinations made in 4.B.3 through 4.B.5.

Table 2
SCREENING CRITERIA FOR HEAT STRESS EXPOSURE
(WBGT Values in °F /°C)

Work Cycle (60 min/ hour)	Acclimatized				Unacclimatized			
	Light Work	Mod. Work	Heavy Work	Very Heavy Work	Light Work	Mod. Work	Heavy Work	Very Heavy Work
100% Work	85.1/ 29.5	81.5/ 27.5	78.8/ 26.0	N/A	81.5/ 27.5	77.0/ 25.0	72.5/ 22.5	N/A
75% Work 25% Rest	86.9/ 30.5	83.3/ 28.5	81.5/ 27.5	N/A	84.2/ 29	79.7/ 26.5	76.1/ 24.5	N/A
50% Work 50% Rest	88.7/ 31.5	85.1/ 29.5	83.3/ 28.5	81.5/ 27.5	86/ 30	82.4/ 28	79.7/ 26.5	77/25
25% Work 75% Rest	90.5/ 32.5	87.8/ 31	86/ 30	85.1/ 29.5	87.8/ 31	84.2/ 29	82.4/ 28	79.7/ 26.5

- a. If the measured WBGT is *less than* the table value, there is little risk of excessive exposure to heat stress, and work can continue. Continue to monitor ambient conditions with the WBGT. However, if there are reports of the symptoms of heat-related disorders, then the analysis of little risk should be reconsidered.
- b. If the measured WBGT is *greater than* the table value, institute heat stress controls, including a work-rest cycle, and perform physiological monitoring as described in section D of this standard.
- c. Because of the physiological strain associated with very heavy work among less fit workers regardless of WBGT, values are not provided in Table 1 for continuous work. Physiological monitoring should always be implemented under these conditions.
- d. For workers wearing cloth coveralls (e.g., Nomex fire resistant clothing), add 3.5 to the measured WBGT. For impermeable clothing, such as Tyvek or Saranex, the WBGT procedures cannot be used. For these situations, workers should begin physiological monitoring as soon as the temperature in the work area exceeds 70°F (21°C).

URS SAFETY MANAGEMENT STANDARD

Heat Stress

C. Humidex Based Heat Response

1. The Humidex method is a simplified way of protecting workers from heat stress which is based on the WBGT to estimate heat strain. It is an equivalent scale intended to express the combined effects of warm temperatures and humidity. Humidex is used as a measure of perceived heat that results from the combined effect of excessive humidity and high temperature.
2. This method requires only a local air temperature and relative humidity value. Monitoring must continue throughout the day for changing conditions. Identify a representative location where measurements can be taken. Measurements should be recorded at least hourly when ambient temperatures and 90°F (32°C) for personnel wearing normal permeable work clothes.
3. Specific procedures to complete the Humidex Based Heat Response Plan are included in Attachment 018-1 NA – Humidex Worksheet.

D. Physiological Monitoring

Physiological monitoring provides a means to assess the effectiveness of the heat stress controls (training, hydration, work-rest cycles, etc.) that are in place. Based on the results of physiological monitoring and self-assessment, work-rest cycles can be adjusted to more effectively control heat stress by shortening the work period, or to allow for longer work periods if workers are recovering adequately during rest breaks.

1. Perform physiological monitoring as soon as the employee stops working and begins their break (rest). Perform *physiological monitoring at least every hour*. Base rest breaks on the results of the monitoring, workers' self-assessment, and professional judgment.
 - a. Example 1: If the WBGT is 85°F (29.4°C) or less for acclimatized, light-duty workers, they can work 60 minutes per hour (100 percent work), and they need only take their regularly scheduled breaks.
 - b. Example 2: If the WBGT is greater than 85°F (29.4°C) for acclimatized, light-duty workers, physiological monitoring must be performed, and workers' work-rest cycles must be adjusted as described below.
2. Have workers assess themselves and their body's reaction to the heat and work conditions (self-assessment), and report any signs or symptoms of

URS SAFETY MANAGEMENT STANDARD
Heat Stress

heat illness. These can include nausea or dizziness, heat cramps, extreme thirst, or very dark urine.

3. Based on the results of the physiological monitoring and on the workers' self-assessments, the work period may be adjusted as follows:
 - a. The work period may be *increased* (generally, by 5- to 10-minutes intervals, up to a maximum of 4 hours) if the results of the first 2 hours of the physiological monitoring and the workers' self-assessments indicate that workers *are* recovering adequately (see below), and on the judgment of the Health and Safety Technician.
 - b. The work period *must be decreased* if the results of the physiological monitoring and the workers' self-assessment indicate that workers are NOT recovering adequately (see below).
4. Perform physiological monitoring
 - a. The worker or the Health and Safety Technician must measure and record body temperature and pulse rate as described below. Use SMS 018-2 NA – Heat Stress Monitoring Record as a tool.
5. Body Temperature Monitoring
 - a. Monitor body temperature to determine if employees are adequately dissipating heat buildup. Ear probe thermometers which are adjusted to oral temperature (aural temperature) are convenient and the preferred method of measurement. Determine work/rest regimen as follows:
 - i. Measure oral body temperature at the end of the work period. Oral body temperatures are to be obtained prior to the employee drinking water or other fluids.
 - ii. If temperature exceeds 99.6°F (37.5°C), shorten the following work period by 1/3 without changing the rest period.
 - iii. If, at the next rest period, temperature still exceeds 99.6°F (37.5°C), the worker should not be allowed to continue work until repeated temperature measurements are in the acceptable range (i.e., less than 99.6°F). Do not leave the worker alone during the recovery time. Watch for signs of heat illness and be prepared to implement emergency response as necessary.

URS SAFETY MANAGEMENT STANDARD
Heat Stress

- iv. Do not allow a worker to wear impermeable PPE when his/her oral temperature exceeds 100.6°F (38.1°C).
 - b. Have employees assess themselves and their body's reaction to the heat and work conditions, and report any signs or symptoms of heat stress, including, but not limited to, feeling nauseous or dizzy, skin rash or skin irritation, muscle cramps, weakness or fatigue, extreme thirst, dizziness, blurred vision, headache, or very dark urine.
6. Pulse Rate Monitoring
- a. Take the radial (wrist) pulse as early as possible in the rest period and determine the worker's heart rate in beats per minute. The heart rate is determined by counting the pulse for ten seconds and multiplying the number by 6 to get the beats per minute. Record this as P1.
 - b. Wait 2 minutes and repeat the pulse measurement. Record this as P2.
 - c. If P1 is greater than or equal to 110 beats per minute (bpm) and if (P1 – P2) is less than or equal to 10 bpm (indicating that workers are not recovering adequately), shorten the next work cycle by 1/3 without changing the rest period.
 - d. At the next rest period, if P1 is still equal to or greater than 110 bpm, and if (P1 – P2) is still less than or equal to 10 bpm, shorten the following work cycle by 1/3 without changing the rest period.
 - e. At the third rest period, if P1 is still equal to or greater than 110 bpm and (P1 – P2) is still less than or equal to 10 bpm, the worker should not be allowed to continue work until repeated pulse measurements are in the acceptable range (i.e., P1 is less than 110 bpm and (P1 – P2) is greater than 10 bpm). Do not leave the worker alone during the recovery time. Watch for signs of heat illness and be prepared to implement emergency response as necessary.
- E. Record monitoring results and worker's self-assessments on Attachment 018-2 NA – Heat Stress Monitoring Record.
- F. Investigate the use of auxiliary cooling devices in extreme heat conditions.
- G. Conduct briefings for employees regarding health hazards and control measures associated with heat stress whenever conditions require the implementation of heat stress monitoring. Supervisors should receive training in heat related illness prevention prior to supervising employees in areas

URS SAFETY MANAGEMENT STANDARD

Heat Stress

- where heat stress could occur. The training should include emergency response information provided in Supplemental Information A.
- H. Provide cool water and electrolyte replacement drinks as described in Supplemental Information A.
 - I. Allow employees who are not accustomed to working in hot environments appropriate time for acclimatization, as described in Supplemental Information A.
 - J. Provide break areas as described in Supplemental Information A.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Heat Stress Monitoring Records
- B. Employee Safety Briefing Verification Forms

6. Resources

- A. NIOSH – [Working in Hot Environments \(Publication No. 86-112\)](#), 1986
- B. NIOSH – Criteria for a Recommended Standard for Occupational Exposures to Hot Environments ([Publication No. 86-113](#)), 1986
- C. ACGIH – [Documentation of the Threshold Limit Values and Biological Indices, 2003](#)
- D. AFL-CIO Building Trades Division – [Heat Stress in Construction](#)
- E. Occupational Health Clinics for Ontario Worker, Inc. – [Humidex Based Heat Response Plan](#)
- F. [Attachment 018-1 NA](#) – Humidex Worksheet
- G. [Attachment 018-2 NA](#) – Heat Stress Monitoring Record

7. Supplemental Information

- A. [Heat Stress Informational Supplement](#)

Step 1: On the Humidex table below, look up the temperature on the left (Celsius is located below RH>) and the relative humidity (RH) on the top. Determine the Humidex value.

F	RH>	100%	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%	45%	40%	35%	30%	25%	20%	
108	42													55	52	50	48	46	
106	41													55	53	51	48	44	
104	40													55	53	51	49	45	
102	39													55	53	51	49	47	
100	38	Step 1 - Determine HUMIDEX VALUE									54	53	51	49	47	45	43	42	40
99	37								54	52	51	49	47	45	44	42	40	38	
97	36				57	55	53	52	50	49	47	45	44	42	40	39	37		
95	35			56	54	53	51	50	48	47	45	43	42	40	39	37	36		
93	34	56	55	53	52	51	49	48	46	45	43	42	40	39	37	36	34		
91	33	55	54	53	51	50	48	47	46	44	43	41	40	39	37	36	34	33	
90	32	53	51	50	49	48	46	45	44	42	41	40	38	37	36	34	33	32	
88	31	50	49	48	47	45	44	43	42	40	39	38	37	35	34	33	32	30	
86	30	48	47	46	44	43	42	41	40	39	37	36	35	34	33	31	30	29	
84	29	46	45	43	42	41	40	39	38	37	36	35	33	32	31	30	29	28	
82	28	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	
81	27	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	
79	26	39	38	37	36	35	34	33	33	32	31	30	29	28	27	26	25	24	
77	25	37	36	35	34	33	33	32	31	30	29	28	27	26	26	25	24	23	

Step 2: Place the Humidex value into the Heat Index Adjustment Table below. Determine the applicable adjustments based on the given work or task.

Heat Index Adjustment Table

Step 2 - Risk Factor Adjustment		
Write in value	What is the HUMIDEX value from the table in Step 1?	
Radiant Heat		Adjustment
	Working in full-sun	Add 2
	Working in ½ or partial sun or weak radiant heat source	Add 1
	Working near very hot equipment surfaces or processes	Add 2
Clothing: Pick One Only		
	Short/long sleeve shirt and pants – no overalls	None
	Overalls (e.g., Nomex suit)	Add 3
	Double layer overalls	Add 5
Stop	Impermeable clothing	Perform Physiological Monitoring
Acclimatization		
	Have been working at least 5 of last 7 days in heat stress conditions.	Subtract 4
Work Load & Miscellaneous Factors		
	Light Work (Standing, slow walking)	Subtract 2
	Medium Work (Walking about with moderate lifting or pushing)	None
	Heavy Work (Shoveling dry sand, carrying 50 lbs)	Add 2
	Very Heavy Work (Shoveling wet sand)	Add 3
TOTAL – Compare to Heat Index Response Plan		

Step 3: Compare adjusted Heat Index Total to the Heat Index Response Plan table to obtain guidance for work/rest.

Heat Index Response Plan*

TOTAL NUMBER	Final Step 3 - HEAT INDEX Response
30-33	alert & information & water
34-37	warning & increase water
38-39	75% work - 25% rest & monitor for signs of heat stress
40-41	50% work - 50% rest & monitor for signs of heat stress
42-44	25% work - 75% rest & monitor for signs of heat stress
45+	Perform Physiological Monitoring

* Percent work and rest/recovery are on a per hour basis. Adjustments and subsequent work/rest cycle recommendations are rough guidelines only. No heat stress prediction scheme can replace monitoring of symptoms or a health care practitioners advice in the case of individuals with special medical conditions or predisposing circumstances for heat related illness. Always pay attention to the way workers are feeling. Recuperate if fatigued, nauseated, dizzy or thirsty.



Health, Safety and Environment
HEAT STRESS MONITORING RECORD

Attachment 018-2 NA
Issue Date: May 2001
Revision 8: September 2012

Date: _____ Safety Representative: _____

Worker's Name: _____ Subcontractor: _____

Work Activity/Equipment: _____

Time	Work-Rest Cycle	Aural Temp (°F/°C)	Pulse (BPM)			Comments
			P ₁	P ₂	P ₁ -P ₂	

HEAT RASH

Heat rash (prickly heat) may result from continuous exposure to heat or humid air. It appears as red papules (elevated skin lesion), usually in areas where the clothing is restrictive, and gives rise to a prickly sensation, particularly as sweating increases. It occurs in skin that is persistently wetted by un-evaporated sweat. The papules may become infected unless treated.

First Aid for Heat Rash - To prevent heat rash, shower after work, dry off thoroughly, and put on clean, dry underwear and clothes. Try to stay in a cool place after work. If, in spite of this, you develop heat rash, see your physician.

HEAT CRAMPS

Heavy sweating with inadequate electrolyte replacement causes heat cramps. Signs and symptoms include:

- Muscle spasms.
- Pain in the hands, feet and abdomen.

First Aid for Heat Cramps - Leave the work area, and rest in a cool, shaded place.

Mild heat cramps can be treated by drinking beverages that contain salt or eating salty food. Severe heat cramps are treated with fluids and salts given intravenously.

Once the spasms disappear, you may return to work. Taking adequate breaks and drinking electrolyte replacement drink should prevent the cramps from returning.

HEAT EXHAUSTION

Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool, moist skin.
- Heavy sweating.
- Dizziness.
- Nausea.
- Fainting.
- Headache.
- Blurred vision.
- Vomiting.

The key here is that the victim is still sweating, so the cooling system is still working; it's just under severe stress. The body core temperature may be elevated, but not higher than 104°F (40°C). It is important to recognize and treat these symptoms as soon as possible, as the transition from heat exhaustion to the very hazardous heat stroke can be quite rapid.

First Aid for Heat Exhaustion – Treatment involves replacing fluids (rehydration) and salts and removing the person from the hot environment. If symptoms are mild, sipping cool, slightly salty beverages every few minutes may be all that is needed. Removing or loosening clothing and applying wet cloths or ice packs to the skin also aid cooling.

HEAT STROKE

Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels, typically at or above 104°F (40°C). Immediate action must be taken to cool the body before serious injury and death occurs. Competent medical help must be obtained. Signs and symptoms are:

- Red, hot, usually dry skin.
- Lack of or reduced perspiration (lack of perspiration may be masked for those wearing chemical protective clothing since perspiration from earlier in the day will be present).
- Nausea.
- Vomiting.
- Dizziness and confusion.
- Strong, rapid pulse.
- Coma.


First Aid for Heat Stroke - THIS IS A MEDICAL EMERGENCY! SUMMON MEDICAL ASSISTANCE IMMEDIATELY!

While awaiting transportation to the hospital, a person should be wrapped in cold, wet bedding or clothing; immersed in a lake, stream, or cool bathtub; or cooled with ice. At the hospital, body cooling is usually accomplished by removing the clothes and covering the exposed skin with water or ice. To speed evaporation and body cooling, a fan may be used to blow air on the body. Body temperature is measured frequently, often constantly. To avoid overcooling, cooling is stopped when the body temperature is reduced to about 102°F (38°C).

HEAT STRESS PREVENTION

The best approach to avoiding heat-related illness is through preventative heat stress management.

Rest areas - A relatively cool, shaded area must be provided for breaks when ambient temperatures exceed 70°F (21°C) and workers are wearing chemical protective clothing (including uncoated Tyvek), or if temperatures exceed 80°F (26°C) and workers are wearing "Level D" coveralls or work clothes. For hazardous waste sites, the rest area should be located in the support zone adjacent to the contamination reduction zone, situated so that part of it is in the decon area so workers can take breaks without going through full decon. If shade is not available, shaded areas shall be constructed. This same type of canopy can be set up to shade personnel performing various types of work in hot weather. Cooling measures other than shade (e.g., misting, air conditioned break areas, air conditioned

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">HEAT STRESS</p> <p style="text-align: center;">INFORMATIONAL SUPPLEMENT</p>	<p style="text-align: right;">SMS 018 NA Supplemental Information A</p> <p style="text-align: right;">Issue Date: February 2009 Revision 2: August 2010</p>
-----------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

vehicles, etc.) can be used in lieu of shade provided it can be demonstrated that they are at least as effective in cooling employees. Employees should have access to these rest areas at break times and at any other time when suffering from heat illness or believing a preventive recovery period is needed.

Liquids - Encourage employees to drink plenty of cool plain water and electrolyte replacement drinks. Supplementing water with cool electrolyte replacement drinks, such as Gatorade, Squench or Quik-kick (drink), is helpful to employees who tend to sweat a lot. Do not use "community cups"; use paper cups. Employees should have access to potable drinking water equivalent to one quart of water per employee per hour during the shift. Less water can be available at the start of the shift provided it is effectively replaced when required.

Have workers drink 16 ounces (0.5 liters) of drink before beginning work, such as in the morning and after lunch. At each break, workers should drink 8 to 16 ounces (0.25 to 0.5 liters). Employees should not wait until they are thirsty to drink.

Discourage the use of alcohol during non-working hours, and discourage the intake of coffee during work hours, as these make heat stress control more difficult.

Acclimatization - This is the process by which your body "gets used to" hot work environments. This is achieved by slowly increasing workloads. Start at 50 percent capacity on day one, and increase by 10 percent per day; on day six, you'll be at 100 percent. You don't lose acclimatization over a weekend, but it'll start to decrease after three to four days. If you don't do hot work for a week, the acclimatization is gone. You don't have to do full shift hot work to achieve or retain acclimatization; a minimum of 100 minutes of continuous hot work exposure per day is adequate.

Auxiliary Cooling - Auxiliary cooling is usually obtained by providing workers with a specially-designed vest, which is worn under the protective clothing, but over any underclothing. These vests typically provide cooling via one of two methods: the use of ice or other frozen media, or the use of a vortex cooler. Each method has its advantages and disadvantages.

The frozen media vest requires a means for freezing the media, and the media (usually water or "blue ice") will melt, requiring replacement.

The vortex cooler tends to cool more uniformly. Instead of frozen media, this vest uses the expansion of compressed air to cool the wearer. The drawback is the compressed air requirement, but this is negated when the wearer is already using an airline respirator supplied by a compressor. A vortex cooler should not be supplied from air cylinders, as this will draw down the cylinders rapidly.

Auxiliary cooling should be considered when the following conditions exist:

- Ambient temperature over 80°F (26°C).
- Workers are wearing impermeable garments (i.e., Tyvek, Saranex, Chemrel, etc.).
- It is desirable to have long work shifts with minimum interruption.

URS SAFETY MANAGEMENT STANDARD

Noise and Hearing Conservation

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies where personnel may encounter noise exposures that may exceed 85 decibels, measured using an A-weighted scale (dBA), as an 8-hour time-weighted average (TWA).

2. Purpose and Scope

The purpose of this procedure is to protect employees from hazardous noise exposures and to prevent hearing loss.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 026 NA](#) – North America; Australia / New Zealand

[SMS 026 INT](#) – International Operations (including Europe, Asia, South America and Africa)

URS SAFETY MANAGEMENT STANDARD

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2. Purpose and Scope

The purpose of this procedure is to protect employees from hazardous noise exposures and to prevent hearing loss.

3. Implementation

Implementation of this procedure is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. General

1. The use of hearing protectors is required in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. Whenever information indicates that any employee's exposure may equal or exceed an 8-hour TWA of 85 dBA, the project manager or location manager will be responsible for enforcing the proper use of hearing protectors.
2. Implement a hearing conservation program in accordance with 29 Code of Federal Regulations (CFR) 1910.95(c) when applicable. Work not applicable to 29 CFR 1910.95(c) will assess hazards of noise exposure on a task basis, and implement engineering or administrative controls to reduce employee noise exposure.
3. Hearing protectors will be used in the event that administrative or engineering controls are either not effective or not feasible, and the following criteria will be applicable to selection of hearing protection devices.
 - a. Require that at least two types of hearing protectors are available to employees free of charge, and that the type of hearing protector is suitable to the task.

URS SAFETY MANAGEMENT STANDARD

Noise and Hearing Conservation

- b. Require that hearing protectors are used in accordance with manufacturer's specifications to effectively protect hearing.
- c. Evaluate the effectiveness of the hearing protectors chosen. The manufacturer's assigned noise reduction rating (NRR) for hearing protection devices can seldom be achieved in workplace conditions; therefore this rating must be attenuated for real world conditions and use. To do so, subtract 7 from the NRR of the protector provided by the manufacturer. Divide this result by 2, and then subtract the remained from the observed "A" scale sound level measurement collected in the employee's work area (see Section 4.B). If this number is below 85, the hearing protectors are adequate for use in the work area.

B. Noise Surveys

1. Noise surveys must be conducted in a manner that reasonably reflects the exposure of the affected employees. Surveys must be conducted under the supervision of a URS Health, Safety, and Environment (HSE) Representative.
2. Sound-level meters and audio dosimeters used to determine employee exposure to noise sources must be Type II (accurate to within +/- 2 dBA), operated in "slow" response, on the "A" scale, and be calibrated to factory guidelines (including periodic factory recalibration).
3. Attachment 026-1NA (Sound Level Survey) and Attachment 026-2NA (Noise Dosimetry Field Sheet) may be used to record noise surveys.

C. Noise Controls

Eliminate noise sources to the extent possible. Examples of controls that must be considered include:

1. Adding or replacing mufflers on motorized equipment.
2. Adding mufflers to air exhausts on pneumatic equipment.
3. Following equipment maintenance procedures to lubricate dry bearings and replace worn or broken components.
4. Isolating loud equipment with barriers.
5. Replacing loud equipment with newer and quieter models.

URS SAFETY MANAGEMENT STANDARD
Noise and Hearing Conservation

6. Using caution signs and Hearing Protection Required signs to designate noisy work areas.
7. Installing HPD-dispensing devices at the entrance to noisy work areas.

D. Audiometric Exams

1. Tests

- a. Details on the medical surveillance program (including audiometric testing) are included in SMS 024 – Medical Screening and Surveillance.
- b. Audiometric tests will be performed by a person meeting the requirements described in 29 CFR 1910.95(g)(3). Within 6 months of an employee's first exposure at or above the action level, a valid baseline audiogram will be established, against which subsequent audiograms can be compared. Testing to establish a baseline audiogram will be preceded by 14 hours without exposure to noise. Hearing protectors may be used as a substitute for the requirement that a baseline audiogram will be preceded by 14 hours without exposure to workplace noise. The medical surveillance provider will notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination. For multi-year projects, an annual audiogram will be obtained for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.
- c. Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid, and if there is a standard threshold shift (STS). A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 hertz (Hz) in either ear. If the annual audiogram shows that an employee has suffered an STS, the employer will obtain a retest within 30 days, and consider the results in assessing an STS as the annual audiogram. The audiologist, otolaryngologist, or physician will review problem audiograms, and will determine whether there is a need for further evaluation. If an STS has occurred, the medical surveillance provider will notify the employee within 21 days of the determination.

URS SAFETY MANAGEMENT STANDARD

Noise and Hearing Conservation

E. Standard Threshold Shifts

If an employee's test results show a confirmed STS, their hearing protection will be evaluated and refitted, and a medical evaluation may be required.

F. Training

Verify that each employee who must work in a noisy environment is current on required Hearing Conservation Training. At a minimum, training shall be conducted before initial assignment and annually. Training must include the following topics:

1. The effects of noise on hearing.
2. The purpose of hearing protectors.
3. The advantages and disadvantages of various types of hearing protectors.
4. The attenuation of various types of hearing protection.
5. The selection, fitting, care, and use of hearing protectors.
6. The purpose of audiometric testing.
7. An explanation of the audiometric testing procedure.

5. Documentation Summary

The following documentation will be maintained:

- A. Noise surveys, when applicable.
- B. Training records.
- C. Audiometric tests (must be maintained by the Company's medical record retention vendor (e.g., WorkCare)).

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standard – [Occupational Noise Exposure – 29 CFR 1910.95](#)

URS SAFETY MANAGEMENT STANDARD
Noise and Hearing Conservation

- B. U.S. OSHA Construction Standard – [Occupational Noise Exposure – 29 CFR 1926.52 and 1926.101](#)
- C. U.S. MSHA – Occupational Noise Exposure [30 CFR 62](#)
- D. U.S. FRA – Occupational Noise Exposure [49 CFR 227](#)
- E. [U.S. OSHA Technical Links – Noise and Hearing Conservation](#)
- F. American Industrial Hygiene Association: [Protect Yourself from Noise-Induced Hearing Loss](#)
- G. [National Hearing Conservation Association web site](#)
- H. [SMS 024](#) – Medical Screening and Surveillance
- I. [Attachment 026-1NA](#) – Sound Level Survey
- J. [Attachment 026-2NA](#) – Noise Dosimetry Field Sheet



SOUND LEVEL SURVEY

Location: _____ **Date:** _____
Conducted By: _____
Sound Level Meter: _____ **Serial #:** _____
Calibrator Model: _____ **Serial #** _____ **Class:** 1 2
Battery Check Completed: **Date of Factory Calibration:** _____

Test No.	Description Location/Equipment	Distance	dBA	Hearing Protection Required?		Comments
				Yes	No	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
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				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	
				<input type="checkbox"/>	<input type="checkbox"/>	



Health, Safety and Environment

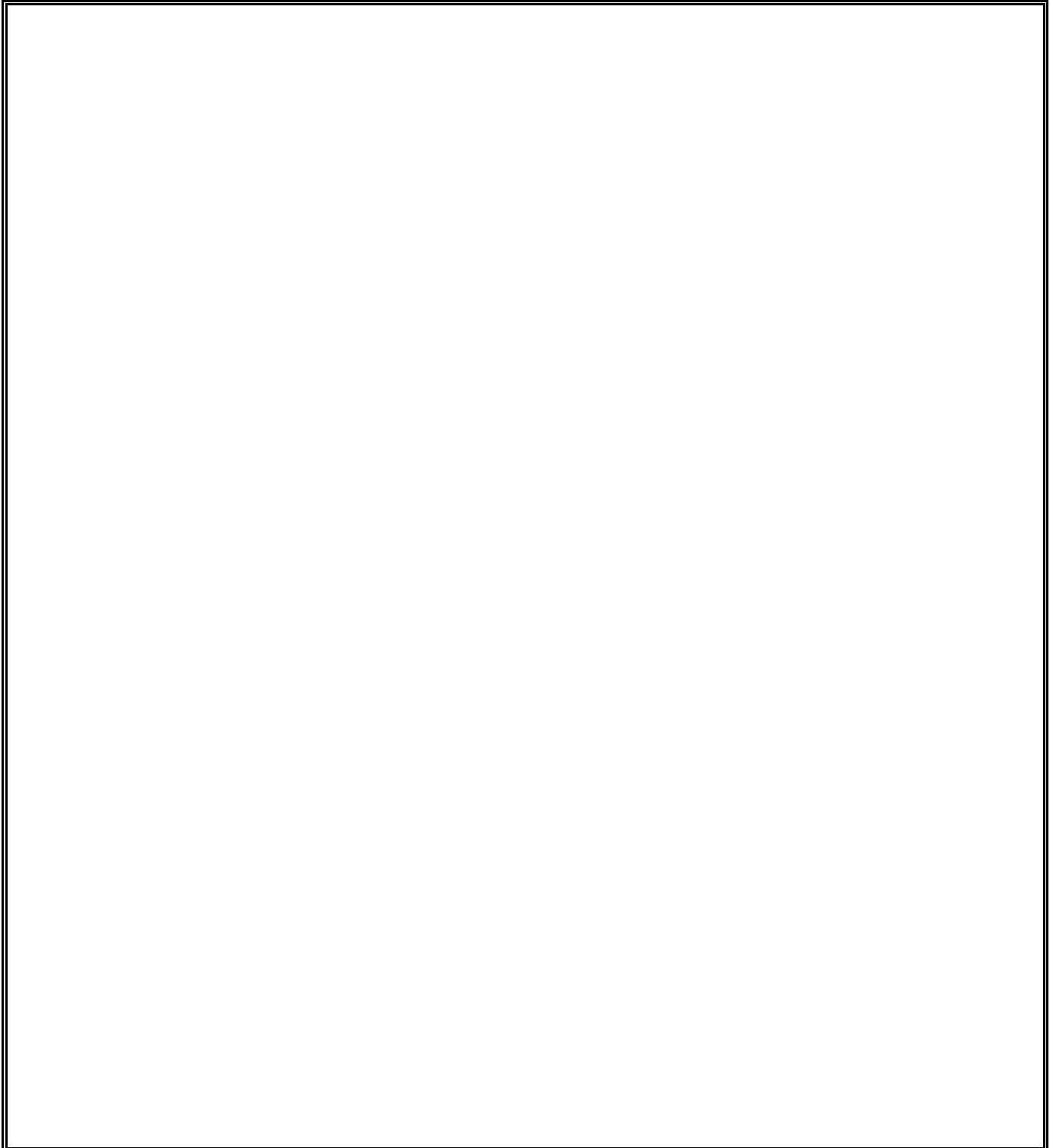
Attachment 026-1 NA

SOUND LEVEL SURVEY

Issue Date: July 2000
Revision 7: March 2012

Drawing of Equipment or Work Layout

Reference Numbers refer to the Test Numbers on Page 1





**NOISE DOSIMETRY
FIELD SHEET**

Sample Identification

Sample #: _____ Date: _____
Employee Monitored: _____ Employee #: _____
Job: _____ Location: _____

Dosimeter Information

Model: _____ Serial # _____
Criterion Level (in dBA): _____ Threshold (in dBA): _____ Exchange Rate (in dBA): _____
Calibration (in dBA): Initial _____ Final _____
Weighting: Fast Slow

Calibrator Information

Model: _____ Serial #: _____ Class 1 2
Battery Check Completed: Date of Factory Calibration: _____

Sample Information

Time On: _____ Time Off: _____ Total Run Time (in min): _____
Time Weighted Average (in dBA): _____ %Dose: _____ Est. %Dose: _____
Average Sound Level (L_{avg}): _____ Peak Sound Level (L_{pk}): _____
Maximum Sound Level (L_{max}): _____ Minimum Sound Level (L_{min}): _____

Workplace Conditions

Scheduled Hours per Shift: _____ Operations: Normal? Abnormal?
Explain: _____

Hearing Protection: Type _____ % of Time Worn _____

Work Description/Comments

Sampled By: _____

URS Safety Management Standard

Personal Protective Equipment

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to provide information on recognizing those conditions that require PPE. PPE is designed to protect the employee from health and safety hazards that cannot be practically removed from the work environment.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 029 NA](#) – North America

[SMS 029 INT](#)- International Operations (including Europe, Asia, South America and Africa)

[SMS AP6-029](#) – Australia / New Zealand

URS Safety Management Standard

Personal Protective Equipment

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies where the use of personal protective equipment (PPE) is anticipated.

2. Purpose and Scope

The purpose of this standard is to provide information on recognizing those conditions that require PPE. PPE is designed to protect the employee from health and safety hazards that cannot be practically removed from the work environment.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

- A. Perform hazard assessments for those work activities that are likely to require the use of PPE.
 - 1. Use Attachment 029-1 NA to perform the assessment.
 - 2. Reevaluate completed hazard assessments when job conditions or duties change.
- B. Eliminate the hazards identified in Attachment 029-1 NA, if possible, through engineering or administrative controls.
- C. Select PPE that will protect employees if hazards cannot be controlled or eliminated.
 - 1. See Attachment 029-1 NA for recommended PPE.
 - 2. Review Material Safety Data Sheets for chemicals used for PPE recommendations.
 - 3. If needed, consult with the applicable safety representative for assistance in selecting PPE.
- D. Provide required PPE to employees free of charge (excluding, in some instances, components of standard work attire such as steel-toed boots and prescription safety glasses), assuring proper fit and providing a choice

URS Safety Management Standard
Personal Protective Equipment

if more than one type of PPE is available. Where applicable, the local policy (office or project) regarding reimbursement for PPE will prevail.

- E. Provide the employees with the appropriate PPE whenever a hazard is recognized and PPE is required. However, when PPE is not required and the employee elects to wear his or her own PPE, the manager directing activities must ensure that the employee is properly trained in the fitting, donning, doffing, cleaning, and maintenance of his or her employee-owned equipment.
- F. Make employees aware that they are responsible for PPE maintenance, care, and proper use. Employees must inform their supervisors when a need arises to use PPE for which the employee has not received training, or when a condition exists where adequate PPE is not available.
- G. Conduct and document employee training.
 - 1. Train all employees who are required to wear PPE.
 - 2. Require that training includes:
 - a. When PPE is to be worn.
 - b. The type of PPE necessary for the task to be completed.
 - c. How to properly don, doff, adjust, and wear PPE.
 - d. Limitations of PPE.
 - e. Proper care, maintenance, useful life and disposal of PPE.
 - 3. Conduct training before PPE is assigned.
 - 4. Provide refresher training when:
 - a. The workplace changes, rendering previous PPE and training obsolete.
 - b. New types of PPE are assigned to the worker.
 - c. The worker cannot demonstrate competency in PPE use.
 - 5. Keep written records of the employees trained and type of training provided, including the date of training.

URS Safety Management Standard
Personal Protective Equipment

H. PPE Specific Information

1. Head Protection

- a. Use hard hats in areas where there is the possible danger of head injury from the impact of falling or flying objects, striking against objects, electrical shock and/or burns, or any combination of these hazards. Hard hats will be worn when required by site safety procedures, client/site requirements, or when posted as an entry requirement.
- b. Adjust the hard hat suspension to fit the wearer and to keep the shell a minimum of 1.25 inches (3.2 cm) above the wearer's head. Do not store materials in the suspension. Cold weather liners and perspiration control bands may be utilized within the hard hat unless specifically excluded by the manufacturer.
- c. Wear hard hats in the forward position unless written verification and instructions from the hard hat manufacturer indicate your hard hat model has been tested and found to be compliant when worn backwards.
- d. Type I helmets are designed to protect the employee from impact and penetration caused by objects hitting the top of the head; Type II helmets extend this protection to the sides of the head as well.
- e. Class G (General) helmets provide protection against impact, penetration, and limited electrical hazards up to 2,200 volts. Class E (Electrical) helmets meet the same criteria, but electrical protection is increased to 20,000 volts. Class C (Conductive) helmets only provide impact and penetration protection.
- f. Do not use bump caps as protection against head injury, except when the only potential hazard is striking against objects and the use has been approved a Business, Country, Group, Regional Business Unit (RBU), or Strategic Business Unit (SBU) Health, Safety and Environment Manager.
- g. Do not alter hard hats in a way that will downgrade their efficiency. Typical prohibited alterations include painting,

URS Safety Management Standard
Personal Protective Equipment

drilling holes in shell, application of metal jewelry, etc. Replace hats with these alterations or with excessive scratches.

- h. Wear integral chinstraps when working in high-wind conditions or near helicopters.
- i. Inspect hard hats before use and remove from service if any of the following are observed: cracking, tearing, fraying, chalking, and flaking.
- j. Remove hard hats and their components from service and replace as recommended by the manufacturer. Hard hats must be replaced after no more than 5 years.

2. Hearing Protection

- a. Provide hearing protection in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. Each task in the work area will be evaluated for potential worker noise exposure as required.
- b. Review SMS 026 – Noise and Hearing Conservation – for additional information.

3. Eye and Face Protection

- a. Use eye and/or face protection when machines or operations create the risk of eye and/or face injuries due to physical, chemical, and/or radiation sources. Safety glasses will be worn when required by site safety procedures, client/site requirements, or when posted as an entry requirement.
- b. Provide safety glasses that can be worn over corrective spectacles for employees whose vision requires the use of corrective lenses. Employees will consult with the applicable safety representative or project managers for policies on reimbursement for prescription safety glasses.
- c. Do not use of sunglasses in place of required safety glasses. Heavily tinted safety glasses will only be used in outdoor areas with suitable lighting. Colored or lightly tinted or gradient lenses may be used indoors as appropriate to the work conditions.

URS Safety Management Standard
Personal Protective Equipment

- d. Tasks involving potential projectiles (e.g., chipping, grinding and cutting) will require face shields over safety goggles. Tasks requiring power washing or handling corrosive chemicals will require a face shield over safety goggles. For welding tasks, refer to Supplemental Information B for lens selection criteria.
 - e. Consult Supplemental Information A for additional information on types of eye and face protection and their various uses.
4. Hand Protection
- a. Wear gloves when the hands are exposed to hazards such as, but not limited to, chemical absorption, cuts or lacerations, abrasions, punctures, chemical burns, thermal burns, vibration, or temperature extremes.
 - b. Gloves must always be provided to workers for tasks with potential hand hazards.
 - c. Identify hand hazards during job or task hazard analysis. A supply of appropriate gloves in various sizes must be provided to workers assigned to work on that task.
 - d. Inspect chemical gloves for degradation or tears prior to use. Do not remove chemical gloves from the work area if it is visibly contaminated. Chemical gloves may be decontaminated or disposed of according to specified procedures. In some cases, inner disposable chemical gloves (e.g., nitrile) will be required for protection of hands during removal of contaminated gloves.
 - e. Select chemical-resistant gloves using manufacturer's hazard-based selection programs or other published guides that identify compatibility of glove material with chemical hazards. Selection must also consider physical requirements of the task with regard to puncture resistance and need for flexibility and dexterity in performing the task.
 - f. Review SMS 064 – Hand Safety – for additional information.

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Personal Protective Equipment

5. Foot Protection

- a. Wear appropriate specialized protective footwear in the following environments:
 - i. Using harmful corrosive substances or processes.
 - ii. Having a high probability of puncture or crushing injuries.
 - iii. Performing regular assembly or disassembly of heavy system components.
 - iv. Working in wet conditions.
 - v. Working in extreme cold.
 - vi. Working around exposed electrical wires or connections.
 - vii. When using hand-operated compactors, snow blowers, pressure washers, or steam cleaners.
 - viii. Other activities or areas as designated by supervisors or safety personnel.
- b. Employees assigned to field projects who are not required to wear specified protective footwear (e.g., steel-toed boots, metatarsal protection, rubber boots, insulated boots, etc.) will wear substantial leather, high-sided work boots. Shoes (leather, canvas, tennis, deck, or other types of material), sandals, high-heeled shoes, etc., are not allowed on field project sites.

I. Maintain Protective Equipment

- 1. Check PPE for damage, cracks, and wear prior to each use. Replace or repair equipment not found in good condition.
- 2. Decontaminate non-disposable PPE with appropriate cleaner, as necessary, to prevent degradation of the equipment. Staff will remove any non-impermeable PPE/clothing that becomes contaminated with hazardous substances. These instructions are reiterated in the emergency decontamination procedures in the Health and Safety Plans.

URS Safety Management Standard **Personal Protective Equipment**

- J. Periodically inspect worksites where employees are using PPE using Attachment 029-2 NA. Regularity of inspections should be determined by the project manager and/or site safety representative.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Completed Hazard Assessment Certification Forms (Attachment 029-1 NA).
- B. Completed Personal Protective Equipment Inspection Sheet (Attachment 029-2 NA).
- C. Documentation of employee training.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Standards – [Personal Protective Equipment – 29 Code of Federal Regulations \(CFR\)1910, Subpart I](#)
- B. U.S. OSHA Construction Standard - [Personal Protective Equipment – 29 CFR 1926 Subpart E](#)
- C. [U.S. OSHA Technical Links – Personal Protective Equipment](#)
- D. American National Standards Institute – [ANSI Z89.1-2003](#), Protective Headwear
- E. American National Standards Institute – ANSI Z87.1-2003 – Eye and Face Protection
- F. American National Standards Institute /International Safety Equipment Association, ANSI/ISEA 107 - 2004 – Standard for High-Visibility Safety Apparel
- G. American National Standards Institute – ANSI Z41-1991, Protective Footwear Requirements, American Society for Testing and Materials, ASTM F-2414-2005, Standard Test Methods for Foot Protection, ASTM F-2413-2005, Standard Specification for Performance Requirements for Protective Footwear

URS Safety Management Standard
Personal Protective Equipment

- H. American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) – 105-2011 – American National Standard for Hand Protection Selection Criteria"
- I. *Quick Selection Guide to Chemical Protective Clothing*, K Forsberg and S.Z. Mansdorf, Wiley Interscience, 2002
- J. Best Manufacturing Co. <http://www.bestglove.com/>. Information on chemical resistant gloves.
- K. [SMS 040](#) – Fall Protection
- L. [SMS 026](#) – Noise and Hearing Conservation
- M. [SMS 064](#) – Hand Safety
- N. [Attachment 029-1 NA](#) – Hazard Assessment Form
- O. [Attachment 029-2 NA](#) – Personal Protective Equipment Inspection Form

7. Supplemental Information

- A. [Welding Lens Selector](#)
- B. [Traffic Control Class Guidelines and Scenarios](#)



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
Revision 9: March 2012

Location: _____ Job No.: _____

Date: _____ Assessment conducted by: _____

Specific tasks performed at this location: _____

If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.

Overhead Hazards

- | | | |
|-------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------|
| 1. Suspended/elevated loads, beams, or objects that could fall or strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |
| 2. Flying objects that could strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |
| 3. Energized wires or equipment that could strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANZI Z89, Class G or E (dependent on potential voltage) |
| 4. Sharp objects or corners at head level | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |

Eye Hazards

- | | | |
|------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 5. Chemical splashes or irritating mists | <input type="checkbox"/> Yes <input type="checkbox"/> No | See Supplemental Information A for additional information |
| 6. Excessive dust | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety glasses or goggles |
| 7. Smoke and/or fumes | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles |
| 8. Welding operations | <input type="checkbox"/> Yes <input type="checkbox"/> No | Welding goggles; See Supplemental Information A and B for additional information |
| 9. Lasers/optical radiation | <input type="checkbox"/> Yes <input type="checkbox"/> No | Have URS HSE Representative assist you in proper selection |
| 10. Projectiles | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles plus face shield |
| 11. Sawing, cutting, chipping, and/or grinding | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles plus face shield; See Supplemental Information A for additional information |

Face Hazards

- | | | |
|-------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 12. Chemical splashes or irritating mists | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles; See Supplemental Information A for more information; add face shield if irritating or corrosive |
| 13. Welding operations | <input type="checkbox"/> Yes <input type="checkbox"/> No | Welding goggles or welding helmet; see Supplemental Information A and B for additional information |
| 14. Projectiles | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles plus face shield |

Hand Hazards

- | | | |
|----------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 15. Chemical exposure | <input type="checkbox"/> Yes <input type="checkbox"/> No | Use chemical-resistant gloves specific to hazard; consult MSDS, chemical hazard guide, or HSE Representative |
| 16. Sharp edges, splinters, etc. | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather or Kevlar gloves |
| 17. Temperature extremes – heat | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather gloves, welder's gloves, hot mill gloves |



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
Revision 9: March 2012

If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.

- | | | |
|------------------------------------------|----------------------------------------------------------|-----------------------------------------------|
| 18. Temperature extremes – cold | <input type="checkbox"/> Yes <input type="checkbox"/> No | Insulated gloves |
| 19. Blood, fungus, biological agents | <input type="checkbox"/> Yes <input type="checkbox"/> No | Nitrile gloves |
| 20. Exposure to live electrical currents | <input type="checkbox"/> Yes <input type="checkbox"/> No | Electrical gloves; consult HSE representative |
| 21. Sharp tools, machine parts, etc. | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather or Kevlar gloves |
| 22. Material handling | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather gloves |

Foot Hazards

- | | | |
|-------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 23. Heavy materials (greater than 50 pounds) handled by employees | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots |
| 24. Potential to crush whole foot | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots with metatarsal guard |
| 25. Sharp edges or points (puncture risk) | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots |
| 26. Exposure to electrical hazards | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots with:

Conductive - Protects the wearer in an environment where the accumulation of static electricity on the body is a hazard.

Static dissipative - Reduces the accumulation of excess static electricity by conducting body charge to ground while maintaining a sufficiently high level of resistance.

Electrical hazard - Provides a secondary source of protection against accidental contact with live electrical circuits, electrically energized conductors, parts or apparatus, and is manufactured with non-conductive electrical shock resistant soles and heels. |
| 27. Slippery conditions | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber-soled boots or grips |
| 28. Chemical contamination | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber, PVC, or polyurethane boots or boot covers with puncture and protective toe if task required |
| 29. Wet conditions | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber boots or boot covers |
| 30. Construction/demolition | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety boots with metatarsal guard if foot-crushing hazard exists |

Fall Hazards

- | | | |
|---------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------|
| 31. Elevations above 4 feet (general industry) or 6 feet (construction) without guardrails | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 32. Suspended scaffolds, boatswain's chairs, float scaffolds, or suspended staging | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 33. Working in trees | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 34. Working in vehicle-mounted elevating work platforms (e.g., bucket trucks, aerial lifts) | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |



Health, Safety and Environment
**HAZARD ASSESSMENT
CERTIFICATION FORM**

Attachment 029-1 NA

Issue Date: July 2000
Revision 9: March 2012

Water Hazards

35. Working on or above water where a risk of drowning exist Yes No U.S. Coast Guard approved personal floatation device; Type I, II, or III

Excessive Heat or Flame

36. Full body chemical protective clothing in temperatures greater than 80 °F Yes No Cooling vest
37. Work around molten metal or flame Yes No Nomex or heat reflective clothing
38. Welding activities Yes No Welding leathers for those areas that are exposed to flame, spark, or molten metal

Respiratory Hazards

39. Airborne particulates, gases, vapors, or mists in excess of established exposure limits Yes No Refer to SMS 042 or URS HSE Representative for respirator selection guidance

Excessive Noise

40. Exposure to noise Yes No Ear plugs, muffs or both

Body and Leg Protection

41. Chemical exposure Yes No Contact URS HSE Representative for assistance in proper selection
42. Using chainsaw, cutting brush Yes No Chainsaw chaps
43. Exposure to snakes Yes No Snake chaps
44. Exposure to vehicle traffic or heavy equipment Yes No See SMS 032 and SMS 029 NA – Supplemental Information C for additional guidance

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on: _____

Name _____ Signature _____



Health, Safety and Environment
**PERSONAL PROTECTIVE EQUIPMENT
INSPECTION SHEET**

Attachment 029-2 NA
Issue Date: July 2000
Revision 9: March 2012

Name of Inspector _____ Date Inspected _____

Hard Hats	
1. The brim or shell does not show signs of exposure and excessive wear, loss of surface gloss, chalking, or flaking.	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Suspension system in hard hat does not show signs of deterioration, including cracking, tearing, or fraying.	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. The brim or shell is not cracked, perforated, or deformed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Employees use hard hats in marked areas.	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Areas requiring hard hat usage are marked.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Shoes	
6. Safety shoes used by employees do not show signs of excessive wear.	<input type="checkbox"/> Yes <input type="checkbox"/> No
7. Areas requiring safety shoes are marked.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Work Gloves	
8. Gloves are available and worn when needed.	<input type="checkbox"/> Yes <input type="checkbox"/> No
9. Gloves are appropriate for the task.	<input type="checkbox"/> Yes <input type="checkbox"/> No
10. Gloves do not show signs of excessive wear such as cracks, scrapes, or lacerations, thinning or discoloration, or break-through to the skin.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Protective Clothing	
11. Protective clothing (including traffic control apparel) is worn by employees when required.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Hearing Protection	
12. Noise hazard areas are posted.	<input type="checkbox"/> Yes <input type="checkbox"/> No
13. Employees are using earplugs or muffs when using noise producing equipment or working in posted noise hazard areas.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Safety Glasses/Goggles	
14. Eye hazard areas are marked or posted.	<input type="checkbox"/> Yes <input type="checkbox"/> No
15. Employees use safety glasses/goggles when working in eye hazard areas or working with equipment that produces an eye hazard.	<input type="checkbox"/> Yes <input type="checkbox"/> No
16. Face shields are used when required and worn over safety goggles.	<input type="checkbox"/> Yes <input type="checkbox"/> No


REMARKS (All "No" answers indicate a hazard which needs to be fixed.)



Health, Safety and Environment
WELDING LENS SELECTION

SMS 029 NA
Supplemental Information A
Issue Date: February 2009
Revision 2: March 2012

Operations	Electrode Size (1/32")	Arc Current	Minimum Protective Shade
Shielded metal arc welding (SMAW)	Less than 3	Less than 60	7
SMAW	3 – 5	60 – 160	8
SMAW	5 – 8	160 – 250	10
SMAW	More than 8	250 – 550	11
Gas metal arc welding and flux cored arc welding		Less than 60	7
Gas metal arc welding and flux cored arc welding		60 - 160	10
Gas metal arc welding and flux cored arc welding		160 – 250	10
Gas metal arc welding and flux cored arc welding		250 - 500	10
Gas tungsten arc welding		Less than 50	8
Gas tungsten arc welding		50 – 150	8
Gas tungsten arc welding		150 - 500	10
Air carbon arc cutting	(light)	Less than 500	10
Air carbon arc cutting	(heavy)	500 – 1000	11
Gas tungsten arc welding		Less than 20	8
Gas tungsten arc welding		20 – 100	8
Gas tungsten arc welding		100 – 400	10
Gas tungsten arc welding		400 – 800	11
Plasma arc cutting	(light)	Less than 300	8
Plasma arc cutting	(medium)	300 – 400	9
Plasma arc cutting	(heavy)	400 -800	10
Torch blazing			3
Torch soldering			2
Carbon arc welding			14
Gas welding			5 – 6
Oxygen cutting			3 - 5


	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">TRAFFIC CONTROL CLASS GUIDELINES AND SCENARIOS</p>	<p style="text-align: right;">SMS 029 NA Supplemental Information B</p> <p style="text-align: right;">Issue Date: February 2009 Revision 2: March 2012</p>
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A. Class 1 Safety Apparel

1. Class 1 safety apparel provides the minimum amount of required material to differentiate the wearer from the work environment.
2. At a minimum, this shall include 217 square inches (in²), or 0.14 square meters (m²), of fluorescent yellow-green, orange-red, or red background materials combined with 155 in² (0.10 m²) retro-reflective material. As an alternative, the apparel can have 310 in² (0.20 m²) of combined-performance material (i.e., materials that are both retro-reflective and fluorescent).
3. Class 1 safety apparel typically consists of a sleeveless traffic vest with retro-reflective bands no less than 0.98 inches (25 mm) in width.
4. Those occupational activities under which Class 1 safety apparel is typically used:
 - a. Permit full and undivided attention to approaching traffic;
 - b. Provide ample separation of the pedestrian worker from conflicting vehicle traffic; and
 - c. Permit optimum conspicuity in backgrounds that are not complex with vehicle and moving equipment speeds not exceeding 25 miles per hour (mph), or 40 kilometers per hour (kph).
5. Examples of pedestrian workers who could work in these situations may include:
 - a. Workers directing vehicle operators to parking/service locations;
 - b. Workers exposed to the hazards of warehouse equipment traffic;
 - c. Roadside “right-of-way” or sidewalk maintenance workers; and
 - d. Delivery vehicle drivers.

B. Class 2 Safety Apparel


1. Class 2 safety apparel provides superior visibility for the wearers by the additional coverage of the torso and is more conspicuous than Class 1.
2. At a minimum, this shall include 775 in² (0.50 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 201 in² (0.13 m²) retro-reflective material. Combined-performance materials may not be used without background materials in Class 2.
3. Class 2 safety apparel typically consists of a full-torso sleeveless traffic vest with retro-reflective bands no less than 1.38 inches (35 mm) in width.
4. Those occupational activities under which Class 2 safety apparel is typically used:
 - a. Greater visibility is desired during inclement weather conditions;
 - b. Complex backgrounds are present;
 - c. Employees are performing tasks which divert attention from approaching vehicle traffic;

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">TRAFFIC CONTROL CLASS GUIDELINES AND SCENARIOS</p>	<p style="text-align: right;">SMS 029 NA Supplemental Information B</p> <p style="text-align: right;">Issue Date: February 2009 Revision 2: March 2012</p>
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- d. Work activities take place in close proximity to vehicle traffic; and
 - e. Vehicle and moving equipment speeds exceed 25 mph (40 kph).
5. Examples of pedestrian workers who could work in these situations may include:
- a. Roadway construction workers;
 - b. Utility workers;
 - c. Survey crews;
 - d. Railway workers;
 - e. Forestry workers;
 - f. Parking and/or toll gate personnel;
 - g. Airport baggage handlers/ground crew;
 - h. Emergency response personnel;
 - i. Law enforcement personnel; and
 - j. Accident site investigators.

C. Class 3 Safety Apparel

1. Class 3 safety apparel offers greater visibility to the wearer in both complex backgrounds and through a full range of body movements. Visibility is enhanced beyond Class 2 by the enhancement of background and reflective materials to the arms and/or legs.
2. At a minimum, this shall include 1240 in² (0.80 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 310 in² (0.20 m²) retro-reflective material. Combined-performance materials may not be used without background materials in Class 3.
3. Class 3 safety apparel typically consists of a coveralls, jumpsuits, long or short-sleeved jackets, or long-sleeved shirts with retro-reflective bands no less than 1.97 inches (50 mm) in width. A sleeveless garment or vest alone shall not be considered Class 3 apparel.
4. Those occupational activities under which Class 3 safety apparel is typically used:
 - a. Workers are exposed to significantly high vehicle speeds and/or reduced sight distances (note that several sources have interpreted the vehicle speed requirements as 50 mph (80 kph) or more);
 - b. The worker and vehicle operator have high task loads, clearly placing the worker in danger; or
 - c. The wearer must be conspicuous through a full range of body motions at a minimum of 1280 feet (390 m) and must be identifiable as a person.
5. Examples of pedestrian workers who could work in these situations may include:
 - a. Roadway construction personnel;
 - b. Utility workers;

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">TRAFFIC CONTROL CLASS GUIDELINES AND SCENARIOS</p>	<p style="text-align: right;">SMS 029 NA Supplemental Information B</p> <p style="text-align: right;">Issue Date: February 2009 Revision 2: March 2012</p>
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- c. Survey crews;
- d. Emergency response personnel; and
- e. Flagging crews.

D. Class E Safety Apparel

1. Class E apparel includes trousers or shorts which are part of a Class 3 apparel ensemble. Frequently a Class 2 vest is paired with Class E trousers, creating an overall ensemble which meets Class 3 apparel requirements. Class E garments are not intended to be worn without Class 2 or 3 garments.
2. At a minimum, Class E trousers shall have 465 in² (0.30 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 108 in² (0.07 m²) retro-reflective material. Retro-reflective material shall encircle each leg (360° of visibility) and be placed not less than 1.97 inches (50 mm) above the bottom leg of the trouser.
3. At a minimum, Class E shorts shall have 465 in² (0.30 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 108 in² (0.07 m²) retro-reflective material. Retro-reflective material shall encircle each leg.

E. Headwear

1. Headwear is considered an important accessory and compliments the overall visibility of the wearer. High-visibility headwear enhances visibility to the head of a moving worker in daylight and helps define the shape of the human form during nighttime exposures.
2. At a minimum, high-visibility headwear shall have 78 in² (0.05 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 10 in² (0.0065 m²) retro-reflective material. As an alternative, the headwear can have 78 in² (0.05 m²) of combined-performance material.

URS SAFETY MANAGEMENT STANDARD

Sanitation

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to provide employees with appropriate personal hygiene facilities, including toilets, wash rooms, and eating facilities, to protect employees from unsanitary conditions.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 030 NA](#) – North America; Australia / New Zealand

[SMS 030 INT](#) – International Operations (including Europe, Asia, South America and Africa)

URS SAFETY MANAGEMENT STANDARD

Sanitation

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to provide employees with appropriate personal hygiene facilities, including toilets, wash rooms, and eating facilities, to protect employees from unsanitary conditions.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility or site.

4. Requirements

A. Prior to the start of site activities, ensure the availability of adequate toilet and wash facilities. Note: Mobile crews having transportation readily available (within 5 minute travel time) to nearby toilet facilities need not be provided with facilities.

1. Flush toilets will be used where available.
2. For job sites without flush toilets readily available, one of the following must be provided:
 - a. Chemical toilets.
 - b. Combustion toilets.
 - c. Recirculation toilets.
3. Other than construction sites, toilets will be provided for employees of each sex at sites according to the following ratio:

Number of Employees	Minimum # of toilets ⁽¹⁾
1 to 15	1
16 to 35	2
36 to 55	3
56 to 80	4
81 to 110	5
111 to 150	6
Over 150	⁽²⁾

Notes:

(1) Where toilet facilities will not be used by women, urinals may be provided instead of the minimum specified.

(2) One (1) additional fixture for each additional 40 employees.

URS SAFETY MANAGEMENT STANDARD
Sanitation

- B. A means for washing hands must be provided next to or near toilet areas.
- C. For facilities under URS control:
 - 1. Maintain toilets and toilet area in good repair and in a clean and sanitary condition. Refer to SMS 021 – Housekeeping.
 - 2. Provide paper towels and soap or other suitable sanitizing material for washing hands.
 - 3. Construct toilets so that the interior is lighted, by artificial or natural light, adequate ventilation is provided, and all windows and vents are screened.
- D. Maintain availability and cleanliness of drinking (potable) water.
 - 1. Use backflow prevention devices, testing, and administrative controls for all potable water supply branches. Maintain backflow prevention devices in a sanitary condition.
 - 2. Keep water coolers and water dispensers in a sanitary condition and filled only with potable water. Clearly mark potable drinking water containers as “Drinking Water.”
 - 3. Clean and sanitize water containers daily. Tightly close, seal, date, and mark containers as to the contents. Provide containers with a tap, and refill daily.
 - 4. Provide fountain-type dispensers or one-use cups at each water dispenser. Provide a waste receptacle where disposable cups are used.
 - 5. Do not use common drinking cups.
 - 6. Conspicuously post outlets for non-potable water such as water for industrial or firefighting purposes (e.g., Danger – Water Unfit for Drinking, Washing, or Cooking).
 - 7. Laboratory-test drinking water obtained from streams, wells, or other temporary sources in accordance with federal, state, or local regulations, or often enough to ensure it is suitable for consumption. Maintain records of testing reports and results.

URS SAFETY MANAGEMENT STANDARD
Sanitation

E. Eating Facilities

1. Operate and maintain food dispensing facilities established by URS in compliance with applicable health and sanitation regulations.
2. Ensure that buildings housing these facilities are floored completely, painted, well lighted, heated, ventilated, fly proof, and sanitary. Equip doors and windows with screens.
3. Use microwave ovens for food only.
4. Use refrigerators designated for food storage for food only (i.e., no chemical or samples storage).
5. Prohibit workers from eating and drinking or storing foods and drinks in areas where there is a potential for contamination.
6. Take positive control measures for protection against vermin, insects, and rodents.
7. Provide an ample supply of hot and cold water at all times in mess halls.
8. Clean break rooms /lunchrooms periodically. Refer to SMS 021 – Housekeeping.

F. Washing Facilities

1. Maintained each washing facility in a sanitary condition, and provide adequate water, soap, individual towels of cloth or paper, and covered receptacles for disposal of waste.
2. Provide emergency showers and eyewash facilities as required. Refer to SMS 065 – Injury Management.
3. Provide at least one shower for each 30 employees in construction camps. The use of a common towel is prohibited.

G. Waste Management:

1. Release sanitary sewage into sanitary sewer lines or to other proper disposal channels.
2. Do not dispose of garbage, refuse, or sewage in lakes, reservoirs, rivers, streams, or ditches.

URS SAFETY MANAGEMENT STANDARD
Sanitation

3. Do not discharge hazardous waste into the sanitary sewer or storm sewer system.
4. Collect garbage and trash daily.
 - a. Provide lids for garbage containers located outside buildings, and keep them closed. Transport garbage offsite at least weekly.
 - b. Remove garbage from the site daily at remote field sites where wild animals are a hazard. Do not let garbage remain on site overnight.

H. Change Rooms

Provide heated and ventilated change rooms for changing, hanging, and/or drying clothing for operations subjecting workers to prolonged wetting or contact with hazardous materials.

I. Sleeping Facilities

1. Keep temporary sleeping quarters heated, ventilated, lighted, and clean. Screen all doors and windows.
2. Keep clean and sanitary, and periodically disinfect bunkhouses, bedding, and furniture.

J. Notify property manager of sanitation issues for sites not under URS control.

K. Personal Hygiene

Wash hands and face before eating, drinking, smoking, and using facilities.

L. Inspect work sites periodically in accordance with Attachment 030-1 NA.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Completed inspection sheets.

URS SAFETY MANAGEMENT STANDARD
Sanitation

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Construction Standard – [Sanitation – 29 Code of Federal Regulations \(CFR\) 1926.51](#)
- B. U.S. OSHA General Industry Standard – [Sanitation – 29 CFR 1910.141](#)
- C. [SMS 021](#) - Housekeeping
- D. [SMS 065](#) – Injury Management
- E. [Attachment 030-1 NA](#) - Sanitation Inspection Sheet



Health, Safety and Environment
SANITATION INSPECTION SHEET

Attachment 030-1 NA
Issue Date: June 1999
Revision 4: September 2011

Location: _____ Job No: _____

Date Inspected: _____ Name of Inspector: _____

Toilets

- 1. Are there an adequate number of toilets on site? Yes No NA
1 to 15 employees = 1 toilet
16 to 35 employees = 2 toilets
36 to 55 employees = 3 toilets
56 to 80 employees = 4 toilets
81 to 110 employees = 5 toilets
- 2. Toilets are in clean condition. Yes No NA
- 3. Toilet paper is provided. Yes No NA
- 4. Toilet areas are clean and sanitary. Yes No NA

Hand Washing Facilities

- 5. Hand washing facilities are provided near toilets. Yes No NA
- 6. Paper towels and soap are provided. Yes No NA

Drinking Water

- 7. Drinking water is provided on site. Yes No NA
- 8. Disposable cups are provided or fountain-type dispenser is provided. Yes No NA
- 9. Drinking water containers are kept clean and tightly closed or covered. Yes No NA

Break Rooms

- 10. Break rooms or eating areas are kept clean. Yes No NA
- 11. Microwaves are used for food only. Yes No NA
- 12. Microwave ovens are kept clean. Yes No NA
- 13. Refrigerators are kept clean. Yes No NA
- 14. Refrigerators are used to store food only. Yes No NA

Vermin

- 15. Rats, mice, and other vermin are not living within buildings. Yes No NA
- 16. Cockroaches and fleas are not thriving within buildings. Yes No NA

Employee Compliance

- 17. Employees only eat/drink in areas free from contamination. Yes No NA
- 18. Employees wash hands/face prior to eating, drinking, smoking. Yes No NA

REMARKS:

URS SAFETY MANAGEMENT STANDARD

Work Zone Traffic Control

1. Applicability

This standard applies to the activities of URS Corporation and its subsidiary companies.

2. Purpose and Scope

This purpose of this standard is to protect personnel from the hazards associated with work performed on or next to highways and roads.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 032 NA](#) – North America

[SMS 032 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-032](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Work Zone Traffic Control

1. Applicability

This standard applies to those activities of URS Corporation and its subsidiary companies involving work performed on roads, highways, and similar areas where motor vehicles may be a hazard, and where URS is responsible for traffic control.

2. Purpose and Scope

This standard is intended to protect personnel from the hazards associated with work performed on or next to highways and roads.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

- A. Review the project in the planning phase to determine if any work will be performed on or adjacent to any road that will disrupt normal traffic flow.
- B. Where project operations will be performed on or adjacent to roadways, plan work to interfere as little as possible with traffic, and to provide and maintain ingress and egress for all residences and places of business that may be impacted.
- C. When required by local regulations or when there is a potential to disrupt traffic, a traffic control plan, in detail appropriate to the complexity of the project, must be prepared by a competent person and understood by all responsible parties before activities begin. Any changes in the traffic control plan should be approved by an official trained in safe traffic control practices.
 1. Competent persons are those who are knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed, and who have the authority to propose and implement corrective measures to eliminate hazardous situations associated with temporary traffic control.
 2. Design traffic control plans to meet requirements set forth in Part 6 of the *Manual on Uniform Traffic Control Devices (MUTCD)*, as well as those rules set by state, county, and cities in which work is

URS SAFETY MANAGEMENT STANDARD
Work Zone Traffic Control

performed. At a minimum, the plan will include information on the following, as needed:

- a. Pedestrian and worker safety;
 - b. Temporary traffic control elements, including (but not limited to) temporary traffic control zones, advance warning zones, transition areas, activity areas, termination areas, tapers, buffers, detours, etc.;
 - c. Flagger controls, including high-visibility safety apparel, hand-signaling devices, and flagger procedures;
 - d. Temporary traffic control zone devices, including (but not limited to) signs, illuminated/flashing panels, warning devices, channelizing devices, drums, barricades, pavement markings; and
 - e. Temporary traffic control zone activities, including scope of work, duration, location, and portions of the roadway/shoulder affected.
- D. Submit the traffic control plan to the applicable road authority for approval.
- E. A Worksite Traffic Control Supervisor, certified by the American Traffic Safety Services Association (ATSSA) or an equivalent organization will be responsible for initiating, installing, and maintaining all traffic control devices. The Worksite Traffic Control Supervisor will also directly supervise all project flaggers.
1. Certified flaggers must attend an 8-hour work-zone traffic control course as taught by an ATSSA certified instructor (or equivalent).
- F. Execute the traffic control plan developed for the job site.
- G. Require all personnel exposed to the risks of moving roadway traffic or construction equipment to wear hardhats, safety glasses, sleeved shirts, long pants, work boots, and the appropriate class of high-visibility safety apparel. Safety apparel background material must be either fluorescent orange-red or fluorescent yellow-green, with accompanying reflective material of orange, yellow, white, silver, or yellow-green, or fluorescent versions of these colors.

URS SAFETY MANAGEMENT STANDARD

Work Zone Traffic Control

H. Wear high-visibility clothing as follows:

1. Class 2 safety apparel (as defined by American National Standards Institute/International Safety Equipment Association [ANSI/ISEA]) is required for all activities where employees could be exposed to traffic or construction equipment in work zones.
2. Apparel must be upgraded to Class 3 during night work and where visibility is impaired due to weather, limited sight distances, complicated background or other causes.
3. Refer to SMS 029 – Personal Protective Equipment for suggested apparel for each class.

F. Perform inspection and maintenance of the Traffic Control devices using Attachment 032-1 NA daily, or at the beginning of each shift.

5. Documentation Summary

The following information will be maintained in the project file:

- A. Copies of traffic control plans used on site.
- B. Training certificates for Traffic Control Supervisors and flaggers.
- C. Inspection records (Attachment 032-1 NA).

6. Resources

- A. Part VI of the [Manual on Uniform Traffic Control Devices](#) (MUTCD) – 2009 Edition
- B. [American Traffic Safety Services Association](#)
- C. [ATTSA Flagger Train-the-Trainer Program](#)
- D. [ANSI/ISEA 107-2004](#) – Standard for High-Visibility Safety Apparel
- E. [High Visibility Apparel in Work Zones](#) – Work Zone Safety
- F. [SMS 029](#) – Personal Protective Equipment
- I. [Attachment 032-1](#) – Traffic Control Device Inspection Checklist



Health, Safety, and Environment
**TRAFFIC CONTROL DEVICE
INSPECTION CHECKLIST**

Attachment 032-1 NA

Issue Date: June 1999
Revision 4: September 2012

Project Name: _____

Project Number: _____

Location Inspected: _____

1. **Are any devices missing?** Yes No

Do any devices need repair? Yes No

Were all replaced or repaired? Yes No

Notes:

2. **Are any lights (flashers, etc.) not functioning?** Yes No

Were they all replaced or repaired? Yes No

Notes:

3. **Are any devices improperly placed?** Yes No

Were all positions corrected? Yes No

Notes:

4. **Do any devices need cleaning?** Yes No

Were all devices cleaned? Yes No

Notes:

5. **Are flaggers certified and flagging appropriately?** Yes No

Notes:

Additional Comments:

The above check was completed by: _____

Date: _____ Time: _____

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The primary purpose of this standard is to establish operating requirements that will permit employees to work safely in the vicinity of electrical, natural gas, fuel, water, and other utility systems and installations. The secondary purpose is to prevent economic damage to utility systems from operations associated with project-related activities.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 034 NA](#) – North America

[SMS 034 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-034](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where personnel may encounter subsurface or overhead utilities.

2. Purpose and Scope

Many field activities are conducted near aboveground and underground utilities. The primary purpose of this standard is to establish operating requirements that will permit employees to work safely in the vicinity of electrical, natural gas, fuel, water, and other utility systems and installations. The secondary purpose is to prevent economic damage to utility systems from operations associated with project-related activities.

The term *utility clearance* includes the following:

- A. The positive locating of utility systems in or near the work area.
- B. A signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.

In some cases, utility representatives may deem it appropriate or necessary to use insulating blankets to isolate a power line. This is an acceptable alternative to positive de-energizing; however, only utility representatives can make the determination.

"Contact" with overhead power lines is considered to occur when equipment is closer to power lines than permitted by the criteria in the table in Section 4.C.2.b. (See note for operations in the United Kingdom).

On-site utilities, including emergency shut-off locations, shall be depicted on a utility drawing or plot plan. Emergency shut-off locations shall be verified before work activities commence.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

- A. Time for Completion

Complete utility clearances prior to the start of any work in the area of the utility that could feasibly result in contact with or damage to that utility.

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

B. Local Regulations

Research local and state codes and regulations regarding utility locating and isolation requirements. Utility companies and locating services are among the appropriate resources.

C. Overhead Power Lines

1. Proximity to Power Lines

No work is to be conducted within 50 feet (15 meters) of overhead power lines without first contacting the utility company to determine the voltage of the system and the height (at the lowest point) of the line has been measured. No aspect of any piece of equipment is to be operated within 50 feet (15 meters) of overhead power lines without first making this determination.

An exclusion zone shall be created at ground level beneath and 50 feet (15 meters) perpendicular to the overhead power lines on each side. This exclusion zone shall be demarcated with visual indicators (e.g., signage, flagging, paint, cones). No equipment shall enter the exclusion zone without approval from URS site management.

2. Operations adjacent to overhead power lines are *prohibited* unless one of the following conditions is satisfied:

- a. Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.
- b. The minimum clearance from energized overhead lines is presented in the following table, or the equipment will be repositioned and blocked so that no part, including cables, can come within the minimum clearances listed in the table.

Minimum Distances from Power Lines	
Nominal System (kilovolt, kV)	Minimum Required Distance
0–50	10 feet (3 meters)
51–100	12 feet (3.6 meters)
101–200	15 feet (4.6 meters)
201–300	20 feet (6.1 meters)
301–500	25 feet (7.6 meters)
501–750	35 feet (10.7 meters)
751–1000	45 feet (13.7 meters)

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

Note: For operations in the United Kingdom, the specific safe distance is determined by the utility company.

- c. The power line(s) has been isolated through the use of insulating blankets, which have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; get this determination in writing with the utility representative's signature.
3. All inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the appropriate URS representative prior to the start of the task that may impact the utility.

D. Underground Utilities

1. Do not begin subsurface work (e.g., trenching, excavation, drilling, etc.) until a check for underground utilities and similar obstructions has been conducted. The use of as-built drawings must be confirmed with additional geophysical or other surveys. Attachment 034-1 NA may be used to verify all utilities have been located prior to performing subsurface work.
2. Contact utility companies or the state/regional utility protection service at least two (2) working days prior to excavation activities to advise them of the proposed work and to ask them to establish the location of the underground utility installations prior to the start of actual excavation. One Call utility location service is available throughout the United States by calling 811. Where these services are unavailable (e.g., private properties), contract with an independent utility locating service to perform an evaluation of subsurface utilities.
3. Obtain utility clearances for subsurface work on both public and private property. Clearances are to be in writing and signed by the party conducting the clearance.
4. Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the URS representative must notify the utility company, utility protection service, or the utility locating service to inform them that the markings have been destroyed.

URS SAFETY MANAGEMENT STANDARD

Utility Clearances and Isolation

5. Do not conduct mechanical-assisted subsurface work (e.g., work using a powered drill rig, mechanical excavator, etc.) within five (5) feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure. Confirm minimum distances for mechanical-assisted subsurface work with the utility owner, as distances beyond this five-foot minimum may be required.
6. Nondestructive clearance techniques (e.g., vacuum extraction or other hand clearing means) are required prior to drilling/excavating in higher risk locations, including chemical plants, retail service stations, or other locations with complex underground utility systems.
7. Subsurface work within five feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure must be done by nondestructive clearing techniques to the point where the obstruction is visually located and exposed. Once the obstruction location is confirmed in this manner, mechanical-assisted work may begin.
8. Reference SMS 013 – Excavation Safety for additional information regarding subsurface operations.

E. Utility Strikes

1. Utility strikes (unplanned contact with utilities resulting in damage to the utility or its protective coating) shall be reported in accordance with SMS 049 – Injury/Illness/Incident Reporting & Notifications.
2. All damaged utilities shall be repaired by a qualified and/or licensed professional.

F. Training

Conduct a briefing for site employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Documents requesting utility clearance.
- B. Documents confirming utility clearance.

URS SAFETY MANAGEMENT STANDARD
Utility Clearances and Isolation

C. Training/briefing documentation of each isolation.

6. Resources

- A. Utility Locating Services (typically under "Utility" in the Yellow Pages)
- B. National Institute for Occupational Safety and Health (NIOSH) Alert – [Preventing Electrocutions from Contact Between Cranes and Power Lines](#)
- C. [One Call Utility Locating List](#)
- D. [National Utility Locating Contractor's Association](#)
- E. [Attachment 034-1](#) – Utility Clearance Checklist
- F. [SMS 013](#) – Excavation Safety
- G. [SMS 049](#) – Injury/Illness/Incident Reporting



Health, Safety and Environment
UTILITY CLEARANCE CHECKLIST

Attachment 034-1 NA

Issue Date: June 1999
Revision 6: September 2011

Project Name:	Project Number:
Project Location:	Client Name:
URS Project Manager Name:	Date Completed:

For any item answered 'No', Project Manager approval required before work can proceed.	
Within the last 10 days, and not less than 72 hours from the initiation of the task, contacts were notified that the public utility locate service (One Call) was made.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Available records have been referenced and a plot plan indicating the location of all underground utilities have been provided and are available for reference at the work site.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Completed Site Walk Over With Site Personnel (site manager, property owner or tenant representative)			
Site Personnel Name:	Site Personnel Signature:		
Does Site Personnel have any additional information regarding site utilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Comment:	
Building Utility Service Line Connections Identified:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Cleared:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Field Observations – Any ** responses must be explained in box below.	
Field walk completed and utilities identified on page 2 of this form are cleared?	<input type="checkbox"/> Yes <input type="checkbox"/> No**
Apparent saw cuts or patches in concrete/pavement?	<input type="checkbox"/> Yes** <input type="checkbox"/> No
Piping along building exterior? Identify purposed and layout.	<input type="checkbox"/> Yes** <input type="checkbox"/> No <input type="checkbox"/> N/A
Manholes, vault covers, drains, pipes present?	<input type="checkbox"/> Yes** <input type="checkbox"/> No
Piping inside of manholes correlate to utility markings?	<input type="checkbox"/> Yes <input type="checkbox"/> No** <input type="checkbox"/> N/A
Clear line-of-sight (equipment/vehicles/snow not blocking view or potential utilities)?	<input type="checkbox"/> Yes <input type="checkbox"/> No**
Work between potential utilities or manholes?	<input type="checkbox"/> Yes** <input type="checkbox"/> No
Work areas clear of overhead utilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No**
All known utilities located on plot/site map for personnel to review?	<input type="checkbox"/> Yes <input type="checkbox"/> No**
Explanations:	

Public Utility Locate (OneCall)			
Date Called:		Called By:	
Ticket Number:		Valid Until:	
Area Requested To Be Cleared:			

Private Utility Locate		
Company Performing Locate:		Date Completed:
Area(s) Requested To Be Cleared (including distance around marked locations):		
Method(s) Used (e.g., GPR, EM):		
Confirm Area(s) Cleared:		



UTILITY CLEARANCE CHECKLIST

OneCall Utilities			Field Observation
Utility	Notified by	Comments	Marked (mains and services)
Electric (Red)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Gas/Petroleum Pipeline (Yellow)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No
Sewer/Drainage (Green)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No
Water (Blue)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No
Communications (Orange)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Other	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above

Utilities Not Identified By OneCall (Includes both Public and Private along with Regional and Site Utilities)			Field Observation
Utility (Colors may vary)	Owner / Contact / Phone #	Notified	Marked
Communications: (Orange) TV, computer, phone, cell towers, site communication, cameras, security, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Electricity: (Red) Mains / Supplies / Interior / Exterior (signs, fuel pumps, low voltage security perimeters, gates, property light posts, equipment, substations, etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Gas: (Yellow) Mains / Supplies / Equipment / Pipelines (Natural, Process, Oil, Crude, Refined (Gas, Diesel, Jet), etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Steam (Yellow)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Structures: Possible horizontally installed facilities, vaults, basements, tunnels, sub-grade structures, foundations, overhead obstructions, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
UST Systems (Tanks / piping / electric)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sewer: (Green) Sanitary, storm, combined, septic, drainage (parking, buildings, fields), irrigation		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Water: (Blue) Process, Plant, potable, well, cooling, return/makeup, fire, sprinkler, landscape irrigation, reclaim (Purple) other		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Other: Abandoned Lines, invisible dog fences, shopping cart perimeter monitoring, traffic lights		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above

If subsurface work is within five feet (1.5 meters) of a confirmed or suspected utility or other subsurface structure, nondestructive clearing techniques (e.g., air knife, vacuum excavation, hand auger) must be completed to visually locate and expose the utility.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Precautions have been taken to prevent contact with overhead or underground utilities.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Printed Name of Person Completing Checklist:	Signature:
-------------------------------------------------	------------

URS SAFETY MANAGEMENT STANDARD

Respiratory Protection

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to protect employees (1) performing operations for which exposures cannot be controlled by use of conventional engineering or administrative controls and (2) prior to establishing a negative air exposure assessment. This standard is also used to select use, maintain, and store respiratory protection equipment in accordance with acceptable practices.

3. Implementation

The associated implementing regional procedures for this standard are included as attachments:

[SMS 042 NA](#) – North America; Australia / New Zealand

[SMS 042 INT](#) – International Operations (including Europe, Asia, South America and Africa)



Health, Safety and Environment
**IDENTIFYING WHEN A RESPIRATOR
IS NEEDED**

Attachment 042-1 NA

Issue Date: July 2000
Revision 6: March 2012

Site Location: _____ Date: _____

Name of Person Performing Evaluation: _____

Project: _____

Answer the questions below for the jobs you are to perform on site. If a 'Yes' response is checked, consult with an HSE Manager or a URS Certified Industrial Hygienist (CIH) to determine if a respirator is truly needed for the job; and if so, the type of respirator needed.

It is important to be aware of the respiratory protection requirements for any chemicals you are exposed to; these can be found on the Material Safety Data Sheets or chemical labels.

Material Used or Process to be Performed	Notes
Abrasive Blasting <ul style="list-style-type: none">Abrasive blasting (with any type of grit or material) will be performed <input type="checkbox"/> Yes <input type="checkbox"/> No _____Employee will fill abrasive blasting pots or perform clean-up activities <input type="checkbox"/> Yes <input type="checkbox"/> No _____Employee will be in a contained area where abrasive blasting is taking place <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Acids <ul style="list-style-type: none">Liquid or powder acids will be used in a situation where acid vapors, mists, or dust may be breathed <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Adhesives <ul style="list-style-type: none">Aerosols-propelled adhesives are to be used in areas where there is insufficient or no local exhaust ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____Two-part adhesives (mix part one with two, let set, then use) are to be used in areas where there is limited ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Alkalis/Bases/Caustics <ul style="list-style-type: none">Powdered alkalis will be used in a situation where an airborne dust may be breathed <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Asbestos Abatement <ul style="list-style-type: none">Asbestos will be removed, repaired, or sampled <input type="checkbox"/> Yes <input type="checkbox"/> No _____Employees will be inspecting or overseeing areas where asbestos will be removed or disturbed <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Cleaning Compounds <ul style="list-style-type: none">Degreasers or carbon removers will be used in areas where local exhaust ventilation is not provided <input type="checkbox"/> Yes <input type="checkbox"/> No _____Aerosol-propelled cleaning compounds will be used in areas where there is no local exhaust ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____Entry into a vault, tank, silo, sewer, or other confined space that has been used for chemical storage, recently painted, or where inert gases may have been used without ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____Degreasers or carbon removers will be used in voids, tanks, or other confined spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Corrosion-Preventive Compounds <ul style="list-style-type: none">Corrosion-prevention compounds, including chemical conversion compounds and corrosion inhibitors, will be used in areas where there is no local exhaust ventilation <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
Detergents/Soaps <ul style="list-style-type: none">Ammonia-based detergents will be used in large quantities (more than 5 gallons) in areas where local exhaust ventilation cannot be provided <input type="checkbox"/> Yes <input type="checkbox"/> No _____	



Health, Safety and Environment
**IDENTIFYING WHEN A RESPIRATOR
IS NEEDED**

Attachment 042-1 NA

Issue Date: July 2000
Revision 6: March 2012

Material Used or Process to be Performed	Notes
<ul style="list-style-type: none">• Large quantities (5- or 55-gallon containers) of high pH powder detergent/soap will be used in a situation where dust may be breathed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Fuels (including regular or unleaded gasoline, kerosene, diesel fuel, JP-5)</p> <ul style="list-style-type: none">• Employees will be inside unventilated fuel cells or other confined spaces containing fuels	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Grinding, Cutting, Sanding</p> <ul style="list-style-type: none">• Cutting, grinding, or sanding surfaces that have coatings containing beryllium, cadmium, chromium, lead, or zinc• Cutting, grinding, or sanding surfaces that are concrete or glass without use of ventilation or water	<input type="checkbox"/> Yes <input type="checkbox"/> No _____ <input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Hazardous Waste Sites</p> <ul style="list-style-type: none">• Employees will be performing tasks on a hazardous waste site that requires the use of respirator (as indicated in the site health and safety plan)• Employees will be performing site assessments on potential hazardous waste sites	<input type="checkbox"/> Yes <input type="checkbox"/> No _____ <input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Hydraulic Fluids (including petroleum-based fluids, synthetic fire-resistant fluids, and water-based fire-resistant fluids)</p> <ul style="list-style-type: none">• Hydraulic fluids and the vapors generated will not be exhausted using local exhaust ventilation• Synthetic fire-resistant fluids or water-based fire-resistant fluids will be used in an area where the air is contaminated with visible mist or spray from hydraulic fluids	<input type="checkbox"/> Yes <input type="checkbox"/> No _____ <input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Inspection Penetrants (including Fluoro-finder, water-indicating pastes, and penetrant removers)</p> <ul style="list-style-type: none">• An aerosol-propelled inspection penetrant will be used in an area where local exhaust ventilation cannot be provided, or in a situation where the solvent vapors can be breathed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Lead Abatement Activities</p> <ul style="list-style-type: none">• Lead-containing materials will be disturbed, removed, or sampled• Employees will be inspecting or overseeing areas where lead will be removed or disturbed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____ <input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Lubricants/Oils</p> <ul style="list-style-type: none">• Aerosol lubricants or oils will be sprayed with no immediate exhaust ventilation	<input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Oxidizers (materials that give off oxygen, including chlorine laundry bleach, calcium hypochlorite, calcium oxide, oxygen candles, lithium hydroxide, hydrogen peroxide, and sodium dichromate)</p> <ul style="list-style-type: none">• Oxidizers containing organic chlorine will be used in a situation where the dusts or vapors may be breathed• Powdered oxidizers will be used in a situation where airborne dust may be breathed	<input type="checkbox"/> Yes <input type="checkbox"/> No _____ <input type="checkbox"/> Yes <input type="checkbox"/> No _____
<p>Paint Materials (including paints, primers, thinners, enamels, lacquers, strippers, coatings, and varnishes)</p> <ul style="list-style-type: none">• Paint materials will be spray-applied in areas where there is no local exhaust ventilation• Two-part (mix part a with part b, let set, then apply) polyurethane or epoxy polyamide paints will be brush- or spray-applied• Paints containing beryllium, cadmium, chromium, lead, or zinc (refer to the MSDS)	<input type="checkbox"/> Yes <input type="checkbox"/> No _____ <input type="checkbox"/> Yes <input type="checkbox"/> No _____ <input type="checkbox"/> Yes <input type="checkbox"/> No _____




Health, Safety and Environment
IDENTIFYING WHEN A RESPIRATOR
IS NEEDED

Attachment 042-1 NA

Issue Date: July 2000
Revision 6: March 2012

Material Used or Process to be Performed	Notes
<ul style="list-style-type: none">• Paint materials will be applied in confined spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
<p>Solvents (including hydrocarbon solvents such as acetone, methyl ethyl ketone, toluene, xylene, and alcohols, as well as mixed solutions like antifreeze, heat-transfer fluid, turpentine, pipe-dope, and naphtha thinner)</p> <ul style="list-style-type: none">• Local exhaust ventilation will not be provided and work will involve breathing solvent vapors <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Solvents will be used within confined spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Solvents will be applied using aerosols <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
<p>Thermal Insulation (including asbestos and non-asbestos materials like pipe lagging, fiberglass insulation, boiler insulation, packing materials, and floor or ceiling tiles)</p> <ul style="list-style-type: none">• Insulation will be disturbed, removed, or sampled <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
<p>Water-Treatment Chemicals (includes corrosive chemicals such as tri-sodium phosphate, hardness buffer, titrating solution, morpholine, caustic soda, citric acid, and nitric acid, as well as toxic chemicals such as mercuric nitrate, hydrazine, EDTA, and sodium nitrate)</p> <ul style="list-style-type: none">• Morpholine, EDTA, or harness buffer/titrating solution is to be used in poorly ventilated spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Powdered water-treatment chemicals will be used in a situation where chemical dusts may be breathed <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
<p>Welding/Brazing/Cutting</p> <ul style="list-style-type: none">• Welding will be performed in confined spaces <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Welding galvanized metal or stainless steel <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Brazing with cadmium or lead <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Torch-cutting on coated/painted materials <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
<p>For Any of the Above-Listed Activities</p> <ul style="list-style-type: none">• An employee will be in the immediate area – within 10 feet of the job or operation; or <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Employee will be inside confined space where activities are taking place; or <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Employee will be inside a “controlled area” such as found in asbestos abatement, lead abatement, radiation control area, or a hazardous waste site <input type="checkbox"/> Yes <input type="checkbox"/> No _____	
<p>Other</p> <ul style="list-style-type: none">• A chemical process procedure (e.g., hydrogen sulfide in refineries, ammonia as a refrigerant, chlorine in water disinfection, inert gas systems) required the use of a respirator or emergency escape respirator <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Mine operations require issuance of an emergency escape respirator <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Emergency response plan requires issuance of respirators to first responders <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Radiological controls require use of a respirator <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Laboratory Chemical Hygiene plan requires issuance of respirators <input type="checkbox"/> Yes <input type="checkbox"/> No _____• Exposure to airborne mold <input type="checkbox"/> Yes <input type="checkbox"/> No _____	

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">VOLUNTARY USE OF RESPIRATORS</p>	<p style="text-align: right;">Attachment 042-2 NA</p> <p style="text-align: right;">Issue Date: July 2000 Revision 6: March 2012</p>
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Instructions: Have the employee that is opting to use a respirator for non-overexposure conditions read this page, and then sign on the bottom of the page. Maintain a copy in the employee's training file.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for employees. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee.

Sometimes employees may wear respirators to avoid exposures to hazards, even if the amount of the hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your own voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not pose a hazard.

1. Read and follow all instructions provided by the manufacture on use, maintenance, cleaning, and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH (the National Institute for Occupational Safety and Health) certifies respirators in the U.S. A label or statement of certification should appear on the respirator or respirator packaging; it will tell you what the respirator is designed for and how it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants against which your respirator is not designed to protect. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, fumes, smoke, or very small solid particles.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
5. If you have any health conditions (asthma; high blood pressure; emphysema; heart disease) that could be aggravated by using a respirator, you should check with your doctor before using one.

I have read and understand this information: Date: _____

Employee's Name (Please Print):

Employee's Signature:



FIT TEST RECORD

Employee Name _____ Employee Number _____

Office/Project _____ Last Medical Exam _____

Fit Test Date _____ Corrective Lenses Needed Yes No

Medically qualified to wear respirator? Yes No

Briefed on fundamental principles of respiratory protection, use, selection, inspection, cleaning, maintenance, and storage of equipment? Yes No

Test agent recognition: Yes No N/A

RESPIRATOR 1

RESPIRATOR 2

RESPIRATOR 3

Equipment Type _____

Manufacturer's Name _____

Model _____

Size _____

Facepiece Composition (Rubber/Silicone) _____

TEST PERFORMED

RESPIRATOR 1

RESPIRATOR 2

RESPIRATOR 3

Negative Pressure Test: Pass Fail Pass Fail Pass Fail

Positive Pressure Test: Pass Fail Pass Fail Pass Fail

Isoamyl Acetate Test: Pass Fail Pass Fail Pass Fail

Irritant Smoke Test: Pass Fail Pass Fail Pass Fail

Bitrex: Pass Fail Pass Fail Pass Fail

Saccharin: Pass Fail Pass Fail Pass Fail

Generated Aerosol Quantitative Fit: P F Fit Factor _____ P F Fit Factor _____ P F Fit Factor _____

Ambient Aerosol Quantitative Fit: P F Fit Factor _____ P F Fit Factor _____ P F Fit Factor _____

Controlled Negative Pressure Quantitative Fit: P F Fit Factor _____ P F Fit Factor _____ P F Fit Factor _____

Examiner's Name (Please Print)

Examiner's Signature

Date

Employee's Signature

Date

	Health, Safety and Environment RESPIRATOR STANDARD OPERATING PROCEDURE	Attachment 042-4 NA Issue Date: July 2000 Revision 6: March 2012
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Job Task Reviewed: _____

Date Reviewed: _____

Task Review by: _____

ADMINISTRATIVE PROCEDURES

1. All respirator users must be medically qualified to use respirators.
2. Respirator users must be trained annually in respirator use, and must be fit-tested annually.
3. The respirator will be used only by the person to whom it was issued.
4. Persons using glasses who are required to use a full-face respirator may use contact lenses or eyeglass inserts designed for the respirator.

GUIDANCE FOR SELECTION OF RESPIRATOR AND CARTRIDGES/FILTERS

1. Respirators are currently being issued and used for the following job activities:

2. The respirator will be equipped with the following cartridges/filters:

3. Filters are to be changed when the breathing resistance increases.
4. Cartridges are to be changed _____ (frequency), or when the contaminant you are protecting yourself from can be smelled or tasted.

FIT TESTING & FIT CHECKING

1. Fit testing is required annually. To arrange for fit testing, call your local, project, or regional safety representative or qualified industrial hygienist.
2. Respirator users will “fit check” the respirator every time the respirator is put on:
 - **Negative Check** – Cover filters/cartridges with palms of hands and breathe in: leakage should not be detected around the face seal of the respirator. Do not use if leakage is detected.
 - **Positive Check** – Cover the exhalation valve cover with palm of hand and blow out slightly: leakage should not be detected around the respirator seal.
 - **For Air Supply Respirators** – Kink or close off air supply hose and breathe in: leakage should not be detected around the face seal of the respirator.

CLEANING AND MAINTENANCE OF RESPIRATOR

1. Clean and disinfect respirator after every use.
2. Inspect respirator at the end of work every day in use to ensure parts are not missing. Replace missing parts from stock supply.
3. Store clean respirator in labeled plastic bag out of direct sunlight.
4. Do not alter respirator in any way.



Health, Safety and Environment
**RESPIRATOR CARTRIDGE
CHANGE SCHEDULE**

SMS 042 NA
Supplemental Information A
Issue Date: February 2009
Revision 2: August 2010

A cartridge change schedule must be developed for cartridges or canisters used with air purifying respirators that do not have an End of Service Life Indicator (ESLI). The purpose of this is to prevent contaminants from breaking through the respirator's sorbent cartridge(s), and thereby over-exposing employees. NIOSH has approved ESLIs for only four cartridges or canisters (mercury vapor, carbon monoxide, ethylene oxide, and hydrogen sulfide). Historically we have relied on the warning properties (odor, irritation) of a contaminant to dictate cartridge change. OSHA no longer allows this as the sole basis for changing respirator cartridges. In developing a change schedule the following factors should be considered:

- Contaminants
- Concentration
- Frequency of use (continuously or intermittently throughout the shift)
- Temperature and humidity
- Work rate
- The presence of potentially interfering chemicals.

The worst-case conditions should be assumed to avoid early breakthrough. This must be documented in the project health and safety plan or, in the cases of office or labs, in the site specific Respiratory Protection Program.

Sources of Help

OSHA provides assistance in developing respirator cartridge change schedules on its website at http://www.osha.gov/SLTC/etools/respiratory/change_schedule.html.

Most cartridge manufacturers maintain on-line interactive cartridge service life programs that can be used to evaluate the service life against many contaminants. Typically, these do not evaluate the service life against mixtures (multiple contaminants).

Because of the complexity in evaluating mixtures, OSHA offers the following guidance:

- When the individual compounds in the mixture have similar breakthrough times (i.e., within one order of magnitude), service life of the cartridge should be established assuming the mixture stream behaves as a pure system of the most rapidly migrating component with the shortest breakthrough time (i.e., sum up the concentration of the components).
- Where the individual compounds in the mixture vary by 2 orders of magnitude or greater, the service life may be based on the contaminant with the shortest breakthrough time.

Rule of Thumb (*"The Occupational Environment" - Its Evaluation and Control*)

- If the chemical's boiling point is >70 °C and the concentration is less than 200 ppm, you can expect a service life of 8 hours at a normal work rate.
- Service life is inversely proportional to work rate.
- Reducing concentration by a factor of 10 will increase service life by a factor of 5.
- Humidity above 85% will reduce service life by 50%.

OSHA Interpretation

The OSHA inspection procedures for the respiratory protection standard specifies that where contaminant migration is possible, respirator cartridges/canisters should be changed after each work shift where exposure occurs unless there is objective data to the contrary (description studies) showing the performance in the conditions and schedule of use/non-use found in the workplace.

- A. A hazard analysis of the workplace must be performed before selecting respirators. The analysis must consider inhalation hazards under routine and foreseeable emergency conditions. Other factors to consider when choosing respirators include skin and eye exposure, the effects of heat or cold, use of protective clothing, employee conditioning, and workload.
- B. Respiratory hazards that must be identified include:
1. Oxygen Deficiency
 2. Air Contaminants
 3. Particulates
 4. Toxic Gases

C. Evaluating Exposures

There are several options on how to evaluate exposures:

1. One option is to rely on personal monitoring data of employees. Representative exposure data provided by industry or laboratory studies is acceptable as long as it applies to similar tasks and conditions at the worksite.
2. The professional judgment provided by the Business, RBU, SBU, Office, or Project HSE Manager and/or as recommended by a qualified industrial hygienist or safety professional may be employed for the task.
3. If the exposure cannot be identified or estimated, then the atmosphere is considered immediately dangerous to life or health (IDLH). Atmospheres with levels of oxygen below 19.5% are also defined as IDLH.
4. Trained and qualified technical personnel shall perform assessment of the degree of respiratory hazard through sampling and testing of the work environment. Problems requiring special respiratory protection should be discussed with the Business or Regional HSE Manager or qualified industrial hygienist.
5. The Project HSE Manager shall establish procedures to control respiratory hazards through engineering or administrative controls, product/material substitution, respiratory protective devices, or a combination of these methods.
6. He/she shall also perform annual evaluations of the effectiveness of the project's respiratory protection program. These evaluations shall be documented.
7. The Project HSE Manager shall select and provide adequate respiratory protective devices for use on the project. This selection shall be based upon the specific type of air contaminant(s), the concentration of the contaminants(s) or oxygen deficiency in the work environment.
8. Establish a change schedule for air-purifying respirators based upon objective information or data that will ensure that cartridges are changed before the end of their useful life. OSHA has mandated that reliance on warning properties is no longer valid

- A. A quantitative fit-test provides the most accurate information; qualitative fit testing depends on the respirator wearer's sense of smell and taste (subjective response). OSHA's standard requires fit-testing for any face mask (full or half) designed to have a tight seal along the face, whether it is used in a positive or negative pressure mode, and whether it is disposable or not. If the required fit factor is greater than 100, then a quantitative fit-test must be performed.
- B. Each person will have a qualitative or quantitative fit test when first required to wear a respirator, every 12 months when respirators will be worn thereafter, or as hazards or respiratory needs change.
- C. Each person will have a qualitative or quantitative fit test for each specific make(s) and model(s) of respirator(s) for which the worker may wear.
- D. Under no circumstances shall a worker be allowed to use any respirator if the results of the qualitative fit test indicate that the worker is unable to obtain a satisfactory seal.
- E. The eight exercises required by OSHA under the respiratory protection standard, 29 CFR 1910.134, Appendix A, are as follows (note that these are not required controlled negative pressure (CNP) quantitative fit testing):
1. normal breathing
 2. deep breathing
 3. head side to side
 4. head up and down
 5. talking out loud
 6. grimacing (quantitative only)
 7. bending
 8. normal breathing
- F. Qualitative and quantitative fit testing must be performed in negative pressure mode for all tight fitting respirators, whether the respirator is positive or negative pressure demand.
- G. Qualitative and quantitative fit testing must be conducted according to one of the protocols found in 29 CFR 1910.134, Appendix A.
- H. Employees using respirators when not required under the standard (i.e., dust masks or comfort masks for nuisance type dust without a specified exposure level) must be aware of the potential hazards of using a respirator. See Attachment 042-2 of this standard or Appendix D of 29 CRF 1910.134 for information program requirement.

- A. Physical characteristics, functional capabilities, and performance limitations of various types of respirators shall be considered in the selection process.
- B. Specifics regarding hazard classification, descriptions of respirator types and modes of operation, and the capabilities and limitations of respirators are listed in ANSIZ88.2-1992.
- C. To select the correct respirator, the hazards must first be identified in the workplace and then follow these steps:
 1. Determine if the environment is IDLH.
 - a. All oxygen deficient atmospheres shall be considered IDLH.
 - b. If the employee exposure cannot be reasonably estimated, the atmosphere must be considered IDLH.
 2. Identify the contaminant(s) present in the atmosphere and answer the following questions:
 - a. What is the concentration?
 - b. Are they gaseous or particulate?
 - c. Are the contaminants IDLH?
 3. After completing the above steps select the appropriate respirator for the particular hazard(s).
 - a. IDLH – Provide a full facepiece NIOSH certified pressure demand SCBA with a minimum service life of 30 minutes or a full facepiece pressure demand airline respirator with an auxiliary self-contained air supply.
 - b. Non-IDLH – A respirator must be provided that is appropriate for the contaminant(s) identified.
 4. For protection against gases and vapors, either an atmosphere-supplying respirator or an air-purifying respirator equipped with a NIOSH certified end-of-service-life indicator (ESLI) for the contaminant must be used. In lieu of an ESLI, a change schedule for cartridges based on objective information or data may be used to ensure cartridges are changed before the end of their service life occurs (see Supplemental Information A). In most cases, respirator cartridge manufacturers provide a product specific on-line or CD-ROM based “Service Life Calculator” that allows determination of useful service life of a cartridge based on expected concentration and environmental and work conditions. If neither an ESLI or change schedule is available, a supplied air respirator must be used.
 5. For protection against particulates, an atmosphere-supplying respirator or an air-purifying respirator equipped with a NIOSH-certified high-efficiency particulate air (HEPA) filter under 30 CFR 11 or an air-purifying respirator equipped with a NIOSH certified filter for particulates under 42 CFR 84 must be used.

6. There are three classes of filters under NIOSH (N, R, and P series) with three levels of filter efficiency in each class – 95%, 99%, and 99.97% (classified as 100). All filters can be used regardless of aerosol size. The new filters are classified as follows:
 - a. N – For solid particulates and non-oil aerosols that do not degrade filter performance.
 - b. R – For solid particulates and degrading oil-based aerosols. R filters have “use limitations.”
 - c. P – For solid particulates and degrading oil-based aerosols. P filters generally have no “use limitations” other than those normally associated with particulate filters. The P100 filter is the replacement for the HEPA filter.
- E. Particulate filters are tested with 200 mg of loading but in many cases, these filters may exceed this capacity. Filtration efficiency may actually increase as the filter cake develops on the filter. Increased resistance to breathing or obvious taste or odor in the respirator would be cause to examine, re-evaluate and replace the filter cartridge

A. Inspection

Routinely used air-purifying and airline respirators should be checked as follows before and after each use:

1. Examine the facepiece for:
 - a. Excessive dirt.
 - b. Cracks, tears, holes or physical distortions of shape from improper storage.
 - c. Inflexibility of rubber facepiece (stretch and knead to restore flexibility).
 - d. Cracked or badly scratched lenses in full facepieces.
 - e. Incorrectly mounted full facepiece lenses, or broken or missing mounting clips.
 - f. Cracked or broken air-purifying element holder(s), badly worn threads or missing gasket(s) if required.
2. Examine the head straps or head harness for:
 - a. Breaks.
 - b. Loss of elasticity.
 - c. Broken or malfunctioning buckles and attachments.
 - d. Excessively worn serrations on head harness, which might permit slippage (full facepieces only).
3. Examine the exhalation valve for the following after removing its cover:
 - a. Foreign material, such as detergent residue, dust particles or human hair under the valve seat.
 - b. Cracks, tears or distortion in the valve material.
 - c. Improper insertion of the valve body in the facepieces.
 - d. Cracks, breaks or chips in the valve body, particularly in the sealing surface.
 - e. Missing or defective valve cover.
 - f. Improper installation of the valve in the valve body.
4. Examine the air-purifying element for:
 - a. Incorrect cartridge, canister, or filter for the hazard.
 - b. Incorrect installation, loose connections, missing or worn gasket or cross threading in the holder.
 - c. Expired shelf-life date on the cartridge or canister.
 - d. Cracks or dents in the outside case of the filter, cartridge or canister, indicated by the absence of sealing material, tape, foil, etc., over the inlet.
5. If the device has a corrugated breathing tube, examine it for:

- a. Broken or missing and connectors.
 - b. Missing or loose hose clamps.
 - c. Deterioration, determined by stretching the tube and looking for cracks.
6. Examine the harness of a front-or back-mounted gas mask for:
- a. Damage or wear to the canister holder, which may prevent its being held in place.
 - b. Broken harness straps for fastening.

B. Self Contained Breathing Apparatus (SCBA)

Follow manufacturer specifications for storage, maintenance and cleaning of SCBA systems.

C. Manual Cleaning

A generalized cleaning procedure is typically found in the manufacturer's manual. Read the respirator manual and follow the manufacturer's recommendations.

1. Remove canisters, filters, valves, straps and speaking diaphragms from the facepiece.
2. Wash facepiece and accessories in warm soapy water or a commercially available cleaner, following the manufacturer's instructions. Gently scrub the respirator.
3. Rinse parts thoroughly in clean water.
4. Air dry in a clean place or wipe dry with a lint less cloth.

D. Machine Cleaning

Machines may be used to expedite the cleaning, sanitizing, rinsing, and drying of large numbers of respirators. Read the machine-cleaning manual and follow manufacturer's recommendations.

1. Extreme care must be taken to ensure against excessive tumbling and agitation, or exposure to temperatures above those recommended by the manufacturer (normally 120°F maximum), as these conditions are likely to result in damage to the respirators.
2. Ultrasonic cleaners, clothes-washing machines, dishwashers, and clothes dryers have been specially adapted and successfully used for cleaning and drying respirators.

E. Disinfection

1. Disinfection is required when more than one person uses the respirator. Recommended NIOSH disinfection procedures include immersion of the respirator body for two minutes in a 50 ppm chlorine solution (about 2 ml bleach to 1 liter of water). Rinse thoroughly in clean water and dry.
 - a. Immersion times have to be limited to minimize damage to respirators. The solutions can age rubber and rust metal parts. Caution must be

taken to thoroughly rinse the respirator after cleaning and disinfection to prevent dermatitis.

- b. An alternate method is to purchase a commercially prepared solution for disinfection/decontamination and follow the directions recommended by the manufacturer.
2. Each person wearing a respirator shall examine the respirator before use in accordance with the training and instruction provided during fit testing.
3. After cleaning and sanitizing, each respirator shall be examined to determine if it is in proper working condition, if it needs replacement of parts or repairs, or if it should be discarded. Respirator inspection shall include, when applicable, a check for tightness of connections; for the condition of the respiratory inlet covering, head harness, valves, connecting tubes, harness assemblies, filters, cartridges, canisters, end-of-service life indicator, and shelf life date(s), and for the proper function of regulators, alarms, and other warning systems.
4. Each rubber or other elastomeric part shall be inspected for pliability and signs of deterioration. Each air and oxygen cylinder shall be inspected to ensure that it is fully charged according to the manufacturer's instructions.

F. Repair

Only persons trained in proper respirator assembly and correction of possible respirator malfunctions and defects shall do replacement of parts or repairs. Replacement parts shall be only those designed for the specific respirator being repaired. Reducing or admission valves, regulators, and alarms shall be returned to the manufacturer for repair or adjustment. The valve, regulator, or alarm manufacturer must approve instrumentation for valve, regulator, and alarm adjustments and tests.

G. Storage

Respirators shall be stored in a convenient, clean and sanitary location. The purpose of good respirator storage is to ensure that the respirators will function properly when used. Respirators shall be stored in a manner that will protect them against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Respirators shall be stored to prevent distortion of rubber or other elastomeric parts. This can be done by storing the respirators in hermetically sealed plastic bags, or plastic bags capable of being sealed. Emergency and rescue use respirators that are placed in work areas shall be quickly accessible at all times, and the storage cabinet or container in which they are stored shall be clearly marked.

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health and Safety Requirements

1. Applicability

This procedure is applicable to subcontractors retained by URS Corporation and its subsidiary companies. This procedure is applicable to the operations of subcontractors and sub-subcontractors of any tier.

This procedure does not apply to third-party contractor operations where there is no subcontract relationship between the contractor and URS Corporation. Health, Safety, and Environment issues regarding third-party contractor operations are governed by project-specific contracts, and are not covered by this standard.

2. Purpose and Scope

This procedure provides requirements on the pre-evaluation of subcontractor safety programs. The attached procedures detail the manner in which this is accomplished by region.

3. Procedures

The associated procedures for this standard are included as attachments:

<i>Infrastructure & Environment; Federal Services</i>

[SMS 046 NA](#) – North America

[SMS 046 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP8-046](#) – Australia / New Zealand

<i>Energy & Construction</i>

[SMS 046 EC](#)

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

1. Applicability

This standard is applicable to subcontractors retained by the Infrastructure & Environment and Federal Services businesses of URS Corporation and its subsidiary companies that perform:

- Intrinsically higher-risk construction-related activities (e.g., drilling, excavation, surveying, demolition, electrical contracting, steel erection etc.).
- Significant building or infrastructure alteration, demolition, and/or repair activities using their own workforce or equipment.
- Activities on hazardous waste sites.
- Activities in government services operations (e.g., aviation repair, vehicle repair, warehousing, facility operations, and maintenance) where the annual cost of the subcontract exceeds \$1,000,000.
- An activity where URS Corporation does not supervise the day-to-day activities and work efforts of subcontractor workers, **and** the subcontractor has a designated Supervisor on the work site.

This procedure is applicable to the operations of subcontractors and sub-subcontractors of any tier.

This procedure does not apply to third-party contractor operations where there is no subcontract relationship between the contractor and URS. Health, Safety, and Environment issues regarding third-party contractor operations are governed by project-specific contracts, and are not covered by this standard.

2. Purpose and Scope

This procedure provides requirements on the pre-evaluation of subcontractor safety and environmental programs; contractual risk management; subcontractor safety performance on the job site; and the responsibilities of the Project Manager with respect to subcontractor jobsite HSE performance.

Each URS subcontractor must be evaluated at least annually using Attachment 046-1 NA, "Subcontractor HSE Evaluation Form," or equivalent client or URS International Operations form, in order to perform work on any new URS projects.

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Pre-qualification of Subcontractor – The Project Manager will complete the following procedures for all subcontractors retained on projects covered by this standard (the PM should also require subcontractors to follow these procedures with respect to pre-qualification of sub-subcontractors of any tier):

1. Request all subcontractor candidates to complete the attached Subcontractor HSE Evaluation Form (Attachment 046-1 NA).
2. Conduct an assessment of each subcontractor's qualifications with respect to the subcontractor HSE evaluation criteria contained in Attachment 046-2 NA.
3. If the subcontractor does not meet the criteria established in Attachment 046-2 NA, and URS must retain the contractor, the Subcontractor Variance Form (Attachment 046-3 NA) must be completed and approved by a Regional, or Strategic Business Unit (SBU) Health, Safety, and Environment (HSE) Manager.
4. Verify that subcontractors meet the insurance requirements as stated in URS' agreement with the subcontractor, or as approved by URS Legal Counsel or Contracting Manager/Officer.
5. If the subcontractor has been successfully evaluated within the last 12 months, that evaluation may be substituted.
6. For long-term operations, update this evaluation within 12 months of the previous evaluation.

B. Contractual and Risk Management Requirements of Subcontractors

1. Ensure that the subcontractor is contractually bound to comply with applicable client and URS HSE Program requirements.
2. Ensure that subcontractor is contractually bound to develop additional safety procedures for work that is exclusive to their activities on the site, and for which they may have superior knowledge.

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

3. Assess compliance of subcontractor's insurance with the URS Corporation subcontract requirements (including, but not limited to, necessary types and amounts of coverage, URS Corporation additional insured endorsement, etc.).
4. Ensure that URS has the right in its subcontract, without liability to URS, to stop the subcontractor's work in the event of any violations of the applicable Health and Safety Plan.

C. Subcontractor Safety Representative

1. Require each subcontractor to appoint a Subcontractor Safety Representative (SSR) who:
 - a. Is knowledgeable of the subcontractor's activities.
 - b. Understands the safety requirements of the subcontractor's activities.
 - c. Has the ability to recognize and the authority to correct safety deficiencies and execute a stop work order should an imminent danger arise.
 - d. Has the responsibility for the administration of the subcontractor Health and Safety Program.
 - e. Will serve as the direct contact with URS Corporation regarding resolution of health and safety issues.

D. Communication

1. Provide the SSR with information regarding Site Safety Program including but not limited to:
 - a. Client Requirements
 - b. URS HSE Program
 - c. Site Hazard Communication Program
 - d. Site Emergency Action Plan
 - e. Any additional safety information from other contractors or subcontractors working on the site.

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

2. Provide the SSR with the name of the URS project or site contact and alternate for addressing site health and safety issues.
 3. Require the participation of subcontractors in all Site Safety Briefings.
 4. Require subcontractor compliance with all safety directives and/or stop work orders issued by the URS site representatives.
 5. Require the subcontractor to notify the URS project or site manager when they will utilize short service employees (SSE) (i.e., employees with less than six months of experience) to perform on-site activities. The URS project or site manager must approve the use of any SSE by the subcontractor prior to mobilization. Site management will interact with the short service employee to verify their level of competency and manage the SSE in accordance with SMS 078 – Short Service Employees.
- E. Subcontractor HSE Performance
1. To the extent reasonable in light of URS' scope of work under the client contract, visit the site and periodically observe subcontractor's operations (i.e., conduct spot checks) to assess whether subcontractor appears to be conducting their operations in accordance with applicable HSE requirements. Periodically review any required subcontractor health and safety written documentation for compliance with applicable requirements.
 2. In the event that unsafe acts or unsafe conditions are observed, immediately stop work, and bring them to the attention of the SSR for resolution.
 3. Investigate all incidents related to subcontractor operations to identify causes and effect corrective actions.
 4. In the event of serious and/or continuing subcontractor breaches of applicable HSE requirements, contact legal counsel to assess whether formal contractual action is appropriate under the subcontract.
 5. Once a job is completed, a subcontractor's HSE performance should be reviewed and feedback provided to subcontractor management.
- F. Subcontractor Database (Infrastructure & Environment only)
1. A database is available to store Attachment 046-1 NA completed by subcontractors. The database can be accessed at:

URS SAFETY MANAGEMENT STANDARD

Subcontractor Health, Safety and Environmental Requirements

<http://thesource.urscorp.com/TheSoURSe/Corporate/HSE/SubcontractorSafetyPreQualification.NSF>

2. A Regional HSE Manager or designee can upload completed Attachment 046-1 NA. Contact your Office HSE Representative or Regional HSE Manager for information on how to access the database.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Subcontractor HSE Evaluation Form (Attachment 046-1 NA)
- B. Applicable and current Insurance Certificates
- C. Names and telephone numbers of SSR for each subcontractor
- D. Verification of HSE documents transmitted to subcontractors and received from subcontractors
- E. Identified safety deficiencies as applicable for subcontractors and verification of correction of conditions
- F. All other safety related documentation between URS and subcontractor such as training certifications, etc.
- G. Subcontractor safety plan, incident reports, and resolution reports.

6. Resources

- A. "Occupational Injury and Illness Rates by SIC," Bureau of Labor Statistics, U. S. Department of Labor (<http://www.bls.gov/iif/oshsum.htm>)
- B. Managing Subcontractor Safety, Prepared by The Construction Industry Institute, Safety Task Force, Publication 13-1, The University of Texas at Austin, Austin, Texas, 1991 (<http://www.construction-institute.org/>)
- C. American National Standard Construction and Demolition Operations—Safety and Health Program Requirements for Multi-Employer Projects, ANSI A10.33-1992, National Safety Council, Itasca, Illinois 60143-3201 (<http://www.nsc.org>)
- D. "Liability, OSHA, and the Safety of Outside Contractors," Professional Safety, American Society of Safety Engineers, January 1993 (<http://www.asse.org>)

URS SAFETY MANAGEMENT STANDARD
Subcontractor Health, Safety and Environmental Requirements

- E. "Proactive Construction Management; Dealing With the Problem of Subcontractor Safety," Professional Safety, American Society of Safety Engineers, January 1990 (<http://www.asse.org>)
- F. [Attachment 046-1 NA](#) – Subcontractor HSE Evaluation Form
- G. [Attachment 046-2 NA](#) – Subcontractor Evaluation Criteria
- H. [Attachment 046-3 NA](#) – Subcontractor Variance Form



**SUBCONTRACTOR HSE
EVALUATION FORM**

It is the policy of URS to provide a safe and healthful environment for all of its employees through the prevention of incidents. As such, URS considers safety as paramount and requests the following information of all subcontractors.

Company Name: _____ Date: _____

Address: _____ Contact Name: _____

_____ Title: _____

City: _____ Telephone: _____

State/Province: _____ Fax: _____

Zip/Postal Code: _____ Email: _____

Type of services performed: _____

Has your company previously performed work as a subcontractor to URS? Yes No

If "Yes" explain the nature of the work, project location, and project date, and URS Project Manager and telephone number.

How many years has your organization been in business under your firm's name? _____

If applicable, what was your organization's previous name(s)? _____

1. WORKERS' COMPENSATION EXPERIENCE INFORMATION

(United States Only)

Insurance Carrier(s): _____

Contact for Insurance Information: _____

Title: _____ Telephone: _____ Fax: _____

A. For U.S. operations - List your firm's Interstate Worker Compensation Experience Modification Rate (EMR) for the three most recent years: (Information is available from your workers compensation insurance carrier.)

For international operations - List the applicable performance rating (e.g., NEER Performance Index in Canada) for your company.

<u>Year</u>	<u>EMR Interstate (or international equivalent)</u>
_____	_____
_____	_____
_____	_____

B. We require verification of your EMR (or international equivalent). Please attach the endorsement page from your policy listing your rating, or have your insurance carrier or broker provide this information on their letterhead.

C. If your rating exceeds 1.0 for any one or more years above, please explain:

Comments: _____

2. SAFETY PERFORMANCE

A. Please consolidate your firm’s injury and illness data for the last 3 years and complete the table below. The information provided must be for your company as a whole, not an individual office location. **For U.S. operations, provide copies of your OSHA 300 and 300A logs for the last 3 years.**

	YEAR	YEAR	YEAR
A. Average Number of Employees			
B. Number of Fatalities			
C. Number of cases that involved days away from work, or cases with job transfer or restriction, or both			
D. Other Recordable Cases – Medical Only (Number of cases without lost or restricted workdays)			
E. Total Recordable Cases			
F. Total hours worked			
G. Total Recordable Incident Rate $\frac{\text{(E above)} \times 200,000}{\text{Employee Hours Worked (Given Year)}}$			
H. Lost Workday Case Incident Rate $\frac{\text{(C above)} \times 200,000}{\text{Employee Hours Worked (Given Year)}}$			

B. For each fatality, please attach a description of the accident, including cause, lessons learned, actions taken resulting from that fatality, actions taken to prevent future fatalities, and corporate management summary of their actions and attitudes.



**SUBCONTRACTOR HSE
EVALUATION FORM**

- C. Has your company been issued any health and safety related citations/orders from any federal, state, province, or local regulatory agency during the past 3 years? Yes No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.

3. RISK MANAGEMENT / INSURANCE DATA

- A. Are you able to provide URS with insurance certificates naming URS, and if requested, URS' client as an additional insured? Yes No
- B. Please provide proof of current Workers' Compensation and Employer's Liability Insurance coverage or proof of exemption. (For U.S. operations, *attach certificate naming URS as Additional Insured*).

4. HEALTH AND SAFETY PROGRAM

- A. Does your company maintain a written Health and Safety program? Yes No
If "Yes," please include a copy of the Table of Contents.
- B. Is your company capable of preparing safety procedures specific to the work proposed for this project? Yes No
- C. Does your firm have a safety officer? Yes No
If "Yes," please provide name and telephone number.

Name: _____ Telephone: _____

- D. Do you hold jobsite safety meetings?
1. How Often?
- Daily Weekly Bi-Weekly Monthly Less Often, As needed
2. Are the health and safety meetings documented? Yes No
- E. Does your firm have the following policies/procedures? *If "Yes," please provide copies of the policies/procedures.*
1. Stop Work? Yes No
2. Short Service Employee? Yes No
3. Fitness for Duty? Yes No
- F. Is a program in place for the reporting and correction of workplace hazards? Yes No
- G. Are workers encouraged to intervene when unsafe conditions are observed? Yes No

URS	Health, Safety and Environment SUBCONTRACTOR HSE EVALUATION FORM	Attachment 046-1 NA Issue Date: July 1999 Revision 9: September 2012
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H. Have the safety and health hazards associated with your job activities been identified? Yes No

1. Has a risk assessment been performed on these hazards? Yes No

5. ACCIDENT/INCIDENT REPORTING, INVESTIGATION, AND INJURY MANAGEMENT

A. Does your company have a process in place for immediate reporting, investigation, and follow-up of incidents, near-misses and occupational injuries? Yes No

If "Yes," who receives copies of the report? (Job Title) _____

(Job Title) _____

(Job Title) _____

B. Who is responsible for investigation and completion of your incident report forms? (Job Title) _____

Please provide your company's incident reporting procedures.

Please provide a copy of an investigation report conducted within the last year.

C. Does your company have an injury management procedure? Yes No
If "Yes," provide a copy of the injury management procedure.

D. Does your injury management procedure include the use of occupational clinics (for non-critical injuries) as a preferred method of medical care? Yes No

E. Does your company have a nurse or doctor on staff? Yes No

F. Does your company use a third party to provide medical advice to injured employees? Yes No

If "Yes," which third-party company is used? _____

6. HEALTH AND SAFETY TRAINING

A. Do you have or provide company paid safety/health training to your employees? Yes No

B. Does your company have a formal safety orientation program for new employees? *If "Yes," submit an outline for evaluation.* Yes No

Are records kept? Yes No

If "Yes," who conducts the orientation? (Job Title) _____



**SUBCONTRACTOR HSE
EVALUATION FORM**

If "No," how are new employees informed of safety policies and procedures and expectations?

C. Do you have additional safety and health training for newly hired or promoted foremen/superintendents? Yes No

Topics Covered:

D. Do you maintain a record of all employees' training? Yes No

E. Are your employees enrolled in a Defensive Driving Training Program? Yes No

If "Yes," describe the training, including the training provider, who receives the training, and course length.

Please provide a copy of training records from a recent HSE training course.

7. MEDICAL / DRUG TESTING

A. Does your company have a Drug/Alcohol policy or program? Yes No

If "Yes," does your drug and alcohol program include the following:

Pre-employment testing Yes No

Testing for Cause Yes No

Post-accident testing Yes No

Random testing Yes No

B. Does your company have an ongoing medical surveillance program as required by applicable governmental regulations? Yes No

Do you conduct medical examinations for:

Pre-employment Yes No



SUBCONTRACTOR HSE EVALUATION FORM

Pre-placement Job Capability

Yes No

Hearing Function (Audiograms)

Yes No

Pulmonary

Yes No

Respiratory

Yes No

8. COMPLIANCE ASSURANCE

A. Does your company conduct job site HSE inspections?

Yes No

1. How often?

2. Who conducts the inspection? (Job Title)

3. Who receives the reports? (Job Title)

4. Are inspections documented? *If "Yes," provide an example.*

Yes No

Comment on any other areas of your company's safety program and policies that you think will be appropriate in our evaluation.

9. ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

A. Has your company been issued any environmental related citations/orders from any federal/state/province, or local regulatory agency during the past 3 years?

Yes No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.



**SUBCONTRACTOR HSE
EVALUATION FORM**

- B. Does your company have an Environmental Management and/or Sustainability Policy Statement (can be incorporated into an HSE policy statement)? Yes No
- C. Does your company have any of the following:
- i. Process to assess environmental compliance requirements? Yes No
 - ii. Process to identify environmental impacts? Yes No
 - iii. Waste Management Program (including recycling)? Yes No
 - iv. Procurement policies requiring purchase of recycled materials? Yes No
 - v. Energy use tracking and management policies? Yes No
 - vi. GHG emissions reduction program? Yes No
 - vii. Tracking of "Carbon Footprint"? Yes No
 - viii. Environmental Certifications (e.g., ISO)? Yes No
 - ix. Water Management/Conservation? Yes No
 - x. Environmental Performance Metrics? Yes No

VERIFICATION OF DATA

Please have an officer of the Company sign below certifying that the information provided in this document is current and correct. Misrepresentation of data requested is grounds for immediate termination of contracts and disqualification from future consideration.

Name

Title

Signature

Date



**SUBCONTRACTOR HSE
EVALUATION FORM**

REQUIRED INFORMATION SUBMITTAL

Please provide copies of the following documents with the completed evaluation form. **If the following information is not included, provide a written reason for the failure to do so.**

- EMR documentation, or international equivalent, from your insurance carrier
- U.S. Only - OSHA 300 and 300A Logs (Past 3 Years) – *Employee names must be removed.*
- Description for any fatalities (if applicable)
- Insurance Certificate(s) – *Naming URS as Additional Insured*
- Explanation of any health and safety related order/citation (if applicable)
- Safety, Health, and Environmental Program (Table of Contents)
- Stop Work, Short Service Employee, Fitness for Duty Policies/Procedures
- Accident/Incident Reporting Procedure
- Example of an Investigation Report conducted within the past year
- Injury Management Procedure
- Safety, Health & Environmental Orientation for New Hires (Outline)
- Example of Safety, Health and Environmental Training Records
- Example of Job Site HSE Inspection conducted within the past year
- Explanation of any environmental related order/citations (if applicable)

URS	Health, Safety and Environment SUBCONTRACTOR HSE EVALUATION FORM	Attachment 046-1 NA Issue Date: July 1999 Revision 9: September 2012
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THIS PAGE IS TO BE COMPLETED BY URS CORPORATION.

Subcontractor Name: _____

Project or Site Manager Evaluation:

- Pass Subcontractor meets the criteria established in Attachment 046-2 NA, and no further action is required.
- Fail Subcontractor does not meet the criteria established in Attachment 046-2 NA. If a unique business need exists, then a subcontractor variance must be initiated using Attachment 046-3 NA. The variance must be submitted to a Regional or Strategic Business Unit HSE Manager for evaluation.

Project or Site Manager Name: _____

Signature: _____

Date: _____



**SUBCONTRACTOR
EVALUATION CRITERIA**

Prior to engaging a subcontractor on a project, Project Managers are required to ensure that the contractor has an effective safety program, is capable of conducting its operations in a safe manner, and has appropriate insurance coverage. The following criteria shall be followed in determining whether the subcontractor may be used on a URS Corporation project.

Note: Some questions/answers (Sections 4 through 9) from Attachment 046-1 NA are not discussed in the evaluation criteria below. These questions are asked and the answers are intended to help the Project Manager understand the HSE culture and/or safety priority of the subcontractor.

GENERAL INFORMATION

If subcontractor has performed work for URS previously, check safety performance history with previous URS Corporation Project Manager.

The numbers in this section directly correspond to the questions in Attachment 046-1 NA.

WORKERS' COMPENSATION EXPERIENCE INFORMATION

1.A. For any EMR, or international equivalent, listed as greater than 1.0, the contractor has failed the sub-evaluation. Further consideration may not occur without referral to a URS Regional, or Strategic Business Unit (SBU) Health, Safety, and Environment (HSE) Manager in your Region for further assessment.

If all EMRs listed are 1.0 or below, continue with the evaluation.

SAFETY PERFORMANCE


2. For any Total Recordable Incident Rate (line G in table) listed as greater than 4.0, the subcontractor has failed the evaluation. Further considerations may not occur without referral to a URS Regional or SBU HSE Manager in your Region for further assessment.

If the Total Recordable Incident Rates are at or below 4.0, continue with the assessment.

2.B. If the contractor has had a fatality, further consideration may not occur without referral to a URS Regional or SBU HSE Manager in your Region.

2.C. In the U.S., determine the subcontractor's citation history at <http://osha.gov/pls/imis/establishment.html>. Query Case Status Open and Closed. Compare the published data to the subcontractor questionnaire. The subcontractor must explain any discrepancies.

For international operations, consult a URS Regional or SBU Manager to evaluate citations/orders a subcontractor has disclosed.

	<p align="center">Health, Safety and Environment</p> <p align="center">SUBCONTRACTOR EVALUATION CRITERIA</p>	<p align="right">Attachment 046-2 NA</p> <p align="right">Issue Date: July 1999 Revision 9: September 2012</p>
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Look for willful, serious, and repeat violations. If they suggest a problem, request information and refer to a URS Regional or SBU HSE Manager in your Region for further assessment.

RISK MANAGEMENT/INSURANCE DATA

- 3.A. The ability to provide Insurance Certificates naming URS Corporation as an additional insured is required. Refer any questions to the URS Legal Department.
- 3.B Proof of Workers' Compensation Insurance (or proof of exemption) is required. Refer any questions to the URS Legal Department.

HEALTH AND SAFETY PROGRAM

For Sections 4 through 8, if a subcontractor answers 'No' to any of the questions, the Project Manager needs to consider the type of work the subcontractor will be performing (e.g. HAZWOPER work required medical surveillance exams) to determine if the answer is acceptable.

- 4.A. A "No" answer should be referred to a URS Regional or SBU HSE Manager in your Region for further assessment. For small subcontractors, a 'No' answer may be acceptable with good incident and insurance rate statistics. Generally, some minimal program is expected depending on the breadth and complexity of the work. Contact a URS Regional or SBU HSE Manager in your Region for further assessment if you have any questions or doubts.
- 4.B. It is expected that a subcontractor being hired to perform services on the project site should be the best prepared to address safety issues for their operations, especially when specialty work is being conducted, or for work in which the subcontractor possesses superior knowledge of their operations.

A "No" answer should be referred to a URS Regional or SBU HSE Manager in your Region for further assessment.

Exception:

If the subcontractor does not meet the other requirements outlined above, the decision will be that the subcontractor will not be used. However, if a unique business need exists (e.g., subcontractor is a specialty subcontractor), the Project Manager should initiate a Subcontractor Variance (Attachment 046-3 NA). The Subcontractor Variance must be approved by a Regional or SBU HSE Manager.



Health, Safety and Environment
SUBCONTRACTOR VARIANCE FORM

Attachment 046-3 NA
Issue Date: July 1999
Revision 9: September 2012

Subcontractor Name: _____

Project or Site Location: _____

Description of Work to be Performed:

Explain any of the following conditions that apply to the subcontractor:

- EMR greater than 1.0
- TRIR greater than 4.0
- Fatalities within the past 3 years
- Willful, serious, or repeat OSHA citations

Why should we use this subcontractor?



Health, Safety and Environment
SUBCONTRACTOR VARIANCE FORM

Attachment 046-3 NA

Issue Date: July 1999
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Have other similar subcontractors been evaluated? If so, please explain.

Mitigations by URS to manage the risks.

Review:

Project or Site Manager Requesting Variance

HSE Manager Approval

Name: _____

Date: _____

Signature: _____

URS SAFETY MANAGEMENT STANDARD

Biological Hazards

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to reduce or eliminate illnesses and injuries transmitted by plants, insects, animals, and pathogenic agents.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 047 NA](#) – North America

[SMS 047 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-047](#) – Australia / New Zealandc

URS SAFETY MANAGEMENT STANDARD

Biological Hazards

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where job activities are performed primarily in outdoor environments.

2. Purpose and Scope

The purpose of this standard is to provide information that will help eliminate or reduce illnesses and injuries transmitted by plants, insects, animals, and pathogenic agents. Although there are many animals and insects that are potentially harmful to humans (e.g., bees, spiders, bears, and rodents), this standard focuses on six common biological hazards: ticks, poison plants, mosquitoes, snakes, Valley Fever, and water-borne pathogenic agents. Refer to SMS 051 – Bloodborne Pathogens for additional information.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Ticks

1. Precautionary Measures

- a. Background information: Ticks do not jump, crawl, or fall onto a person. They are picked up when clothing or hair brushes a leaf or other object the tick is on. Ticks are generally found within 3 feet of the ground. Once picked up, they will crawl until they find a likely site to feed. Often they will find a spot at the back of the knee, near the hairline, behind the ears, or at pressure points where clothing presses against the skin (underwear elastic, belts, neckline). The best way to prevent tick-borne diseases is not to be bitten by a tick. Ticks can carry a number of diseases, including the following:
 - i. *Lyme Disease* is an infection caused by the corkscrew-shaped bacteria *Borrelia burgdorferi* that is transmitted by the bite of deer tick (ixodes) and western black-legged ticks. The disease occurs in the forested areas of North America, Europe, and Asia. Symptoms that occur within 3 to 30 days following a tick bite include: a spreading ‘bulls-eye’ rash, fever, fatigue, headache, and joint and muscle aches. Prompt treatment with antibiotics is essential in order to prevent more serious complications that may occur if left untreated.

URS SAFETY MANAGEMENT STANDARD
Biological Hazards

- ii. *Rocky Mountain Spotted Fever* is an infection caused by the bacteria *Rickettsia rickettsii*. The disease occurs in North, Central, and South America. Other *Rickettsia* organisms cause disease worldwide (Mediterranean, Japan, Africa, North Asia). Symptoms which occur 2-6 days following a tick bite include: fever, nausea, vomiting, diarrhea, rash, muscle and joint pain. The disease is treated with antibiotics.
- iii. *Babesiosis* is caused by hemoprotozoan parasites of the genus *Babesia*. It is transmitted by the ixodid tick. The geographic distribution is worldwide. Symptoms include fever, chills, fatigue, muscle aches, and an enlarged spleen and liver. The disease is treated with anti-protozoan drugs.
- iv. *Ehrlichiosis* is caused by several bacteria of the genus *Ehrlichiae*. The geographic distribution is global, primarily in temperate regions. Symptoms which occur 5-10 days following a tick bite include fever, headache, fatigue, muscle aches, nausea, vomiting, diarrhea, confusion, and occasionally a rash. The disease is treated with antibiotics.

b. Avoidance of tick habitats

Whenever possible, persons should avoid entering areas that are likely to be infested with ticks, particularly in spring and summer when nymphal ticks feed. Ticks favor a moist, shaded environment, especially which provided by leaf litter and low-lying vegetation in wooded, brushy, or overgrown grassy habitat. Both deer and rodent hosts must be abundant to maintain the life cycle of the tick.

c. Personal Protective Equipment

- i. Wear light colored clothing or white Tyvek® to allow you to see ticks that are crawling on your clothing.
- ii. Tuck your pant legs into your socks or boots, wear high rubber boots, or use tape to close the opening where they meet so that ticks cannot crawl up the inside of your pant legs.
- iii. Wear a hat, and tie back long hair.
- iv. Apply repellents to discourage tick attachment. Repellents containing permethrin can be sprayed on boots and clothing, and will last for several days. Repellents containing DEET (n,n-diethyl-m-toluamide) can be applied to the skin, but will last only a few

URS SAFETY MANAGEMENT STANDARD

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hours before reapplication is necessary. Apply according to Environmental Protection Agency guidelines to reduce the possibility of toxicity.

d. Tick Check

- i. Change clothes when you return from an area where ticks may be located.
- ii. Shower to wash off any loose ticks.
- iii. Check your entire body for ticks. Use a hand held or full-length mirror to view all parts of your body.
- iv. Place clothing worn in tick infested areas into the dryer for at least 30 minutes in order to kill any ticks.

2. Tick Removal

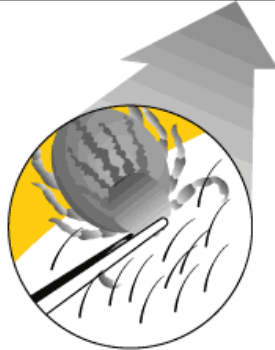
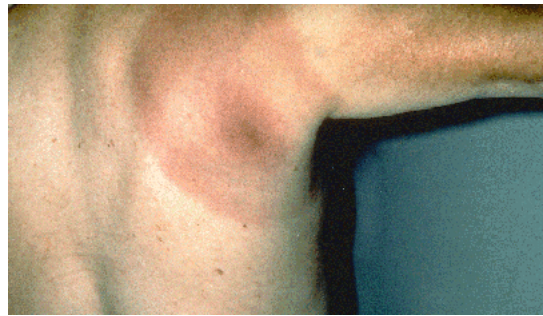
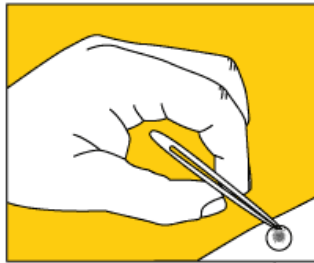
Because it takes several hours of attachment before microorganisms are transmitted from the tick to the host, prompt removal of attached or crawling ticks is an important method of preventing disease. Remember, folklore remedies of tick removal to do not work! Methods such as the use of petroleum jelly or hot matches may actually make matters worse by irritating the tick and stimulating it to release additional saliva or regurgitate gut contents, increasing the chances of transmitting disease.

The best method to remove an attached tick is with a set of fine tipped tweezers.



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- a. Use fine-tipped tweezers. When possible, avoid removing ticks with bare hands.
 - b. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. If this happens, remove mouthparts with the tweezers.
 - c. Do not squeeze, crush, or puncture the body of the tick because its fluids (saliva and gut contents) may contain infectious organisms.
 - d. After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
 - e. Disinfect the tweezers.
 - f. Save the tick for identification in case you become ill. This may help the doctor make an accurate diagnosis. Place the tick in a vial or plastic zip lock bag and put it in the freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag.
3. Reporting and Medical Follow-Up

Tick bites must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management. In most circumstances, medical treatment of persons who only have a tick bite is not recommended. However, individuals who are

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bitten by a tick should seek medical attention if any signs and symptoms of tick-borne disease develop over the weeks following the tick bite.

B. Poisonous Plants

1. Background Information

Poison ivy and poison oak plants are the most common cause of allergic contact dermatitis in North America. These poisonous plants can be a hazard for many various outdoor activities at work, home, and play. Skin contact with the oleoresins (urushiol) from these plants can cause an itchy, red, oozing, blistered rash in sensitive individuals. Oil content in the plants is highest in the spring and summer; however, the plants are even hazardous in the winter when they have dropped their leaves. There are three types of exposure:

- a. Direct contact: An initial skin exposure is necessary to “sensitize” the individual. Subsequent contact in a sensitized person will result in a rash appearing within 4 to 48 hours. Approximately 50 to 70 percent of the population is sensitized. Poison plant dermatitis is usually characterized by areas of linear or streaked patches where branches of the plant brushed the skin.
- b. Indirect contact: Skin exposure can happen indirectly. Clothing, shoes, tools, personal protective equipment, and other items can be contaminated with the oils and maintain potency for months.
- c. Airborne smoke contact: Never burn poison plants. Droplets of oil can be carried by smoke and enter the respiratory system, causing a severe internal outbreak.

Poison plant rash is not contagious. Skin contact with blister fluid from an affected individual will not cause dermatitis in another sensitized person. Scratching the rash can only spread it to other parts of your body if the oil is still on your skin. After the oil has been washed off or absorbed by the skin, scratching will not spread the rash.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each and are green in the summer and red in the fall. Both plants also have greenish-white flowers and berries that grow in clusters. All parts of these plants are toxic.

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Poison Ivy grows as a small plant, vine, and as a shrub. Leaves always consist of three glossy leaflets.



Poison Oak grows as a shrub or vine. It has three leaflets that resemble oak leaves.



Poison Sumac grows as a woody shrub or small tree from 5 to 25 feet tall. It has 7 to 13 leaves that grow opposite each other with a leaflet at the tip. Poison sumac grows in wet soils, typically in swamps and bogs.



Poison Sumac

2. Precautionary Measures

- a. The best approach is to learn to identify the plants and avoid them.
- b. Wear long pants and long sleeves, boots, and gloves.
- c. Barrier skin creams may offer some protection if applied before contact.

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- d. Avoid indirect contact with tools, clothing, or other objects that have come into contact with a crushed or broken plant. Don't forget to wash contaminated clothing and clean up contaminated equipment.
- e. If you can wash exposed skin areas within 3 to 5 minutes with cold running water, you may keep the urushiol from penetrating your skin. Proper washing may not be practical in remote areas, but a small wash-up kit with pre-packaged alcohol-based cleansing tissues can be effective.

3. Reporting and Medical Follow-Up

Exposure to poisonous plants must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management.

Home treatment: Calamine lotion and an oatmeal (1 cup to a tub full of water) bath can help relieve itching. To prevent secondary skin infection, scratching is not helpful, and the finger nails should be cut to avoid damage to the skin. Over-the-counter hydrocortisone cream can decrease inflammation and itching; however, read the label and use according to directions.

When to see the doctor: Severe cases may require further treatment. A physician should be seen if the rash appears infected, is on the face or other sensitive body areas, or is too extensive to be easily treated at home.

C. Mosquito-Borne Diseases

1. Background Information

- a. Arboviral encephalitis is a viral illness causing inflammation of the brain, and is transmitted to humans by the bite of infected mosquitoes. Globally, there are several strains, including: Eastern equine, Japanese, La Crosse, St. Louis, West Nile, and Western equine encephalitis. Some of the strains have a vaccine. Symptoms of infection are nonspecific and flu-like: fever, headache, and tiredness. Fortunately, only a small proportion of infected people progress to encephalitis. Treatment is supportive, antibiotics are not effective.
- b. Malaria is a serious but preventable disease spread by the bite of an infected anopheline mosquito. It is caused by four species of the parasite *Plasmodium* (*P. falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*). Malaria-risk areas include primarily tropical areas of Central

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and South America, Africa, India, Southeast Asia, and the Middle East. Symptoms of malaria, which occur 8 days to 1 year after infection, include fever, shaking, chills, headache, muscle ache, tiredness, jaundice, nausea, vomiting, and diarrhea. Malaria can be cured with prescription drugs.

- c. Dengue Fever is a potentially life-threatening viral illness transmitted by the bite of the Aedes mosquito, found primarily in urban areas. The disease is found in most of tropical Asia, the Pacific Islands, Central and South America, and Africa. There are four dengue virus serotypes. Symptoms include sudden onset, high fever, severe headache, joint and muscle pain, rash, nausea, and vomiting. There is no specific treatment and no vaccine.
- d. Yellow Fever is a viral disease transmitted between humans by mosquitoes. It occurs only in Africa and South America. There is a vaccine that confers immunity lasting 10 years or more. Symptoms begin 3 to 6 days after the mosquito bite, and include fever, nausea, vomiting, headache, slow pulse, muscle aches, and restlessness. Treatment is symptomatic.
- e. West Nile virus is a viral disease transmitted by mosquitoes. It occurs in North America, Europe, Africa, west and central Asia, and the Middle East. There is no vaccine for West Nile virus. Symptoms include nausea, vomiting, and diarrhea.

2. Precautionary Measures

- a. Insect Repellent: Use insect repellants that contain DEET. The effect should last about 4 hours. Always use according to label directions. Use only when outdoors and wash skin after coming indoors. Do not breathe in, swallow, or get into the eyes. Do not put on wounds or broken skin.
- b. Protective Clothing: Wear long-sleeved shirts and long pants, especially from dusk to dawn. Avoid going outdoors during these hours.
- c. Mosquito netting: Travelers who will not be staying in well-screened or air conditioned rooms should use a pyrethroid-containing flying insect spray in living and sleeping areas during evening and nighttime hours. Sleep under mosquito netting (bed nets) that has been sprayed with permethrin.

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- d. Malaria prophylaxis medications may be prescribed; however, they do not provide complete protection. The type of medication given depends on the area of travel.

D. Poisonous Snakes

1. Background Information

No single characteristic distinguishes a poisonous snake from a harmless one except the presence of poison fangs and glands. Only in dead specimens can you determine the presence of these fangs and glands without danger. Most poisonous snakes have both neurotoxic and hemotoxic venom; however, one type is dominant and the other is weak.

- a. Hemotoxic venom. The folded-fang snakes (fangs can raise to an erect position) have venoms that affect the circulatory system, destroying blood cells, damaging skin tissues, and causing internal hemorrhaging.
- b. Neurotoxic venom. The fixed-fang snakes (permanently erect fangs) have venoms that affect the nervous system, making the victim unable to breathe.
- c. Poisonous snakes in the Americas: copperhead, coral snake, cottonmouth, and rattlesnake.
- d. Poisonous snakes in Europe: adder, viper.
- e. Poisonous snakes in Africa and Asia: viper, cobra, adder, green mamba.
- f. Poisonous snakes in Australia: copperhead, adder, taipan, tiger snake.

2. Precautionary Measures

Bites occur when you don't hear or see the snake, when you step on them, or when you walk too close to them. Follow these simple rules to reduce the chance of accidental snakebite:

- a. Don't put your hands into dark places, such as rock crevices, heavy brush, or hollow logs, without first investigating.
- b. Don't step over a fallen tree. Step on the log and look to see if there is a snake resting on the other side.
- c. Don't walk through heavy brush or tall grass without looking down. Look where you are walking.

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- d. Do not pick up any live snake. If you encounter a snake, walk around the snake, giving it plenty of room. A snake can strike half its length.
- e. Don't pick up freshly killed snakes without first severing the head. The nervous system may still be active and a dead snake can deliver a bite.

3. Reporting and Medical Follow-Up

Snake bites must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management.

If you are bitten by a snake, the primary goal is to get to a hospital as soon as possible to receive professional medical evaluation, and possible treatment with anti-venom if warranted. Initial first aid should include: Washing the bite with soap and water; immobilizing the bitten area and keeping it lower than the heart. Try to remain calm. If you are unable to reach a hospital within 30 minutes, a bandage, wrapped 2 to 4 inches above the bite, may help slow the venom. The bandage should not cut off blood flow from a vein or artery; make sure the bandage is loose enough that a finger can slip under it.

Research has shown the following to be potentially harmful: DO NOT apply ice, use a tourniquet, or make incisions into the wound.

E. Valley Fever

1. Background Information

Valley Fever is an illness that results from exposure to a fungal spore (*Coccidioides immitis*). It is endemic to the San Joaquin Valley in California, as well as areas of the Southwestern U.S., Mexico, and Central and South America, although it has been found in many other areas. It is particularly associated with arid soils that are not cultivated. Exposure is generally by inhalation of spores, though it may also enter through broken skin. Approximately 2 weeks after inhalation exposure, severe weakness and flu-like symptoms develop; severe pneumonia may occur. It may also affect the brain, bones, and joints causing disability, spinal meningitis, or death. Dermal forms of the infection can form disfiguring fungal lesions.

2. Precautionary Measures

Because it is associated with arid soils, personnel should avoid locations and activities that create dust. Persons at risk of exposure include

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geologists, surveyors, excavators, archaeologists, etc. Dust suppression methods should be employed and the use of particulate respirators should be considered for areas known to harbor the fungus. At one phase of the fungus' life cycle, cottony, spider-web-like growths may be seen on the soil surface. If observed, these growths must not be disturbed, and work should be relocated if possible.

3. Reporting and Medical Follow-up

Exposure to fungal spores must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management.

Approximately 60 percent of exposed persons will not have symptoms. Persons that have been in areas associated with Valley Fever should be alert to the development of flu-like symptoms, fatigue, or skin rashes 2 to 4 weeks later. Valley Fever can be treated with anti-fungal medication. Early treatment is critical, as disseminated forms of the disease can result in chronic disease or death.

F. Pathogenic organisms

1. Background Information

Employees who perform certain activities, such as disaster response, may be in areas where water-borne pathogens may be present. A partial list of agents includes: E. coli, Hepatitis A, typhoid, and cholera. Chemical hazards and molds and fungus may also be present. Refer to SMS 051– Bloodborne Pathogens for additional information.

2. Precautionary Measures

All work must be performed within the scope of either a Health and Safety Plan or Safe Work Plan that identifies the task hazards, and specifies appropriate controls. A medical exam and/or inoculations may be required. See SMS 024 – Medical Screening and Surveillance, or contact the Occupational Health Manager for assistance.

Where contact with water or wet materials may occur, personnel must use protection such as impervious coveralls, boots/waders, faceshields, etc, as specified in the project Health and Safety Plan or Safe Work Plan. Personnel must protect any areas of broken skin, eyes, nose, and mouth from contact with potentially infectious materials, and practice good personal hygiene before eating, drinking, etc.

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3. Reporting and Medical Follow-up

Exposure to pathogenic organisms must be reported and managed in accordance with SMS 049 – Injury/Illness/Incident Reporting and SMS 065 – Injury and Claims Management.

Medical evaluation and/or an inoculation schedule may be required prior to beginning work. Because early evaluation and treatment is more successful, personnel should be alert to signs and symptoms of possible pathogenic organisms and seek prompt medical evaluation if illness develops or is suspected.

G. Natural disaster relief efforts

1. Natural disaster relief efforts present a variety of hazards, including biological hazards. Biological hazards potentially encountered during relief efforts include mold, sewage-contaminated water, various building materials that may puncture the skin and create various types of infections, and displaced animals and insects. Before work begins, each disaster relief site should be evaluated for the various types of biological hazards that may be encountered. Control measures must be developed to address the biological hazards.

5. Documentation Summary

Complete and distribute a URS Incident Report form 049-1 for all work-related biological exposure incidents.

6. Resources

- A. Centers for Disease Control <http://www.cdc.gov>
- B. U. S. Occupational Safety and Health Administration <http://www.osha.gov>
- C. U.S. Food and Drug Administration - Treating and Preventing Venomous Snake Bites
http://www.fda.gov/fdac/features/995_snakes.html
- D. ENature – Identify plant and animals hazards in a specific area.
<http://enature.com/zipguides/index.asp?choice=poisonous>
- E. [SMS 051](#) – Bloodborne Pathogens
- F. [SMS 024](#) – Medical Screening and Surveillance

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- G. [SMS 049](#) – Injury / Illness / Incident Reporting & Notifications
- H. [SMS 065](#) – Injury and Claims Management
- I. [ORC Pandemic Planning Guide](#)

URS SAFETY MANAGEMENT STANDARD
Hazardous Materials/Dangerous Goods Shipping

1. Applicability

This standard applies to operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

This purpose of this standard is to provide a framework for compliance with the requirements of the U.S. Department of Transportation (DOT) 49 CFR and the International Air Transportation Association (IATA) for shipping hazardous materials/dangerous goods by land or air.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 048 NA](#) – North America

[SMS 048 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-048](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Hazardous Materials/Dangerous Goods Shipping

1. Applicability

This standard applies to URS Corporation (URS) and its subsidiary companies that ship hazardous materials (hazmat).

U.S. Department of Transportation (DOT) regulations for hazardous materials shipping (by air, ground, or water) and the International Air Transportation Association (IATA) regulations for dangerous goods shipping (by air) prohibit the shipment of certain materials unless they are packaged, marked, labeled, and accompanied with shipping documentation in a specified manner. Failure to adhere to these shipping requirements may result in fines to the company and disciplinary action to the employee(s) involved in the shipment.

Examples of Hazardous Materials/Dangerous Goods regulated by the DOT and IATA that may be encountered or used during URS projects may include, but are not limited to, certain field environmental samples, compressed gases (fire extinguishers, calibration gases, compressed air, and welding and cutting gases), ionizing radiation sources used to calibrate detection equipment or analytical equipment, nuclear-density meters, laboratory reagents, hazardous wastes, materials used for bench-scale and pilot plant operations, oils, greases, lubricating fluids, cleaning solvents, degreasing solvents, paints, spray paints, paint removers and/or strippers, diesel fuel, gasoline, pesticides, inks, glues, and other adhesives, battery fluids, ammonia cleaning solutions and peroxide solutions. When possible, only use ground carriers for transportation of hazardous materials.

The air shipment of environmental samples represents a significant percentage of hazardous materials/dangerous goods shipped by URS. Although most environmental samples (both water and soil) do not meet the definition of hazardous, extreme care must be taken to properly classify materials.

2. Purpose and Scope

The purpose of this standard is to prevent shipping-related incidents and violations, and prevent injuries to employees and members of the public.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

Project Managers' responsibilities include the following related to hazardous materials shipping:

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Hazardous Materials/Dangerous Goods Shipping

- A. Ensure that every employee and driver involved with shipping a hazardous material in commerce is trained and certified, and records are maintained in accordance with 49 Code of Federal Regulations (CFR) 172.704.
- B. Ensure every driver of a truck that has a gross vehicle weight rating exceeding 26,000 pounds (11.8 kg), or as mandated by state, or hauling a placardable quantity of hazmat has a commercial driver's license (CDL) with proper endorsements (e.g., hazmat, tank, etc.) in accordance with 49 CFR 383.91 and 383.93, and has current DOT hazmat training in all required areas, in accordance with 49 CFR 172.704 and 177.816.
- C. Ensure every truck hauling hazmat in regulated quantities carries a current DOT Hazardous Materials Certificate of Registration; and if required, a Federal Motor Carrier Safety Administration (FMCSA) Hazardous Materials Safety Permit and any other state-mandated registration.
- D. Verify that insurance coverage includes transportation of hazardous materials over commercial roads (49 CFR 387.9).
- E. Ensure every truck hauling hazmat has the proper documentation, including shipping paper, emergency response information, 24-hour emergency response telephone number, and the DOT Hazardous Materials Registration (if required). In addition, when using a third-party emergency response provided such as CHEMTREC, a Customer Contract Number (CCN#) must appear on the shipping paper.
- F. If using CHEMTREC as the 24-hour emergency number, ensure that current Safety Data Sheets (SDSs) for each transported hazmat are submitted to CHEMTREC before transport.
- G. Ensure all hazmat incidents are properly reported to the project safety supervisor, in accordance with URS reporting procedures.
- H. Report hazardous material spills within 24 hours, including material spilled and estimated quantity.

4. Requirements

In order to minimize the potential for an improper shipment, Project Managers and Site Managers are required to ensure that an individual trained according to DOT Regulations in 49 CFR 172 Subpart H and, if applicable, IATA Dangerous Goods Regulations Subsection 1.5 is responsible for the correct classification, packaging, marking, labeling, and completion of shipping papers for any hazardous materials being shipped offsite. No hazmat shipments shall leave the site without prior inspection. The assigned person must have current DOT

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hazmat certification and, if applicable, IATA certification. DOT requires recurrent training every 3 years, and IATA requires recurrent training every 2 years.

A. Staffing

1. Each project or site must ensure that DOT hazmat-trained individuals are involved in the process of preparing hazardous materials for shipment.
2. Each location where hazardous material shipping occurs or where hazardous material employees are assigned must identify a local or regional shipping specialist.
3. The assigned shipping specialist must have current certification of DOT hazmat, and if applicable, IATA training.

B. Hazmat Hotline

URS maintains a **shipping Hazmat Hotline** for hazardous materials/dangerous goods to provide answers to specific shipping questions.

1. **800-381-0664** in Canada and U.S.
2. **919-461-1227** for other countries
3. **Email: HazmatHotline@urs.com**

C. Shipper Training

All employees involved in the transportation of hazmat in commerce must be formally trained and certified in accordance with 49 CFR 172.704. Training must include the following components: general awareness, function-specific, safety, hazmat security, security plan (if applicable), and if applicable, driver training.

1. Training Requirements. Require employees who package, prepare paperwork, load and/or unload, and transport hazardous materials be trained to the appropriate level of activity:
 - a. Training is required prior to performing hazardous material shipping activities.
 - b. Training is required when regulatory changes impact current procedures, and every 2 years (IATA) or 3 years (DOT).

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Hazardous Materials/Dangerous Goods Shipping

- c. Regional or local hazmat shipping specialists must complete a 2-day hazardous material/dangerous goods shipping course conducted by URS, or complete an outside equivalent course.
 - d. Drivers may be exempt from function-specific training if the DOT's Materials of Trade (MOT) exception applies to the shipment (see Section 4.K.6 and SMS 048 NA, Supplemental Information A).
 - e. Certain shipments of hazmat must have a Hazardous Materials Security Plan (see Section 4.I for more information).
2. Training Records. Employers are required to maintain training records for all hazmat employees during employment, and for 90 days after, including:
- a. Hazmat employee's name;
 - b. Completion date of most recent training;
 - c. Training materials (copy, description, or location);
 - d. Name and address of hazmat trainer; and
 - e. Certification that the hazmat employee has been trained and tested.

D. Hazmat Driver Training

1. In addition to the training required by 49 CFR 172.704 (above), hazmat drivers must also be trained in the requirements of 49 CFR 177.816, or have a CDL with a hazmat endorsement.
2. CDL requirements are located in 49 CFR 383.

E. Hazmat Registration

1. Shippers or carriers who offer any of the following in commerce must have a hazmat registration in accordance with 49 CFR 107.601-620:
 - a. Any highway route-controlled quantity of a Class 7 (radioactive) material;

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Hazardous Materials/Dangerous Goods Shipping

- b. More than 55 pounds (25 kilograms) of a Division 1.1, 1.2, or 1.3 (explosive) material in a motor vehicle, rail car, or freight container;
- c. More than 1 liter (1.08 quarts) per package of a material extremely toxic by inhalation (i.e., “material poisonous by inhalation,” as defined in 49 CFR 171.8, that meets the criteria for “hazard zone A,” as specified in 49 CFR 173.116(a) or 173.133(a));
- d. A hazardous material in a bulk packaging having a capacity of 3,500 gallons for liquids or gases, or more than 468 cubic feet of solids;
- e. A shipment in other than bulk packaging of 5,000 pounds gross weight or more of one class of hazardous material for which the transport vehicle requires placarding for which placarding of a vehicle, rail car, or freight container is required for that class; and
- f. Except for certain farm-related activities, any quantity of materials requiring placarding.

In general, this includes Company fuel and lube trucks that travel on public roads.

- 2. The vehicle must keep a copy of the current Certificate of Registration in each truck used to transport hazmat.
- 3. In addition, a copy of the registration statement filed with the DOT and the Certificate of Registration must be maintained at the principal place of business for a period of 3 years.
- 4. This registration must be renewed each year.

F. FMCSA Hazardous Materials Safety Permits

- 1. Since January 2005, certain highway carriers of hazmat must obtain a hazmat safety permit from the FMCSA as required under 49 CFR 385.403, 390.3, and 390.19. In general, a safety permit is required if a motor carrier transports any of the following:
 - a. A highway route–controlled quantity of a Class 7 (radioactive) material;

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- b. More than 55 pounds (25 kilograms) of a Division 1.1, 1.2, or 1.3 (explosive) material or an amount of a Division 1.5 (explosive) material requiring placarding;
- c. More than 1.08 quarts (one liter) per package of a “material poisonous by inhalation,” that meets the criteria for “Hazard Zone A.”
- d. A “material poisonous by inhalation” that meets the criteria for “Hazard Zone B ” in a bulk packaging (capacity greater than 119 gallons [450 liters]);
- e. A “material poisonous by inhalation” in a “bulk packaging,” both defined in 49 CFR 171.8, that meets the criteria for “Hazard Zone C or “Hazard Zone D” in a packaging having a capacity equal to or greater than 3,500 gallons (13,248 liters); or
- f. A shipment of compressed or refrigerated liquefied methane or liquefied natural gas, or other liquefied gas with a methane content of at least 85 percent, in a bulk packaging having a capacity equal to or greater than 3,500 gallons (13,248 liters).

G. Shipping Papers

- 1. With few exemptions, anyone who offers a hazmat for transportation must complete shipping papers that must be carried in the vehicle, within the driver’s immediate reach when restrained by a seat belt, and visible to a person entering the vehicle, or in a holder mounted on the inside of the driver’s door (49 CFR 172, Subpart C; and 49 CFR 177.817).
- 2. Shippers must retain copies of shipping papers for at least 2 years after the transporter accepts the material (49 CFR 172.201).
- 3. A motor carrier using a shipping paper without change for multiple shipments of one or more hazardous materials having the same shipping name and identification number may retain a single copy of the shipping paper, instead of a copy for each shipment made, if the carrier also retains a record of each shipment made, to include shipping name, identification number, quantity transported, and date of shipment.
- 4. Shippers and transporters of hazardous waste (as defined in 40 CFR 261) must retain copies of hazardous waste manifests for at least 3 years after the initial carrier accepted the material.

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5. Upon request, hazmat shipping papers and hazardous waste manifests must be made available to federal, state, and local inspectors.

H. Emergency Response Information

1. DOT requires anyone who offers, transports, or handles hazmat to have emergency response information immediately available. (49 CFR 172.600). Safety Data Sheets (SDSs) and DOT's Emergency Response Guidebook are common reference sources for emergency response information.
2. In addition, persons who offer hazmat for transportation must provide a 24-hour emergency response telephone number that must be monitored by a knowledgeable person at all times while the material is in transit.
3. URS maintains an account with CHEMTREC for this service. Before using this service, URS must submit an SDS or Waste Safety Data Sheet to them. Contact the Hazmat Hotline (see Section 4.B) for more information.

I. Hazardous Material Transportation Security Plan

1. URS sites that transport or offer the following types or quantities of materials for transportation must have a Hazardous Material Transportation Security Plan on site and must ensure that all hazmat employees are trained in the plan, as required by 49 CFR 172.800.
 - a. Any quantity of a Division 1.1, 1.2, or 1.3 material;
 - b. A quantity of a Division 1.4, 1.5, or 1.6 material requiring placarding in accordance with subpart F;
 - c. A large bulk quantity of Division 2.1 material;
 - d. A large bulk quantity of Division 2.2 material with a subsidiary hazard of 5.1;
 - e. Any quantity of a material poisonous by inhalation, as defined in 49 CFR 171.8;
 - f. A large bulk quantity of a Class 3 material meeting the criteria for Packing Group I or II;

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- g. A quantity of desensitized explosives meeting the definition of Division 4.1 or Class 3 material requiring placarding in accordance with subpart F;
 - h. A large bulk quantity of a Division 4.2 material meeting the criteria for Packing Group I or II;
 - i. A quantity of a Division 4.3 material requiring placarding in accordance with subpart F;
 - j. A large bulk quantity of a Division 5.1 material in Packing Groups I and II; perchlorates; or ammonium nitrate, ammonium nitrate fertilizers, or ammonium nitrate emulsions, suspensions, or gels;
 - k. Any quantity of organic peroxide, Type B, liquid or solid, temperature controlled;
 - l. A large bulk quantity of Division 6.1 material (for a material poisonous by inhalation see paragraph (e) above);
 - m. A select agent or toxin regulated by the Centers for Disease Control and Prevention under 42 CFR 73 or the United States Department of Agriculture under 9 CFR 121;
 - n. A quantity of uranium hexafluoride requiring placarding under 49 CFR 172.505(b);
 - o. International Atomic Energy Agency (IAEA) Code of Conduct Category 1 and 2 materials including Highway Route Controlled quantities as defined in 49 CFR 173.403 or known radionuclides in forms listed as RAM-QC by the Nuclear Regulatory Commission;
 - p. A large bulk quantity of Class 8 material meeting the criteria for Packing Group I.
2. If a project or office determines that a hazmat security plan is required, contact the URS Hazmat Hotline.
 3. A Hazmat Security Specialist will be assigned at each site required to have a hazmat security plan.
 4. All Hazmat Security Plans will be reviewed annually and updated if required.

URS SAFETY MANAGEMENT STANDARD
Hazardous Materials/Dangerous Goods Shipping

J. Hazardous Incident Report

1. A person in possession of a hazmat at the time of a reportable incident as outlined in 49 CFR 171.15 must immediately report the incident to the National Response Center. In addition, these incidents require filing a detailed written incident report within 30 days of the incident (see 49 CFR 171.16).
2. Incidents that do not trigger the immediate reporting as outlined in 49 CFR 171.15, but which meet any of the other incident criteria in 49 CFR 171.16 still warrant a detailed written report under 171.16 within 30 days of the incident.
3. All hazmat incidents must be reported in accordance with SMS 049 – Injury/Illness/Incident Reporting & Notifications.

K. General Procedures

1. Select the best way to ship the hazardous material based on the quantity, hazard(s), and mode of transportation (e.g., air, land, water).
2. Ensure shipping containers are designed, constructed, filled, closed, secured and maintained so that, under normal conditions of handling and transport, there will be no accidental release of hazardous materials which could endanger public safety.
3. Ensure that a copy of the closure instructions provided by the package manufacturer is available for each UN specification shipping container type that is used at the facility.
4. Package, mark, label, and placard according to applicable regulations.
5. Complete the shipping documentation according to applicable regulations, which may include bill of lading, shipper's declaration, hazardous waste manifest, or other, as applicable.
6. Follow hazard communication requirements:
 - a. Send a copy of the appropriate Emergency Response Guidebook page or MSDS with each shipment.

URS SAFETY MANAGEMENT STANDARD

Hazardous Materials/Dangerous Goods Shipping

- b. Include the 24-hour emergency response phone number (CHEMTREC 800-262-8200 domestic; 1-703-741-5500 international) on the shipping paperwork.
 - i. Any shipment of a hazardous material or hazardous waste requires that CHEMTREC be notified in advance of the shipment. CHEMTREC requires that either an SDS or Hazard Profile of the hazardous material being offered for shipment be provided to CHEMTREC. URS maintains a current contract with CHEMTREC to provide this required service and the right to use the CHEMTREC emergency phone number on shipping papers when notification of the shipment has been made. Contact the Hazmat Hotline (see Section 4.B) before contacting CHEMTREC.
7. URS also maintains current Hazardous Materials Certificate of Registrations with the U.S. Department of Transportation. Contact the Hazmat Hotline for more information.
8. DOT regulations include a "Materials of Trade" or "MOTs" exception. MOTs are hazmat, other than hazardous waste, that are carried on a motor vehicle:
 - to protect the health and safety of the motor vehicle operator or passengers, such as insect repellent or a fire extinguisher;
 - to support the operation or maintenance of a motor vehicle (including its auxiliary equipment), such as a spare battery or gasoline; or
 - to directly support a principal business of a private motor carrier (including vehicles operated by a rail carrier) that is other than transportation by motor vehicle – for example, landscaping, pest control, painting, plumbing, or welding services.

URS operations may qualify under this exception. Refer to the exception requirements under 49 CFR 173.6. A hazmat-trained employee should make the determination as to whether this exception will apply to the shipment.

L. Special Requirements

1. Do not offer packages for shipment without knowing the contents and classifying the packages in accordance with the DOT, and, if applicable, IATA regulations. Do not ship potentially hazardous

URS SAFETY MANAGEMENT STANDARD
Hazardous Materials/Dangerous Goods Shipping

materials using an unknown carrier or broker. A Hazardous Material Transportation Security Plan may be required for shipment of certain hazardous materials, and employee training is required to protect shipments of hazardous materials from theft and acts of terrorism.

2. Contact the applicable shipping company, shipping specialist, or the Hazmat Hotline if you are unsure or suspect there may be additional special requirements on a shipment.
3. Some transporters have more stringent requirements than DOT or IATA. For example, the United Parcel Service (UPS) publishes its own Guide for Shipping Ground and Air Hazardous Materials. URS shipping training and this program may not meet these additional requirements.
4. Some countries have more stringent requirements than DOT or IATA. Refer to the international hotline for assistance.
5. For international shipments, an expediter may be required to ensure needed materials are not held in customs. It may be advisable to purchase hazardous materials in the destination country.
6. The air shipment of environmental media samples represents a large percentage of potential hazardous materials/dangerous goods shipped by URS. Most environmental media samples (water and soil) typically do not meet the definition of a dangerous good (hazardous material) unless preservatives are added to make the sample a corrosive material. DOT exemptions may apply to allow air shipment as long as the samples are properly packaged and the package is properly marked; however, extreme care must be taken to properly classify, package, and mark the environmental samples to ensure compliance with the regulations.
7. Because more stringent requirements apply to air shipments, ground shipment (e.g., including use of a lab courier service) should be considered first for hazardous materials shipping.
8. Hazardous materials shipments must be loaded and secured in an appropriate shipping container (see 4.K.2 for additional information). The shipping container must also be loaded and secured on the means of transportation used for shipping in such a way as to prevent, under normal means of transport, damage to the

URS SAFETY MANAGEMENT STANDARD

Hazardous Materials/Dangerous Goods Shipping

shipping container or to the means of transportation that could lead to an accidental release of the hazardous materials.

9. Where an accidental release of hazardous materials from its packaging/containment in excess of a prescribed quantity or concentration occurs or is imminent, any person who at the time has the charge, management or control of the means of containment shall report the occurrence or imminence of the release to the project safety supervisor. Every person required to make a report shall, as soon as possible in the circumstances, take all safe and reasonable emergency measures to reduce or eliminate any danger to public safety that results or may reasonably be expected to result from the release using the Safety Data Sheets (SDSs), DOT's Emergency Response Guidebook, or other resources as appropriate.

5. Documentation

The following documentation will be maintained in the project files:

A. Training Records

1. Employers are required to maintain training records for all hazmat employees during employment and for 90 days after, including hazmat employee's name; completion date of most recent training; training materials (copy, description, or location); name and address of hazmat trainer; and certification that the hazmat employee has been trained and tested. Ensure training records include:
 - a. Hazmat employee's name;
 - b. Completion date of most recent training;
 - c. Training materials (copy, description, or location);
 - d. Name and address of hazmat trainer; and
 - e. Certification that the hazmat employee has been trained.

B. Shipping Documentation Records

1. Shippers must retain copies of shipping papers for at least 2 years after the transporter accepts the material. Shippers and transporters of hazardous waste must retain copies of hazardous

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Hazardous Materials/Dangerous Goods Shipping

waste manifests for at least 3 years after the initial carrier accepted the material.

2. For each shipment:
 - a. Copy of shipper's declaration for dangerous goods;
 - b. Copy of applicable ERG or MSDS accompanying shipment;
 - c. Copy of information (MSDS or Hazard Profile) provided to CHEMTREC; and
 - d. Supporting documentation related to the classification of the material.
- C. Hazardous Materials Transportation Security Plan, if required and applicable to site or facility operations.
- D. Hazardous Incident Report(s), if reportable incident(s) has occurred.

6. Resources

- A. [49 Code of Federal Regulations, Parts 171-180](#), Subchapter C – Hazardous Materials Regulations
- B. [International Air Transport Association](#) Dangerous Goods Regulations (DGR), updated and issued annually
- C. [International Maritime Dangerous Goods Code](#). International Maritime Organization, Amendment 29-98
- D. [DOT Office of Hazardous Materials Safety](#)
- E. URS Hazardous Materials Hotline: **800-381-0664**
- F. [SMS 049](#) – Injury/Illness/Incident Reporting & Notifications

7. Supplemental Information

- A. [Materials of Trade Summary](#)



Health, Safety and Environment
MATERIALS OF TRADE (MOTs)
SUMMARY

SMS 048 NA
Supplemental Information A

Issue Date: February 2009
Revision 2: March 2013

The Department of Transportation (DOT) "Materials of Trade" or "MOTs" exception applies to hazardous materials, other than hazardous waste, that are carried on a motor vehicle for one of the following purposes:

- to protect the health and safety of the motor vehicle operator or passengers, such as insect repellent or a fire extinguisher;
- to support the operation or maintenance of a motor vehicle (including its auxiliary equipment), such as a spare battery or gasoline; or
- to directly support a principal business of a private motor carrier (including vehicles operated by a rail carrier) that is other than transportation by motor vehicle – for example, landscaping, pest control, painting, plumbing, or welding services.

Some URS activities (e.g., environmental sampling and other field services), may be able to use this exception. The exception is found in the Code of Federal Regulations at 49 CFR 173.6. A hazmat-trained employee should make the determination as to whether this exception will apply to the shipment.

The MOTs exception allows URS Corporation employees to transport certain amounts of chemicals aboard their vehicles without preparing shipping papers, emergency response information, placarding, or formal training.

MOTs must be packaged in the manufacturer's original packaging, or a packaging of equal or greater strength or integrity. Gases must be in DOT specification cylinders. If the inner container (such as the bottle) is secured against movement inside the vehicle (if it is kept in a cabinet or tool box), then no outer packaging (such as a cardboard box) is required. The MOT must be marked with a common name or the technical name.

No hazardous material training is required, except that the driver must have general knowledge of the MOT regulations, quantity limitations, packaging requirements, and marking and labeling requirements. The driver is not allowed to exceed total aggregate weight of 440 pounds of MOTs aboard the vehicle.

The hazardous material classes and quantities of hazmat items typically transported by URS field can be transported as MOTs:

- The inner container of a Packing Group II and III material in Class 3, 8, 9, Division 4.1, 5.1, 5.2, 6.1, or ORM-D cannot exceed 66 pounds or 8 gallons each.
- A Division 2.1 or 2.2 cylinder cannot exceed 220 pounds.
- The inner container of a Packing Group II or III material in Division 4.3 cannot exceed 1 ounce.

URS SAFETY MANAGEMENT STANDARD

Incident Reporting, Notifications, and Investigation

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to provide guidance for the timely reporting of work-related injuries, illness, and incidents. This procedure also defines incident notification and investigation procedures. For incidents involving motor vehicles, the reporting and notification requirements of SMS 057 – Vehicle Safety Program will also apply.

3. Procedures

The associated procedures for this standard are included as attachments:

[SMS 049 NA](#) – North America

[SMS 049 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP11-066](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Incident Reporting, Notifications, and Investigation

1. Applicability

This standard applies to the operations of URS Corporation (URS) and its subsidiary companies.

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The purpose of this standard is to provide guidance for the timely reporting of work-related injuries, illness, and incidents. This procedure also defines incident notification and investigation procedures. For incidents involving motor vehicles, the reporting and notification requirements of SMS 057 – Vehicle Safety Program, will also apply.

Substance abuse testing may be required after an incident occurs. Consult the division-specific substance abuse testing requirements; and if applicable, client/project contract documentation.

Refer to Supplemental Information A – Definitions, in this standard for clarification on the meaning of terminology.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Reporting: All employees must immediately notify their appropriate level of management (line, project, and/or office) of a reportable incident. A reportable incident includes the following:

1. An injury or illness to any URS employee or subcontractor, even if the injury does not require medical attention.
2. An injury to a member of the public, or clients, occurring on a URS-controlled work site.
3. Work-related illness resulting from suspected chemical or biological exposure.
4. Re-occurring conditions such as back pain or cumulative trauma disorders (e.g., carpal tunnel syndrome).
5. Fire or explosion.

URS SAFETY MANAGEMENT STANDARD

Incident Reporting, Notifications, and Investigation

6. Natural or man-made disasters which result in property damage or injury.
7. Any vehicle incident occurring on site, while traveling to or from client locations, or with any company-owned, rented, or leased vehicle (including personal vehicles used for company business). If the vehicle incident involves injury, complete both the Incident Report Form (Attachment 049-1 NA) and Auto Claim Report (Attachment 057-1 NA). If the vehicle incident does not involve injuries, complete Attachment 057-1 NA.
8. Property damage resulting from any URS or subcontractor activity.
9. Unexpected release or imminent release of a hazardous material including spills during transport on public highways. Hazardous material releases require notification to Division Legal (or Insured Litigation) within 24 hours including identification of chemical(s) released and estimated quantity and the URS HAZMAT Hotline – **800-384-0664** for hazardous chemical spills during transportation. Refer to SMS 048 NA for additional information.
10. Unexpected chemical exposures to workers or the public. (This may require notification to the Environmental Protection Agency or Local/State Emergency Response Authorities according to site/project Emergency Preparedness Plan.)
11. A safety-related complaint from the public regarding URS activities.
12. Incidents that could result in adverse public media interest concerning URS or a URS project.
13. Any incident that could or does result in an actual investigation by state, federal, provincial, or local regulatory or law enforcement agencies.
14. Any other significant occurrence that could impact safety, including a near-miss.

Note: A near-miss is defined as an incident having the potential to cause injury or property damage as listed above, but did not. An example of a near-miss includes: a worker steps off a ledge, falls 3 feet (1 meter) to the floor, and is uninjured.

URS SAFETY MANAGEMENT STANDARD
Incident Reporting, Notifications, and Investigation

B. Actions: Take the actions listed below following a reportable incident:

1. Employees:
 - a. If necessary, suspend operations and secure and/or evacuate the area according to your site Emergency Preparedness Plan.
 - b. Immediately notify your supervisor and/or project manager. If the site has a Safety Committee or Floor Warden team, also notify a member of this team and follow instructions accordingly. Many members of Safety Committees and Floor Warden team are trained in First Aid/CPR as well as site and project emergency preparedness procedures.
 - c. Contact appropriate emergency services according to your site Emergency Preparedness Plan and obtain medical attention as required, or as directed by your supervisor. For additional information, refer to SMS 065 – Injury and Claims Management.
 - d. For a near miss occurring in Energy & Construction or Federal Services, contact the Safety Manager who will enter the information into G-SMART. For a near miss occurring in Infrastructure & Environment, employees shall enter near miss information into the Near Miss/Observation database.
 - e. Do not discuss the incident with members of the news media or legal representatives (except URS legal counsel or your personal legal advisor) unless directed to do so by URS management.
 - f. Do not make statements pertaining to guilt, fault, or liability.
 - g. Complete and sign a Statement Form (included in Attachment 049-1).
2. Line/Project Management Responsibilities
 - a. If an incident occurs on a client-controlled site, Project Management will ensure that appropriate client notifications are made within the required time frames. These notification requirements will be documented in project-specific planning documents (e.g., IMT, Emergency Preparedness Plan).

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Incident Reporting, Notifications, and Investigation

- b. Review circumstances (i.e., who, what, when, where, and how) of the incident within 7 working days with applicable employee(s) to determine apparent causes, and to develop recommended corrective actions.
 - c. Discuss the circumstances surrounding the incident, and corrective actions taken, with department or project staff. In some cases, Legal may direct that discussions and communications be limited by Attorney-Client protection.
3. Local Office or Project Safety Representative

- a. Record information pertaining to the incident (e.g., time, date, location, name and company of person(s) involved, witnesses, description of event, and actions taken.

Energy & Construction and Federal Services must enter the incident information into G-SMART within 24 hours of the incident. Infrastructure & Environment employees must submit Attachment 049-1 NA to incidentreport@urs.com within 24 hours of the incident.

Information from the Incident Report Form may be used by our workers' compensation third-party administrator to prepare a First Report of Injury (FROI) to meet regulatory requirements. Financial penalties might be assessed by state or federal agencies for delayed reports. Refer to SMS 065 – Injury and Claims Management, for additional information.

- b. Drug and alcohol testing shall be performed in accordance with the division drug and alcohol (substance abuse) testing program.
- c. Assist with incident evaluation and investigation as directed by management. Investigations shall be completed within 7 working days of an incident.
- d. With management, identify cause(s) of the incident and identify corrective actions needed to avoid recurrence.
- e. Review injury/incident report or the near-miss report for completeness and accuracy. Ensure the reports are distributed properly.

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Incident Reporting, Notifications, and Investigation

- f. Ensure that the injured employee is properly counseled/advised as directed by SMS 065 – Injury and Claims Management. In cases of fatalities and large scale natural or man-made disasters, professional counselors from the URS Employee Assistance Program (EAP) will be utilized as directed by the site Human Resources department.
 - g. Implement corrective actions as directed by management.
4. Occupational Health Manager (OHM) / Claims Manager
- a. Manage work-related injuries and illness with the workers' compensation third-party administrator/carrier.
 - b. Ensure that the employee's injury is managed in accordance with SMS 065 – Injury and Claims Management. Provide guidance for the affected office, project, and/or safety representative.
5. Safety Management
- a. The OHM (Infrastructure & Environment and Federal Services) or Operating Group Safety Director (Energy & Construction), with input from the appropriate Safety Manager, will review all reported incidents to determine U.S. Occupational Safety and Health Administration (OSHA)/Mine Safety and Health Administration (MSHA) reporting and recording requirements. For a determination of recordability for cases in which the recordable classification is unclear, the Vice President of Safety will make the final determination. All decisions will be based strictly on current OSHA/MSHA recordkeeping regulations.
 - b. Where an incident has resulted in an injury or illness, and that injury or illness is determined to be recordable in accordance with OSHA/MSHA recordkeeping requirements, the OHM (Infrastructure & Environment and Federal Services) or site/project Safety Manager (Energy & Construction) shall enter pertinent information related to the case into URS' recordkeeping documents/databases no later than 7 working days after receiving information that the event occurred.

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Incident Reporting, Notifications, and Investigation

- c. Each January, the OHM (Infrastructure & Environment and Federal Services) or site/project Safety Manager (Energy & Construction) will prepare and distribute the appropriate government injury/illness. These reports will summarize all required government information for incidents that occurred at the job site, plant, or project office during the preceding calendar year.

For Energy & Construction, reports, where required by regulation, will be signed by an officer of the company or the highest ranking company official at a site or project (usually the office or project manager). For Federal Services & Infrastructure & Environment, reports will be signed by an officer of the company.

6. Fatalities and Serious Incidents

- a. Immediately notify URS management by telephone (or other direct means) in the order listed below for incidents involving a URS employee or subcontractor: death, inpatient hospitalization, amputation of a leg, arm, hand, or foot, (not a finger or toe), burns to a major portion of the body, loss of sight in an eye, or equipment damage valued at more than \$100,000 (USD). (Refer to the Division or Operating Group reporting procedures for required contacts and notification times.)
 - i. Appropriate senior leadership for the affected program.
 - ii. Division Vice President of Safety.
 - iii. Notifications in accordance with the applicable Crisis Management Plan or IMT /Emergency Preparedness Plan.
- b. The Vice President of Safety will notify the URS Management Committee and the Vice Presidents of Safety for the other URS divisions.
- c. The designated Safety Manager for the Division, Operating Group or site/project (or designee) will notify federal and state authorities as appropriate within the required timeframe (usually 8 hours).
- d. In the event of a fatality, URS may provide compassion payments to the family. The compassion payments have no

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bearing on insurance coverage. The payments will help cover items such as travel, lodging, and meals for the family. The amount and method of payment(s) shall be approved by Operations Management or Vice President of Human Resources.

- e. The Vice President of Safety in the Division in which the serious incident occurred will direct the investigation. Subject matter experts from other URS divisions may be asked to assist in the investigation.
- f. Prepare documentation related to the incident at the direction of URS Legal Counsel. Documentation must contain "Privileged and Confidential" and "This document was prepared at the direction of counsel for use in anticipated litigation."
- g. Route copies of incident reports, medical reports, certificate of death, and other correspondences to the Vice President of Safety (or designee) and URS Legal to maintain privilege.

C. Incident Investigation

- 1. Perform root cause investigations on the following types of incidents:
 - a. A recordable injury or illness of a URS or subcontractor employee.
 - b. A vehicle incident involving a URS employee (while working) where either the employee or a member of the public is hospitalized.
 - c. Incidents that result in significant adverse public media interest in URS or a URS project.
 - d. Any near miss or incident occurring on projects undertaken for specific clients, where URS has contractually agreed to participate in safety systems that dictate that all near misses and incidents undergo a root-cause analysis.
 - e. Damage to Company- or Government-owned equipment that exceeds \$25,000, unless otherwise required by a client.
 - f. A release to the environment of a substance in excess of a mandated reportable quantity, and requiring the response of external response organizations.

URS SAFETY MANAGEMENT STANDARD **Incident Reporting, Notifications, and Investigation**

- g. Any near miss that a Safety Manager determines—if taken to its logical conclusion—would have resulted in a fatality, multi-day lost-workday case, and/or inpatient hospitalization.
 - h. Any incident that the Vice President of Safety or Safety Director deems appropriate for an investigation.
- 2. Actions: The following actions will be taken to investigate an incident:
 - a. The Project or Office Manager or Supervisor will notify the responsible Safety Manager that a recordable incident has occurred.
 - b. The investigation may require that an investigation team be assembled. The team will be selected by the responsible Safety Manager, in collaboration with URS line managers.
 - c. The responsible Safety Manager may include other appropriate members of management in an investigation team, and may solicit input from URS Legal regarding the investigation. The person leading the investigation will be trained in investigation techniques and root-cause analysis.
 - d. If deemed appropriate by the Vice President of Safety, the responsible Safety Manager will complete the investigation under the direction of URS Legal Counsel and the Vice President of Safety (or designee).
 - e. Following an incident, immediately determine the sources of evidence. Evidence may include a listing of people, equipment, and materials involved; a recording of environmental factors such as weather, illumination, temperature, noise, ventilation; and physical factors such as fatigue and medical conditions.
 - f. The investigation process will include interviews with those involved or those directly witnessing the event.
 - g. The investigation team lead should ensure that investigation tools are available (e.g., cameras, protective equipment, tape measures, marking devices, etc.).
 - h. Store evidence (e.g., witness statements, photographs, documentation, etc.) that is collected during the investigation in a secured and locked location.
 - i. If photos are taken, a photo log should be created as the photos are taken during the investigation. The Photo

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- Evidence Sheet (Attachment 049-2 NA) may be used to document photo details (e.g., date, time, direction).
- j. The Visitors Log (Attachment 049-3 NA) may be used to document visitors present during the investigation.
 - k. Prepare an Incident Investigation Summary (Attachment 049-4 NA) for any investigation within 7 working days of the incident. For Energy & Construction and Federal Services, the Incident Investigation Summary should be uploaded into G-SMART. For Infrastructure & Environment, the information should be submitted to incidentreport@urs.com.
 - l. Investigation reports will identify the critical factors involved in the incident. Develop direct and contributing causes to identify the root cause(s) of an incident. Investigators will evaluate causes associated with human activities, physical causes, and systems causes. The report will identify corrective actions, and assign a responsible party and due dates.
 - m. Incident Investigation Report Template (Attachment 049-5) may be used as a template to prepare a detailed incident investigation report.
 - n. The responsible Safety Manager (or designee) should complete a Lessons Learned (Attachment 049-6 NA) within 7 working days of the incident. This Lessons Learned shall be forwarded to the Group Safety Director or Vice President of Safety and after review and approval be distributed to operations. This will then be used for communication to URS staff in order to facilitate the communication of lessons learned. The Lessons Learned will contain only basic facts; will be without reference to a site, location, or employee; and will be developed solely for the purpose of conveying lessons learned to prevent a similar incident, illness, or injury. Lessons Learned information should be posted on the Source for other employees to access.
3. Release of the investigation report outside of URS may only be authorized by the Division Vice President of Safety (or designee).
 4. Following the completion of the incident investigation and development of corrective actions, it is critical that the requirements for preventing a recurrence of the event be implemented prior to re-starting the activity.

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Incident Reporting, Notifications, and Investigation

5. Documentation Summary

File incident information and associated incident investigation documentation in the appropriate safety files (e.g., GSMART).

6. Resources

A. Occupational Health Managers (OHMs)/Claims Managers

Infrastructure & Environment	Federal Services	Energy & Construction
Occupational Health Manager	Occupational Health Nurse Workers' Compensation Manager	Claims Manager
Jeanette Schrimsher, RN COHN-S (866) 326-7321 (Toll Free-U.S.) jeanette.schrimsher@urs.com	BJ Heinrich, RN, COHN-S/CM, STS (877) 878-9525 (Toll Free) bj.heinrich@urs.com	Terry Sower, CPCU, AIC, CWCP (208) 386-6038 (Office) terry.sower@urs.com

- B. [Why Tree – RCA Training Materials](#)
- C. SMS 048 – Hazardous Materials/Dangerous Goods Shipping
- D. [SMS 057](#) – Vehicle Safety Program
- E. [SMS 065](#) – Injury and Claims Management
- F. Attachment 049-1 NA – Incident Report Form
- G. Attachment 049-2 NA – Photo Evidence Sheet
- H. Attachment 049-3 NA – Visitor Log
- I. Attachment 049-4 NA – Incident Investigation Summary
- J. Attachment 049-5 NA – Incident Investigation Report Template
- K. Attachment 049-6 NA – Lessons Learned Template
- L. Supplemental Information A – Definitions



INCIDENT REPORT FORM

GENERAL DETAILS

Project Name (If applicable):

Client (If applicable):

Incident Occurred While On: URS Premises Client Site Travel Other:

Address:

Event Type: Injury/Illness Fire Property Damage Spill/Release

Injury Type: Injury Illness First Aid Information Only (no treatment)

Office Employee Assigned To:

Date of Incident:

Time of Incident:

Date Reported to Supervisor:

Time Reported to Supervisor:

Specific On-Site Location of Incident (e.g., loading dock):

Brief Description of Incident (what happened, severity of injury, and status of injured people including levels of medical treatment, work status):

Employee Description of Incident – Has the Employee completed Statement Form (page 2)?

Yes No, state reason:

What was the employee doing just before the incident occurred? (Name tools, equipment, material and what the employee was doing with them):

How did the incident occur? (What and how details, name object(s), substance(s) involved):

What object(s) or substance(s) directly harmed the employee?

What was the injury or illness (Provide a brief description of the body part/nature of injury):

EMPLOYEE DETAILS

Employee Name:

Employee ID/Number:

URS Contractor

Employee Phone #:

Time Employee Started Work:

Supervisor Managing Work (PM if applicable):

Supervisor Phone #:

Days Worked Weekly: Mon - Fri Other Than Mon - Fri Describe if Other: _____



INCIDENT REPORT FORM

STATEMENT FORM

Name of Injured Employee:

Name of Individual Providing Statement:

This is a statement from: Injured Employee Supervisor Witness

Describe the incident in as much detail as possible (attach additional pages if needed).

Signature of Individual Providing Statement:

Date:

Contact Phone Number:



INCIDENT REPORT FORM

ACCIDENT TYPE	PRIMARY BODY PART	NATURE OF INJURY
<input type="checkbox"/> Body reaction / systemic <input type="checkbox"/> Caught in, under, or between <input type="checkbox"/> Contact with (e.g., biological) <input type="checkbox"/> Contact with chemicals <input type="checkbox"/> Contact with electrical <input type="checkbox"/> Contact with temperature extremes <input type="checkbox"/> Fall from elevation <input type="checkbox"/> Fall on same level <input type="checkbox"/> Foreign body in eye <input type="checkbox"/> Inhalation <input type="checkbox"/> Lifting, pushing, pulling <input type="checkbox"/> Mobile equipment / component failure <input type="checkbox"/> Mobile equipment incident <input type="checkbox"/> Motor vehicle incident <input type="checkbox"/> Overexertion <input type="checkbox"/> Repetitive motion, cumulative trauma <input type="checkbox"/> Rubbed or abraded <input type="checkbox"/> Slip or overexertion resulting in strain, hernia, etc. <input type="checkbox"/> Struck against <input type="checkbox"/> Struck by <input type="checkbox"/> Surface contacted with irritating substances	<input type="checkbox"/> Abdomen <input type="checkbox"/> Hip <input type="checkbox"/> Ankle <input type="checkbox"/> Knee <input type="checkbox"/> Back, lower / upper <input type="checkbox"/> Lip <input type="checkbox"/> Buttocks <input type="checkbox"/> Lower leg <input type="checkbox"/> Chest <input type="checkbox"/> Mouth/teeth <input type="checkbox"/> Chin <input type="checkbox"/> Neck <input type="checkbox"/> Circulatory system <input type="checkbox"/> Nervous system <input type="checkbox"/> Digestive system <input type="checkbox"/> Nose <input type="checkbox"/> Ear(s) <input type="checkbox"/> Respiratory system <input type="checkbox"/> Elbow <input type="checkbox"/> Ribcage <input type="checkbox"/> Eye(s) <input type="checkbox"/> Shoulder <input type="checkbox"/> Face <input type="checkbox"/> Spine <input type="checkbox"/> Finger/thumb <input type="checkbox"/> Testicles <input type="checkbox"/> Foot <input type="checkbox"/> Toe <input type="checkbox"/> Forearm <input type="checkbox"/> Upper arm <input type="checkbox"/> Hand <input type="checkbox"/> Upper leg <input type="checkbox"/> Head <input type="checkbox"/> Wrist	<input type="checkbox"/> Amputation <input type="checkbox"/> Frost bite <input type="checkbox"/> Asphyxia <input type="checkbox"/> Ganglion cyst <input type="checkbox"/> Blister <input type="checkbox"/> Heat exhaustion /stroke <input type="checkbox"/> Burn, chemical <input type="checkbox"/> Hernia <input type="checkbox"/> Burn, electrical <input type="checkbox"/> Infection <input type="checkbox"/> Burn, fire / thermal <input type="checkbox"/> Inflammation <input type="checkbox"/> Carpal tunnel syndrome <input type="checkbox"/> Injection <input type="checkbox"/> Conjunctivitis <input type="checkbox"/> Pneumoconiosis <input type="checkbox"/> Contusion / bruise <input type="checkbox"/> Poisoning <input type="checkbox"/> Cut / laceration <input type="checkbox"/> Puncture <input type="checkbox"/> Dermatitis, allergic <input type="checkbox"/> Repetitive stress <input type="checkbox"/> Dermatitis, direct <input type="checkbox"/> Respiratory <input type="checkbox"/> Dislocation <input type="checkbox"/> Splinter <input type="checkbox"/> Foreign body <input type="checkbox"/> Sprain <input type="checkbox"/> Fracture <input type="checkbox"/> Strain
	<p align="center">PRIMARY BODY PART SIDE</p> <input type="checkbox"/> Left <input type="checkbox"/> Right <input type="checkbox"/> Both	

MEDICAL TREATMENT	
What level of medical treatment was received?	<input type="checkbox"/> First Aid <input type="checkbox"/> Clinic/Physician <input type="checkbox"/> Emergency Room <input type="checkbox"/> Refused/None
Was injured hospitalized overnight as an inpatient?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was treatment provided on site?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Describe:	
Hospital/Occupational Clinic Name:	Physician Name:



INCIDENT REPORT FORM

CONTRIBUTING CAUSES

Contributing Causes:

ROOT CAUSE DETERMINATION

Root Cause(s):

CORRECTIVE ACTIONS

List methods of preventing/avoiding this type of incident in the future. There must be one or more corrective actions for each root cause.

Corrective Action	Responsible Party	Due Date

DISTRIBUTION

Energy & Construction

Incident data must be entered into G-SMART and a copy of the report sent to the respective Operating Group (OG) Safety Director per OG procedures.

Federal Services

Incident data must be entered into G-SMART within 24 hours of the incident.

Infrastructure & Environment

E-mail incident report to incidentreport@urs.com or fax to 512.419.6413.



Health, Safety, and Environment

Attachment 049-2 NA

PHOTO EVIDENCE SHEET

Issue Date: May 2001
Revision 12: April 2013

Incident/Facility: _____

Instructions:

Pertinent information such as photo number, time and date photos were taken, direction camera was pointing (e.g., north, south, east, or west), and relationship to the incident must be recorded below each photo.

Date of Incident: _____

Photos Taken By: _____
(Last) (First) (M.I.)

Job Title: _____

Evidence Sheet Prepared By: _____
(Last) (First) (M.I.)

Job Title: _____



Health, Safety, and Environment

Attachment 049-2 NA

PHOTO EVIDENCE SHEET

Issue Date: May 2001
Revision 12: April 2013

Investigation Name: _____

Attach Photo Here

Attach Photo Here

Print Number: _____

Print Number: _____

Time/Date Taken: _____

Time/Date Taken: _____

Direction: _____

Direction: _____

Notes:

Notes:

	<p style="text-align: center;">Health, Safety and Environment</p> <p style="text-align: center;">INCIDENT INVESTIGATION REPORT</p>	<p style="text-align: right;">Attachment 049-5 NA</p> <p style="text-align: right;">Issue Date: May 2001 Revision 12: April 2013</p>
-----------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------

Investigation Title

Incident Location

Date Prepared

Investigation Participants:

{Name, Title}

{Name, Title}

{Name, Title}

{Name, Title}

Report Prepared by:

Name

Signature

Date

This report is for internal use only.

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1.0	EXECUTIVE SUMMARY	#
2.0	DESCRIPTION OF EVENT	#
3.0	IMMEDIATE ACTIONS TAKEN.....	#
4.0	CONTRIBUTING CAUSES.....	#
5.0	ROOT CAUSES.....	#
6.0	RECOMMENDED CORRECTIVE ACTIONS.....	#
7.0	ATTACHMENTS.....	#

1.0 Executive Summary

Describe in two or three paragraphs what happened, root causes, and corrective actions.

2.0 Description of Event

Describe in detail what happened, sequence of events, and the extent of injuries or damage. Describe the findings related to Physical, System and Human/Behavior causes. Note times of events, the names of personnel involved, injured or as witnesses.

Reference picture(s) as (see **Figure 1**)

{Insert Image
Here}

Figure 1, Brief Description

3.0 Immediate Actions Taken

Describe the events immediately following the incident. Note responder first aid actions, emergency transport, hospital information, and resolution.

4.0 Contributing Causes

Describe completely each Physical, System and Human/Behavior cause.

5.0 Root Causes

Describe completely the root cause(s).

6.0 Recommended Corrective Actions

Describe the corrective action, responsible party and due date for completion. Use the following format.

CORRECTIVE ACTIONS		
Corrective Action	Responsible Party	Due Date

7.0 Attachments

Witness statements, figures, documents, pictures, etc.

Safety

Lessons Learned



Attachment 049-6 NA
Issue Date: May 2001
Revision 12: April 2013

Title of Lesson Learned – Tahoma 20pt

Incident Summary

The Lessons Learned shall contain only basic facts; will be without reference to a site, location, or employee; and will be developed solely for the purpose of conveying lessons learned to prevent a similar incident, illness, or injury.

Use this column to describe the incident. Include photos within the column.

Heading text is Arial 12pt, bold, 3 pt after. Column text is Arial 10pt, paragraph 0pt before, 3pt after, line spacing 1.0, justified. Cell has default 0.19cm margins left and right. There is a central column to provide a gap between the left hand summary text and the right hand findings text.

You can fill this column with as much text as you wish, but the whole page, including the date at right below must still fit on one page.

The page is now laid out as a table, not as columns so the text in this column will now not flow into the adjacent column.

Insert photo if room is available. Do not include pictures that could identify the employee(s) involved.

Attempt to limit the document to one page when possible.

What Went Wrong?

- Use this section of this column to describe what went wrong.
- Text is Arial 10pt, paragraph 0pt before, 3pt after, line spacing 1.0, justified. Cell has default 0.19cm margins left and right.
- Keep the bulleting.

What Went Right?

- Use this section of this column to describe what went right.
- Text is Arial 10pt, paragraph 0pt before, 3pt after, line spacing 1.0, justified.
- Keep the bulleting.

Lessons Learned

- Use this section of this column to describe lessons learned.
- Text is Arial 10pt, paragraph 0pt before, 3pt after, line spacing 1.0, justified.
- Keep the bulleting.

If the text does not fill the column, you should insert additional line spaces before What Went Right and before Lessons Learned.

Do not allow the text to overwrite the date.

Insert Month Year

**DEFINITIONS**

Contributing Cause: A cause that contributed to an occurrence but, by itself, would not have caused the occurrence.

Days-Away Case (DAC): Injuries that result in time lost from the job in excess of the day of the injury.

Fatality: Injuries or illnesses that result in death.

First Aid: Cases that require minor treatment administered on the job site. First Aid cases include treatments and subsequent observation of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care even though a physician, or registered professional personnel, may provide the care. Repeated use of non-prescription medication at non-prescription dosage, other than antiseptic, is a first aid case.

Incident Rate: The injury frequency expressed in terms of the number of incidence per 100 employees worked in a given year (200,000 hours). The incident rate is calculated for lost time, medical, total Occupational Safety and Health Administration (OSHA) recordable injuries, and total lost workdays.

Medical Injury: Injuries, which require treatment beyond first aid and are not, lost time or restricted duty injuries. Medical injuries include (but are not limited to) stitches, fractures, loss of consciousness, surgery, prescription medicines, etc. Medical injuries are OSHA recordable.

Mine Accident, Injury and Illness Reporting: Reporting for projects covered by MSHA and 30 CFR shall follow reporting procedures specified in 30 CFR 50.20 using Form 7000-1. This form has four sections and definitions for data required are included in Part 50 of the regulation.

OSHA Recordable: Those injuries and illnesses that are required to be recorded on the OSHA 300 Log. These injuries include lost time injuries, restricted duty injuries, medical injuries, and all occupational illnesses as defined by 29 CFR 1904 Subpart C and entered on the OSHA 300 Log plus all work related non-first aid occupational illnesses or work related illnesses as listed in 29 CFR 1904, Appendix B regardless of treatment.

Recordable Injury/Illness: Those injury or illnesses that are work-related and results in one or more of the following:

1. Death.
2. Days away from work.
3. Restricted work or transfer to another job.

4. Medical treatment beyond first aid.
5. Loss of consciousness.
6. A significant injury or illness diagnosed by a physician or other licensed health care professional.

Restricted Work Injury: Injuries that result in the individual being assigned to transitional duty and/or temporary job assignment.

Root Cause: The cause that, if corrected, would prevent recurrence of this and similar occurrences. The root cause does not apply to this occurrence only, but has generic implications to a broad group of possible occurrences, and it is the most fundamental aspect of the cause that can logically be identified and corrected.

Critical Injury (Canada):

Per the Ontario Occupational Health and Safety Act, R.R.O. 1990, Regulation 834, a Critical Injury is defined as an injury of a serious nature that:

- a. Places life in jeopardy;
- b. Produces unconsciousness;
- c. Results in substantial loss of blood;
- d. Involves the fracture of a leg or arm but not a finger or toe;
- e. Involves the amputation of a leg, arm, hand or foot, but not a finger or toe;
- f. Consists of burns to a major portion of the body; or
- g. Causes the loss of sight in an eye.

Per the British Columbia Workers Compensation Act, RSBC 1996, Chapter 492, a Critical Injury is defined as injury of a serious nature that includes the following:

- a. Any incident that kills, causes risk of death, or seriously injures a worker;
- b. Any blasting accident that results in injury, or unusual event involving explosives;
- c. A diving incident that causes death, injury, or decompression sickness requiring treatment;
- d. A major leak or release of a dangerous substance;
- e. A major structural failure or collapse of a structure, equipment, construction support system or excavation; and any serious mishap.

URS SAFETY MANAGEMENT STANDARD

Bloodborne Pathogens

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to (1) identify jobs and tasks where occupational exposure to bloodborne pathogens exists and (2) eliminate or significantly reduce the risk of infectious bloodborne diseases.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 051 NA](#) – North America

[SMS 051 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-051](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Bloodborne Pathogens

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies, and to all employees who may incur exposure to blood or other potentially infectious body fluids as a result of performing their assigned job duties. Examples include: designated first aid and emergency responders, work assignment at a medical laboratory site, or janitorial work involving removal of red bag waste or sharps from medical facilities or clinics.

Sewage work does not typically involve exposure to bloodborne pathogens as covered under the Occupational Safety and Health Administration (OSHA) standard, even though other biological hazards may be present, and should be addressed in the task/job hazard analysis.

Employees serving on safety committees or who volunteer as first-aid-trained employees do not fall under the OSHA requirements for vaccination, but should have training on bloodborne pathogens as part of the curriculum of their first aid training.

2. Purpose and Scope

The purpose of this standard is to identify jobs and tasks where occupational exposure to bloodborne pathogens (e.g., Human Immunodeficiency Virus, that will eliminate or significantly reduce the risk of infectious bloodborne diseases in accordance with the OSHA Bloodborne Pathogen Standard (29 Code of Federal Regulations [CFR] 1910.1030). This standard also includes provisions for affected employees to receive personal protective equipment; Hepatitis B vaccinations; training; and if necessary, confidential medical evaluations and follow up.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

- Program Administration – The Occupational Health Manager (OHM) and Vice President of Health, Safety, and Environment (or equivalent) is responsible for implementation and annual evaluation of the Exposure Control Plan (ECP) – Attachment 051-1 NA. The OHM will ensure that all medical actions required are performed, and that the appropriate employee health and OSHA records are maintained. The Vice President of Health, Safety, and Environment (or equivalent) will oversee provisions of necessary personal protective equipment and supplies, training, documentation of training, and will make the written ECP available to employees and OSHA representatives.

URS SAFETY MANAGEMENT STANDARD

Bloodborne Pathogens

4. Requirements

A. Risk Identification

1. The facility or site manager, with assistance from the site safety representative, will perform an exposure determination concerning which employee may or may not have exposure to bloodborne pathogens. Employees will be classified into two categories:
 - a. Employees formally designated as part of their job to perform tasks that may involve direct contact with blood or potentially infectious body fluids.
 - i. Requires initial and annual training
 - ii. Hepatitis B vaccination series will be offered
 - iii. Requires procedures be followed in ECP.
 - b. Employees not assigned to jobs or tasks that involve exposure to blood or potentially infectious body fluids, but who could in extraordinary situations, voluntarily assist injured or ill individuals, and therefore could have exposure to bloodborne pathogens.
 - i. Requires post-exposure procedures outlined in ECP.
2. The ECP will be reviewed and updated at least annually, and whenever necessary to include new or modified tasks and procedures. The ECP will be reviewed by non-managerial employees responsible for direct patient care who are potentially exposed to injuries from contaminated sharps. These employees will be trained in the identification, evaluation, and selection of effective engineering and work practice controls.

B. Exposure Control Methods

1. All employees will use universal precautions—an approach to infection control where all human blood and body fluids are treated as potentially infectious.
2. Use engineering and work practice controls (e.g., sharps disposal containers, perform procedures to prevent splashing) to eliminate or minimize exposure to employees.
3. Provide personal protective equipment (e.g. disposable gloves, face masks with eye protection, liquid impermeable gowns, CPR

URS SAFETY MANAGEMENT STANDARD

Bloodborne Pathogens

pocket masks) and ensure use in order to place a barrier between the employee and the blood or body fluids.

4. Wash hands immediately with soap and water after removing gloves or performing any work with blood or body fluids.
5. Perform housekeeping and decontamination of work surfaces with U.S. Environmental Protection Agency (U.S. EPA)-registered germicides, or a bleach solution diluted 1:10 with water, as needed, to maintain a safe working environment.
6. Dispose of regulated biohazardous waste (contaminated sharps or items that are capable of releasing blood or body fluids through employee handling) in special waste receptacles lined with red bags, and incinerate per federal and state regulations. This does not include small amounts of waste from a minor wound, which can be sealed in a plastic bag and disposed of in a solid waste receptacle.

- C. Provide the Hepatitis B Vaccination series to all employees who have been designated to perform tasks that involve direct exposure to bloodborne pathogens. Further, make this vaccination series immediately available to employees who have had an occupational bloodborne exposure incident, whether as a result of their assigned tasks, or occurring as a result of incidental contact.

An employee who declines the vaccination must sign the wavier form located at the end of Attachment 051-1 NA.

- D. In the event that an employee is exposed to blood or body fluids, they should immediately flush the affected area with copious amounts of water. Arrange a confidential medical evaluation and follow-up with an occupational physician for the employee as soon as possible following the report of an exposure incident; preferably within 1 to 2 hours after the exposure incident has occurred.

E. Hazard Communication

1. Use orange-red biohazard warning labels to identify lab areas or disposal containers with blood or other potentially infectious materials present.
2. Conduct initial and annual training classes for all employees assigned to tasks where occupational exposure may occur.

URS SAFETY MANAGEMENT STANDARD

Bloodborne Pathogens

F. Exposure Incident Investigation

The OHM and HSE Manager will review the circumstances of each exposure incident to determine if the appropriate work procedures were being followed at the time of the incident, and to assess and implement any necessary corrective actions, including changes required in the ECP.

5. Documentation Summary

- A. Post-exposure medical records from consulting physician and exposure incident reports will be retained in employee's confidential medical record
- B. Initial and annual training records
- C. Regulated infectious medical waste manifest records will be stored by the site safety representative

6. Resources

- A. [U.S. OSHA 29 CFR 1910.1030](#) Occupational Exposure to Bloodborne Pathogens Standard, current revision.
- B. Centers for Disease Control Morbidity and Mortality Weekly Report: ["Public Health Service Guidelines for the Management of Health-Care Worker Exposure to HIV and Recommendations for Post-exposure Prophylaxis"](#)
- C. Centers for Disease Control Morbidity and Mortality Weekly Report: ["Immunization of Health-Care Workers: Recommendations"](#) December 26, 1997; Vol. 46, No. RR-18.
- D. Centers for Disease Control Morbidity and Mortality Weekly Report: ["Recommendations for Prevention and Control of Hepatitis C Virus \(HCV\) Infection and HCV-Related Chronic Disease"](#) October 16, 1998; Vol. 47, No. RR-19.
- E. [Bloodborne pathogens standard and the construction industry](#) (OSHA letter of interpretation 01-26-93)
- F. [Clarification on first aid requirements for hazardous waste sites](#) (OSHA letter of interpretation 04-20-93)
- G. [SMS 024](#) – Medical Screening and Surveillance
- H. [Attachment 051-1 NA](#) – Bloodborne Pathogens Exposure Control Plan

1. Introduction

Employees are at risk for exposure to and possible transmission of infectious diseases each time they are in contact with blood or body fluids. Bloodborne pathogens are microorganisms present in human blood and other body fluids that can cause serious disease in humans and include, but are not limited to Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV). Therefore, this exposure control plan (ECP) has been established to ensure that employees are effectively informed concerning potential workplace health hazards, and that protective measures necessary to eliminate or minimize bloodborne exposure incidents are used whenever possible.

2. Exposure Determination

The Medical Surveillance Evaluation form (Attachment 024-2) will be used to evaluate which employees may incur occupational exposure to blood or other potentially infectious materials when performing routine tasks and procedures. These exposure determinations will be made without regard to the use of personal protective equipment, and regardless of exposure frequency.

The employees in the following job classifications may have occupational exposure to bloodborne pathogens, and are covered by this program:

- Occupational health nurse
- Paramedics
- Registered nurses
- Designated first aid providers
- Medical laboratory employees
- Janitorial workers in medical facilities and clinics.

Tasks and procedures that may expose employees to bloodborne pathogens include:

- Treating cuts, abrasions, and burns
- Cleaning contaminated environmental surfaces
- Administering cardiopulmonary resuscitation (CPR).

3. Exposure Control

- A. "Universal precautions" are a required method of control to prevent exposure to blood and body fluids. This term refers to the concept that all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, HCV, and other bloodborne pathogens, regardless of the perceived risk status of another individual. Universal

precautions apply to blood, other body fluids containing visible blood, semen, and vaginal fluids. Universal precautions do not apply to feces, nasal secretions, saliva, sweat, tears, sputum, urine, and vomitus unless they contain visible blood. Although these fluids have an extremely low or nonexistent risk for bloodborne pathogens, they are a potential source for other infectious diseases, and precautions must also be followed when these body fluids are present.

B. Engineering and Work Practice Controls

The following engineering controls will be in place in all areas of occupational exposure:

1. Accessible handwashing facilities. If soap and running water are not available, an antiseptic hand cleaner in conjunction with clean paper towels or antiseptic towelettes are acceptable temporary alternatives to running water. When this alternative method is used, employees must wash their hands with soap and running water as soon as feasible.
2. Containers for disposable contaminated sharps must be puncture-resistant, labeled a biohazard, leakproof, and have a closable top.
3. Containers for storage, transport, or shipment of blood or other potentially infectious materials, regulated waste, and contaminated laundry will be labeled with the biohazard symbol and site address, and have a securely closing lid.

Engineering controls will be reviewed and maintained on a regular basis to ensure effectiveness.

The following work practice controls must be strictly followed to minimize exposure, and isolate or remove bloodborne pathogens from the workplace:

1. Personal protective equipment will be provided at no cost to the employee, and will be chosen based on the anticipated exposure to blood. PPE is considered appropriate if it does not permit blood or other potentially infectious materials to reach or pass through clothes, skin, or mucous membranes of the eyes or mouth under normal conditions of use, and for the duration of time the equipment will be used. PPE must be readily accessible and will be removed prior to leaving the work area.
 - a. Disposable single-use gloves must be used as a protective barrier in all situations in which contact with body fluids is anticipated. Gloves of the correct size will be provided. Disposable gloves will not be washed or disinfected for reuse, and will be replaced between employees, and if they become torn or punctured. Gloves are especially important

if the employee has cuts, abraded skin, chapped hands, or dermatitis.

- b. Liquid-impermeable gowns, boots, and masks, in combination with eye-protective devices such as goggles and shatterproof glasses with solid-side shields or chin-length face shields, must be worn whenever splashing, spraying, or spattering of blood droplets or body fluids can be reasonably anticipated.
- c. Disposable pocket mask ventilation devices must be provided in all first aid kits and used to avoid mouth-to-mouth contact during emergency cardiopulmonary resuscitation.

Examples of Recommended PPE (depending on task, more PPE may be needed).

<u>Task</u>	<u>Gloves</u>	<u>Gown</u>	<u>Mask</u>	<u>Goggles</u>	<u>Boots</u>
Bleeding control w/ minimal bleeding	Yes	No	No	No	No
Bleeding control w /spurting blood	Yes	Yes	Yes	Yes	No
Cardiopulmonary resuscitation	No	No	Yes	No	No
Decontamination/clean-up	Yes	No	No	No	No
Medical laboratory activities	Yes	Yes	Yes	Yes	No

- 2. Eating, drinking, smoking, applying cosmetics, and handling of contact lenses is prohibited in work areas where there is a reasonable likelihood of occupational exposure. Food and drink cannot be kept in refrigerators, freezers, shelves, cabinets, or on counter tops where blood or body fluids are present.
- 3. Contaminated needles and other sharps must not be bent or recapped unless a one-handed technique is used. They must be disposed of in an appropriate sharps container.
- 4. All regulated biohazardous waste will be placed in a waste receptacle that has designated red biohazard bags and a closable top controlled by a foot peddle. When full, the bags shall be removed with gloved hands, tied off, and placed in a biohazard shipping carton, to be held for pick-up. If any biohazard bag appears to be leaking, it must be double-bagged. The waste will be incinerated per federal and state regulations.

C. Housekeeping

- 1. Universal precautions must be used when cleaning or decontaminating any surface or equipment that may be

contaminated. Appropriate PPE must be used for protection during decontamination.

2. All contaminated environmental work surfaces such as countertops or floors will be cleaned with a household bleach solution diluted 1:10 with water directly following contamination with blood or body fluids.
3. Instruments such as tweezers, bandage scissors, and thermometers must be disposable rather than reusable equipment, and must be disposed of in an appropriate manner.
4. Broken, contaminated glassware must not be picked up directly with the hands. It must be cleaned up using a mechanical means such as a brush and dustpan or tongs.

4. Hepatitis B Vaccination

Within 10 working days of placement, all employees assigned to tasks with potential occupational exposure to bloodborne pathogens must be offered the Hepatitis B vaccination at no cost to the employee, unless the employee has had a previous Hepatitis B vaccination series, antibody testing reveals the employee is immune, or the vaccine is contraindicated for medical reasons. Further, this vaccination series must be made immediately available to employees who have an occupational exposure, whether as a result of their assigned tasks, or occurring from an incidental contact.

The local occupational medical facility used for routine medical surveillance will administer the vaccinations.

Employees who decline the Hepatitis B vaccine must sign a copy of the waiver form located at the end of this attachment. The signed waiver will be stored in the employee's medical record with the Occupational Health Manager. Employees may initially decline the vaccination, but may decide to take them at a later date, while still covered under this plan. The vaccinations will be made available to the employee at that time.

Employees choosing to take the vaccination series will sign a consent form at the occupational clinic prior to receiving the injections, and are advised to read the package insert regarding the efficacy, safety, method of administration, and benefits of the vaccine. Employees may also ask questions directly of the Medical Service Provider or local occupational physician. Employees are not required to participate in a prescreening program (to determine immunity) before receiving the vaccinations. If a routine booster of Hepatitis B vaccine is recommended by the U.S. Public Health Service at a future date, such booster dose(s) will be made available to affected employees.

5. Post-Exposure Incident Evaluation And Follow-Up

All occupational bloodborne pathogen exposures must be reported to the HSE representative and Occupational Health Manager immediately after initial decontamination first aid is accomplished. Following the report of an exposure incident, a confidential medical evaluation with an occupational physician will be arranged as soon as possible, ideally no later than 1 to 2 hours after the incident has occurred. In some states, depending on applicable workers' compensation law, employees may choose treatment from their personal physician. A copy of the OSHA Bloodborne Pathogen Standard will be provided if the physician does not have a copy. A written incident report must be completed as soon as possible, fully describing the incident.

A. First aid protocol for treatment immediately after an exposure incident:

1. Lacerations, punctures, and abrasions should be washed under cool running water for at least 5 minutes, allowing free bleeding. Cleanse area well with soap or iodine solution. Apply sterile dressing as needed. Give tetanus booster if indicated (7 to 10 years since last booster).
2. Ocular exposure requires irrigation of the eye with water or sterile normal saline solution for 15 minutes.
3. Mucous membrane exposure requires rinsing mouth with $\frac{1}{2}$ strength 3 percent hydrogen peroxide for 30 seconds, four separate and consecutive times.

B. Confidential Medical Evaluation

1. The treating occupational physician will receive documentation of the routes of exposure, the circumstances surrounding the incident, and identification of the source individual (the individual the employee was exposed to). The blood of the source individual will be tested if possible, and after consent is obtained. When legally permissible, results of the source individual's tests will be made available to the exposed employee, with the exposed employee informed about the applicable laws and regulations concerning the disclosure of the identity and infectivity of the source individual.
2. Testing of the exposed employee's blood, if consented to (the employee may consent to baseline blood collection, but may request that the sample not be tested for HIV for up to 90 days, if at all), is recommended.
3. Post-exposure medical treatment will be offered in accordance with the current recommendations of the U.S. Public Health Services. This may include, but is not limited to:
 - a. A series of HIV post-exposure blood tests

- b. Hepatitis B vaccination and/or Hepatitis B immune globulin
- c. HIV post-exposure prophylactic medications
- d. Evaluation of acute febrile illnesses following exposure
- e. Employee counseling concerning precautions to take during the period after the exposure incident, and information on signs and symptoms of potential illnesses.

C. Healthcare Professional's Written Opinion

The Occupational Health Manager must obtain and provide the employee with a copy of the evaluating physician's written opinion within 15 days of the completion of the medical evaluation. A copy will be maintained in the employee's confidential medical record. The written opinion must be in accordance with the requirements of the OSHA Bloodborne Pathogens Standard indicating that the employee has been informed of any medical conditions resulting from exposure that require further evaluation or treatment. All other findings or diagnoses must remain confidential and will not be included in the report.

6. Hazard Communication

- A. Fluorescent red or orange-red warning labels bearing the universal biohazard symbol and the legend BIOHAZARD must be firmly affixed to all containers (e.g., waste cans, sharps containers, and refrigerators) used for the storage or shipment of blood or other potentially infectious materials.
- B. All employees designated to perform tasks involving occupational exposure must receive bloodborne pathogens training at the time of initial assignment to the job. This training will be given during working hours and at no cost to employees. Refresher courses will be provided annually (within 1 year of previous training), and if new tasks or procedures are implemented. Material appropriate in content and vocabulary to education level, literacy, and language of the employees must be used for all required training.

Training will include: making accessible a copy of the regulatory text of the standard and explanation of its contents, general discussion on bloodborne diseases and their transmission, exposure control plan, engineering and work practice controls, personal protective equipment, Hepatitis B vaccine, response to emergencies involving blood, how to handle exposure incidents, the post-exposure evaluation and follow-up program, signs/labels/color-coding, and question and answer time with the trainer.

7. Exposure Incident Investigation

The site Health and Safety Representative will review the circumstances of any exposure incident to determine corrective actions. The incident report will include:

- A. Engineering controls in use at the time
- B. Work practices followed
- C. A description of any equipment being used
- D. A description of the work being performed
- E. PPE that was used at the time of the incident
- F. Date, time, and location of the incident
- G. Employee's training.

Within 24 hours, a copy of this incident report will be forwarded to the Occupational Health Manager, who will evaluate what follow-up actions should be addressed, including if revisions need to be made to the Exposure Control Plan.

8. Recordkeeping

- A. The Occupational Health Manager will be responsible for establishing and maintaining accurate, confidential workers' compensation medical records for each employee with occupational exposure for the duration of employment plus 30 years, in accordance with OSHA 29 CFR 1910.1020 – Access to Employee Exposure and Medical Records.
- B. The HSE representative will be responsible for maintaining the bloodborne pathogens training class records for at least 3 years from the date of training. The records will include the date of the training class, a summary of the class contents, the names of the qualified instructors, and the names and job titles of personnel attending the training.
- C. Employee medical records must be made available to employees (or their designated representative) with written consent by the employee within 15 working days of request.
- D. An exposure incident will be evaluated by the Occupational Health Manager and Vice President of Health, Safety, and Environment to determine if the case meets OSHA's Recordkeeping Requirements (29 CFR 1904).



HEPATITIS B VACCINATION DECLINATION FORM

I understand that due to my occupational exposure to blood or other potentially infectious materials, I may be at risk of acquiring Hepatitis B virus (HBV) infection.

I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself; however, I decline Hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease.

If, in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with the Hepatitis B vaccine, I can receive the vaccine series at no cost to me.

Name

Date

Witness

Date

URS SAFETY MANAGEMENT STANDARD

Drilling Safety Guidelines

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to provide an overview for working safely around drilling operations with truck-mounted and other engine-powered drill rigs. The procedure addresses off-road movement of drill rigs, overhead and buried utilities, use of augers, rotary and core drilling, and other drilling operations and activities.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 056 NA](#) – North America; Australia / New Zealand

[SMS 056 INT](#) – International Operations (including Europe, Asia, South America and Africa)

URS SAFETY MANAGEMENT STANDARD

Drilling Safety Guidelines

1. Applicability

This standard applies to URS Corporation and its subsidiary companies on projects using truck-mounted or other engine-powered drill rigs. The primary responsibility for drilling safety is with the drilling contractor.

2. Purpose and Scope

The purpose of this standard is to provide an overview for working safely around drilling operations with truck-mounted and other engine-powered drill rigs. The procedure addresses off-road movement of drill rigs, overhead and buried utilities, the use of augers, rotary and core drilling, and other drilling operations and activities. More detailed drilling safety guidelines are provided in the document *Environmental Remediation Drilling Safety Guidelines*.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

Drill rig safety and maintenance is the responsibility of the drill rig operator. Drilling subcontractors must be qualified in accordance with SMS 046 – Subcontractor Health, Safety and Environmental Requirements.

4. Requirements

A. General Safety Guidelines

URS technicians, geologists, engineers, or other field staff assigned to oversee drilling operations or collect soil samples will observe the following guidelines:

1. Require a meeting at project startup regarding the drill rig operator's responsibility for rig safety, and any site- and equipment-specific safety requirements.
2. Excluding geoprobe activities, set up any sample tables and general work areas for the URS field staff at a distance of at least the height of the fully extended mast plus 5 feet (1.52 meters), and no less than 30 feet (10 meters) from the rig.
3. URS engineers, technicians, and geologists will not assist the drillers with drilling equipment or supplies, and will not operate the drill rig controls except to activate the emergency shutoff, if needed.

URS SAFETY MANAGEMENT STANDARD
Drilling Safety Guidelines

4. Require that all rotary drilling equipment have an emergency shut off/ kill switch. The location of the switch should be reviewed with all field staff.
5. Drilling rigs shall be inspected by the lead driller prior to use daily. Attachment 056-1 NA – Drill Rig Inspection Checklist may be utilized to document the inspection.
6. Sit-on direct push rigs are not permitted on URS sites unless the rig have been modified (in accordance with manufacturer’s requirements) to be operated by remote control or the rig has been manufactured with a rollover protection system and seat belt.
7. When using the tooling winches on a drill rig, the down-hole rods shall not extend above the crown of the drilling mast when retrieving soil sampling tools. Drilling rods shall be lifted/lowered using a hoisting plug and not a friction device (e.g., pipe dog, pulling plates etc.).
8. Use of J-hooks and cat-heads is prohibited.

B. Movement of Drill Rigs

1. Before moving a rig, the operator must do the following:
 - a. To the extent practical, walk the planned route of travel and inspect it for depressions, gullies, ruts, and other obstacles.
 - b. Check the brakes of the truck/carrier, especially if the terrain along the route of travel is rough or sloped.
 - c. Discharge all passengers before moving on rough or steep terrain.
 - d. Engage the front axle (on 4x4, 6x6, etc., vehicles) before traversing rough or steep terrain.
2. Driving drill rigs along the sides of hills or embankments should be avoided; however, if side-hill travel becomes necessary, the operator must conservatively evaluate the ability of the rig to remain upright while on the hill or embankment. The possibility must be considered that the presence of drilling tools on the rig may reduce the ability of the rig to remain upright (raises the center of mass of the rig).
3. Logs, ditches, road curbs, and other long and horizontal obstacles should be approached and driven over squarely, not at an angle.

URS SAFETY MANAGEMENT STANDARD

Drilling Safety Guidelines

4. When close lateral or overhead clearance is encountered, the driver of the rig should be guided by another person on the ground.
5. Loads on the drill rig and truck must be properly stored while the truck is moving, and the mast must be in the fully lowered position.
6. After the rig has been positioned to begin drilling, all brakes and/or locks must be set before drilling begins. If the rig is positioned on a steep grade and leveling of the ground is impossible or impractical, the wheel of the transport vehicle must be blocked and other means employed of preventing the rig from moving or toppling over.

C. Buried and Overhead Utilities

1. The location of overhead and buried utility lines must be determined before drilling begins, and the locations should be noted on boring plans and/or assignment sheets.
2. When overhead power lines are close by, the drill rig mast should not be raised unless the distance between the rig and the nearest power line is at the minimum distance stated in SMS 034 – Utility Clearances and Isolation. The drill rig operator or assistant should walk completely around the rig to make sure that adequate clearance exists.
3. The rig operator should be aware that when the drill rig is positioned near an overhead line, hoist lines and power lines can be moved towards each other by wind. When necessary and approved by the project manager, the utility and/or power lines may be shielded, shut down, or moved by the appropriate personnel.
4. Before performing work, for additional information, please refer to SMS 034 – Utility Clearances and Isolation.

D. Clearing the Work Area

1. Before a drill rig is positioned to drill, the area on which the rig is to be positioned must be cleared of removable obstacles and the rig must be leveled if it is sloped. The cleared/leveled area should be large enough to accommodate the rig and supplies.

E. Safe Use of Augers

1. Never place hands or fingers under the bottom of an auger flight or drill rods when hoisting the augers or rods over the top of another auger or rod in the ground or other hard surfaces, such as the drill rig platform.

URS SAFETY MANAGEMENT STANDARD
Drilling Safety Guidelines

2. Never allow feet to get under the auger or drill rod while they are being hoisted.
3. When the drill is rotating, stay clear of the drill string and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.
4. Move auger cuttings away from the auger with a long-handled shovel or spade; never use hands or feet.
5. Never clean an auger attached to the drill rig unless the transmission is in neutral or the engine is off, and the auger has stopped rotating.
6. Do not wear loose clothing or jewelry while working near the drill rig. Long hair must be pulled back to avoid entanglement with moving parts.
7. Hearing protection is required when working near an operating drill rig.
8. When pulling/lifting augers, a clevis pin or other closed device shall be used. Use of J-hooks is prohibited.

F. Rod Separation

1. Do not use manual tools (e.g., pipe wrenches) in combination with rotation of the drill stem. Manual tools are not designed for the load, and may break. The use of such tools creates a significant impact hazard for those in the work area, because they rotate with the drill stem. URS does not permit drillers to use manual tools in combination with a rotating drill stem to break rods. Manual tools may be used if the drill stem is isolated/positively disengaged.
2. Mechanical means of rod separation that are permitted include:
 - a. Opposing hydraulic controls.
 - b. Rod locking devices.
 - c. Hydraulic breakout tools.
 - d. Hydraulic foot clamps.

URS SAFETY MANAGEMENT STANDARD

Drilling Safety Guidelines

G. Safe Use of Hand Tools

Review SMS 064 – Hand Safety for information regarding hand tools in addition to the guidelines provided below:

1. Use each tool to perform only tasks for which it was originally designed.
2. Repair damaged tools before use, or discard them.
3. Wear safety goggles or glasses when using a hammer or chisel. Nearby co-workers and bystanders are required to wear safety goggles or glasses also, or move away.
4. Clean tools and store them in an orderly manner when they are not in use.

H. Safe Use of Wire Line Hoists, Wire Rope, and Hoisting Hardware

1. Whenever wire line hoists, wire rope, or hoisting hardware are used, the safety rules described in Title 29 Code of Federal Regulations (CFR) 1926.552, and guidelines contained in the Wire Rope User's Manual published by the American Iron and Steel Institute, will be followed. The driller will provide written reports (upon request) documenting inspections of equipment.

I. Traffic Safety

1. Drilling in streets, parking lots, or other areas of vehicular traffic requires definition of the work zones with cones, warning tape, etc., and compliance with local police requirements. Refer to SMS 032 – Work Zone Traffic Control.

J. Fire Safety

1. Fire extinguishers (type ABC) will be kept on or near drill rigs for fighting small fires.
2. If methane or other flammable gases or vapors are suspected in the area, a combustible gas indicator (CGI) will be used to monitor the air near the borehole, with all work to stop at 20 percent of the Lower Explosive Limit (LEL).
3. Work must stop during lightning storms.

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Drilling Safety Guidelines

K. Drilling at Potential MEC/UXO Sites

If the project site is suspected of containing munitions and explosives of concern (MEC) or unexploded ordnance (UXO), the UXO team will conduct a reconnaissance and MEC/UXO avoidance to provide clear access routes to each site before drilling crews enter the area. The following procedures will be implemented:

1. Drilling operations on an MEC/UXO site will not be conducted until a complete plan for the site is prepared and approved by the URS UXO Safety Officer. MEC/UXO avoidance must be conducted during drilling operations on known or suspect MEC/UXO sites. Refer to SMS 039 – Munitions Response/Munitions and Explosives of Concern.
2. The UXO team will identify and distinctly mark the boundaries of a clear approach path for the drilling crews, vehicles, and equipment to enter the site. This path will be, at a minimum, twice the width of the widest vehicle. No personnel will be allowed outside any marked boundary.
3. If MEC/UXO is encountered on the ground surface, the UXO team will clearly mark the area where it is found, report it to the proper authorities, and divert the approach path around it.
4. The UXO team will conduct an access survey using the appropriate geophysical instrument over the approach path for avoidance of MEC/UXO that may be in the subsurface. If a magnetic anomaly is encountered, it will be assumed to be MEC/UXO, and the approach path will be diverted around the anomaly. UXO personnel only will operate the appropriate geophysical instrument and identify MEC/UXO.
5. An incremental geophysical survey of the drill-hole location(s) will be initially accomplished by the UXO team using a hand auger to install a pilot hole. If MEC/UXO is encountered or an anomaly cannot be positively identified as inert material, Hazardous, Toxic, and Radioactive Waste (HTRW) sampling personnel will select a new drill-hole location.
6. Once the surface of a drilling site has been cleared and a pilot hole established as described above, the drilling contractor will be notified that the site is available for subsurface drilling.

URS SAFETY MANAGEMENT STANDARD

Drilling Safety Guidelines

7. Additional guidance for MEC/UXO support during drilling activities is provided in SMS 039 – Munitions Response/Munitions and Explosives of Concern.

L. Protective Gear

1. Minimum Protective Gear

At a minimum, items listed below must be worn by all staff working within 30 feet (10 meters) of drilling activities.

- a. Hearing protection.
- b. Hard hat.
- c. Eye protection (safety glasses, goggles, or face-shield).
- d. Safety shoes (steel-toed shoes or boots).

2. Other Gear

Items listed below must be worn when conditions warrant their use. Some of the conditions are listed after each item.

- a. Safety Harnesses and Lifelines: Safety harnesses and lifelines must be worn by all persons working on top of an elevated derrick beam or mast. Lifelines should be secured at a position that will allow a person to fall no more than 6 feet (2 meters). OSHA Fall Protection (1926 Subpart M) requirements apply. Refer to SMS 040 – Fall Protection for additional information.
- b. Life Vests: Life vests must be used for work over water. Refer to SMS 027 – Work Over Water for additional information.

5. Resources

- A. International Association of Drilling Contractors Safety Alerts
<http://iadc.org/alerts.htm>
- B. U.S. Occupational Safety and Health Administration (OSHA) Standard Fall Protection – [29 CFR 1926 Subpart M](#)
- C. U.S. OSHA - [29 CFR 1926.552](#), Material Hoists, Personnel Hoists and Elevators

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Drilling Safety Guidelines

- D. [Environmental Remedial Safety Drilling Guidelines](#)
- E. [SMS 026](#) – Noise and Hearing Conservation
- F. [SMS 027](#) – Work Over Water
- G. [SMS 032](#) – Work Zone Traffic Control
- H. [SMS 034](#) – Utility Clearances and Isolation
- I. [SMS 039](#) – Munitions Response/Munitions and Explosives of Concern
- J. [SMS 040](#) – Fall Protection
- K. [SMS 046](#) – Subcontractor Health, Safety and Environment Requirements
- L. [SMS 064](#) – Hand Safety
- M. [Attachment 056-1 NA](#) – Drill Rig Inspection Checklist



DRILL RIG INSPECTION CHECKLIST

Site / Project Name _____

Rig Inspector (Name/Company) _____

RIG INFORMATION:

Rig Type Rotary/Auger Drilling Rig Direct Push Type (DPT)

Owner _____ VIN# _____

Year/Make _____ Mileage _____

Model _____ Drill Hrs _____

INSTRUCTIONS: Each shift must inspect all applicable items. If an unsatisfactory condition (fail) is observed, suspend operation of the equipment and report the condition to the site supervisor immediately.

Emergency Switches	
Kill switches are located and accessible to workers on both sides of the rotating stem. NOTE: Location and number of switches depend on the rig manufacturer; please refer to owner's manual (DPT typically has one switch on control panel).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Kill switches installed by the manufacturer are verified to be in operable condition and all workers are familiar with the location and operation of these switches. NEVER BYPASS, DISABLE, OR REMOVE KILL DEVICES.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Protective Guards	
Drive shafts, belts, chain drives, and universal joints are guarded to prevent accidental insertion of hands, fingers, or tools.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables	
Cables on drill rig are free of kinks, frayed wires, birdcages, flat spots, grease, and worn or missing sections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables are terminated at the working end with a proper eye splice; either swaged, coupled, or using cable clamps.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cable clamps are installed with the saddle on the live or load side. Clamps are not alternated and are of the correct size and number for the cable size.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Wire ropes are not allowed to bend around sharp edges without cushion material.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pulleys	
Pulleys are not to be bent, cracked, or broken.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pulleys operate smoothly and freely, without resistance.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cable Winches	
Motor is mounted in correct location and tightly secured to drill rig.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Winch is capable of being placed in the free spool (unwind smoothly) and locked position correctly, demonstrating that the cable is suitable for lifting during drilling operations.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Safety Latches	
Hooks installed on hoist cables are the safety type with a functional latch to prevent accidental separation.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Safety latches are functional and completely span the entire throat of the hook and have positive action to close the throat except when manually displaced for connecting or disconnecting a load.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Flights/Augers	
Flights/Augers should not be bent, cracked, or broken. NOTE: Flights/Augers failing inspection must be removed from jobsite.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Flights should be blunt to prevent the risks of cuts.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Auger keys should not be bent, have any cracks/fractures, be excessively worn, or otherwise damaged.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Auger bolt holes and threads should not be damaged.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A



Health, Safety and Environment
DRILL RIG INSPECTION CHECKLIST

Attachment 056-1 NA

Issue Date: December 2009
Revision 6: March 2013

Inspect flights/augers for metal burns. NOTE: Burrs must be filed to flat surface.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Avoid stacking augers; all should lay flat on ground.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Avoid manually lifting/moving augers. Should be lifted/moved with cable lines, or, at a minimum, by two persons.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Drill String	
Drill string should not be bent or have any cracks/fractures.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Drill string connecting pins should not be bent, have any cracks/fractures, or be excessively worn.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Mast	
Mast is free of bends, cracks, or broken sections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
All mounting hardware (pins, bolts, etc) should be in place.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
No moving of drill rig while mast is in vertical position.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Maintenance/repairs to be performed on mast only in horizontal position.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hammering Device	
Hammer free of cracks, fatigue, or other signs of excessive wear.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hammer connections are secure.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Leveling Devices	
Outriggers move in/out and up/down smoothly and freely while using controls on drill rig, with no hydraulics leaks.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Outriggers are extended prior to and whenever the mast is raised off its cradle. Outriggers must maintain pressure to continuously support and stabilize the drill rig (even while unattended).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Outriggers are properly supported on the ground surface to prevent setting into the soil (use of outrigger support pads).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Controls	
Controls are intact, properly labeled, have freedom of movement, and have no loose wiring or connections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Controls are not blocked or locked into an operating position.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Installed lights, signals, gauges, and alarms operate properly.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Lifting Devices	
Slings, chokers, and lifting devices are inspected before using and are in proper working order. NOTE: Damaged units are to be labeled and removed from jobsite.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Shackles/Clevises are in proper working order with pins/screws in place that is to be used while lifting.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables and lifting devices are not operated erratically or with a jerking action to overcome resistance.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic System	
Hydraulic lines are secure, in good condition with no signs of excessive wear, and not leaking. NOTE: Check while pressurized.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic lines are not in a bent or pinched position causing additional fluid restrictions/pressures.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic oil reservoir has appropriate amount of oil and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Documentation available to confirm that pressure relief valve was checked during shop maintenance activity and noted on maintenance log.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pump Lines (water, grout, etc)	
Suction/Discharge hoses, pipes, valves, and fittings are secured and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
High pressure hoses have a safety chain, cable, or strap at each end to prevent whipping in the event of a failure.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Fire Prevention	
A fire extinguisher of appropriate size is located on drill rig and readily available/accessible for drilling crew (recommended 20 lb).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A

URS	Health, Safety and Environment	Attachment 056-1 NA
	DRILL RIG INSPECTION CHECKLIST	Issue Date: December 2009 Revision 6: March 2013

Ladders	
Drill rig has a permanently attached or proper portable ladder to be used for access to drilling platform.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Tracks	
Tracks on rig are not excessively worn and free of any debris or foreign material.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
General	
Drill rig meets regulations for transport on state/federal highways (inspection sticker, license plate, etc.).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Does the rig size meet job requirements?	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Maintenance log available for previous 3 months to confirm proper maintenance/inspection.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Exhaust	
Exhaust system should be free from defect and routes engine exhaust away from drill rig workers.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Fuels	
Fuel stored in an approved and properly labeled container.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Fuel transfer lines free from signs of excessive wear and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Refueling and transferring of fuel is performed in an approved area with sufficient containment to prevent spillage.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Exclusion/Work Zones	
The exclusion/work zone is centered over the borehole and the radius equal to or greater than the height of the mast (measured from ground level).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
The exclusion/work zone should be clear of tripping hazards.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Overhead Obstructions	
Except where electrical distribution and transmission lines have been de-energized and visibly grounded, drill rigs will be operated proximate to under, by, or near power lines in accordance with the following: <ul style="list-style-type: none"> • 50 KV or less – minimum clearance of 10 feet (3 meters) • 50 KV or greater – add 0.4 inches for every KV over 50 KV • If voltage is unknown, maintain at least 20 feet (6.1 meters) of clearance 	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Rig Repairs	
Repairs, when possible, are conducted offsite to reduce the risk of any onsite incidents.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Specialized PPE	
When working at elevated heights, workers are to wear a fall restraining device attached in a manner to restrict falls to less than six feet (1.83 meters).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
When working in wet/slippery conditions, all workers have a lug-type sole or similar slip resistant sole, on their safety footwear to prevent slipping.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A

Comments:

Signature of Inspector: _____ Date: _____

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

This standard applies to employees operating motor vehicles that are owned, rented or leased by the Company, and the use of personal or government supplied vehicles while on Company business.

This SMS does not apply to heavy equipment operations.

2. Purpose and Scope

This standard defines the policies that help URS minimize losses, injuries, and legal liabilities associated with improper vehicle use.

3. Procedures

The associated implementing procedures for this standard are included as attachments:

Infrastructure & Environment

[SMS 057 NA](#) – North America

[SMS 057 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-057](#) – Australia / New Zealand

Energy & Construction

[SMS 057 EC](#)

Federal Services

[SMS 057 FS](#)

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

1. Applicability

This standard applies to the operations of Infrastructure & Environment business of URS Corporation and its subsidiary companies.

This standard applies to employees who operate motor vehicles that are owned, rented, or leased by URS and to employees who use personal, client or government-supplied vehicles while conducting URS business. This safety management standard (SMS) does not apply to heavy equipment operations (see SMS 019 – Heavy Equipment Operations).

2. Purpose and Scope

This standard defines the policies that help URS minimize losses, injuries, and legal liabilities associated with improper vehicle use. This policy also provides information for required training and makes all applicable employees aware of their respective duties and obligations when driving on URS business.

The standard applies to operations worldwide. For countries outside the United States, some terminology may need to be read in the context of local or national regulations.

3. Implementation

The overall responsibility for this standard implementation is with the URS Office Manager. Additional responsibilities are as follows:

Fleet Management Participation in the Vehicle Safety Program, vehicle acquisition, insurance claims reporting, controlling access to vehicles, fueling and maintenance of vehicles, and participation in the incident review processes.

Human Resources Documentation of driver's license upon hire, and participation in the incident review processes when necessary and any related performance management issues.

Health and Safety Employee safety training, maintenance of the Vehicle Safety Program, and participation in the incident review processes.

Employee Familiarization with URS Vehicle Safety Program and compliance with its requirements.

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

4. Requirements

A. Authorized Drivers

1. Authorized Drivers are those individuals permitted to drive URS-owned, -rented, or -leased vehicles, client vehicles, and employees driving a personal vehicle for work purposes.
2. The Authorized Driver must be at least 18 years of age (noncommercial license) or 21 years of age (commercial license) and have a current driver's license for the appropriate class of vehicle (unless more stringent requirements are established by the leasing/renting agency). Employees with conditional licenses are prohibited from operating vehicles on URS business.
3. Human Resources/Administration will conduct an authorized background check, which includes a driving record, and will obtain a copy of the state-issued driver's license for all Authorized Drivers during the new hire process. The employee will not be permitted to be an Authorized Driver if the background check indicates legal action involving alcohol or drug use (e.g. driving under the influence [DUI]), a driving without a license violation, or a hit-and-run/leaving the scene of an accident within the past two years.

URS employees that are Authorized Drivers will produce their driver's license upon request at any time. Authorized drivers who lose their driver's license through legal action or are otherwise unauthorized to drive *must* notify their Human Resources Representative immediately. The Human Resources Representative will notify the Fleet Manager, Office Manager, and Health, Safety and Environment (HSE) Representative of this employee's loss of authorization to drive for URS.

4. Authorized drivers must:
 - a. Review SMS 057 – Vehicle Safety Program.
 - b. Report any conviction for driving under the influence of drugs or alcohol to the Human Resources Representative responsible for the employee's office or operation.
 - c. Complete vehicle safety training, including the URS online training module and other sanctioned driving courses described in Section 4.B, Training.

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

- d. Report all incidents in accordance with Section 4.E, Notifications.
 - e. Cooperate with any URS investigation concerning the incident.
 - f. Complete remedial driver safety training described in Section 4.B.3 as appropriate following an incident.
5. Non-URS employees (e.g., subcontractors, alliance partners) may operate URS-owned, -leased, or -rented vehicles or client vehicles only when this activity is specifically agreed to in the applicable contract and only within the parameters of the contract and project plans.
 6. For URS operations or offices that plan vehicle use that requires compliance with Federal Motor Carrier Regulations, the affected manager directing operations at the facility or site must obtain approvals from the Vice President/Director HSE and the Fleet Manager. This requirement typically applies to vehicles with a gross vehicle weight over 10,000 pounds, vehicles carrying more than 15 passengers, or vehicles used for hazardous materials transport. The driver must have an appropriate commercial driver's license and may be subject to specific training and medical surveillance (see SMS 024 – Medical Screening and Surveillance).
 7. Only Authorized Drivers can be reimbursed mileage for the use of their personal vehicle on URS business. Requests for reimbursements for mileage by nondesignated drivers may be denied.

B. Training

1. Within 1 month of their hire date, Authorized Drivers will complete basic driver safety training, including a review of the URS Vehicle Safety Program (SMS 057) and the 30-minute online Learning Management System (LMS) Vehicle Safety training module.
2. Authorized Drivers will complete the 4-hour web-based defensive driving training program provided through the National Safety Council (NSC). Other defensive driving training programs that are equivalent or exceed the NSC training (e.g., the Smith Driving System) may be substituted by approval of the Regional HSE

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

Manager. *All URS Authorized Drivers shall complete this web-based defensive driver training or equivalent.*

3. Additional training is required for employees who have been involved in multiple work-related, at-fault vehicle incidents where \$2,000 in damages was sustained. This additional training will be determined by concurrent agreement from the URS Operating Unit Manager, the URS Fleet Manager, and the Vice President/Director HSE and may be in the form of a behind-the-wheel training equivalent to the Smith Driving System.
- C. General Operating Policy and Procedure (Applies to Authorized Drivers and Passengers Operating Motor Vehicles on Official URS Business)
1. Only properly licensed employees who are specifically authorized to drive URS vehicles may operate motor vehicles owned, rented, or leased by URS.
 2. **The use of cellular phones/devices, including cellular phones with hands-free devices, while driving is prohibited.** If you need to make a call on a cellular phone, pull over and park in a safe area. This prohibition includes text messaging and other wireless devices (e.g., Blackberries, iPhones).
 3. Authorized drivers required to operate vehicles with special hazards (i.e., trucks carrying fuel cells, vehicles used to tow trailers, vehicles with limited visibility, etc.) will be thoroughly briefed on the hazards and control measures necessary for safe operation of the vehicle. The local URS operation will maintain documentation of the briefing.
 4. Drivers/operators will know and obey all federal, state, and local motor vehicle laws applicable to the operation of their vehicle.
 5. A driver will not permit unauthorized persons to operate a vehicle owned, rented, or leased by URS.
 6. URS policy regarding reimbursement and insurance coverage requirements for use of personal automobiles may be found in the Policies and Procedures Manual (Section 074.020). Only Authorized Drivers may be reimbursed mileage for the use of a personal vehicle.

URS SAFETY MANAGEMENT STANDARD
Vehicle Safety Program

7. Personal vehicles driven by Authorized Drivers for business use must satisfy the state's registration and inspection requirements and may not be modified beyond manufacturer's specifications.
8. All cargo extending 4 feet or more beyond the end of a truck, trailer, or similar vehicle will be clearly marked with a red warning flag or cloth measuring no less than 16 inches square. Red lights must be used at night.
9. URS-owned, -rented, or -leased vehicles are for official business use only and are not to be used for personal activities. Exceptions to this requirement can be made only with the specific approval of a Business Manager, Senior Vice President, or the URS Fleet Manager.
10. Seat belts and shoulder harnesses (occupant restraint systems) will be worn or used whenever the vehicle is in operation. The vehicle may not move until all passengers have fastened their restraints. Vehicles are not to be operated or used by URS employees if seatbelts are not included as part of the vehicle's safety equipment.
11. When parking or leaving a vehicle, the following procedures must be followed: Shut off the engine, engage the transmission in park (automatic transmission) or first gear (standard transmission), set the parking brake, remove the ignition keys, and lock the vehicle.
12. The vehicle's engine is to be turned off during refueling. Smoking or cellular phone use is not allowed while refueling.
13. Drivers/operators will not drive or operate vehicles while under the influence of alcohol or illegal drugs. Additional details on the URS Substance Abuse Policy are available in the Policies and Procedures Manual (Section 034.030).
14. Drivers/operators will not drive or operate vehicles while under the influence of medications when told by a physician, another healthcare provider, or the manufacturer (i.e., instructions on the label) that the activity is unsafe.
15. Vehicle operators are responsible for any fines levied by law enforcement agencies for the operation of their vehicles.
16. Driver/operators may not deactivate or muffle any backup warning device.

URS SAFETY MANAGEMENT STANDARD

Vehicle Safety Program

17. Distractions while driving are a major cause of incidents. Distractions include the use of cellular phones (including texting), eating, drinking, smoking, and engaging in intense conversations. URS Authorized Drivers must exercise proper control of the vehicle at all times, including the management of possibly distracting actions and behaviors. If you have to eat, pull over and park. If you become engaged in an intense conversation to the point of distraction, pull over and park or end the conversation.
18. Fatigue is the result of physical or mental exertion that impairs performance. Driver fatigue may be due to lack of adequate sleep, extended work hours, strenuous work or non-work activities, or a combination of other factors. When drivers recognize the signals of drowsiness (e.g., frequent yawning, heavy eyes, or blurred vision) they will pull over in a safe location and rest. Refer to SMS 060 – Fatigue Management for additional information.
19. The use of motorcycles on URS business is prohibited.
20. The use of all-terrain vehicles is prohibited without the approval of a Division, Regional, or Business Unit HSE Manager or Director. All-terrain vehicle operators will be required to have the proper qualifications, training and personal protective equipment prior to operating the vehicle.
21. When practical, drivers should travel during daylight hours and avoid driving during adverse weather conditions. Drivers should also inform colleagues of their travel itinerary including destination and anticipated departure and arrival times.
22. When practical, alternatives to road travel should be evaluated including teleconferencing/video conferencing, the use of public transportation or carpooling.

D. Field/Site Vehicle Safety

1. Define specific vehicle travel routes and parking areas at field sites. Use fencing, cones, or other markings to define roads and parking. SMS 032 – Work Zone Traffic Control provides additional information.
2. If parking on the shoulder of an active road, park as far off the road as possible.

URS SAFETY MANAGEMENT STANDARD
Vehicle Safety Program

3. If work (e.g., surveying) is required alongside an active road, park the vehicle behind the area of work to provide a barrier against out-of-control vehicles.
4. URS will not transport DOT-placard quantities of hazardous materials. However, small quantities of hazardous materials (e.g., sample coolers) may be transported if properly packaged. Take precautions to prevent chemical contamination of the vehicle. Further details on DOT shipping may be found in SMS 048 – Hazardous Materials/Dangerous Goods Shipping.
5. Nuclear density meters (e.g., Troxler units) may be transported only by employees who have been trained in the use of nuclear density meters (see SMS 044 – Radiation Safety for Portable Gauges). Nuclear density meters must be secured from movement and locked during transport. Nuclear Regulatory Commission (NRC) and state-specific regulations regarding transport documentation also apply.
6. When performing fieldwork that requires the blocking of traffic lanes (e.g., bridge inspection), follow SMS 032, the Manual on Uniform Traffic Control Devices for Streets and Highways (American National Standards Institute D6.1), and local police requirements for barriers, cones, and flaggers.
7. No employee may ride in the bed of a pickup truck unless seating and restraints are provided for this specific use.
8. Articles (e.g., tools, equipment, stickers, and labels) placed in/on vehicles will not interfere with vision or the proper operation of the vehicle in any way. All items in the vehicle must be secured to prevent them from moving about or out of the vehicle during sudden stops or turning, potentially injuring vehicle occupants, the public or damaging equipment. Company equipment (e.g., tools) shall be removed from the vehicle when parking overnight, unless parked in a secure area.
9. Whenever practicable, backing of a vehicle should be prevented. Trucks or vehicles with obstructed rearview mirrors must observe the following procedures when backing up: Position an employee to act as a spotter at the rear of the vehicles, in the driver's line of sight, to ensure that the area behind the truck is clear. If no other employee is present, then the driver must step out of the vehicle

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and check the area behind the vehicle before backing up. As an added precaution, avoid backing up whenever possible.

10. All uncontrolled intersections (no traffic lights or traffic signs) will be treated as a four-way stop. The driver will exercise extreme caution at uncontrolled intersections.
11. URS drivers carrying more than 15 passengers will perform route planning using Journey Management Plan – Attachment 057-2 NA. A Journey Management Plan is also recommended when employees travel to a new location or unfamiliar destination. Route planning will address hazards associated along the intended route, including lack of traffic controls, speed, and hazards associated with road conditions, weather, visibility, and other threats. Route planning will be verified by the Office or Site Manager and will be reviewed by affected employees.
12. On buses and vehicles capable of carrying more than 15 passengers, no passengers may ride in a seat in the driver's row, which would otherwise impede the driver's lateral visibility.
13. Drivers must identify a reliable method of communication (e.g., cell phones) in case of an emergency and vehicles should be equipped with a roadside emergency kit when practical.

E. Incident Response and Reporting

1. In case of injury, call or have someone else call 9-1-1 immediately for emergency assistance. If you are involved in an incident and are not injured, the following requirements apply:
 - a. Protect the scene.
 - b. Do not admit liability or place any blame for the incident.
 - c. Provide only your name, address, driver's license number, and vehicle insurance information.
 - d. Complete the Auto Claim Report – Attachment 057-1 NA and obtain the following information:
 - i. Name(s), addresses, and telephone number(s) of the owner(s).
 - ii. Name(s) of the driver and any occupants of other vehicle(s).
 - iii. The owner's insurance company.

URS SAFETY MANAGEMENT STANDARD
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- iv. Driver's license number.
 - v. Year, make, model, and license number of the vehicle(s).
 - vi. Name(s) and addresses of any witnesses.
- e. DO NOT
- Make any admissions of guilt or culpability.
 - Call the insurance company; the Fleet Manager's office will do this (unless the incident involves your personal vehicle).
 - Give a statement to the press.
 - Give a signed statement to the claims adjuster representing the other driver's insurance company.

Note: The Auto Claim Report for vehicles owned or leased by URS is located in the vehicle glove compartment. The driver must complete this form at the scene.

2. Notifications

All incidents with a URS-owned, -rented, or -leased vehicle, or client vehicle or with a personally owned vehicle used for business must be reported to the Office Manager within 24 hours of the incident or on the next business day.

Incidents involving URS-owned, -leased, client vehicles or personally owned vehicles used for company business The Auto Claim Report, Attachment 057-1 NA, must be completed and distributed as instructed on the form. In addition, incidents involving rental vehicles will be reported to the rental agency.

Additionally, for motor vehicle incidents involving injured parties, the Incident Report Form – Attachment 049-1 NA must be completed.

Traffic violations received while operating a URS-owned, -rented, or -leased vehicle, client vehicle or with a personally owned vehicle used for company business must be reported to your Office Manager within 24 hours of the violation or on the next business day.

F. Incident Review

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1. A violation of this vehicle safety standard is subject to disciplinary action, including termination. The Fleet Manager will review all incidents involving URS-owned, -rented, or -leased vehicles.
2. URS may suspend the privilege to operate vehicles on URS business because of noncompliance with the URS Vehicle Safety Program, involvement in a motor vehicle incident, or resulting citations or other legal actions associated with motor vehicle violations. Personnel authorized to suspend an employee's status as an Authorized Driver include the following:
 - a. A Project Manager with responsibility for dedicated vehicles on a site. The suspension is applicable to those site vehicles only.
 - b. A URS Operations Manager responsible for the employee.
 - c. The URS Fleet Manager.
 - d. The Vice President/Director HSE.
3. The employee's driving privileges *will be* suspended for any of the following:
 - a. Accidents or legal action involving alcohol or drug use (e.g., driving under the influence [DUI]).
 - b. Driving without a license.
 - c. Hit-and-run driving or leaving the scene of an accident.
 - d. Unauthorized use of URS vehicles (i.e., using a URS vehicle for moving personal items, carrying passengers who are not associated with work activities, etc.).
4. The employee's driving privileges *may be* suspended for any of the following:
 - a. Two or more at-fault accidents involving the same Authorized Driver within a 12-month period.
 - b. Multiple complaints from other employees or members of the public about driving performance.

URS SAFETY MANAGEMENT STANDARD
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- c. Any accident caused by a URS Authorized Driver where damages exceed \$2,000.
 - d. Failure to comply with the cellular phone use policy.
 - e. Gross misconduct or violation of policy.
5. An Authorized Driver's driving privileges may be reinstated as follows:
- a. For any suspension resulting from law enforcement agency legal action involving drugs and alcohol on the part of the former Authorized Driver, driving privileges may be reinstated only by concurrent agreement from the URS Operating Unit Manager, the URS Fleet Manager, the Vice President/Director HSE, and the appropriate Human Resources Regional Manager.
 - b. For those Authorized Driver's privilege suspensions that are not related to driving under the influence of drugs or alcohol, privileges may be reinstated with concurrent agreement by the URS Operating Unit Manager, the Vice President/Director HSE, and appropriate Human Resources Regional Manager upon completion of required remedial training (see Section 4.B.3).
6. Disciplinary action may include the following:
- a. Loss of URS driving privileges.
 - b. Additional driver safety training. Refer to Section 4.B, Training.
 - c. Disciplinary warning.
 - d. Termination.

G. Inspection

- 1. The driver is responsible for inspecting the vehicle prior to use and not driving a vehicle with obvious safety defects. Attachment 057-3 NA may be used to document the inspection.
- 2. Basic safety checks must include the following:

URS SAFETY MANAGEMENT STANDARD

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- a. Tire condition/pressure.
- b. Lights/turn signals.
- c. A clean windshield and adequate window washer fluid.
- d. Gauges/warning lights indicating a normal condition.
- e. Mirrors properly adjusted.
- f. Brakes with adequate pedal pressure for proper braking.

Any defects must be reported to the local office Fleet Representative or Office Administrator.

H. Vehicle Maintenance

1. The Office Administrator (or designee) is to ensure that all vehicles owned or leased by URS are properly maintained.
2. Routine maintenance must be performed in accordance with the schedule provided in the owner's manual stored in the vehicle.
3. Reported defects/problems with vehicles must be repaired promptly.

5. Documentation Summary

The following documentation will be maintained in the office/project file:

- A. Auto Claim Reports
- B. Journey Management Plans
- C. Vehicle Inspections

6. Resources

- A. National Safety Council, Information on Defensive Driving Courses
<http://www.nscddonline.com/>
- B. AAA Foundation for Traffic Safety
<http://www.aaafoundation.org/>
- C. Smith Driving System
<http://smith-system.com/>

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- D. American National Standards Institute (ANSI) D6.1 – Manual on Uniform Traffic Control Devices for Streets and Highways
- E. [SMS 019](#) – Heavy Equipment Operations
- F. [SMS 024](#) – Medical Screening and Surveillance
- G. [SMS 032](#) – Work Zone Traffic Control
- H. [SMS 044](#) – Radiation Safety for Portable Gauges
- I. [SMS 048](#) – Hazardous Materials/Dangerous Goods Shipping
- J. [SMS 049](#) – Injury/Illness/Incident Reporting and Notifications
- K. [SMS 060](#) – Fatigue Management
- L. [Attachment 057-1 NA](#) – Auto Claim Report
- M. [Attachment 057-2 NA](#) – Journey Management Plan
- N. [Attachment 057-3 NA](#) – Vehicle Inspection Checklist



AUTO CLAIM REPORT

To be used for **all** vehicle accidents involving URS-leased/owned, client, and rental vehicles and for personal vehicles used on company business.

Name of Employee Involved in Accident _____

Was the employee injured? Yes No _____ If Yes, complete SMS 049-1NA.

Was anyone else injured? Yes No **Details:** _____

Office Location _____ **Date of Accident** _____

Employee Phone/Cell # _____ **Office Phone #** _____

Describe Injury (including medical treatment, if any):

Company Vehicle¹ On Company business at the time of accident? Yes No
Personal Vehicle¹ Was alcohol or drugs involved at the time of accident? Yes No
Rental Vehicle² Vehicle Identification Number (company or personal):
Government or Client Vehicle _____

Year _____ Make _____ Model _____

Other Driver's Information

Name _____ Phone Number _____

Address _____

Insurance Co. _____ Policy # _____

License Plate # _____ Make _____ Model _____

Description of Accident

Time of Accident _____ Police Report # _____

Location of Accident _____ Police Department _____

At any time, were police or authorities called or present? Yes No

Description (provide a clear, inclusive description of the accident):

Distribution: Office/Site Manager Regional HSE Manager Office/Site HSE Representative

¹ All accidents occurring in the US to company, client or personal vehicles will be reported to:
PHH
Phone 800 446 7052 Fax 410 771 2619

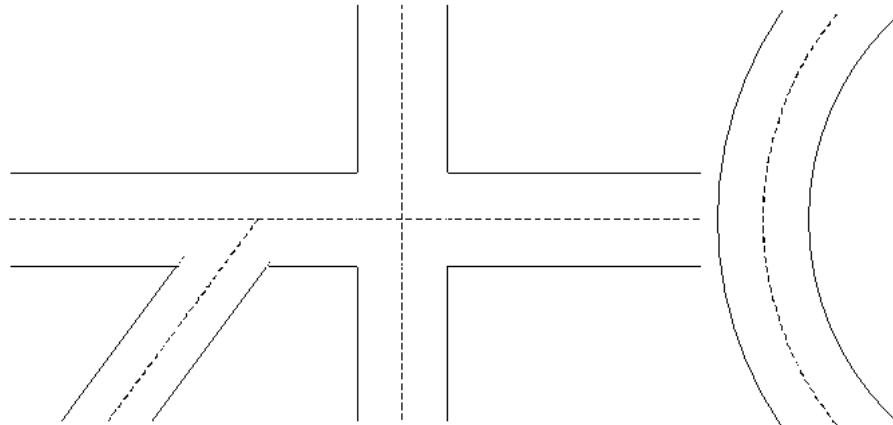
² All accidents occurring in rental vehicles will also be reported to the rental agency. All accidents occurring outside the US will be reported to the Regional HSE Manager.



AUTO CLAIM REPORT

To be used for **all** vehicle accidents involving URS-leased/owned, client, and rental vehicles and for personal vehicles used on company business.

Draw a diagram showing the position of vehicles before and after the accident. Correct the diagram to fit your situation. Attach police report if available.



Check all applicable conditions on each subject

WEATHER

- Clear
- Cloudy
- Fog
- Rain
- Snow
- Sleet
- Other

LIGHTING

- Daylight
- Dusk
- Dark - no street lights on
- Dark - street lights on
- Headlights
- Headlights on dim
- Headlights on bright
- No lights on
- Dark
- Dawn

ROAD SURFACE

- Dry
- Wet
- Muddy
- Snowy
- Snow-covered
- Ice in places
- Ice -covered
- Other

ROAD DESCRIPTION

- Straight
- Level
- Hill
- Paved
- One-way
- Two-way
- Divided road
- Intersection
- Curve
- Up
- Down
- Black top

ACTION OF DRIVER

	You	Other
Exceeding safe speed	<input type="checkbox"/>	<input type="checkbox"/>
On wrong side of street	<input type="checkbox"/>	<input type="checkbox"/>
Did not have right-of-way	<input type="checkbox"/>	<input type="checkbox"/>
Disobeyed traffic signal	<input type="checkbox"/>	<input type="checkbox"/>
Passed illegally	<input type="checkbox"/>	<input type="checkbox"/>
Improper turning	<input type="checkbox"/>	<input type="checkbox"/>
Improper backing	<input type="checkbox"/>	<input type="checkbox"/>
Following too closely	<input type="checkbox"/>	<input type="checkbox"/>
Failure to signal	<input type="checkbox"/>	<input type="checkbox"/>
Improper lane change	<input type="checkbox"/>	<input type="checkbox"/>
Misjudged clearance	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

What was speed limit?

_____ MPH

Traffic control

- Signal lights
- Caution lights
- Stop sign
- Police officer
- None
- Other

Witnesses?

- Yes
- No

Witness Name

Address _____

Name _____

Address _____

I understand that any misrepresentation or material omission made by me on this Auto Claim Report will be sufficient cause for immediate termination of employment whenever it may be discovered. I represent and warrant that I have read and fully understand the foregoing, that all information I have provided on this Report is true and accurate.

Signature		Date	
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Health, Safety and Environment
JOURNEY MANAGEMENT PLAN

Attachment 057-2 NA

Issue Date: February 2001
Revision 11: September 2012

Commencement Point	Destination Point

Issue #: 1 Date:

<u>ROUTE DIRECTIONS</u>	<u>PERSONAL PROTECTIVE EQUIPMENT</u>
<u>TIME AND DISTANCE, ROUND TRIP</u>	<u>SPECIAL INSTRUCTIONS</u> 1. Do not use cell phone or two-way communication devices while driving. 2. Use three points of contact when entering/exiting the cab. 3. Everyone has the authority and responsibility to stop work if conditions are unsafe. 4. Do not drive while under the influence of medication, drugs or alcohol. 5. Do not drive when you are fatigued.
<u>SITE HAZARDS</u>	
<u>ROUTE HAZARDS</u>	<u>EMERGENCY INFORMATION</u>
<u>DESTINATION ENTRY INSTRUCTIONS</u>	<u>EMERGENCY CONTACT NUMBERS</u> Fire/Ambulance/Police:
<u>DESTINATION HAZARDS</u>	<u>SITE CONTACT NUMBERS</u> Site Manager:
	Safety Manager:
<u>DESTINATION EXIT INSTRUCTIONS</u>	<u>CURRENT TRIP INFORMATION UPDATE</u>
<u>RETURN JOURNEY</u>	



Health, Safety and Environment
JOURNEY MANAGEMENT PLAN

Attachment 057-2 NA

Issue Date: February 2001
Revision 11: September 2012

ROUTE MAP



**VEHICLE
INSPECTION CHECKLIST**

Make/Model/Plate #: _____ Inspector's Name: _____

Mileage: _____ Date: _____

ITEM INSPECTED	CHECK IF SATISFACTORY	COMMENTS
Vehicle Registration	<input type="checkbox"/>	
Insurance Information	<input type="checkbox"/>	
Tires (Tread Depth, Inflation)	<input type="checkbox"/>	
Spare Tire	<input type="checkbox"/>	
Shocks	<input type="checkbox"/>	
Exhaust System	<input type="checkbox"/>	
Engine	<input type="checkbox"/>	
Steering	<input type="checkbox"/>	
Horn	<input type="checkbox"/>	
Mirrors	<input type="checkbox"/>	
First Aid Kit	<input type="checkbox"/>	
Fire Extinguisher	<input type="checkbox"/>	
Brakes	<input type="checkbox"/>	
Parking Brake	<input type="checkbox"/>	
Windshield Wipers	<input type="checkbox"/>	
Windshield	<input type="checkbox"/>	
Washers	<input type="checkbox"/>	
Headlights (High, Low)	<input type="checkbox"/>	
Turn Signals	<input type="checkbox"/>	
Brake Lights	<input type="checkbox"/>	
Back-up Lights	<input type="checkbox"/>	
Instrument Lights	<input type="checkbox"/>	
Tail Lights	<input type="checkbox"/>	
Body Condition	<input type="checkbox"/>	
Back-up Alarm	<input type="checkbox"/>	
Ice Scraper	<input type="checkbox"/>	
Spare Tire	<input type="checkbox"/>	
Clutch	<input type="checkbox"/>	
Safety Restraints	<input type="checkbox"/>	
Fluids	<input type="checkbox"/>	
Engine Oil	<input type="checkbox"/>	
Brake Fluid	<input type="checkbox"/>	
Transmission Fluid	<input type="checkbox"/>	
Engine Coolant	<input type="checkbox"/>	
Washer Fluid	<input type="checkbox"/>	
Power Steering Fluid	<input type="checkbox"/>	

URS SAFETY MANAGEMENT STANDARD

Cold Stress

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to protect project personnel from hypothermia and frostbite when working outdoors in damp and cool (below 50° F or 10°C) conditions or anytime temperatures are below 32°F or 0°C.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 059 NA](#) – North America

[SMS 059 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-059](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Cold Stress

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where field crews are working outdoors in damp and cool (below 50 degrees Fahrenheit [°F] or 10 degrees Celsius [°C]) conditions or anytime temperatures are below 32°F or 0°C.

2. Purpose and Scope

The purpose of this standard is to protect project personnel from hypothermia and frostbite.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

- A. Carefully plan work anticipated to be performed in cool or cold conditions. Include costs in project budgets for specialized equipment and supplies needed to complete the field activities.
- B. Monitor weather forecasts immediately prior to entering the field. If possible, schedule heavy work during the warmer parts of the day. Implement a work-warming regimen by taking breaks out of the cold.
- C. Observe and monitor weather conditions such as ambient temperature, wind speed, and precipitation while in the field. If needed, use Supplemental Information B to determine wind chill.
- D. Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. Adequate insulating dry clothing will be required in air or wind chill temperatures below 40 °F (4.4 °C).
 1. Wear at least 3 layers of clothing to help prevent cold stress. It is important to preserve the air space between the body and the outer layer of clothing to retain body heat.
 2. Wear an outer layer to break the wind and allow some ventilation (e.g., Gortex[®] or nylon).

URS SAFETY MANAGEMENT STANDARD
Cold Stress

3. Wear a middle layer of down, wool, or similar materials to provide insulation.
 4. Wear an inner layer of cotton or synthetic weave to allow ventilation.
 5. Wear a hat or hardhat liner. Up to 40 percent of body heat can be lost when the head is left exposed.
 6. Wear insulated boots or other insulated footwear, and insulated gloves to help reduce the chance of frostbite.
 7. Keep a change of dry clothing available in case work clothes become wet.
 8. Do not wear tight clothing. Loose clothing allows better ventilation.
 9. Skin should not be left exposed on a continuous basis when air temperature or chill factors are below -17°F (-27°C).
 10. Drink plenty of liquids, avoiding caffeine and alcohol, which are vasoconstrictors. It is easy to become dehydrated in cold weather.
- E. Use the following work practices:
1. Use Supplemental Information C to establish work/rest cycles in cold weather.
 2. Drink plenty of warm liquids. It is easy to become dehydrated in cold weather.
 3. Avoiding caffeine and alcohol. Alcohol will accelerate loss of body heat.
 4. Eat high calorie snacks to help maintain body metabolism.
 5. If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold.
 6. Work in pairs to keep an eye on each other and watch for signs of cold stress.
 7. NEVER IGNORE SHIVERING. Persistent or violent shivering is a clear warning that you are on the verge of hypothermia.
 8. Avoid exhaustion.

URS SAFETY MANAGEMENT STANDARD
Cold Stress

- F. When possible, use the following engineering controls:
1. Provide shelter to escape cold, wind, and precipitation
 2. Provide a source of heat (such as warm packs or portable heaters).
 3. Use insulating materials on equipment handles when temperatures drop below 30°F (-1°C).
- G. Watch for symptoms and signs of hypothermia. Work in pairs to keep an eye on each other and watch for signs of cold stress.
- H. Treat cold stress illness as follows:
1. Hypothermia: Prompt treatment of hypothermia is essential. Once the body temperature drops below 95°F (35°C), the loss of temperature control occurs, and the body can no longer rewarm itself. Initial treatment includes reducing heat loss by moving the individual out of the wind and cold, removing wet clothing, applying external heat (such as a pre-warmed sleeping bag, electric blanket, or body-heat from other workers), and obtaining follow-up medical attention.
 2. Frost Bite: The initial treatment for frostbite includes bringing the individual to a warm location, removing clothing in the affected area, and, **if help is delayed**, placing the affected parts in warm (100° to 104°F or 38° to 40°C) water. Do not massage or rub the frostbite area. After the initial treatment, wrap the affected area loosely in sterile gauze and seek medical attention.

For further discussion on Cold Stress treatment, please refer to Supplemental Information A.

- I. Hypothermia in Water:

Loss of body heat to the water is a major cause of deaths in boating and working near water incidents. Often the cause of death is listed as drowning; however, the primary cause is often hypothermia. It should also be noted that alcohol lowers the body temperature around 2 to 3 degrees by dilating the blood vessels. Do not drink alcohol around cold water. The following table shows the effects of hypothermia in water:

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Cold Stress

WATER TEMPERATURE	EXHAUSTION	SURVIVAL TIME
32.5°F (0°C)	Under 15 minutes	Under 15 to 45 minutes
32.5 to 40°F (0 to 4°C)	15 to 30 minutes	30 to 90 minutes
40 to 50°F (4 to 10°C)	30 to 60 minutes	1 to 3 hours
50 to 60°F (10 to 16°C)	1 to 2 hours	1 to 6 hours
60 to 70°F (16 to 21°C)	2 to 7 hours	2 to 40 hours
60 to 70°F (16 to 21°C)	3 to 12 hours	3 hours to indefinite
Over 80°F (27°C)	Indefinite	Indefinite

SOME POINTS TO REMEMBER:

1. Wear your PFD. Review SMS 027 – Work Over Water, SMS 053 – Marine Safety and Boat Operations and SMS 095 – Barge Operations.
2. If the water is less than 50°F (10°C), wear a wet suit or dry suit for work in water (e.g., wading), or if a significant potential to fall in water exists.
3. While in the water, do not attempt to swim unless to reach nearby safety. Unnecessary swimming increases the rate of body heat loss. Keep your head out of the water. This will increase your survival time.
4. Keep a positive attitude about your rescue. This will increase your chances of survival.
5. If there is more than one person in the water, huddling is recommended.

J. Training

Workers at risk of developing hypothermia or cold-related injury will be trained in:

1. Recognition of the signs and symptoms of cold injury or impending hypothermia;

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Cold Stress

2. Proper re-warming procedures and appropriate first aid treatment;
3. Proper use of clothing;
4. Proper eating and drinking practices; and
5. Safe work practices appropriate to the work that is to be performed.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Cold stress training records.

6. Resources

- A. U.S. Occupational Safety and Health Administration (OSHA) Fact Sheets – [“Protecting Workers in Cold Environments”](#)
- B. [OSHA Publication 3156 – Quick Reference Card](#)
- C. [SMS 027](#) – Work Over Water
- D. [SMS 053](#) – Marine Safety and Boat Operations
- E. [SMS 095](#) – Barge Operations

7. Supplemental Information

- A. [Signs of, and Treatment for, Cold Stress-Related Illnesses](#)
- B. [Wind Chill Index](#) (units in °F and miles/hour, and units in °C and Kilometers/hour)
- C. [Work/Warm-up Schedule for Outside Workers](#) based on a Four-Hour Shift



Health, Safety and Environment
SIGNS OF AND TREATMENT FOR COLD
STRESS RELATED ILLNESSES

SMS 059 NA
 Supplemental Information A
 Issue Date: February 2009
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Hypothermia: Hypothermia results when the body loses heat faster than it can be produced. When this situation first occurs, blood vessels in the skin constrict in an attempt to conserve vital internal heat. Hands and feet are first affected. If the body continues to lose heat, involuntary shivers begin. This is the body's way of attempting to produce more heat, and it is usually the first real warning sign of hypothermia. Further heat loss produces speech difficulty, confusion, loss of manual dexterity, collapse, and finally death. Wet clothes or immersion in cold water greatly increases the hypothermia risk. The progressive clinical presentation of hypothermia is described in the table below.

Frostbite: Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite can be categorized into:

- **Frost Nip or Initial Frostbite:** (1st degree frostbite) Characterized by blanching or whitening of skin.
- **Superficial Frostbite:** (2nd degree frostbite) Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. Blistering and peeling of the frozen skin will follow exposure.
- **Deep Frostbite:** (3rd degree frostbite) Tissues are cold, pale, and solid; extremely serious injury with possible amputation of affected area.

Frostbite can occur without hypothermia when the extremities do not receive sufficient heat. The toes, fingers, cheeks, and ears are the most commonly affected. Frostbite occurs when there is freezing of the fluids around the cells of the affected tissues. The first symptom of frostbite is an uncomfortable sensation of coldness, followed by numbness. There may be tingling, stinging, or cramping. Contact by the skin with tools or other metal objects below 20°F (-7°C) may result in contact frostbite.

Condition	Core Body Temperature	Signs/Symptoms	Treatment
Mild Hypothermia	99 - 97 F 37 – 36 C	Normal, shivering may begin	Seek dry shelter; replace wet clothing, insulate whole body and head, avoid sweating, use external warmth (bath, fire) only if core above 95 degrees F, give warm sweet drinks and food.
	97 - 95 F 36 – 35 C	Cold sensation, goose bumps, unable to perform complex tasks with hands, shiver can be mild to severe, hands numb.	
Moderate Hypothermia	95 - 93 F 35 – 34 C	Intense shivering, muscle in-coordination becomes apparent, movements slow and labored, stumbling pace, mild confusion may appear alert.	Avoid exercise and external warmth, gently rest; give warm sweet drinks and calories, internal warming via warm moist air, monitor pulse and breathing.
	93 - 90 F 34 – 32 C	Violent shivering persist, difficulty speaking, sluggish thinking, amnesia starts to appear, gross muscle movements sluggish, unable to use hands, stumbles frequently, signs of depression, withdrawn.	
Severe Hypothermia	90 – 86 F 32 – 30 C	Shivering stops, exposed skin blue or puffy, muscle coordination very poor, inability to walk, confusion, incoherent/irrational behavior, but may be able to maintain posture and appearance of awareness.	Medical emergency, give nothing by mouth, wrap in an insulated blanket, avoid rapid rewarming, transfer to hospital immediately.
	86 – 82 F 30 – 28 C	Muscle rigidity, semiconscious, stupor, loss of awareness of others, pulse and respiration rate decrease, possible heart fibrillation.	
	82 – 78 F 28 – 25.5 C	Unconscious, heart beat and respiration erratic, pulse may not be palpable.	
	78 - 75 F 25.5 – 24 C	Pulmonary edema, cardiac and respiratory failure, death. Death may occur before this temperature is reached.	



WIND CHILL INDEX

Estimated wind speed	Actual temperature reading (°F/°C)											
	50/10	40/4	30/-1	20/-7	10/-12	0/-18	-10/-23	-20/-29	-30/-34	-40/-40	-50/-46	-60/-51
(mph/kph)	Equivalent wind chill temperature (°F/°C)											
0 (Calm)	50/10	40/4	30/-1	20/-7	10/-12	0/-18	-10/-23	-20/-29	-30/-34	-40/-40	-50/-46	-60/-51
5/8	48/9	37/3	27/-3	16/-9	6/-14	-5/-21	-15/-26	-26/-32	-36/-38	-47/-44	-57/-49	-68/-56
10/16	40/4	28/-2	16/-9	4/-16	-9/-23	-24/-31	-33/-36	-46/-43	-58/-50	-70/-57	-83/-64	-95/-71
15/24	36/2	22/-6	9/-13	-5/-21	-18/-28	-32/-36	-45/-43	-58/-50	-72/-58	-85/-65	-99/-73	-112/-80
20/32	32/0	18/-8	4/-16	-10/-23	-25/-32	-39/-39	-53/-47	-67/-55	-82/-63	-96/-71	-110/-79	-121/-85
25/40	30/-1	16/-9	0/-18	-15/-26	-29/-34	-44/-42	-59/-51	-74/-59	-88/-67	-104/-76	-118/-83	-133/-92
30/48	28/-2	13/-11	-2/-19	-18/-28	-33/-36	-48/-44	-63/-53	-79/-62	-94/-70	-109/-78	-125/-87	-140/-96
35/56	27/-3	11/-12	-4/-20	-20/-29	-35/-37	-51/-46	-67/-55	-82/-63	-98/-72	-113/-81	-129/-89	-145/-98
40/64	26/-3	10/-12	-6/-21	-21/-29	-37/-38	-53/-47	-69/-56	-85/-65	-100/-73	-116/-82	-132/-91	-148/-100
	LOW HAZARD Risk of exposed, dry skin being affected in less than one hour. Awareness of hazard low.				INCREASING HAZARD Danger from freezing of exposed flesh within one minute.				HIGH HAZARD Flesh may freeze within 30seconds.			

Note that wind speeds greater than 40 mph/64 kph have little additional effect.

Information in this table was originally developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA, and is further adapted from the 2004 *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*, published by the ACGIH. The ACGIH publication provides the equivalent table with temperature in degrees Fahrenheit and wind speed in mph.

Equivalent wind chill temperatures identified require dry clothing to maintain core body temperature above 96.8°F (36°C).



How fast a person's body cools in cold weather depends on: air temperature, wind speed, heat of the sun, and work being done. The fingers and toes usually feel cold first. Shivering then sets in. Shivering is the body's way of warning that it needs to be warm-up. |

The Work Warm-Up Schedule shows the warm-up breaks needed for work in cold conditions. It assumes that normal work practice provides for breaks in warm locations every two hours. The schedule provides for additional breaks as the wind velocity at the work site increases and/or the temperature drops. Warm-up breaks should begin when the temperature reaches -15° (-26° C) with winds of 10 mph (16 km/h) or greater. When the work involves riding on an unshielded vehicle or some other activity that generates wind, the number of breaks should be increases appropriately. If effective protection against the wind can be provided by shields or screens, work modifications or measures, then the work warm-up schedule for "No Noticeable Wind" would apply.

The information below applies to any four-hour period. Warm-up breaks are assumed to provide 10 minutes in a warm environment. These guidelines apply to workers wearing dry clothing.

Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx.)	°F (approx.)	Max. work Period	No. of Breaks**	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm breaks) 1		(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	(Norm breaks) 1		75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease		Non-emergency work should cease			
-40° to -42°	-40° to -44°	30 min.	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease			
-43° & below	-45° & below	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease			

Note: All temperatures are approximate.

Apply the schedule one step lower for work with limited physical activity. For example, at -30° F (-35° C) with no noticeable wind, a worker with a job requiring little physical movement should have a maximum work period of 40 minutes with four breaks in a four-hour period.

If reliable weather reports are not available, us the following as a guide to estimate wind velocity:

- A 5 mph (8 km/h) wind will move a light flag
- A 10 mph (16 km/h) wind will fully extend the flag
- A 15 mph (24 km/h)wind will raise a newspaper sheet
- A 20 mph (23 km/h) wind will produce blowing and drifting snow.

URS SAFETY MANAGEMENT STANDARD

Manual Material Handling

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to prevent common injuries caused by the practice of manual materials handling (MMH). For this procedure, MMH is defined as the movement of items by lifting, lowering, pushing, pulling, carrying, holding, or restraining.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 069 NA](#) – North America

[SMS 069 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP7-069](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Manual Material Handling

1. Applicability

This standard applies to URS Corporation and its subsidiary companies where personnel perform manual handling of materials. For this procedure, manual material handling (MMH) is defined as the movement of items by lifting, lowering, pushing, pulling, carrying, holding, or restraining.

2. Purpose and Scope

The purpose of this standard is to prevent common injuries caused by the practice of MMH. Immediate or short-term effects include lacerations, bruises, and muscle fatigue. Long-term effects include chronic pain, frequently in the lower back but also in limb joints and ligaments.

3. Implementation

Implementation of this standard is the responsibility of the URS manager directing activities of the facility, site, or project.

4. Requirements

A. General

1. Prior to lifting, lowering, pushing, pulling, carrying, holding, or restraining an object of any significant size or weight, employees must evaluate the object and the required task to determine whether they can handle the object safely.
2. If the employee has any doubt about whether he or she can safely move the object alone, the employee should obtain additional manual or mechanical help.
3. Healthy employees with no physician-imposed restrictions should be able to lift and carry a maximum of 50 pounds (23 kilograms) using proper lifting and carrying techniques. Physical and workplace factors may reduce this recommended weight limit (RWL) significantly and should be considered prior to attempting lifts of this magnitude. Examples of physical and workplace factors may include the following:
 - a. Physical size of an object.
 - b. Slippery container surface or poor grip ability.
 - c. Sharp edges.
 - d. Slippery floors or obstacles on the floor.
 - e. Cold or hot objects surfaces.
 - f. Distance and route of travel.

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Manual Material Handling

4. An employee's personal "safe" MMH capability is defined as the employee's personal capability to manually lift, carry, push, or pull an object alone. This "safe" limit must consider the employee's past experience and training with MMH, health status, and any other personal or environmental characteristics affecting the employee's ability to perform these tasks. An employee's "safe" MMH capability is typically at or below the calculated RWL. In some cases, a trained and physically conditioned employee may exceed the MMH capability limit, but only after a complete hazard review of the task has determined an acceptable risk for minimizing injury.
5. An MMH task that exceeds an employee's personal "safe" MMH capability or RWL should be brought to the attention of the applicable manager or safety supervisor for the project.
6. If, due to a medical or health condition, the employee's physician or the employee has set a personal "safe" MMH capability, then appropriate medical documentation must be provided to the applicable manager to define these limits. The manager and appropriate safety supervisor should evaluate the tasks to which that employee is assigned and recommend a specific course of action to limit the potential for injury. This should include periodic monitoring of the employee and his/her work environment.
7. A recommended RWL can be calculated using the factors described in Supplemental Information A. The weight limit derived from these calculations is considered to be a load that over 99% of men and over 75% of women can safely handle without application of engineering or administrative controls. **Implementation of the calculations in Supplemental Information A should be attempted only with the assistance of a safety professional knowledgeable in the application of these factors. The calculations are intended to determine RWLs for repetitive lifting scenarios rather than occasional lifts.**
8. Prior to any manual lift, it is suggested that the employee warm up his or her muscles and joints using a combination of stretching and flexing.

B. Preplanning

1. Where MMH will be a necessary function of the task, the manager and/or safety supervisor should perform a thorough evaluation of the activities to determine ergonomic solutions to reduce or eliminate conditions that can cause or contribute to MMH injuries.

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2. If a heavy object is to be moved to another location, the safest transport route should be determined prior to the activity.
3. The area around the object and the route over which it will be transported should be checked for slip, trip, and fall hazards. Hazards should be removed prior to initiation of the task.
4. The object to be moved should be inspected for grasping or handling hazards, such as slivers, sharp edges, grease, water, etc. Eliminate or abate any identified hazards where possible. Safe grasping or handling points on the object should be determined. Whenever possible, containers with carrying handles should be used for objects because they increase the manual grip strength for holding the object, thus providing better control and reduced muscle fatigue.
5. The distance to be traveled and the length of time that a grip on the object must be maintained should be considered before moving objects. If the travel distance is greater than 10 feet (3 meters) at maximum RWL, the employee should consider using an alternative method, rather than manually carrying the object.

C. Lifting/Lowering Guidelines

1. Reduce or eliminate manual lifting and lowering tasks where possible. Determine whether there are ways to abate the safety and ergonomic hazards associated with manual lifting.
2. The recommended technique for two-handed manual lifting/lowering involves five maneuvers:
 - a. Get a firm footing. Keep your feet apart for a stable base. Put one foot slightly in front of the other.
 - b. Bend your knees. Do not bend at the waist. When grasping the object, a firm grip should be obtained before lifting/lowering.
 - c. Lift/lower with your legs. Lift/lower the load slowly and in a straight line, avoiding sudden movements.
 - d. Keep the load close to the body. Generally, the closer the load is to the body, the less force it exerts on your back.
 - e. Keep your back straight, your head and shoulders up, and your stomach muscles tight. Do not add the weight of your body to the load. Avoid twisting.

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3. When a turn or change of direction is necessary, the object should be lifted or lowered into a carrying position, then the whole body should be turned with the feet, avoiding any trunk twisting motion.
4. Objects to be lifted to shoulder height should first be lifted to waist height, then rested on a level surface so the grasping position can be changed prior to lifting to a higher level.
5. Employees should never lift a load above their head.

D. Carrying/Holding Guidelines

1. Manual carrying is an inefficient way of transporting materials in the work place. Where possible, reduce or eliminate manual carrying tasks.
2. Never carry a load above the head.
3. Carry an object close to the body using both hands. One-handed carries are awkward and tend to unbalance the employee.
4. Do not carry objects that are so large they will obstruct visibility.
5. Do not change grips on an object while carrying or holding an object. Rest the object on a secure surface prior to changing grip.
6. If an object is of a size, shape, or mass that it requires two people to carry, use two people of similar size and physique. Two-person lifts should be planned and coordinated before performing the lift. Lift the item in unison.
7. Avoid carrying objects on stairs, particularly where the line of sight may be obstructed or the object can interfere with leg movement. All travel on stairs requires use of a handrail at all times, so only carry objects that can be safely handled with one hand. Always maintain handrail contact when carrying an object up or down stairs.

E. Pushing/Pulling Guidelines

1. Check the condition of the floor, ground, or other surface prior to pushing or pulling an object across it.
2. Be aware of the "break out" force of the object; this is the force at which a push or pull overcomes the frictional force between the surface and object. Adjust posture to avoid losing balance when this point is reached.
3. Get assistance when moving or guiding a large load.
4. Where possible, always push rather than pull a load.

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5. Never load the cart or load-carrying device in such a manner that visibility is obstructed in the path of travel.
6. When pushing or pulling an object on an inclined surface, be certain that you can control the load and direction of travel before proceeding. Obtain additional support to control the load if necessary.
7. Never leave carts or loads in an area that will present a hazard to other workers. Make sure carts or transport devices are secured in position before leaving them unattended.

F. Workplace Design

1. Store heavy or bulky materials at heights between the knee and shoulder to avoid the need to stretch or bend. Use step stools to access objects above shoulder height.
2. Pack or arrange items to be lifted to avoid shifting of weight in the package. If a box has hand cutouts (e.g., file archive boxes) do not load the box so full that the handles cannot be used for carrying the box.
3. Design work areas to avoid the need to lift, carry, push, or pull heavy or bulky materials for extended distances.
4. Design workplaces with the following in mind:
 - a. Lifts from the floor should be avoided.
 - b. The torso should never twist while handling loads.
 - c. Asymmetrical or unbalanced one-handed lifts should be avoided.
 - d. Loads should not be lifted with sudden movements.
 - e. Loads should not be lifted over obstacles.
 - f. Loads should not be lifted at extended forward or sideways reaches.
 - g. Uncomfortable or static postures should not be necessary throughout the work cycle.
 - h. Environmental factors (e.g., task lighting, dry work surfaces, heat or cold stress) should be considered.

G. Training

1. Personnel who may have MMH as part of their duties are required to receive training that includes the following topics:

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Manual Material Handling

- a. Showing personnel how to avoid unnecessary physical stress and strain during MMH operations.
 - b. Teaching personnel to become aware of what they can comfortably handle without undue strain.
 - c. Instructing personnel on the proper use of equipment.
 - d. Teaching personnel to recognize potential hazards and how to prevent or correct them.
2. This training must be completed prior to an employee being assigned to a task that involves MMH activities.
 3. Assistance with training or training materials is available through the HSE staff.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Training rosters.
- B. Other proof of completion of MMH training.

6. Resources

- A. National Institute for Occupational Safety and Health (NIOSH) – Work Practices Guide for Manual Lifting <http://www.cdc.gov/niosh>
- B. Canadian Centre for Occupational Health and Safety <http://www.ccohs.ca/oshanswers/ergonomics/>
- C. Oregon OSHA – Ergonomics of Manual Materials Handling <http://www.cbs.state.or.us/external/osha/pdf/workshops/206w.pdf>
- D. North Carolina Department of Labor – A Guide to Manual Materials Handling and Back Safety <http://www.nclabor.com/osha/etta/indguide/ig26.pdf>

7. Supplemental Information

- A. [Recommended Weight Limit \(RWL\) Calculations](#)

This lifting equation, developed by the National Institute for Occupational Safety and Health (NIOSH), takes into account the weight of an object plus several other variables in lifting tasks that contribute to the risk of injury. For example, if the situation requires frequent lifts or lifting loads far away from the body, there is an increased risk of injury. Under these conditions, the weight limit would be reduced from a baseline weight or "load constant" (LC) to a recommended weight limit (RWL). A "load constant" (LC) of 23 kg (about 51 pounds) has been established by NIOSH as a load that, under ideal conditions, is safe for 75% of females and 90% of males.

To calculate the RWL, you must first measure or assess several variables related to the lifting task. The six variables that are considered in determining the RWL are:

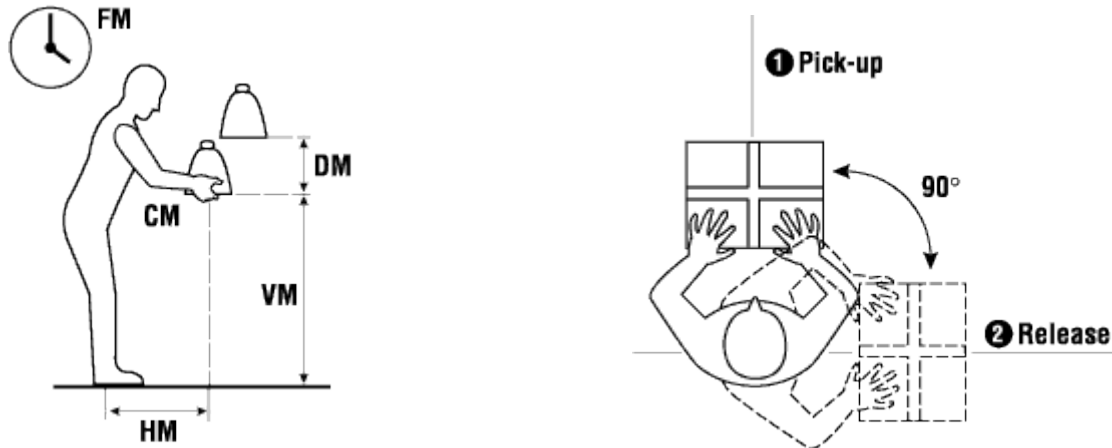
- The horizontal distance (H) the load is lifted (distance of hands from midpoint between ankles),
- The starting height of the hands from the ground (V),
- The vertical distance of lifting (D),
- The time between lifts or frequency of lifting (F),
- The angle of the load in relation to the body (e.g., straight in front of you or off to the side, A), and
- The quality of the grasp or handhold based on the type of handles available (hand-to-load coupling, C).

Each of these variables is then assigned a numerical value (multiplier factor) from look-up charts. The equation includes six multiplier factors to calculate the RWL:

$$\text{RWL} = \text{LC} \times \text{HM} \times \text{VM} \times \text{DM} \times \text{FM} \times \text{AM} \times \text{CM}$$

Where LC is the load constant (23 kg) and other factors in the equation are:

- HM, the "Horizontal Multiplier" factor,
- VM, the "Vertical Multiplier" factor,
- DM, the "Distance Multiplier" factor,
- FM, the "Frequency Multiplier" factor,
- AM, the "Asymmetric Multiplier" factor, and
- CM, the "Coupling Multiplier" factor.



Horizontal Multiplier is the distance the object is from the body. Measure (in centimeters) the distance from in between the person's ankles to their hands when holding the object. Write down this number. Next, look up the number on the accompanying chart and find the matching "multiplier factor". Use this factor in the lifting equation.

Vertical Multiplier is measured as the starting point of the lift and is the distance in centimeters of the hands up from the ground. Measure this distance and use the number to determine which value to use on the chart.

Distance Multiplier is the number of centimeters the load travels up (or down) from the starting position. Measure this distance and use the number to determine which value to use on the chart.

Frequency Multiplier is how often the lift is repeated within a certain time period. You need to determine if the lift is done while standing or stooping, for more or less than one hour (in total time for the shift), and how much time there is for rest between lifts.

Asymmetric Multiplier measures if the body must twist or turn during the lift. This measurement is done in degrees (with 360° being one complete circle).

Coupling Multiplier determines the "coupling" or type of grasp the person has on the container. It rates the type of handles as good (handles), fair (make-shift cut outs in cardboard boxes) or poor. You also need to know if the lift is done in a standing or stooping position.

When these multipliers are placed into the equation, determine the RWL. If the weight of the object to be lifted exceeds the RWL, the task is considered to be dangerous. Assess the relevant factors which contribute most to the risk (the lower the factor, the more it contributes to the risk) and redesign the handling task.

The lifting equation only applies in certain situations. It does not apply in situations where a person is lifting (or lowering):

- With one hand,
- For over 8 hours,
- While seated or kneeling,
- In a restricted work space,
- Objects that are unstable (such as buckets or containers of liquids),
- While pushing or pulling,
- With wheelbarrows or shovels,
- With high speed motion (faster than about 30 inches/second),
- Extremely hot or cold objects or in extreme temperatures, or
- With poor foot/floor coupling (high risk of a slip or fall).

This equation applies to most workers for:

- Two-handed lifting,
- Comfortable lifting postures, and
- Comfortable environments and non-slip floorings.

FACTORS USED IN RWL CALCULATIONS

Horizontal Multiplier (HM): Horizontal distance (H, in cm) from the midpoint between the ankles to the hands while holding the object.

H = Horizontal Distance (cm)	HM Factor
25 or less	1.00
30	0.83
40	0.63
50	0.50
60	0.42

Vertical Multiplier (VM): The vertical distance (V, in cm) of the hands from the ground at the start of the lift.

V = Starting Height (cm)	VM Factor
0	0.78
30	0.87
50	0.93
70	0.99
100	0.93
150	0.78
175	0.70
>175	0.00

Distance Multiplier (DM): The vertical distance (D, in cm) that the load travels.

D = Lifting Distance (cm)	DM Factor
25 or less	1.00
40	0.97
55	0.90
100	0.87
145	0.85
175	0.85
>175	0.00

Asymmetric Multiplier (AM): The twisting angle (A) of the body while lifting, measured in degrees.

A = Angle (degrees)	AM Factor
90°	0.71
60°	0.81
45°	0.86
30°	0.90
0°	1.00

Frequency Multiplier (FM): The frequency (F) of lifts and the duration of lifting (in minutes or seconds) over a work shift.

F = Time Between Lifts	FM Factor			
	Lifting While Standing		Lifting While Stooping	
	One Hour or Less	Over One Hour	One Hour or Less	Over One Hour
5 min	1.00	0.85	1.00	0.85
1 min	0.94	0.75	0.94	0.75
30 sec	0.91	0.65	0.91	0.65
15 sec	0.84	0.45	0.84	0.45
10 sec	0.75	0.27	0.75	0.27
6 sec	0.45	0.13	0.45	-
5 sec	0.37	-	0.37	-

Coupling Multiplier (CM): The quality of grasp (or coupling, C) classified as good, fair or poor and depends on the body position (either standing or stooping).

C = Grasp	CM Factor	
	Standing	Stooping
Good (handles)	1.00	1.00
Fair	1.00	0.95
Poor	0.90	0.90

URS SAFETY MANAGEMENT STANDARD

Behavior Based Safety

1. Applicability

This standard applies to the operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to describe the URS approach to implementing our behavior based safety program.

Behavior based safety is a process that provides a higher level of safety excellence by promoting proactive responses, building ownership, and developing opportunities which relate to employee safety. A primary concept is that most accidents are due to unsafe behavior, and behavior changes may be made that significantly reduce accident risk.

3. Procedures

The associated implementing regional procedures for this standard are included as attachments:

[SMS 072 NA](#) – North America

[SMS 072 INT](#) – International Operations (including Europe, Asia, South America and Africa)

[SMS AP4-072](#) – Australia / New Zealand

URS SAFETY MANAGEMENT STANDARD

Behavior-Based Safety

1. Applicability

This standard applies to all operations of URS Corporation and its subsidiary companies.

2. Purpose and Scope

The purpose of this standard is to describe the URS approach to implementing our behavior-based safety program.

Behavior-based safety is a process that provides a higher level of safety excellence by promoting proactive involvement, building ownership, and fostering communication that relates to employee safety. A primary concept is that most accidents are due to at-risk behavior, and behavioral changes may be made that significantly reduce accident potential.

3. Implementation

Implementation of this procedure is the responsibility of the URS manager directing activities of the facility, site, or project location.

4. Requirements

A. Definitions

1. **At-Risk Behavior:** Individual actions that increase the chance of injury, despite knowledge of the hazard. An example is excessive speed while driving.
2. **Activators:** Items that are intended to produce desired behaviors. URS activators for safety include, but are not limited to, policy statements, safety management standards (SMS), training, safety slogans, posters and signs, health and safety plans, safe work plans, safety meetings, and rules and regulations.
3. **Behaviors:** Visible actions on the part of individuals and can be characterized as safe (following health and safety plans, using work practices that minimize risk, coaching others on safe behavior, having safety as a priority over speed and convenience, etc.), or at-risk.
4. **Consequences:** Result of safe and at-risk behaviors, and can therefore be positive or negative. Examples of consequences include self-approval, reprimand, peer approval, penalty, feedback, inconvenience, and comfort. The most effective consequences are positive, immediate, and certain.

URS SAFETY MANAGEMENT STANDARD

Behavior-Based Safety

B. Values of Behavior-Based Safety

1. Employees hold safety as a core value.
2. Each employee feels responsible for the safety of their coworkers as well as themselves, and takes action accordingly.
3. Each employee is willing and able to “go beyond the call of duty” on behalf of the safety of others.

C. Roles for Safe Behavior

1. Supervisor’s Role:
 - a. Provide clearly defined safety expectations and encourage/reinforce the implementation of safety observations using the SMS 072-1 NA checklist or equivalent.
 - b. Provide consequences for observed behaviors throughout the course of the work shift.
2. Co-Worker Role
 - a. Intervene when observing at-risk behavior.
 - b. Provide positive feedback for safe behavior.
 - c. Volunteer to be observed.

C. Identification of At-Risk Behaviors

Observations and review of incident and near miss data will be used by URS Safety Officers to help identify at-risk behavior.

1. Employee observations.
 - a. Observation checklists, either project-specific or Attachment 072-1 NA, will be used as a tool to help identify safe and at-risk behaviors and why the behavior(s) occurred.
 - b. Employees will be instructed on using the checklists.
 - c. Checklists will be included in the site-specific health and safety plan or the safe work plan.
 - d. The checklists will include the expected safe behaviors.

URS SAFETY MANAGEMENT STANDARD

Behavior-Based Safety

- e. Peers will complete the checklist for applicable work tasks.
- f. Checklists may change throughout the project to include additional behaviors.

E. Feedback to Employees

- 1. Observers will immediately provide one-on-one feedback to the observed, noting both safe and at-risk behaviors.
- 2. Observer and observee will discuss the identified barriers to safe behavior, and potential solutions.
- 3. Near-Miss and Incident Reports will be reviewed to identify at-risk behaviors and corrective actions.
- 4. Management and Health, Safety, and Environment staff will verify compliance with this standard.

F. Feedback Follow-up

- 1. Observation checklists will be collected and discussed at periodic safety meetings.
- 2. The manager will review the trends for at-risk and safe behavior, and report the trends to the employees.
- 3. Project-specific trends are analyzed and areas of additional action are identified.

5. Documentation Summary

The following documentation will be maintained in the project file:

- A. Behavior-Based Safety Checklists.

6. Resources

[Attachment 072-1 NA](#) – Behavior-Based Safety Checklist



**Health, Safety and Environment
BEHAVIOR BASED SAFETY
CHECKLIST**

Attachment 072-1 NA

Issue Date: September 2003
Revision 2: February 2009

Job Location: _____

Date: _____

Task/Work _____

Observer: _____

Observed: _____

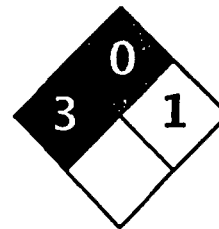
	<u>Safe</u>	<u>Unsafe</u>	<u>Comments *</u>
Personal Protective Equipment			
Head	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hand	<input type="checkbox"/>	<input type="checkbox"/>	_____
Feet	<input type="checkbox"/>	<input type="checkbox"/>	_____
Eyes/Face	<input type="checkbox"/>	<input type="checkbox"/>	_____
Skin	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hearing	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fall Protection	<input type="checkbox"/>	<input type="checkbox"/>	_____
Equipment / Tools			
Proper tool for the job	<input type="checkbox"/>	<input type="checkbox"/>	_____
Condition	<input type="checkbox"/>	<input type="checkbox"/>	_____
Proper Use	<input type="checkbox"/>	<input type="checkbox"/>	_____
Body Use / Position			
Lifting	<input type="checkbox"/>	<input type="checkbox"/>	_____
Pinch Point	<input type="checkbox"/>	<input type="checkbox"/>	_____
Ladder / stairs	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hand placement	<input type="checkbox"/>	<input type="checkbox"/>	_____
Travel path / speed	<input type="checkbox"/>	<input type="checkbox"/>	_____
Body position	<input type="checkbox"/>	<input type="checkbox"/>	_____
Work Practices			
Follow Safety Plan / Procedures	<input type="checkbox"/>	<input type="checkbox"/>	_____
Housekeeping	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other			
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____

* Use comment column when unsafe behavior / conditions were observed. Describe what was observed and why this occurred.

ATTACHMENT B

MATERIAL SAFETY DATA SHEETS

(MSDSs)



Health	3
Fire	0
Reactivity	1
Personal Protection	

Material Safety Data Sheet

Hydrochloric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Hydrochloric acid

Catalog Codes: SLH1462, SLH3154

CAS#: Mixture.

RTECS: MW4025000

TSCA: TSCA 8(b) inventory: Hydrochloric acid

CM#: Not applicable.

Synonym: Hydrochloric Acid; Muriatic Acid

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

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
Hydrogen chloride	7647-01-0	20-38
Water	7732-18-5	62-80

Toxicological Data on Ingredients: Hydrogen chloride: GAS (LC50): Acute: 4701 ppm 0.5 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in 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:

Slightly hazardous in case of skin contact (sensitizer).

CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid].

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.

Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. 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 immediately.

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: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Non combustible.

Calcium carbide reacts with hydrogen chloride gas with incandescence.

Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine.

Rubidium acetylene carbides burns with slightly warm hydrochloric acid.

Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved.

Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammable gas.

Cesium acetylene carbide burns hydrogen chloride gas.

Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute.

Reacts with most metals to produce flammable Hydrogen gas.

Special Remarks on Explosion Hazards:

Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction: Acetic anhydride $\text{AgClO} + \text{CCl}_4$ Alcohols + hydrogen cyanide, Aluminum Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide Ca_3P_2 Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO_4 Hexalithium disilicide H_2SO_4 Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl), Sodium hydroxide Sodium tetraselenium, Sulfonic acid, Tetraselenium tetranitride, U_3P_4 , Vinyl acetate. Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

Section 6: Accidental Release Measures**Small Spill:**

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:

Corrosive liquid. Poisonous liquid.

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. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. 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. Do not ingest. Do not breathe gas/fumes/ vapor/spray. 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, organic materials, metals, alkalis, moisture.

May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

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:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

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:

CEIL: 5 (ppm) from OSHA (PEL) [United States]

CEIL: 7 (mg/m³) from OSHA (PEL) [United States]

CEIL: 5 from NIOSH

CEIL: 7 (mg/m³) from NIOSH

TWA: 1 STEL: 5 (ppm) [United Kingdom (UK)]

TWA: 2 STEL: 8 (mg/m³) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent. Irritating (Strong.)

Taste: Not available.

Molecular Weight: Not applicable.

Color: Colorless to light yellow.

pH (1% soln/water): Acidic.

Boiling Point:

108.58 C @ 760 mm Hg (for 20.22% HCl in water)

83 C @ 760 mm Hg (for 31% HCl in water)

50.5 C (for 37% HCl in water)

Melting Point:

-62.25°C (-80°F) (20.69% HCl in water)

-46.2 C (31.24% HCl in water)

-25.4 C (39.17% HCl in water)

Critical Temperature: Not available.

Specific Gravity:

1.1- 1.19 (Water = 1)

1.10 (20% and 22% HCl solutions)

1.12 (24% HCl solution)

1.15 (29.57% HCl solution)

1.16 (32% HCl solution)

1.19 (37% and 38% HCl solutions)

Vapor Pressure: 16 kPa (@ 20°C) average

Vapor Density: 1.267 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.25 to 10 ppm

Water/Oil Dist. Coeff.: Not available.

Conductivity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility: Soluble in cold water, hot water, diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, water

Incompatibility with various substances:

Highly reactive with metals.

Reactive with oxidizing agents, organic materials, alkalis, water.

Corrosivity:

Extremely corrosive in presence of aluminum, of copper, of stainless steel(304), of stainless steel(316).

Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Reacts with water especially when water is added to the product.

Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg. C.

Sodium reacts very violently with gaseous hydrogen chloride.

Calcium phosphide and hydrochloric acid undergo very energetic reaction.

It reacts with oxidizers releasing chlorine gas.

Incompatible with, alkali metals, carbides, borides, metal oxides, vinyl acetate, acetylides, sulphides, phosphides, cyanides, carbonates.

Reacts with most metals to produce flammable Hydrogen gas.

Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct sunlight, alkalis (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates), amines, metals, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid(increase in temperature and pressure) Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid.

Adsorption of Hydrochloric Acid onto silicon dioxide results in exothermic reaction.

Hydrogen chloride causes aldehydes and epoxides to violently polymerize.

Hydrogen chloride or Hydrochloric Acid in contact with the following can cause explosion or ignition on contact or

Special Remarks on Corrosivity:

Highly corrosive. Incompatible with copper and copper alloys. It attacks nearly all metals (mercury, gold, platinum, tantalum, silver, and certain alloys are exceptions).

It is one of the most corrosive of the nonoxidizing acids in contact with copper alloys.

No corrosivity data on zinc, steel.

Severe Corrosive effect on brass and bronze

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

Acute oral toxicity (LD50): 900 mg/kg [Rabbit].

Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse].

Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid].

It may cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin,

eyes, Circulatory System, teeth.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, .
Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Doses (LDL/LCL)

LDL [Man] -Route: Oral; 2857 ug/kg

LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M

LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (fetotoxicity).

May affect genetic material.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: Corrosive. Causes severe skin irritation and burns.

Eyes: Corrosive. Causes severe eye irritation/conjunctivitis, burns, corneal necrosis.

Inhalation: May be fatal if inhaled. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and laryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well as headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure,

occur, particularly if exposure is prolonged. May affect the liver.

Ingestion: May be fatal if swallowed. Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomiting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophageal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis).

Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel.

Chronic Potential Health Effects:

dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also

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 8: Corrosive material

Identification : Hydrochloric acid, solution UNNA: 1789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Hydrochloric acid
Illinois toxic substances disclosure to employee act: Hydrochloric acid
Illinois chemical safety act: Hydrochloric acid
New York release reporting list: Hydrochloric acid
Rhode Island RTK hazardous substances: Hydrochloric acid
Pennsylvania RTK: Hydrochloric acid
Minnesota: Hydrochloric acid
Massachusetts RTK: Hydrochloric acid
Massachusetts spill list: Hydrochloric acid
New Jersey: Hydrochloric acid
New Jersey spill list: Hydrochloric acid
Louisiana RTK reporting list: Hydrochloric acid
Louisiana spill reporting: Hydrochloric acid
California Director's List of Hazardous Substances: Hydrochloric acid
TSCA 8(b) inventory: Hydrochloric acid
TSCA 4(a) proposed test rules: Hydrochloric acid
SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid
SARA 313 toxic chemical notification and release reporting: Hydrochloric acid
CERCLA: Hazardous substances.: Hydrochloric acid: 5000 lbs. (2268 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 D-2A: Material causing other toxic effects (VERY TOXIC).
CLASS E: Corrosive liquid.

DSCL (EEC):

R34- Causes burns.
R37- Irritating to respiratory system.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves.

Full suit.

Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Face shield.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.

-SAX, N.I. Dangerous Properties of Industrial 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 dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

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MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: NONFLAMMABLE GAS MIXTURE
 Containing One or More of the Following Components in a Nitrogen Balance Gas:
 Oxygen 0-23.5%; Isobutylene, 0.0005-0.9%

SYNONYMS: Not Applicable
 CHEMICAL FAMILY NAME: Not Applicable
 FORMULA: Not Applicable
 Document Number: 50054

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
SUPPLIER/MANUFACTURER'S NAME:	CALGAZ, LLC
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-6400
	General MSDS Information: 1-713/868-0440
	Fax on Demand: 1-800/231-1366

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR				NIOSH IDLH ppm	OTHER ppm
			ACGIH-TLV		OSHA-PEL			
			TWA ppm	STEL ppm	TWA ppm	STEL ppm		
Isobutylene	115-11-7	0.0005-0.9%	There are no specific exposure limits for Isobutylene.					
Oxygen	7782-44-7	0-23.5%	There are no specific exposure limits for Oxygen.					
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established. See Section 16 for Definitions of Terms Used.
 NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This is a colorless, odorless gas mixture. Releases of this gas mixture may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene, a component of this gas mixture, may cause drowsiness and other central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this gas mixture is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. The chief health hazard associated with this gas mixture is when this gas mixture contains less than 19.5% Oxygen and is released in a small, poorly-ventilated area (i.e. an enclosed or confined space). Under this circumstance, an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN

12-16% Oxygen:

10-14% Oxygen:

6-10% Oxygen:
 Below 6%:

OBSERVED EFFECT

Breathing and pulse rate increase, muscular coordination slightly disturbed.

Emotional upset, abnormal fatigue, disturbed respiration.

Nausea, vomiting, collapse, or loss of consciousness. Convulsive movements, possible respiratory collapse, and death.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation In Lay Terms. Over-exposure to this gas mixture may cause the following health effects:

ACUTE: Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. The most significant hazard associated with this gas mixture when it contains less than 19.5% oxygen is the potential for exposure to oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color. Additionally, isobutylene, a component of this gas mixture, may cause drowsiness or central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

CHRONIC: Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, eyes. CHRONIC: Heart, cardiovascular system, central nervous system

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	1
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FLAMMABILITY HAZARD	(RED)	0
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PHYSICAL HAZARD	(YELLOW)	0
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PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
See Section 8			

For Routine Industrial Use and Handling Applications

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn.

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary, treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

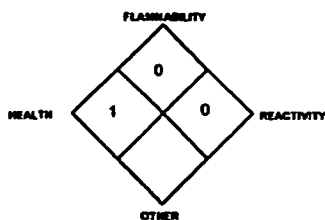
UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of an oxygen deficient environment and other safety hazards than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen. Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area.

If leaking incidentally from the cylinder, contact your supplier.

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue, exposures to total concentrations of this gas mixture could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

STORAGE AND HANDLING PRACTICES: Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C [70°F]). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING!** Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: **WARNING!** Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Nitrous Oxide and Oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection when oxygen levels are below 19.5%, or during emergency response to a release of this gas mixture. During an emergency situation, before entering the area, check the concentration of Methane and Oxygen. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.072 lb/ft³ (1.153 kg/m³)

BOILING POINT: -195.8°C (-320.4°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906

SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023

EVAPORATION RATE (nBuAc = 1): Not applicable.

ODOR THRESHOLD: Not applicable.

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

FREEZING/MELTING POINT @ 10 psig: -210°C (-345.8°F)

pH: Not applicable

MOLECULAR WEIGHT: 28.01

EXPANSION RATIO: Not applicable.

SPECIFIC VOLUME (ft³/lb): 13.8

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for Oxygen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.083 lb/ft³ (1.326 kg/m³)

FREEZING/MELTING POINT @ 10 psig: -218.8°C (-361.8°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 1.105

SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.0491

EVAPORATION RATE (nBuAc = 1): Not applicable.

ODOR THRESHOLD: Not applicable.

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

BOILING POINT: -183.0°C (-297.4°F)

pH: Not applicable.

MOLECULAR WEIGHT: 32.00

EXPANSION RATIO: Not applicable.

VOLUME (ft³/lb): 12.1

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for the gas mixture.

APPEARANCE AND COLOR: This is a colorless, odorless gas mixture.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this gas mixture. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.

DECOMPOSITION PRODUCTS: The thermal decomposition products of Isobutylene include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in the Nitrogen component of this gas mixture. Lithium reacts slowly with Nitrogen at ambient temperatures. The Isobutylene component of this gas mixture is also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen difluoride, and nitrogen trifluoride).

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are available for the components of this gas mixture.

ISOBUTYLENE:

LC₅₀ (inhalation, rat) = 620,000 mg/kg/4 hours

LC₅₀ (inhalation, mouse) = 415,000 mg/kg

NITROGEN:

There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

SUSPECTED CANCER AGENT: The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can be irritating to exposed skin and eyes.

SENSITIZATION TO THE PRODUCT: The components of this gas mixture are not known to cause human skin or respiratory sensitization.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture and its components on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for the components in this gas mixture.

Embryotoxicity: No embryotoxic effects have been described for the components in this gas mixture.

Teratogenicity: No teratogenicity effects have been described for the components in this gas mixture.

Reproductive Toxicity: No reproductive toxicity effects have been described for the components in gas mixture.

A **mutagen** is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An **embryotoxin** is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.

OXYGEN: Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log K_{ow} = -0.65

NITROGEN: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C. 1.6 volumes Nitrogen/100 volumes water at 20°C.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on the effects of this gas mixture on plant and animal life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on the effects of this gas mixture on aquatic life.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not applicable.

DOT LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 125

MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Note: DOT 39 Cylinders ship in a strong outer carton (overpack). Pertinent shipping information goes on the outside of the overpack. DOT 39 Cylinders do not have transportation information on the cylinder itself.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas is considered as Dangerous Goods, per regulations of Transport Canada.

PROPER SHIPPING NAME: Compressed gases, n.o.s. ("Oxygen, Nitrogen") or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not Applicable

HAZARD LABEL: Class 2.2 (Non-Flammable Gas)

SPECIAL PROVISIONS: None

EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX: 0 12

ERAP INDEX: None

PASSENGER CARRYING SHIP INDEX: None

PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: 75

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 125

NOTE: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this gas mixture. 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. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

OTHER U.S. FEDERAL REGULATIONS:

- No component of this gas mixture is subject to the requirements of CFR 29 1910.1000 (under the 1989 PELs)
- Isobutylene is subject to the reporting requirements of Section 112(i) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 pounds.
- The regulations of the Process Safety Management of Highly Hazardous Chemicals are not applicable (29 CFR 1910.119)
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR Part 82)

15. REGULATORY INFORMATION (continued)

- Nitrogen and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Isobutylene is listed under this regulation in Table 3 as Regulated Substances (Flammable Substances), in quantities of 10,000 lbs (4,554 kg) or greater.

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.
California - Permissible Exposure Limits for Chemical Contaminants: Nitrogen.
Florida - Substance List: Oxygen, Isobutylene.
Illinois - Toxic Substance List: No.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Oxygen, Isobutylene.
Michigan - Critical Materials Register: No.
Minnesota - List of Hazardous Substances: No.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
Rhode Island - Hazardous Substance List: Oxygen, Nitrogen.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: : No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this gas mixture is on the California Proposition 65 lists.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

16. OTHER INFORMATION

INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommend recycling for scrap metal content. CALGAZ, LLC will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

MIXTURES: When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1 "Safe Handling of Compressed Gases in Containers"
AV-1 "Safe Handling and Storage of Compressed Gases"
"Handbook of Compressed Gases"

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
PO Box 3519, La Mesa, CA 91944-3519
619/670-0609
Fax on Demand: 1-800/231-1366



This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of CALGAZ, LLC's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.



Material Safety Data Sheet

MSDS ID NO.: 0117MAR019
Revision date: 07/25/2006

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product name: Marathon No. 2 Low Sulfur Fuel Oil Dyed 500 ppm Sulfur Max
Synonym: No. 2 Fuel Oil Dyed (0.05% Sulfur Max); No. 2 Fuel Oil Dyed 0.05% Sulfur Max; No. 2 NR 500 Fuel Oil Dyed; Fuel Oil No. 2, Non-Road Use, Dyed
Chemical Family: Petroleum Hydrocarbon
Formula: Mixture

Manufacturer:
Marathon Petroleum Company LLC
539 South Main Street
Findlay OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION/INFORMATION ON INGREDIENTS

No. 2 Fuel Oil is a complex mixture of paraffins, cycloparaffins, olefins and aromatic hydrocarbons having hydrocarbon chain lengths predominantly in the range of C11 through C20. May contain a trace amount of benzene (<0.01%). Can contain small amounts of red dye and additives (<0.15%) which are not considered hazardous at the concentrations used.

Product information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Marathon No. 2 Fuel Oil Dyed (0.05% Sulfur Max)	68476-30-2	100	= 100 mg/m ³ TWA vapor and aerosol, as total hydrocarbons skin - potential for cutaneous absorption (as total hydrocarbons)		

Component information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Saturated Hydrocarbons	Mixture	54-85			
Aromatic Hydrocarbons	Mixture	15-45			
Unsaturated Hydrocarbons	Mixture	1-6			
Naphthalene	91-20-3	0.1-0.5	Skin - potential significant contribution to overall exposure by the cutaneous route = 10 ppm TWA = 15 ppm STEL	= 10 ppm TWA = 50 mg/m ³ TWA = 15 ppm STEL = 75 mg/m ³ STEL	

Notes:

The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

EMERGENCY OVERVIEW

FUEL OIL IS A RED COLORED LIQUID. THIS PRODUCT IS CONSIDERED TO BE A COMBUSTIBLE LIQUID PER THE OSHA HAZARD COMMUNICATION STANDARD AND SHOULD BE KEPT AWAY FROM HEAT, FLAME AND SOURCES OF IGNITION. NEVER SIPHON THIS PRODUCT BY MOUTH. IF SWALLOWED, THIS PRODUCT MAY GET SUCKED INTO THE LUNGS (ASPIRATED) AND CAUSE LUNG DAMAGE OR EVEN DEATH. PROLONGED OR REPEATED SKIN CONTACT CAN CAUSE DEFATTING AND DRYING OF THE SKIN WHICH MAY PRODUCE SEVERE IRRITATION OR DERMATITIS.

OSHA WARNING LABEL:

**WARNING.
COMBUSTIBLE LIQUID.
ASPIRATION (INADVERTENT SUCTION) OF LIQUID INTO THE LUNGS CAN PRODUCE CHEMICAL PNEUMONIA
OR EVEN DEATH.
PRODUCES SKIN IRRITATION UPON PROLONGED OR REPEATED CONTACT.**

CONSUMER WARNING LABEL:

A CONSUMER WARNING LABEL IS NOT APPLICABLE FOR THIS PRODUCT.

Inhalation: Exposure to high vapor concentrations may produce headache, giddiness, vertigo, and anesthetic stupor.

Ingestion: Ingestion may result in nausea, vomiting, diarrhea and restlessness. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

Skin contact: Prolonged and repeated liquid contact can cause defatting and drying of the skin and can lead to irritation and/or dermatitis.

Eye contact: Produces little or no irritation on direct contact with the eye.

Carcinogenic Evaluation:

Product information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Marathon No. 2 Fuel Oil Dyed (0.05% Sulfur Max) 68476-30-2	NE		A3 - Animal Carcinogen (as total hydrocarbons)	

Notes: The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of diesel fuel/fuel oil in humans. IARC determined that there was limited evidence for the carcinogenicity of marine diesel fuel in animals. Distillate (light) diesel fuels were not classifiable as to their carcinogenicity to humans (Group 3A).

IARC has determined that there is sufficient evidence for the carcinogenicity in experimental animals of diesel engine exhaust and extracts of diesel engine exhaust particles. IARC determined that there is only limited evidence for the carcinogenicity in humans of diesel engine exhaust. However, IARC's overall evaluation has resulted in the IARC designation of diesel engine exhaust as probably carcinogenic to humans (Group 2A) because of the presence of certain engine exhaust components.

Component Information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Naphthalene 91-20-3	Monograph 82, 2002	Reasonably Anticipated To Be A Carcinogen Listed	A4 - Not Classifiable as a Human Carcinogen	Present

Notes: The International Agency for Research on Cancer (IARC) and the Environmental Protection Agency (EPA) have determined that naphthalene could be a possible human carcinogen.

4. FIRST AID MEASURES

Inhalation: If affected, move person to fresh air. If breathing is difficult, administer oxygen. If not breathing or if no heartbeat, give artificial respiration or cardiopulmonary resuscitation (CPR). Immediately call a physician. If symptoms or irritation occur with any exposure, call a physician.

Skin contact: Wash with soap and large amounts of water. Remove contaminated clothing. If symptoms or irritation occur, call a physician.

Ingestion: If swallowed, do not induce vomiting and do not give liquids. Immediately call a physician.

Eye contact: Flush eyes with large amounts of tepid water for at least 15 minutes. If symptoms or irritation occur, call a physician.

Medical conditions aggravated by exposure: Pre-existing skin conditions and respiratory disorders may be aggravated by exposures to components of this product.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: For small fires, Class B fire extinguishing media such as CO₂, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFT/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards: This product has been determined to be a combustible liquid per the OSHA Hazard Communication Standard and should be handled accordingly. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 128.

Special protective equipment for firefighters: Avoid using straight water streams. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Avoid excessive water spray application. Keep surrounding area cool with water spray from a distance and prevent further ignition of combustible material. Keep run-off water out of sewers and water sources.

Flash point: 130-190 F
Autoignition temperature: 637 F
Flammable limits in air - lower (%): 0.7
Flammable limits in air - upper (%): 5.0

NFPA rating: Health: 1
 Flammability: 2

HMIS classification: Health: 1
 Flammability: 2

Reactivity: 1
Other: -

Reactivity: 1
Special: *See Section 8 for guidance in selection of personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. Advise authorities and National Response Center (800-424-8802) if substance has entered a watercourse or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids.

7. HANDLING AND STORAGE

Handling: Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Avoid repeated and prolonged skin contact. Never siphon this product by mouth. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures: Local or general exhaust required when using at elevated temperatures that generate vapors or mists.

Respiratory protection: Use approved organic vapor chemical cartridge or supplied air respirators when material produces vapors that exceed permissible limits or excessive vapors are generated. Observe respirator protection factor criteria cited in ANSI Z88.2. Self-contained breathing apparatus should be used for fire fighting.

Skin and body protection: Neoprene, nitrile, polyvinyl alcohol (PVA), polyvinyl chloride and polyurethane gloves to prevent skin contact.

Eye protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields.

Hygiene measures: No special protective clothing is normally required. Select protective clothing depending on industrial operations. Use mechanical ventilation equipment that is explosion-proof.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Red Liquid
Physical state (Solid/Liquid/Gas):	Liquid
Substance type (Pure/Mixture):	Mixture
Color:	Red
Odor:	Slight Hydrocarbon
Molecular weight:	180
pH:	Neutral
Boiling point/range (5-95%):	400-640 F
Melting point/range:	No disponible.

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Decomposition temperature:	Not applicable.
Specific gravity:	Not determined
Density:	6.76 lbs/gal
Bulk density:	No data available.
Vapor density:	4-5
Vapor pressure:	1-10 mm Hg @ 100 F
Evaporation rate:	No data available.
Solubility:	Negligible
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	No data available.
VOC content(%):	10%
Viscosity:	1.9-3.4 @ 40 C

10. STABILITY AND REACTIVITY

Stability:	The material is stable at 70 F, 760 mm pressure.
Polymerization:	Will not occur.
Hazardous decomposition products:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
Materials to avoid:	Strong oxidizers such as nitrates, perchlorates, chlorine, fluorine.
Conditions to avoid:	Excessive heat, sources of ignition and open flames.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information:

Name	CAS Number	Inhalation:	Dermal:	Oral:
Marathon No. 2 Fuel Oil Dyed (0.05% Sulfur Max)	68476-30-2	>2 mg/l for 4 hr [Dog]	>5 ml/kg [Rabbit]	9-16 ml/kg [Rat]

Lifetime skin painting studies in animals with similar distillate fuels have produced weak to moderate carcinogenic activity following prolonged and repeated exposure. Similar middle distillates, when tested at nonirritating dose levels, did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not to dose. Repeated dermal application has produced severe irritation and systemic toxicity in subacute toxicity studies. Some components of this product, have been shown to produce a species specific, sex hormonal dependent kidney lesion in male rats from repeated oral or inhalation exposure. Subsequent research has shown that the kidney damage develops via the formation of a alpha-2μ-globulin, a mechanism unique to the male rat. Humans do not form alpha-2μ-globulin, therefore, the kidney effects resulting from this mechanism are not relevant in humans. Some components of this product were found to be positive in a few mutagenicity tests while negative in the majority of others. The exact relationship between these results and human health is not known.

Summary of health effect data on distillate fuel components:

This product may contain >0.1% naphthalene. Exposure to naphthalene at 30 ppm for two years caused lung tumors in female mice. Male mice with the same exposure did not develop tumors. Exposure to 10-60 ppm naphthalene for 2 years caused tumors in the tissue lining of the nose and respiratory tract in male and female rats. Oral administration of 133-267 mg/kg/day of naphthalene in mice for up to 90 days did not produce mortality, systemic toxicity, adversely affect organ or body weight or produce changes in blood. Repeated oral administration of naphthalene produced an anemia in dogs. Repeated intraperitoneal doses of naphthalene produced lung damage in mice. Repeated high doses of naphthalene has caused the formation of cataracts and retinotoxicity in the eyes of rats and rabbits due to accumulation of 1,2-naphthoquinone, a toxic metabolite. Effects in human eyes is uncertain and not well documented. Pregnant rats administered intraperitoneal doses of naphthalene during gestation gave birth to offspring that had delayed heart and bone development. Pregnant mice given near lethal doses of naphthalene showed no significant maternal toxicity and a reduction in the number of pups per litter, but no gross abnormalities in offspring. Suppressed spermatogenesis and progeny development have been reported in mice, rats and guinea pigs after exposure to high concentrations of naphthalene in their drinking water. Certain groups or individuals, i.e., infants, Semites, Arabs, Asians and Blacks, with a certain blood enzyme deficiency (glucose-6-phosphate dehydrogenase) are particularly susceptible to hemolytic agents and can rapidly develop hemolytic anemia and systemic poisoning from ingestion or inhalation of naphthalene.

Summary of health effect information on diesel engine exhaust:

Chronic inhalation studies of whole diesel engine exhaust in mice and rats produced a significant increase in lung tumors. Combustion of kerosine and/or diesel fuels produces gases and particulates which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur and hydrocarbons. Significant exposure to carbon monoxide vapors decreases the oxygen carrying capacity of the blood and may cause tissue hypoxia via formation of carboxyhemoglobin.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects:

Product can cause fouling of shoreline and may be harmful to aquatic life in low concentrations. The 96 hour LL50 values for an accomadated fraction (WAF) of fuel oil ranged from 3.2 to 65 mg/l in fish and 2-210 mg/l in invertebrates. EL50 values for inhibition of algal growth ranged from 1.8 to 2.9 mg/l for No. 2 fuel oil and from 10 to 78 mg/l for diesel fuel. This product does not concentrate or accumulate in the food chain. If released to soil and water, this product is expected to biodegrade under both aerobic and anaerobic conditions.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations:

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of an "characteristic" hazardous waste. This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name: Fuel Oil, No. 2
UN/identification No: NA 1993
Hazard Class: 3
Packing group: III
DOT reportable quantity (lbs): Not applicable.

TDG (Canada):

Proper shipping name: Fuel Oil, No. 2
UN/identification No: NA 1993
Hazard Class: 3
Packing group: III
Regulated substances: Not applicable.

15. REGULATORY INFORMATION

Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard: This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Naphthalene	NA

SARA Section 304: This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Naphthalene	= 0.454 kg final RQ = 1 lb final RQ = 100 lb final RQ = 45.4 kg final RQ

SARA Section 311/312: The following EPA hazard categories apply to this product:

Acute Health Hazard
Fire Hazard

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SARA Section 313:

This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Saturated Hydrocarbons	None
Aromatic Hydrocarbons	None
Unsaturated Hydrocarbons	None
Naphthalene	= 0.1 % de minimis concentration

State and Community Right-To-Know Regulations:

The following component(s) of this material are identified on the regulatory lists below:

Saturated Hydrocarbons

- Louisiana Right-To-Know: Not Listed
- California Proposition 65: Not Listed
- New Jersey Right-To-Know: Not Listed.
- Pennsylvania Right-To-Know: Not Listed.
- Massachusetts Right-To Know: Not Listed.
- Florida substance List: Not Listed.
- Rhode Island Right-To-Know: Not Listed
- Michigan critical materials register list: Not Listed.
- Massachusetts Extraordinarily Hazardous Substances: Not Listed
- California - Regulated Carcinogens: Not Listed
- Pennsylvania RTK - Special Hazardous Substances: Not Listed
- New Jersey - Special Hazardous Substances: Not Listed
- New Jersey - Environmental Hazardous Substances List: Not Listed
- Illinois - Toxic Air Contaminants Not Listed
- New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed

Aromatic Hydrocarbons

- Louisiana Right-To-Know: Not Listed
- California Proposition 65: Not Listed
- New Jersey Right-To-Know: Not Listed.
- Pennsylvania Right-To-Know: Not Listed.
- Massachusetts Right-To Know: Not Listed.
- Florida substance List: Not Listed.
- Rhode Island Right-To-Know: Not Listed
- Michigan critical materials register list: Not Listed.
- Massachusetts Extraordinarily Hazardous Substances: Not Listed
- California - Regulated Carcinogens: Not Listed
- Pennsylvania RTK - Special Hazardous Substances: Not Listed
- New Jersey - Special Hazardous Substances: Not Listed
- New Jersey - Environmental Hazardous Substances List: Not Listed
- Illinois - Toxic Air Contaminants Not Listed
- New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed

Unsaturated Hydrocarbons

- Louisiana Right-To-Know: Not Listed
- California Proposition 65: Not Listed
- New Jersey Right-To-Know: Not Listed.
- Pennsylvania Right-To-Know: Not Listed.

Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Listed
New Jersey Right-To-Know:	Listed
Pennsylvania Right-To-Know:	Listed
Massachusetts Right-To Know:	Listed
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Listed
Illinois - Toxic Air Contaminants	Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Listed

Canadian Regulatory Information:

Canada DSL/NDL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Naphthalene	B4, D2A	1 %

16. OTHER INFORMATION

Additional Information: No data available.

Prepared by: Craig M. Parker Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Petroleum Company LLC (MPC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage may be required. MPC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.



Material Safety Data Sheet

MSDS ID NO.: 0127MAR019
Revision date: 07/20/2006

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product name: Marathon Regular Unleaded Gasoline
Synonym: Conventional Regular Unleaded Gasoline
Chemical Family: Petroleum Hydrocarbon
Formula: Mixture

Manufacturer:
Marathon Petroleum Company LLC
539 South Main Street
Findlay OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION/INFORMATION ON INGREDIENTS

Gasoline is a complex combination of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having carbon numbers predominantly greater than C3 and boiling in the range of 85-500 F. Can contain small amounts of dye and other additives (>0.02%) which are not considered hazardous at the concentrations used.

Product information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Marathon Regular Unleaded Gasoline	86290-81-5	100	300 ppm TWA; 500 ppm STEL		

Component Information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Saturated Hydrocarbons	Mixture	55-85			
Aromatic Hydrocarbons	Mixture	10-40			
Unsaturated Hydrocarbons	Mixture	1-15			
Toluene	108-88-3	1-15	= 50 ppm TWA skin - potential for cutaneous absorption	= 100 ppm TWA = 150 ppm STEL = 375 mg/m ³ TWA = 560 mg/m ³ STEL	
Xylene	1330-20-7	2-10	= 100 ppm TWA = 150 ppm STEL	= 100 ppm TWA = 150 ppm STEL = 435 mg/m ³ TWA = 655 mg/m ³ STEL	
1,2,4-Trimethylbenzene	95-63-6	1-5	= 25 ppm TWA	= 125 mg/m ³ TWA = 25 ppm TWA	
Benzene	71-43-2	0.5-3.5	= 0.5 ppm TWA = 2.5 ppm STEL skin - potential for cutaneous absorption	= 10 ppm TWA unless specified in 1910.1028 = 25 ppm Ceiling unless specified in 1910.1028 = 50 ppm STEL 10 min, unless specified in 1910.1028	OSHA Exposure Limit as specified in 1910.1028: = 1.0 ppm TWA = 5 ppm STEL = 0.5 ppm Action Level
Hexane	110-54-3	0-3	= 1000 ppm STEL = 50 ppm TWA = 500 ppm TWA skin - potential for cutaneous absorption		
Ethyl Benzene	100-41-4	0.5-2.0	= 100 ppm TWA = 125 ppm STEL	= 100 ppm TWA = 125 ppm STEL = 435 mg/m ³ TWA = 545 mg/m ³ STEL	
Naphthalene	91-20-3	0.1-0.5	Skin - potential significant contribution to overall exposure by the cutaneous route = 10 ppm TWA = 15 ppm STEL	= 10 ppm TWA = 50 mg/m ³ TWA = 15 ppm STEL = 75 mg/m ³ STEL	

Notes:

The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

EMERGENCY OVERVIEW

GASOLINE IS A CLEAR OR COLORED LIQUID WITH A STRONG HYDROCARBON ODOR. IT IS A VOLATILE AND EXTREMELY FLAMMABLE LIQUID THAT MAY CAUSE FLASH FIRES. KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME. THIS PRODUCT CONTAINS BENZENE WHICH MAY CAUSE CANCER OR BE TOXIC TO BLOOD-FORMING ORGANS. CONTAINS MATERIAL THAT HAS CAUSED CANCER BASED ON ANIMAL DATA. NEVER SIPHON THIS PRODUCT BY MOUTH. IF SWALLOWED, THIS PRODUCT MAY GET SUCKED INTO THE LUNGS (ASPIRATED) AND CAUSE LUNG DAMAGE OR EVEN DEATH.

OSHA WARNING LABEL:

**DANGER!
EXTREMELY FLAMMABLE.**

ASPIRATION (INADVERTENT SUCTION) OF LIQUID INTO THE LUNGS CAN PRODUCE CHEMICAL PNEUMONIA OR EVEN DEATH.

**CONTAINS BENZENE WHICH MAY CAUSE CANCER OR BE TOXIC TO BLOOD-FORMING ORGANS.
CONTAINS MATERIAL THAT HAS CAUSED CANCER BASED ON ANIMAL DATA.**

CONSUMER WARNING LABEL:**GASOLINE HEALTH AND SAFETY WARNING STATEMENT:**

**EXTREMELY FLAMMABLE, VAPORS MAY EXPLODE.
HARMFUL OR FATAL IF SWALLOWED.
LONG TERM EXPOSURE TO VAPORS HAS CAUSED CANCER IN LABORATORY ANIMALS.
KEEP FACE AWAY FROM NOZZLE WHILE FILLING.
KEEP NOZZLE AWAY FROM EYES AND SKIN.
NEVER SIPHON BY MOUTH.
DON'T OVERFILL TANK.
FOR USE AS A MOTOR FUEL ONLY.**

STATIC ELECTRICITY, SPARK EXPLOSION, ELECTRONIC DEVICES WARNING:

**DO NOT GET BACK IN YOUR VEHICLE WHILE REFUELING.
RE-ENTRY COULD CAUSE STATIC ELECTRICITY BUILD UP.
USE APPROVED CONTAINER.
PUT CONTAINER ON GROUND (NEVER ON OR IN A VEHICLE).
KEEP NOZZLE IN CONTACT WITH CONTAINER.
KEEP CELLULAR PHONES OR OTHER DEVICES IN YOUR VEHICLE DURING REFUELING.**

Inhalation:

Exposure to vapor concentrations of gasoline exceeding 1,000 ppm can cause respiratory irritation, headache, dizziness, nausea and loss of coordination. Higher concentrations may cause loss of consciousness, cardiac sensitization, coma and death resulting from respiratory failure. Intentional overexposure to high concentrations of product vapors (such as huffing) can cause nervous system and brain damage, convulsions and sudden death from cardiac arrest.

Ingestion:

Ingestion may result in nausea, vomiting, diarrhea and restlessness. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

Skin contact:

Prolonged and repeated liquid contact can cause defatting and drying of the skin and can lead to irritation and/or dermatitis.

Eye contact:

Eye irritation may result from contact with the liquid or exposure to the vapor at concentrations above the TLV.

Carcinogenic Evaluation:**Product Information:**

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Marathon Regular Unleaded Gasoline 86290-81-5	A2 - Possible Human Carcinogen		A3 - Animal Carcinogen	

Notes:

The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of gasoline in humans. IARC determined that limited evidence of carcinogenicity in animals exists. IARC's overall evaluation of gasoline, in spite of limited carcinogenicity evidence, has resulted in the IARC designation of gasoline as possibly carcinogenic to humans (Group 2B) because gasoline contains benzene.

IARC has determined that there is inadequate evidence for the carcinogenicity of gasoline engine exhaust in humans or animals. However, IARC's overall evaluation on gasoline engine exhaust, in spite of the absence of carcinogenicity data, has resulted in the IARC designation of gasoline engine exhaust as possibly carcinogenic to humans (Group 2B) because of the presence of certain engine exhaust components.

Component Information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Toluene 108-88-3			A4 - Not Classifiable as a Human Carcinogen	
Xylene 1330-20-7			A4 - Not Classifiable as a Human Carcinogen	
Benzene 71-43-2	Supplement 7, 1987; Monograph 29, 1982	Known Carcinogen Reasonably Anticipated To Be A Carcinogen	A1 - Confirmed Human Carcinogen	Present
Ethyl Benzene 100-41-4	Monograph 77, 2000		A3 - Animal Carcinogen	
Naphthalene 91-20-3	Monograph 82, 2002	Reasonably Anticipated To Be A Carcinogen Listed	A4 - Not Classifiable as a Human Carcinogen	Present

Notes:

The International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), and OSHA have determined that there is sufficient evidence for the carcinogenicity of benzene in humans (Group 1A).

The International Agency for Research on Cancer (IARC) has concluded that ethyl benzene is possibly carcinogenic to humans (Group 2B).

The International Agency for Research on Cancer (IARC) and the Environmental Protection Agency (EPA) have determined that naphthalene could be a possible human carcinogen.

4. FIRST AID MEASURES

Inhalation:

If affected, move person to fresh air. If breathing is difficult, administer oxygen. If not breathing or if no heartbeat, give artificial respiration or cardiopulmonary resuscitation (CPR). Immediately call a physician. If symptoms or irritation occur with any exposure, call a physician.

Skin contact:

Wash with soap and large amounts of water. Remove contaminated clothing. If symptoms or irritation occur, call a physician.

Ingestion: If swallowed, do not induce vomiting and do not give liquids. Immediately call a physician.

Eye contact: Flush eyes with large amounts of tepid water for at least 15 minutes. If symptoms or irritation occur, call a physician.

Medical conditions aggravated by exposure: Pre-existing eye, skin, respiratory, liver and/or kidney disorders may be aggravated by exposure to components of this product.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: For small fires, Class B fire extinguishing media such as CO₂, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFT/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards: This product has been determined to be a flammable liquid per the OSHA Hazard Communication Standard, and should be handled accordingly. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 128.

Special protective equipment for firefighters: Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Flash point: -50
Autoignition temperature: CA 495 F
Flammable limits in air - lower (%): 1.4
Flammable limits in air - upper (%): 7.6

NFPA rating:

Health: 1
 Flammability: 3
 Reactivity: 0
 Other: -

HMS classification:

Health: 1
 Flammability: 3
 Reactivity: 0
 Special: *See Section 8 for guidance in selection of personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. Advise authorities and National Response Center (800-424-8802) if substance has entered a watercourse or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids.

7. HANDLING AND STORAGE

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with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on containers since they may contain explosive residues. Avoid skin contact. Exercise good personal hygiene and removal of soiled clothing and prompt washing with soap and water.

as a motor fuel only. Product should never be used as a solvent due to its flammable and potentially toxic vapors. Siphoning by mouth can result in lung aspiration which can be harmful or fatal.

containers of 12 gallons (45 liters) or less should never be filled while they are in or on a motor vehicle or marine engine. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. Containers should be placed on the ground. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers. A buildup of static electricity can occur upon re-entry into the vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of synthetic fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling. Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures:	Local or general exhaust required in an enclosed area or when there is inadequate ventilation.
Respiratory protection:	Approved organic vapor chemical cartridge or supplied air respirators should be worn for exposures to any components exceeding the TLV or STEL. Observe respirator protection factor criteria cited in ANSI Z88.2. Self-contained breathing apparatus should be used for fire fighting.
Hand and body protection:	Use nitrile rubber, viton or PVA gloves for repeated or prolonged skin exposure.
Eye protection:	No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields.
Hygiene measures:	No special protective clothing is normally required. Select protective clothing depending on industrial operations. Use mechanical ventilation equipment that is explosion-proof.

PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear Or Colored Liquid
Physical state (Solid/Liquid/Gas):	Liquid
Appearance type (Pure/Mixture):	Mixture
Color:	Clear or Colored
Specific gravity:	Strong Hydrocarbon
Molecular weight:	100
Boiling point/temperature (5-95%):	Neutral
Freezing point/temperature:	90-437 F
Flash point/temperature:	Not determined.
Autoignition temperature:	Not applicable.
Density:	0.70-0.77

NO.: 0127MAR019

Product name: Marathon Regular Unleaded Gasoline

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Density:	5.9-6.3 lbs/gal
Bulk density:	No data available.
Vapor density:	3-4
Vapor pressure:	Not determined.
Evaporation rate:	No data available.
Solubility:	Negligible
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	2.13-4.5
VOC content(%):	100%
Viscosity:	No data available.

10. STABILITY AND REACTIVITY

Stability:	The material is stable at 70 F, 760 mm pressure.
Polymerization:	Will not occur.
Hazardous decomposition products:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
Materials to avoid:	Strong oxidizers such as nitrates, chlorates, peroxides.
Conditions to avoid:	Excessive heat, sources of ignition, open flame.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information:

Name	CAS Number	Inhalation:	Dermal:	Oral:
Marathon Regular Unleaded Gasoline	88290-81-5	>10,000 ppm [Dog]	>5 ml/kg [Rabbit]	>14 ml/kg [Rat]

Lifetime inhalation studies with full vaporized gasoline (67, 292 and 2,056 ppm) produced kidney damage and kidney tumors in male rats but not in female rats or male and female mice. Female mice developed a slightly higher incidence of liver tumors compared to controls at the highest exposure level. Results from separate studies with compounds producing similar effects, i.e., 1,4-dichlorobenzene and perchloroethylene, have shown that the kidney damage and kidney tumors develop via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not form alpha-2u-globulin, therefore, tumors resulting from this mechanism are not relevant in humans. The biologic significance of the mouse liver tumor response with regard to human health risk is questionable.

Summary of health effect information on gasoline engine exhaust:

Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs. Combustion of gasoline produces gases and particulates which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur and hydrocarbons. Significant exposure to carbon monoxide vapors decreases the oxygen carrying capacity of the blood and may cause tissue hypoxia via formation of carboxyhemoglobin. Overexposure to CO can cause headache, nausea, nervous system depression, coma and death.

Summary of health effect data on gasoline components:

This product may contain benzene at a level of >0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

This product contains >0.1% ethyl benzene (EB). Rats and mice exposed to 750 ppm EB for 6 hours/day, 5 days/week for two years developed kidney tumors in male and female rats and lung tumors in male mice and liver tumor in female mice.

This product contains >0.1% naphthalene. Exposure to naphthalene at 30 ppm for two years caused lung tumors in female mice. Male mice with the same exposure did not develop tumors. Exposure to 10-60 ppm naphthalene for 2 years caused tumors in the tissue lining of the nose and respiratory tract in male and female rats. Oral administration of 133-267 mg/kg/day of naphthalene in mice for up to 90 days did not produce mortality, systemic toxicity, adversely affect organ or body weight or produce changes in blood. Repeated oral administration of naphthalene produced an anemia in dogs. Repeated intraperitoneal doses of naphthalene produced lung damage in mice. Repeated high doses of naphthalene has caused the formation of cataracts and retinotoxicity in the eyes of rats and rabbits due to accumulation of 1,2-naphthoquinone, a toxic metabolite. Effects in human eyes is uncertain and not well documented. Pregnant rats administered intraperitoneal doses of naphthalene during gestation gave birth to offspring that had delayed heart and bone development. Pregnant mice given near lethal doses of naphthalene showed no significant maternal toxicity and a reduction in the number of pups per litter, but no gross abnormalities in offspring. Suppressed spermatogenesis and progeny development have been reported in mice, rats and guinea pigs after exposure to high concentrations of naphthalene in their drinking water. Certain groups or individuals, i.e., infants, Semites, Arabs, Asians and Blacks, with a certain blood enzyme deficiency (glucose-6-phosphate dehydrogenase) are particularly susceptible to hemolytic agents and can rapidly develop hemolytic anemia and systemic poisoning from ingestion or inhalation of naphthalene.

This product may contain hexane at a level of >1.0%. Studies in laboratory animals have produced systemic toxicity in blood, spleen and lungs. Fetotoxicity has been observed at hexane concentrations that produced maternal toxicity. Long term exposure to high concentrations of hexane has been shown to cause testicular effects and nervous system damage.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects:

Product can cause fouling of shoreline and may be harmful to aquatic life in low concentrations. This product does not concentrate or accumulate in the food chain.

The aquatic toxicity of gasoline is as follows:

Freshwater Toxicity:

LD50 is 8 ppm at 96 hours in bluegill.
TLM is 90 ppm at 24 hours in juvenile shad.

Saltwater Toxicity:

LC50 is 2 ppm at 96 hours in mullet.
LD50 is 1.5 ppm at 96 hours in grass shrimp.
LC50 is 2 ppm at 96 hours in menhaden.
TLM is 91 ppm at 24 hours in juvenile shad.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations:

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of a "characteristic" hazardous waste. This product could also contain benzene at >0.5 ppm and could exhibit the characteristics of "toxicity" as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name:	Gasoline
UN/identification No:	UN 1203
Hazard Class:	3
Packing group:	II
DOT reportable quantity (lbs):	Not applicable.

TDG (Canada):

Proper shipping name:	Gasoline
UN/identification No:	UN 1203
Hazard Class:	3
Packing group:	II
Regulated substances:	Not applicable.

15. REGULATORY INFORMATION

Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard:

This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Toluene	NA
Xylene	NA
1,2,4-Trimethylbenzene	NA
Benzene	NA
Hexane	NA
Ethyl Benzene	NA
Naphthalene	NA

SARA Section 304: This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Toluene	= 0.454 kg final RQ = 1 lb final RQ = 10 lb final RQ = 100 lb final RQ = 1000 lb final RQ = 4.54 kg final RQ = 45.4 kg final RQ = 454 kg final RQ
Xylene	= 100 lb final RQ = 45.4 kg final RQ
1,2,4-Trimethylbenzene	NA
Benzene	= 0.454 kg final RQ = 0.454 kg statutory RQ = 1 lb final RQ = 1 lb statutory RQ = 10 lb final RQ = 100 lb final RQ = 4.54 kg final RQ = 45.4 kg final RQ = 10 lb final RQ receives an adjustable RQ of 10 lbs based on potential carcinogenicity in August 14, 1989 final rule = 4.54 kg final RQ receives an adjustable RQ of 10 lbs based on potential carcinogenicity in August 14, 1989 final rule
Hexane	= 2270 kg final RQ = 5000 lb final RQ
Ethyl Benzene	= 100 lb final RQ = 1000 lb final RQ = 45.4 kg final RQ = 454 kg final RQ
Naphthalene	= 0.454 kg final RQ = 1 lb final RQ = 100 lb final RQ = 45.4 kg final RQ

SARA Section 311/312: The following EPA hazard categories apply to this product:

- Acute Health Hazard
- Chronic Health Hazard
- Fire Hazard

SARA Section 313:

This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Saturated Hydrocarbons	None
Aromatic Hydrocarbons	None
Unsaturated Hydrocarbons	None
Toluene	= 1.0 percent de minimis concentration
Xylene	= 1.0 percent de minimis concentration
1,2,4-Trimethylbenzene	= 1.0 percent de minimis concentration
Benzene	= 0.1 percent de minimis concentration
Hexane	= 1.0 percent de minimis concentration
Ethyl Benzene	= 0.1 percent de minimis concentration
Naphthalene	= 0.1 % de minimis concentration

State and Community Right-To-Know Regulations:

The following component(s) of this material are identified on the regulatory lists below:

Saturated Hydrocarbons

- Louisiana Right-To-Know: Not Listed
- California Proposition 65: Not Listed
- New Jersey Right-To-Know: Not Listed.
- Pennsylvania Right-To-Know: Not Listed.
- Massachusetts Right-To Know: Not Listed.
- Florida substance List: Not Listed.
- Rhode Island Right-To-Know: Not Listed
- Michigan critical materials register list: Not Listed.
- Massachusetts Extraordinarily Hazardous Substances: Not Listed
- California - Regulated Carcinogens: Not Listed
- Pennsylvania RTK - Special Hazardous Substances: Not Listed
- New Jersey - Special Hazardous Substances: Not Listed
- New Jersey - Environmental Hazardous Substances List: Not Listed
- Illinois - Toxic Air Contaminants: Not Listed
- New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed

Aromatic Hydrocarbons

- Louisiana Right-To-Know: Not Listed
- California Proposition 65: Not Listed
- New Jersey Right-To-Know: Not Listed.
- Pennsylvania Right-To-Know: Not Listed.
- Massachusetts Right-To Know: Not Listed.
- Florida substance List: Not Listed.
- Rhode Island Right-To-Know: Not Listed
- Michigan critical materials register list: Not Listed.
- Massachusetts Extraordinarily Hazardous Substances: Not Listed
- California - Regulated Carcinogens: Not Listed
- Pennsylvania RTK - Special Hazardous Substances: Not Listed
- New Jersey - Special Hazardous Substances: Not Listed
- New Jersey - Environmental Hazardous Substances List: Not Listed
- Illinois - Toxic Air Contaminants: Not Listed
- New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed

Unsaturated Hydrocarbons

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Toluene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	developmental toxicity; initial date 1/1/91
New Jersey Right-To-Know:	sn 1866
Pennsylvania Right-To-Know:	environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic, Flammable; skin
Michigan critical materials register list:	Annual usage threshold = 100 pounds
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 1866
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 1,000 lbs Air RQ

Xylene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	sn 2014
Pennsylvania Right-To-Know:	environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic, Flammable
Michigan critical materials register list:	Annual usage threshold = 100 pounds (all isomers)
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree

New Jersey - Environmental Hazardous Substances List:	SN 2014
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 1,000 lbs Air RQ
1,2,4-Trimethylbenzene	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	sn 1929 sn 2716
Pennsylvania Right-To-Know:	[present] environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	SN 2716
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed
Benzene	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	carcinogen; initial date 2/27/87 developmental toxicity; initial date 12/26/97 male reproductive toxicity; initial date 12/26/97 sn 0197
New Jersey Right-To-Know:	environmental hazard; special hazardous substance
Pennsylvania Right-To-Know:	Carcinogen; Extraordinarily hazardous
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Toxic, Flammable, Carcinogen; skin
Rhode Island Right-To-Know:	Annual usage threshold = 100 pounds
Michigan critical materials register list:	carcinogen; extraordinarily hazardous
Massachusetts Extraordinarily Hazardous Substances:	
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	[present]
New Jersey - Special Hazardous Substances:	carcinogen; flammable - third degree; mutagen
New Jersey - Environmental Hazardous Substances List:	SN 0197
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 10 lbs Air RQ
Hexane	
Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed

Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Ethyl Benzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	sn 0851
Pennsylvania Right-To-Know:	environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic, Flammable
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0851
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 1,000 lbs Air RQ

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Listed
New Jersey Right-To-Know:	Listed
Pennsylvania Right-To-Know:	Listed
Massachusetts Right-To Know:	Listed
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Listed
Illinois - Toxic Air Contaminants	Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Listed

Canadian Regulatory Information:

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Toluene	B2; D2A	1% (English Item 1578, French Item 1622)
Xylene	B2; D2A; D2B	
1,2,4-Trimethylbenzene	B3	0.1% (English Item 1640, French Item 1684) 1% (English Item 1638, French Item 1682)
Benzene	B2; D2A	0.1% (English Item 153, French Item 277)
Ethyl Benzene	B2; D2A; D2B	0.1% (English Item 697, French Item 854)
Naphthalene	B4, D2A	1 %

16. OTHER INFORMATION

Additional Information: No data available.

Prepared by: Craig M. Parker Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Petroleum Company LLC (MPC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. MPC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

MSDS SUMMARY SHEET

Manufacturer:

Name: PHILLIPS PETROLEUM COMPANY

Address 1:

Address 2:

Address 3:

CSZ: BARTLESVILLE State: OK **Zipcode:** 74004

Emergency phone: (800) 424-9300

Business phone: 800-762-0942

Product:

Ferndale MSDS#: 1354 **Version # :** 6

Manufacturer MSDS#: 0041

Current? : 2002

Name:

NO. 2 DIESEL FUEL

Synonyms:

CARB Diesel TF3

CARB Diesel

CARB Diesel 10%

Diesel Fuel Oil

EPA Low Sulfur Diesel Fuel

EPA Low Sulfur Diesel Fuel – Dyed

EPA Off Road High Sulfur Diesel – Dyed

Fuel Oil No. 2 – CAS # 68476-30-2

No. 2 Diesel Fuel Oil

No. 2 Fuel Oil – Non Hiway – Dyed

No. 2 High Sulfur Diesel – Dyed

No. 2 Low Sulfur Diesel - Dyed

No. 2 Low Sulfur Diesel - Undyed

Crude column 3rd IR

Crude column 3rd side cut

Atmospheric tower 3rd side cut

Ultra Low Sulfur Diesel No. 2

Finished Diesel

DHT Reactor Feed

Straight Run Diesel

Diesel

Middle Distillate

Product/Catalog Numbers:

MSDS Date: 01/01/2002 (received: 01/14/2002)

NFPA codes:

Health: 0 **Flammability:** 2 **Reactivity:** 0

**MATERIAL SAFETY DATA SHEET
No. 2 Diesel Fuel**

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: No. 2 Diesel Fuel
Product Code: Multiple
SAP Code:
Synonyms: 1354
CARB Diesel TF3
CARB Diesel
CARB Diesel 10%
Diesel Fuel Oil
EPA Low Sulfur Diesel Fuel
EPA Low Sulfur Diesel Fuel – Dyed
EPA Off Road High Sulfur Diesel – Dyed
Fuel Oil No. 2 – CAS # 68476-30-2
No. 2 Diesel Fuel Oil
No. 2 Fuel Oil – Non Hiway – Dyed
No. 2 High Sulfur Diesel – Dyed
No. 2 Low Sulfur Diesel – Dyed
No. 2 Low Sulfur Diesel – Undyed
No. 2 Ultra Low Sulfur Diesel – Dyed
No. 2 Ultra Low Sulfur Diesel – Undyed
Intended Use: Fuel
Chemical Family:
Responsible Party: Phillip's Petroleum Company
Bartlesville, Oklahoma 74004

For Additional MSDSs: 800-762-0942

Technical Information:

The intended use of this product is indicated above. If any additional use is known, please contact us at the Technical Information number listed.

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:

Spill, Leak, Fire or Accident

California Poison Control System: 800-356-3120

Call CHEMTREC

North America: (800) 424-9300

Others: (703) 527-3887 (collect)

Health Hazards/Precautionary Measures: Causes severe skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Do not taste or swallow. Wash thoroughly after handling.

Physical Hazards/Precautionary Measures: Flammable liquid and vapor. Keep away from heat, sparks, flames, static electricity or other sources of ignition.

Appearance: Straw-colored to dyed red
Physical Form: Liquid
Odor: Characteristic petroleum

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Immediately remove contaminated shoes, clothing, and constrictive jewelry and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek immediate medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops, seek immediate medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard; Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

5. FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: >125°F/>52°
OSHA Flammability Class: Combustible liquid
LEL %: 0.3 / UEL %: 10.0
Autoignition Temperature: 500°F/260°C

Unusual Fire & Explosion Hazards: This material is flammable and can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors (see Section 5). Spilled material may be absorbed into an appropriate material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharged. The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-704 and/or API RP 2003 for specific bonding/grounding requirements.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames. Use good personal hygiene practices.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing or high pressure hydraulic oil equipment.

“Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. “Empty” drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSIZ49.1 and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area “No Smoking or Open Flame.” Store only in approved containers. Keep away from incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentration below the established exposure limits (see Section 2), additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrants a respirator's use.

Skin: The use of gloves impervious to the specific material handled is advised to prevent skin contact, possible irritation and skin damage (see glove manufacturer literature for information on permeability). Depending on conditions of use, apron and/or arm covers may be necessary.

Eyes/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse. It is recommended that impervious clothing be worn when skin contact is possible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1atm).

Appearance: Straw-colored to dyed red
Physical State: Liquid
Odor: Characteristic petroleum
pH: unavailable
Vapor Pressure (mm Hg): 0.40
Vapor Density (air=1): >3
Boiling Point/Range: 320-700°F /160-371°C
Freezing/Melting Point: No Data
Solubility in Water: Negligible
Specific Gravity: 0.81-0.88 @ 60°F
Percent Volatile: Negligible
Evaporation Rate (nBuAc=1): <1
Viscosity: 32.6-40.0 SUS @ 100°F
Bulk Density: 7.08 lbs/gal
Flash Point: >125°F / >52°C
Flammable/Explosive Limits (%): LEL: 0.3 / UEL: 10.0

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Flammable liquid and vapor. Vapor can cause flash fire.

Conditions To Avoid: Avoid all possible sources of ignition (see Sections 5 and 7).

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc.

Hazardous Decomposition Products: The use of hydrocarbon fuels in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels. ACGIH has included a TLV of 0.05 mg/m³ TWA for diesel exhaust particulate on its 1999 Notice of Intended Changes. See Section 11 for additional information on hazards of engine exhaust.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Diesel Fuel No. 2 (CAS# 68476-34-6)

Carcinogenicity: Chronic dermal application of certain middle distillate streams contained in diesel fuel No. 2 resulted in an increased incidence of skin tumors in mice. This material has not been identified as carcinogen by NTP, IARC, or OSHA. Diesel exhaust is a probable cancer hazard based on tests with laboratory animals.

Target Organ(s): Limited evidence of renal impairment has been noted from a few case reports involving excessive exposure to diesel fuel No. 2.

Naphthalene (CAS# 91-20-3)

Carcinogenicity: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has not been identified as a carcinogen by IARC or OSHA.

12. ECOLOGICAL INFORMATION

Not evaluated at this time

13. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, would be a RCRA "characteristic" hazardous waste due to the characteristic(s) of ignitability (D001) and benzene (D018). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this material, once it becomes a waste, is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container insate? could be considered a RCRA hazardous waste and must be disposed of with care and in compliance with federal, state and local regulations. Large empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller containers, consult with state and local regulations and disposal authorities.

14. TRANSPORT INFORMATION

DOT Shipping Description: Diesel Fuel, NA 1983
Non-Bulk Package Marking: Diesel Fuel, 3, NA 1993, III

15. REGULATORY INFORMATION

EPA SARA 311/312 (Title III Hazard Categories):

Acute Health: Yes
Chronic Health: Yes
Fire Hazard: Yes
Pressure Hazard: No
Reactive Hazard: No

SARA 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Component	CAS Number	Weight %
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-- None known --

California Proposition 65:

Warning: This material contains the following chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Effect
Benzene	Cancer, Developmental and Reproductive Toxicant
Toluene	Developmental Toxicant

Diesel engine exhaust, while not a component of this material, is on the Proposition 65 list of chemicals known to the State of California to cause cancer.

Carcinogen Identification:

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any. Diesel exhaust is a probable cancer hazard based on tests in laboratory animals. It has been identified as carcinogen by IARC.

EPA (CERCLA Reportable Quantity): None

16. OTHER INFORMATION

Issue Date: 01/01/02
Previous Issue Date: 05/15/01
Product Code: Multiple
Revised Sections: None
Previous Product Code: Multiple
MSDS Number: 0041

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Data Safety Sheet is based on data believed to be accurate as of the date this Material Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THE PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Tosco Refining Company

Ferndale Refinery

UltraLow Sulfur Diesel Product Specification

Ferndale Product Code:34380xx (5) Product Code: ULSD2

(COMETS)

Specification	Unit	Limit	Test Procedure	Typical
Appearance Water & Sediment Color Haze Rating	Vol % Number Rating	0.05 Max 3.0 Max 2 Max	D 2709 D 1500 D 4176	
Composition Carbon Residue (Ramsbottom)	Wt %	0.35 Max	D 524, D 189	
Volatility 90% Recovered Flash Point Gravity	Deg; F Deg; F Deg; F API	540 Min 640 Min 125 Min (1) 30 Min	D 86 D 86 D 93 D 287, D4052	130 F
Fluidity Pour Point Cloud Point Viscosity @ 104F	Deg; F Deg; F cSt cSt	See Season Table (6) See Season Table (6) 1.9 Min 4.1 Max	D 97 D 2500 D 445 D 445	10 F
Lubricity, SLBOCLE	grams	3100 Min	D 6078	3300gm
Lubricity, HFRR	mm	.45	D 6079	
Combustion Cetane Index or Cetane Number (3,4)	Number	40.0 Min	D 976, D613	47.0
Corrosion Copper Strip, 3hr @ 50 deg C	Number	3 Max (2)	D 130	
Aromatics (4)	Vol %	35 Max	D 1319	25 %
Contaminants Total Sulfur Water & Sediment Ash	PPM Vol % Wt %	30 Max 0.05 Max 0.01 Max	D 2622, D4294 D 1796 D 482	15-20ppm
Additives Cetane Improver Dye	Lb/MBbl	675 Max Undyed		

1. Minimum release specification is 125 deg. F. The refinery should target 135 deg. F.
2. Test result reported as a number and letter (e.g. 1a). Any letter is allowable as long as the number meets the spec shown.
3. Either specification must be met.
4. Either cetane index minimum or aromatics maximum must be met.
5. Winter cloud and pour specifications may be relaxed to the summer specifications by agreement with the customer.
6. Season Table

Month	Product Code	Pour Point	Cloud Point
Jan, Feb, Nov, Dec	WI	0 max (5)	14 max (5)
Mar - Oct	SU	15 max	24 max

ALCONOX MSDS

Section 1: PRODUCT INFORMATION

Chemical family: Detergent.

Product name: Alconox

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency 800-255-3924.
phone number: 813-248-0585 (outside of the United States).

Supplier: Same as manufacturer.

TDG classification: Not regulated.

WHMIS classification:

D2B



DSL status: The supplier has certified that all substances in this product appear on the domestic substances list.

Supplier MSDS date: 2005/03/09

Section 2: HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE

7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL	NOT AVAILABLE
				3100 MG/KG MOUSE ORAL	
				>4640 MG/KG RABBIT DERMAL	

Section 2A: ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
 CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
 CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3: PHYSICAL DATA

Physical state: Solid
Appearance & odor: Almost odourless.
 White granular powder.
Odor threshold (ppm): Not available.
Vapour pressure (mmHg): Not applicable.
Vapour density (air=1): Not applicable.
By weight: Not available.
Evaporation rate (butyl acetate = 1): Not applicable.
Boiling point (°C): Not applicable.
Freezing point (°C): Not applicable.
pH: (1% aqueous solution).
 9.5
Specific gravity @ 20 °C: (water = 1).
 0.85 - 1.10
Solubility in water (%): 100 - > 10% w/w
Coefficient of water\oil dist.: Not available.
VOC: None

Section 4: FIRE & EXPLOSION DATA

Flammability: Not flammable.
Conditions of flammability: Surrounding fire.
Extinguishing media: Carbon dioxide, dry chemical, foam.
 Water
 Water fog.
Special procedures: Self-contained breathing apparatus required.
 Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Explosion Data

Sensitivity to static discharge: Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Explosive power: None

Section 5: REACTIVITY DATA

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 6: TOXICOLOGICAL PROPERTIES

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of acute exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Exposure limit of material: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.
Teratogenicity: Not available.
Mutagenicity: Not available.
Synergistic materials: Not available.
Medical conditions aggravated by exposure: Not available.

Section 7: PREVENTATIVE MEASURES

Precautionary Measures

Gloves/Type:



Neoprene or rubber gloves.

Respiratory/Type:



If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye/Type:



Safety glasses with side-shields.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Leak/Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

TDG classification: Not regulated.

Special shipping information: Not regulated.

Section 8: FIRST AID MEASURES

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Additional information: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any inaccuracies.

Section 9: ADDITIONAL INFORMATION

General note: This material safety data sheet was prepared from information obtained from various sources, including product suppliers and the Canadian Center for Occupational Health and Safety.



Terra Industries Inc.
Terra Centre – 600 Fourth Street
Sioux City, Iowa 51101

Nitric Acid

MSDS Number 2019 (Revised December 7, 2006)

8 Pages

1. CHEMICAL PRODUCT and EMERGENCY TELEPHONE CONTACT

Product Name:..... Nitric Acid
 Chemical Family:..... Inorganic Compound – Mineral Acid
 Synonyms:..... Aqua Fortis, Azotic Acid, Engraver’s Acid,
 Nital, Hydrogen Nitrate
 Formula: HNO₃
 Product Use:..... Manufacture of Fertilizers, Explosives and
 other Chemicals

EMERGENCY TELEPHONE NUMBER

CHEMTREC (U.S.):..... 800-424-9300
 CANUTEC (Canada):..... 613-996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient Name/CAS Number	Concentration	CAS Number
Nitric Acid	56 - 63 %	7697-37-2
Water	42 - 37 %	7732-18-5

(1 ppm = approximately 2.5 mg/m³)

Component	Exposure Limits			
	TWA	STEL	PEL	IDLH
Nitric Acid (Vapor)	2 ppm	4 ppm	4 ppm	25 ppm

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Watery liquid, colorless to light brown. Vapors and mists are irritants of the eyes, nose, throat, skin and teeth. Liquid or high concentrations of vapor may cause severe burns of the eyes with permanent damage. Nitric acid is a human poison by ingestion and an experimental teratogen. Poisonous gases are produced when heated. Nitric acid is a powerful oxidizing agent. Many substances are highly reactive with nitric acid. Nitric acid will react with water or steam to produce heat and toxic and corrosive fumes. To fight a fire in which nitric acid is involved, use water.

NFPA Hazard Classification	Health Hazard.....	3
	Flammability.....	0
	Reactivity.....	0

POTENTIAL HEALTH EFFECTS

Primary Routes of Entry: Inhalation, skin contact and eye contact.

General Acute Exposure: Nitric acid can be corrosive to the skin, eyes, nose, mucous membranes, respiratory and gastrointestinal tracts, or any tissue with which it comes in contact. Severe burns can occur with necrosis and scarring. Milder exposures can cause irritation of the skin, mucous membranes, respiratory and digestive tracts. Sudden circulatory collapse can occur from acute exposure.

Inhalation

Acute Exposure: Respiratory tract irritation, delayed effects, pulmonary function changes, chemical pneumonitis, pulmonary edema, and dyspnea may occur. **ADDITIONAL MEDICAL INFORMATION:** Inhalation of vapor or mist can produce coughing, dyspnea (breathing difficulty), chest pain, and pulmonary edema (water on the lungs), with these effects often delayed in onset up to 30 hours. Severity of symptoms may be no different between mild cases and those that will later show sudden circulatory collapse.

Chronic Exposure: Chronic bronchitis, chemical pneumonitis, pulmonary fibrosis, and changes in pulmonary function may occur with overt symptoms resembling acute viral respiratory tract infection.

Skin

Acute Contact: Severe burns, ulceration, scarring, dermatitis, and yellow staining of the skin may be observed. Causes second and third degree burns on short contact.

Eye

Acute Contact: Vapor and/or liquid contact may cause severe damage to the eyes. **ADDITIONAL MEDICAL INFORMATION:** Eye exposure may result in conjunctivitis, corneal ulcers, necrosis, and/or corneal opacity.

Neurologic

Acute Exposure: Headache, methemoglobinemia, vertigo, loss of coordination and mental facilities, and weakness can occur.

Gastrointestinal

Acute Exposure: Gastritis, hemorrhagic gastritis, esophageal and gastric burns have been observed. Ingestion of nitric acid can cause epigastric pain, nausea, and vomiting of mucoid and "coffee ground" material. Ingestion may produce esophageal corrosion or stricture, necrosis and perforation of the stomach, especially at the pylorus, and occasionally injury to the small bowel.

Hepatic

Acute Exposure: Ischemic lesions may occur in the liver after several hours of uncorrected circulatory collapse.

Genitourinary

Acute Exposure: Renal failure has been observed. Kidney failure and decreased urine output can occur after several hours of uncorrected circulatory collapse.

Dental

Chronic Exposure: Discoloration and erosion of dental enamel can occur.

Cardiovascular

Acute Effects: Sudden circulatory collapse can occur with respiratory symptoms no more severe than in mild cases. Ischemic lesions in the heart may occur after several hours of uncorrected circulatory collapse.

Hematologic

Acute Exposure: Methemoglobinemia, hemolysis, and/or leukocytosis may occur.

Acute Effects: If nitric acid has been in contact with organic materials or in other conditions likely to release nitric oxide, methemoglobin may be formed, producing symptoms of hypoxia including cyanosis, headache, dizziness, vomiting, weakness, loss of coordination and mental facilities, drowsiness, and death from respiratory arrest.

Genotoxicity

Nitric acid and related compounds can react chemically with other substances to form mutagenic products.

Carcinogenicity:

NTP:..... Not Listed
IARC:..... Not Listed
OSHA:..... Not Regulated

Medical Conditions Aggravated by Exposure: Persons with skin, eye, or respiratory conditions may be more sensitive to the irritative effects of nitric acid. Persons with disorders of the blood which result in lessened oxygen-carrying capacity, such as anemia, and those with liver or kidney disorders may be more sensitive to the effects of methemoglobinemia.

4. FIRST AID MEASURES

First Aid for Eyes: Immediately flush eyes with copious amounts of tepid water for at least 15 minutes. If irritation, pain, swelling, excessive tearing, or light sensitivity persists, the patient should be seen in a health care facility and referral to an ophthalmologist considered.

First Aid for Skin: Immediately flush exposed area with copious amounts of tepid water for at least 15 minutes followed by washing area thoroughly with soap and water. The patient should be seen in a health care facility if irritation or pain persists. Treat dermal irritation or burns with standard topical therapy. Patients developing dermal hypersensitivity reactions may require treatment with systemic or topical corticosteroids or antihistamines.

First Aid for Inhalation: Move patient to fresh air. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. If trained to do so administer supplemental oxygen with assisted ventilation as required. Administer artificial respiration if patient is not breathing.

First Aid for Ingestion: Call a physician. If conscious, give the patient 4 to 8 ounces of milk or water to drink immediately. Do not induce vomiting. Observe patient for possible development of esophageal or gastrointestinal tract irritation or burns.

5. FIRE FIGHTING MEASURES

Flash Point: Not Flammable
Lower Flammable Limit: Not Flammable
Upper Flammable Limit: Not Flammable
Autoignition Temperature: Not Flammable

NOTE: Nitric acid itself is not combustible, but it can cause ignition of other combustible materials (wood, paper, oil, etc.) and it may produce flammable gases when contacting other materials.

Extinguishing Media:

Small Fire: Water, dry chemical, soda ash.
Large Fire: Flood fire area with water.

Special Fire Fighting Procedures:

- a. Do not get water inside container. Mixing of water and nitric acid will generate heat and vapor.
- b. Move container from fire area if you can do it without risk.
- c. Apply cooling water to sides of containers that are exposed to flames until well after fire is out.
- d. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- e. Use water spray to control vapors.
- f. Positive pressure self-contained breathing apparatus (SCBA) should be used when there is a potential for inhalation of vapors and/or fumes.
- g. Chemical protective clothing, which is safe for use with nitric acid, involved in a fire, should be worn.

CAUTION:

- a. Structural firefighters protective clothing is not effective.
- b. Runoff from fire control or dilution water may cause pollution.
- c. Do not touch or walk through spilled material.
- d. Remove and isolate contaminated clothing and shoes at the site.
- e. Reaction with fuels may be violent.
- f. Flammable / poisonous gases may accumulate in tanks and hopper cars.
- g. Runoff to sewer may create fire or explosion hazard.

6. ACCIDENTAL RELEASE MEASURES

Spill or Leak Measures: As an immediate precautionary measure, isolate spill or leak area in all directions for at least 150 feet for liquids and at least 75 feet for solids. Stop leak if you can do it without risk. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Evaluate the affected area to determine whether to evacuate or shelter-in-place by taping windows and doors, shutting off outside air intake (attic fans, etc.), and placing a wet towel or cloth over the face (if needed). Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire. Use water spray to control vapors. Mixing of water and nitric acid will generate heat and vapor.

Determining Spill Size: Generally, a small spill is one that involves a single, small package (i.e. up to a 55 gallon drum), small cylinder, or a small (non-continuing) leak from a large container.

Small Spill:

- a. Flush area with flooding amounts of water.
- b. Small amounts of spilled material can be covered with sodium bicarbonate or an equal mixture of slaked lime and soda ash. Water may then be added to form a slurry, and the resultant solution can be discharged into a sink lined with chipped marble and a protective matting with a large quantity of water (ITI, 1985).

Large Spill:

- a. Dike far ahead of liquid spill for later disposal.
- b. Follow local emergency protocol for handling.
- c. Land Spills
 1. Holding areas for large amounts of spilled liquid may be constructed by digging pits, ponds, or lagoons.
 2. Surface flow may be diked with foamed cement, foamed polyurethane, soil, or sand bags.
 3. Bulk liquid can be neutralized with sodium bicarbonate, agricultural lime, or crushed limestone.
 4. Bulk liquid may be adsorbed with cement powder or fly ash.

7. HANDLING AND STORAGE

Segregate from metallic powders, carbides, hydrogen sulfide, turpentine, organic acids, and all combustible, organic or other readily oxidizable materials. Provide good ventilation.

Handling Precautions: Use proper personal protective equipment when working with or around nitric acid. Safety showers and eye wash stations should be located in acid handling areas.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Respiratory Protection Requirements:

- <2 ppm: No protection required.
- 2 to 4 ppm: Protection required if exposed for more than 15 minutes (must be fresh air supply system – see below).
- >4 ppm: A fresh air supply system must be used (i.e. positive pressure self contained breathing apparatus).

NOTE: Nitric acid is an oxidizer and should not come in contact with cartridges and canisters that contain oxidizable materials, such as activated charcoal.

Skin Protection Requirements: Prevent Skin Contact! Skin protection is required for exposure to liquid and / or mist. Neoprene or Viton gauntlet-type gloves, rain suits, aprons, boots, etc.

Eye Protection Requirements: Prevent Eye Contact! Use chemical (indirectly vented) goggles when there is a potential for contact with liquid or mist. A full-face shield may be worn over goggles for additional protection, but not as a substitute for goggles.

Other Protective Equipment: Safety shower and eyewash fountain should be provided in the nitric acid handling area.

Engineering Controls: Adequate ventilation to keep vapor / fume concentrations below applicable standards.

NOTE: See Section 2 for regulatory exposure guidelines.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: Liquid
Color: Colorless to slightly yellow
Odor: Choking odor.
Boiling Point: 181-245° F
Melting point: -50° F
pH: <1 (Strong, monobasic acid)
Solubility: Soluble in all proportions in water
Specific Gravity: 1.4 (@ 60° F)
Vapor Density: 3.2 (@ 60° F)
Vapor Pressure: 42 mm Hg (@ 60° F)
% Volatile by Volume: 100
Molecular Weight: 63.01
Density: 11.67 lb. per gallon (@ 60° F)
Critical Temperature: No test results
Critical Pressure: No test results

10. REACTIVITY

Stability: This is a stable material.

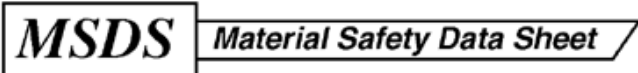
Hazardous Polymerization: Will not occur.

Decomposition: Nitric acid releases oxides of nitrogen, i.e. NO, NO₂, NO_x.



Incompatibilities:

- a. Nitric acid itself is nonflammable, but in concentrated form it is a powerful oxidizer. It can increase the flammability of organic materials and can cause spontaneous combustion of some materials.
- b. Nitric acid can react explosively with metallic powders; carbides; hydrogen sulfide and turpentine, and can react violently with alcohol.
- c. Nitric acid can react violently or is incompatible with the following; Acetic acid, Acetylene, Ammonia, Arsine, Bismuth, Boron, Carbon, Cresol, Cyanides, Ethanol, Ethylenediamine, Germanium, Hydrogen Peroxide, Hydrogen Sulfide, Lithium, Magnesium, Phosphorus, Sodium; Titanium, Vinyl Acetate, Zinc.

MSDS Number: **T0767** * * * * * *Effective Date: 08/16/05* * * * * * *Supersedes: 05/08/03*

	24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
	National Response in Canada CANUTEC: 613-996-6666
Outside U.S. and Canada Chemtrec: 703-527-3887	NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

From: Mallinckrodt Baker, Inc.
 222 Red School Lane
 Phillipsburg, NJ 08865

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TETRACHLOROETHYLENE

1. Product Identification

Synonyms: ethylene tetrachloride; tetrachloroethene; perchloroethylene; carbon bichloride; carbon dichloride

CAS No.: 127-18-4

Molecular Weight: 165.83

Chemical Formula: Cl₂C:CCl₂

Product Codes:

J.T. Baker: 9218, 9360, 9453, 9465, 9469

Mallinckrodt: 1933, 8058

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Tetrachloroethylene	127-18-4	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)

Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate (Life)

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Irritating to the upper respiratory tract. Giddiness, headache, intoxication, nausea and vomiting may follow the inhalation of large amounts while massive amounts can cause breathing arrest, liver and kidney damage, and death. Concentrations of 600 ppm and more can affect the central nervous system after a few minutes.

Ingestion:

Not highly toxic by this route because of low water solubility. Used as an oral dosage for hookworm (1 to 4 ml). Causes abdominal pain, nausea, diarrhea, headache, and dizziness.

Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

Eye Contact:

Causes irritation, redness, and pain.

Chronic Exposure:

May cause liver, kidney or central nervous system damage after repeated or prolonged exposures. Suspected cancer risk from animal studies.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance. The use of alcoholic beverages enhances the toxic effects.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard but becomes hazardous in a fire situation because of vapor generation and possible degradation to phosgene (highly toxic) and hydrogen chloride (corrosive). Vapors are heavier than air and collect in low-lying areas.

Explosion:

Not considered to be an explosion hazard. Containers may explode when involved in a fire.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Store in a cool, dry, ventilated area away from sources of heat or ignition. Isolate from flammable materials. Protect from direct sunlight. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA), 200 ppm (ceiling),
300 ppm/5min/3-hour (max)

-ACGIH Threshold Limit Value (TLV):

25 ppm (TWA), 100 ppm (STEL); listed as A3, animal carcinogen

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Ethereal odor.

Solubility:

0.015 g in 100 g of water.

Specific Gravity:

1.62 @ 20C/4C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

121C (250F)

Melting Point:

-19C (-2F)

Vapor Density (Air=1):

5.7

Vapor Pressure (mm Hg):

18 @ 25C (77F)

Evaporation Rate (BuAc=1):

0.33 (trichloroethylene = 1)

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Slowly decomposed by light. Deteriorates rapidly in warm, moist climates.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition. Hydrogen chloride gas and phosgene gas may be formed upon heating. Decomposes with moisture to yield trichloroacetic acid and hydrochloric acid.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong acids, strong oxidizers, strong alkalis, especially NaOH, KOH; finely divided metals, especially zinc, barium, lithium. Slowly corrodes aluminum, iron and zinc.

Conditions to Avoid:

Moisture, light, heat and incompatibles.

11. Toxicological Information

Oral rat LD50: 2629 mg/kg; inhalation rat LC50: 4100 ppm/6H; investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Tetrachloroethylene (127-18-4)	No	Yes	2A

12. Ecological Information

Environmental Fate:

When released into the soil, this material is expected to quickly evaporate. When released into the soil, this

material may leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into water, this material is not expected to biodegrade. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals.

Environmental Toxicity:

The LC50/96-hour values for fish are between 1 and 10 mg/l. The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TETRACHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 20L

International (Water, I.M.O.)

Proper Shipping Name: TETRACHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 20L

15. Regulatory Information

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-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Tetrachloroethylene (127-18-4)                Yes  Yes  Yes    Yes

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-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL  Phil.
-----
Tetrachloroethylene (127-18-4)                Yes   Yes   No    Yes

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-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ   TPQ   List  Chemical Catg.
-----
Tetrachloroethylene (127-18-4)                No    No    Yes   No

```

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-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                         261.33  8(d)
-----

```

Tetrachloroethylene (127-18-4) 100 U210 No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 2[Z]

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor or mist.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Label First Aid:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3, 11.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.

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Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)



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Section 1 Chemical Product and Company Identification

PRODUCT NAME: RemOx® L ISCO Reagent	Revision Date: April 2008
TRADE NAME: RemOx® L ISCO Reagent	

USES OF SUBSTANCE: RemOx® L ISCO Reagent is a liquid oxidant recommended for in-situ and ex-situ remediation of sites that require a strong oxidant.

COMPANY NAME (Europe): CARUS NALON S.L.	COMPANY ADDRESS: Carus Nalon S.L. Barrio Nalon, s/n 33100 Trubia-Oviedo Espana, Spain
COMPANY NAME (US): CARUS CORPORATION	INFORMATION: (34) 985-785-513 (34) 985-785-513 www.caruseurope.com (Web) carus@carusnalon.com (Email)
	EMERGENCY TELEPHONE: (34) 985-785-513
	COMPANY ADDRESS: 315 Fifth Street Peru, IL 61354, USA
	INFORMATION: (815)-223-1500 www.caruscorporation.com (Web) salesmkt@caruscorporation.com (Email)
	EMERGENCY TELEPHONE: (800) 435-6856 (USA) (800) 424-9300 (CHEMTREC, USA) (815)-223-1500 (Other countries)

Section 2 Hazards Identification

- Eye Contact**
RemOx® L ISCO Reagent is damaging to eye tissue on contact. It may cause burns that result in damage to the eye.
- Skin Contact**
Momentary contact of solution at room temperature may be irritating to the skin, leaving brown stains. Prolonged contact is damaging to the skin.
- Inhalation**
Acute inhalation toxicity data are not available. However, airborne concentrations of RemOx® L ISCO Reagent in the form of mist may cause irritation to the respiratory tract.
- Ingestion**
RemOx® L ISCO Reagent if swallowed, may cause burns to mucous membranes of the mouth, throat, esophagus, and stomach.



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Section 3 Hazardous Ingredients

<u>Material or Component</u>	<u>CAS No.</u>	<u>%</u>	<u>Hazard Data</u>
Sodium Permanganate	10101-50-5	40	PEL/C 5 mg Mn per cubic meter of air TLV-TWA 0.2 mg Mn per cubic meter of air
<u>HAZARD SYMBOLS:</u>			
<u>RISK PHRASES:</u>			
8 Contact with combustibles may cause fire.			
22 Harmful if swallowed.			
50/53 Very toxic to aquatic organisms, may cause long-term effects in the aquatic environment.			
<u>SAFETY PHRASES:</u>			
17 Keep away from combustible materials.			
24/25 Avoid contact with skin and eyes.			
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice			

Section 4 First Aid Measures

1. <u>Eyes</u>	Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Do not attempt to neutralize chemically. Seek medical attention immediately. Note to physician: Decomposition products are alkaline.
2. <u>Skin</u>	Immediately wash contaminated areas with water. Remove contaminated clothing and footwear. (Caution: Solution may ignite certain textiles). Wash clothing and decontaminate footwear before reuse. Seek medical attention immediately if irritation is severe and persistent.
3. <u>Inhalation</u>	Remove person from contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.
4. <u>Ingestion</u>	Never give anything by mouth to an unconscious or convulsing person. If person is conscious, give large quantities of water or milk. Seek medical attention immediately.

Section 5 Fire Fighting Measures

NFPA* HAZARD SIGNS:			
Health Hazard	1	=	Materials which under fire conditions would give off irritating combustion products. (less than 1 hour exposure) Materials which on the skin could cause irritation.
Flammability Hazard	0	=	Materials that will not burn.
Reactivity Hazard	0	=	Materials which in themselves are normally stable, even under fire exposure



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Special Hazard	OX = Oxidizer	conditions, and which are not reactive with water.
*National Fire Protection Association 704		
FIRST RESPONDERS: Wear protective gloves, boots, goggles, and respirator. In case of fire, wear positive pressure breathing apparatus. Approach incident with caution. Use 2004 Emergency Response Guidebook (U.S. DOT RSPA, TC and STC). Guide No. 140. (http://hazmat.dot.gov/pubs/erg2004/erg2004.pdf).		
FLASHPOINT		None
FLAMMABLE OR EXPLOSIVE LIMITS		Lower: Nonflammable Upper: Nonflammable
EXTINGUISHING MEDIA		Use large quantities of water. Water will turn pink to purple if in contact with RemOx® L ISCO Reagent. Dike to contain. Do not use dry chemicals, CO ₂ Halon® or foams.
SPECIAL FIREFIGHTING PROCEDURES		If material is involved in fire, flood with water. Cool all affected containers with large quantities of water. Apply water from as far as a distance as possible. Wear self-contained breathing apparatus and full protective clothing.
UNUSUAL FIRE AND EXPLOSION		Powerful oxidizing material. May decompose spontaneously if exposed to heat (135°C/275°F). May be explosive in contact with certain other chemicals (Section 10). May react violently with finely divided and readily oxidizable substances. Increases burning rate of combustible material. May ignite wood and cloth.

Section 6 Accidental Release Measures

PERSONAL PRECAUTIONS

Personnel should wear protective clothing suitable for the task. Remove all ignition sources and incompatible materials before attempting clean up.

ENVIRONMENTAL PRECAUTIONS:

Do not flush into sanitary sewer system or surface water. If accidental release into the environment occurs, inform the responsible authorities. Keep the product away from drains, sewers, surface and ground water and soil.

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Contain spill by collecting the liquid in a pit or holding behind a dam (sand or soil). Dilute to approximately 6% with water, and then reduce with sodium thiosulfate, a bisulfite or ferrous salt solution. The bisulfite or ferrous



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salt may require some dilute sulfuric acid (10% w/w) to promote reduction. Neutralize with sodium carbonate to neutral pH, if acid was used. Decant or filter and deposit sludge in approved landfill. Where permitted, the sludge may be drained into sewer with large quantities of water. To clean contaminated floors, flush with abundant quantities of water into sewer, if permitted by federal, state, and local regulations. If not, collect water and treat as above.

Section 7 Handling and Storage

WORK/HYGIENIC PRACTICES

Wash hands thoroughly with soap and water after handling RemOx® L ISCO Reagent. Do not eat, drink or smoke when working with RemOx® L ISCO Reagent. Wear proper protective equipment. Remove clothing, if it becomes contaminated.

VENTILATION REQUIREMENTS

Provide sufficient mechanical and/or local exhaust to maintain exposure below the TLV/TWA.

CONDITIONS FOR SAFE STORAGE

Store in accordance with NFPA 430 requirements for Class II oxidizers. Protect containers from physical damage. Store in a cool, dry area in closed containers. Segregate from acids, peroxides, formaldehyde, and all combustible, organic, or easily oxidizable materials including antifreeze and hydraulic fluid.

Section 8 Exposure Controls and Personal Protection

RESPIRATORY PROTECTION

In cases where overexposure to mist may occur, the use of an approved NIOSH-MSHA mist respirator or an air supplied respirator is advised. Engineering or administrative controls should be implemented to control mist.

EYE

Faceshield, goggles, or safety glasses with side shields should be worn. Provide eyewash in working area.

GLOVES

Rubber or plastic gloves should be worn.

OTHER PROTECTIVE EQUIPMENT

Normal work clothing covering arms and legs, and rubber, or plastic apron should be worn. Caution: If clothing becomes contaminated, wash off immediately. Spontaneous ignition may occur with cloth or paper.

Section 9 Physical and Chemical Properties

APPEARANCE AND ODOR	Dark purple solution, odorless
BOILING POINT, 760 mm Hg	105 °C
VAPOR PRESSURE (mm Hg)	760 mm at 105°C
SOLUBILITY IN WATER % BY SOLUTION	Miscible in all proportions
PERCENT VOLATILE BY VOLUME	61% (as water)
EVAPORATION RATE	Same as water
FREEZING POINT	-15.0 °C
SPECIFIC GRAVITY	1.36-1.39



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pH	5-9
OXIDIZING PROPERTIES	Strong oxidizer. May ignite wood and cloth.
EXPLOSIVE PROPERTIES	Explosive in contact with sulfuric acid or peroxides, or readily oxidizable substances.

Section 10 Stability and Reactivity

STABILITY	Under normal conditions, the material is stable.
CONDITIONS TO AVOID could	Contact with incompatible materials or heat (135°C / 275°F) result in violent exothermic chemical reaction.
INCOMPATIBLE MATERIALS	Acids, peroxides, formaldehyde, antifreeze, hydraulic fluids, and all combustible organic or readily oxidizable materials, including metal powders. With hydrochloric acid, toxic chlorine gas is liberated.
HAZARDOUS DECOMPOSITION PRODUCTS	When involved in a fire, liquid permanganate may form corrosive fumes.
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	Material is not known to polymerize.

Section 11 Toxicological Information

SODIUM PERMANGANATE:	Acute oral LD₅₀ not known.
<u>1. Acute toxicity</u>	
Irritating to body tissue with which it comes into contact. No acute toxicity data is available for sodium permanganate. Toxicity is expected to be similar to that of potassium permanganate. The toxicity data for potassium permanganate is given below:	
<u>Ingestion:</u> LD 50 oral rat: 780 mg/kg male (14 days); 525 mg/kg female (14 days). Harmful if swallowed. ALD: 10g. Ingestion may cause nausea, vomiting, sore throat, stomach-ache and eventually lead to a perforation of the intestine. Liver and kidney injuries may occur.	
<u>Skin contact:</u> LD 50 dermal no data available. The product may be absorbed into the body through the skin. Major effects of exposure: severe irritation, brown staining of skin.	
<u>Inhalation:</u> LC 50 inhal. no data available. The product may be absorbed into the body by inhalation. Major effects of exposure: respiratory disorder, cough.	
<u>2. Chronic toxicity</u>	
No known cases of chronic poisoning due to permanganates have been reported. Prolonged exposure, usually	



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over many years, to heavy concentrations of manganese oxides in the form of dust and fumes may lead to chronic manganese poisoning, chiefly involving the central nervous system.

3. Carcinogenicity

Sodium permanganate has not been classified as a carcinogen by ACGIH, NIOSH, OSHA, NTP, or IARC.

4. Medical Conditions Generally Aggravated by Exposure

Sodium permanganate solution will cause further irritation of tissue, open wounds, burns or mucous membranes.

Section 12 Ecological Information

Entry to the Environment

Permanganate has a low estimated lifetime in the environment, being readily converted by oxidizable materials to insoluble MnO₂.

Bioconcentration Potential

In non-reducing and non-acidic environments MnO₂ is insoluble and has a very low bioaccumulative potential.

Aquatic Toxicity

No data.

Section 13 Disposal Considerations

Waste Disposal

RemOx® L ISCO Reagent, once it becomes a waste, is considered a D001 hazardous (ignitable) waste. For disposal of RemOx® L ISCO Reagent solutions, follow procedures in Section 6 and deactivate the permanganate to insoluble manganese dioxide. Dispose of it in a permitted landfill. Contact Carus Chemical Company for additional recommendations.

Section 14 Transport Information

USA (land, D.O.T.)	Proper Shipping Name: 49 CFR172.101 Permanganates, inorganic, aqueous solution, n.o.s (contains sodium permanganate) Hazard Class: 49 CFR172.101...Oxidizer ID Number: 49 CFR172.101...UN 3214 Packing Group: 49 CFR172.101...II Division: 49 CFR172.101...5.1
European Labeling in accordance Road/Rail Transport (ADR/RID)	ID Number: UN 3214 ADR/RID Class: 5.1 Description of Goods: Permanganates, inorganic, aqueous solution, n.o.s (contains sodium permanganate) Hazard Identification No. 50
European Labeling in accordance with EC directive (Water, I.M.O.)	Proper Shipping Name: Permanganates, inorganic, aqueous solution, n.o.s (contains sodium permanganate) Hazard Class: Oxidizer ID Number: UN 3214



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	Packing Group: II Division: 5.1 Marine Pollutant: No
European Labeling in accordance with EC directive (Air, I.C.A.O.)	Proper Shipping Name: Permanganates, inorganic, aqueous solution, n.o.s (contains sodium permanganate) Hazard Class: Oxidizer ID Number: UN 3214 Packing Group: II Division: 5.1

Section 15 Regulatory Information (Sodium Permanganate)

TSCA	Listed in the Toxic Substances Control Act (TSCA) Chemical Substance Inventory.
CERCLA	Not listed.
RCRA	Oxidizers such as RemOx® L ISCO Reagent solution meet the criteria of ignitable waste. 40 CFR 261.21.
SARA TITLE III Information	
Section 302/303	Extremely hazardous substance: Not listed
Section 311/312	Hazard categories: Fire, acute and chronic toxicity.
Section 313	RemOx® L ISCO Reagent contains 40% manganese compounds as part of the chemical and is subject to the reporting requirements of Section 313 of Title III, Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.
FOREIGN LIST	Canadian Non-Domestic Substance List , EINECS

Section 16 Other Information

NIOSH	National Institute for Occupational Safety and Health
MSHA	Mine Safety and Health Administration
OSHA	Occupational Safety and Health Administration
NTP	National Toxicology Program
IARC	International Agency for Research on Cancer
PEL	Permissible Exposure Limit
C	Ceiling Exposure Limit
TLV-TWA	Threshold Limit Value-Time Weighted Average
CAS	Chemical Abstract Service
EINECS	Inventory of Existing Chemical Substances (European)

Chithambarathanu Pillai (S.O.F.)

April 2008

The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change and, therefore, holders and users should satisfy themselves that they are aware of all current data and regulations relevant to their particular use of product. CARUS CORPORATION DISCLAIMS ALL LIABILITY FOR RELIANCE ON THE COMPLETENESS OR ACCURACY OR THE INFORMATION INCLUDED HEREIN. CARUS CORPORATION MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR USE OR PURPOSE OF THE PRODUCT DESCRIBED HEREIN. All conditions relating to storage, handling, and use of the product are beyond the control of Carus Corporation, and shall be the sole responsibility of the holder or user of the product.



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Responsible Care®
Good Chemistry at Work

ATTACHMENT C

NYCDOT STREET WORKS MANUAL

Street Works Manual



New York City
Department of Transportation

Street Works Manual

New York City
Department of Transportation

2011



www.nyc.gov/dot

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Second Edition

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1. REFERENCE/General

2. TRANSPORTATION/General

Printed copies of the Street Works Manual can be purchased at CityStore, 1 Centre Street, North Plaza New York, NY 10007 and on-line at <http://a856-citystore.nyc.gov/2/Municipal-Publications/12/Surveys-Reports/1694/Street-Works-Manual>

The most current version of the manual, including any updates and addenda, is available for download on the New York City Department of Transportation website at www.nyc.gov/dot.

OPPOSITE:
Street work in New York City to accommodate growth and changing needs requires coordination, permitting and oversight by NYC DOT to minimize disruption in a complex street space.





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65	Glossary
69	Acknowledgments
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Letter from the Mayor

Dear Friends:

New York City is always growing. The telecommunications, power, water, and sewer infrastructures that lie beneath the city's streets also need to grow and be maintained. Management of New York's City's street system is a never-ending balancing act, not only among our many modes of transportation and active street life, but also between transportation, and maintenance and improvement of our underground utilities. The New York City Street Works Manual is a major step forward in enhancing New York City Department of Transportation's (NYC DOT) performance in this regard. It will allow New York City government to better serve both the traveling public and the city's utility and construction sectors.

In fiscal year 2010, NYC DOT issued nearly a quarter million permits for work in city streets by utilities, construction companies and contractors.

With the policies and procedures set forth in this Manual, we aim to protect the public's investment in good street surfaces and have our streets operating at capacity a greater percentage of the time. There will be ongoing, formalized coordination and information-sharing about upcoming street construction work by both government and the private sector, and higher penalties for violations or non-permitted work. These will reduce the number of individual street excavations and reduce costs for companies, users of city streets and New York City taxpayers.

The Manual also provides a comprehensive and transparent compendium of NYC DOT procedures and regulations governing work on city streets, including forms and online links for registration and permit application that utilities and contractors need. Its online/web version will be especially useful as a hands-on tool for the companies that need NYC DOT permits. We have streamlined the procedures for obtaining permits and will continue that process into the future. Applicants can now electronically apply for and receive construction-related permits anytime, anywhere.

As our city continues to grow, the New York City Street Works Manual will help us serve New Yorkers better and more efficiently, and improve the quality of life in neighborhoods across all five boroughs.

Sincerely,



Michael R. Bloomberg
Mayor

הַמְנוּחָה

Foreword from the Commissioner

Dear Fellow New Yorkers:

City streets are New York's basic circulatory system, serving huge numbers of daily foot, bus and auto trips, as well as facilitating the millions of large and small goods deliveries that keep our economy running. Our streets are also the conduits for the increasingly complex set of public utilities needed for daily life in the 21st Century - water, electricity, gas, steam and telecommunications of every kind.

At times these multiple functions conflict - nearly every New Yorker seems to have a story about a work crew digging up a freshly surfaced city street. Though better coordination of paving and sub-surface work seems elementary, it has been elusive owing to sheer scales of both our street system and the utility networks buried beneath them.

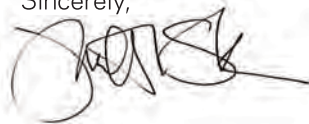
The New York City Street Works Manual represents a major step in solving this problem. The work by NYC DOT and the city's major utility companies to produce both the Manual and a series of agreements about data-sharing and consultation on work needs will go a long way to protect the public's investment in better street surfaces. New information applications will facilitate the coordination of vast and complex work schedules across the city.

In the same vein, the Manual also marks adoption of new, business-friendly technology improvements in NYC DOT's issuance of permits to contractors who need to undertake work in or under city streets. All-electronic permitting will save time and money for the utility and construction industries, while reducing costs and saving taxpayer dollars.

Transportation and good streets have always been keys to the improvement of the city's economy and daily life, which is why our Administration is a leader in infrastructure investment. While much of our country struggles to sustain basic upkeep, we have brought City-owned bridges to their best condition in a generation and expanded street resurfacing to a consistent 1,000 lane-miles per year. In just the last four years, NYC DOT has committed more than \$4.3 billion in capital investments, an unprecedented effort in the Administration's commitment to bring the city's roads, bridges and sidewalks into a state of good repair.

The Street Works Manual will help us preserve and extend the benefits of this critical work, and facilitate investment by the utility industry in other systems that are equally critical to the people of New York City.

Sincerely,



Janette Sadik-Khan
Commissioner



**There are nearly
6,000 linear
street miles in
the city.**

1. Introduction

The NYC Street Works Manual marks the beginning of new policies governing work on city streets, and clearly presents procedures for notice, approval and execution of such work. These new policies and the Manual's presentation of permit procedures are designed to deliver higher quality street surfaces, fewer transportation capacity reductions and a more efficient construction environment to the people and businesses of New York City.

There are nearly 6,000 miles of streets in New York City. City streets facilitate the movement of pedestrians, transit riders, motorists and cyclists as well as the delivery of goods and services throughout the city. Under the surface, the same streets support the city's water, sewer, power and telecommunications infrastructure, as well as its subway tunnels and building vaults. The streets themselves also serve as public spaces, fostering social, economic and recreational activities.



Management of New York City's street infrastructure is critical to the city's economic well-being and quality of life. The Street Works Manual is a new tool intended to increase the performance of both city government and the private sector in this regard. Its overall goals are both far-reaching and vital: sustaining the city's investment in its streets, enhancing access to subsurface infrastructure and minimizing transportation and community disruptions.

To this end, the Street Works Manual is intended as a resource for all parties that perform work in New York City streets, from utilities and contractors installing, replacing and repairing underground infrastructure to developers replacing roadways and sidewalks adjacent to building sites and homeowners performing their own sidewalk repairs.

New Street Works Policies

Street “excavation”, “opening”, and “cut” are often used interchangeably. Street Opening Permits are required for such excavation work.

New York City has developed and implemented the following policy changes in the course of evaluating the process of street cuts and developing the Street Works Manual:

1 Street Synergy 2011— Formalized Information Sharing

A recently executed agreement between NYC DOT and major utility companies provides for the monthly sharing of data regarding all active NYC DOT street excavation permits, NYC DOT’s list of “protected streets” (recently repaved or reconstructed streets that have strict restoration requirements if disturbed), NYC DOT’s roadway resurfacing schedule, short-term utility excavation needs and long-term utility project schedules.

The agreement brings together the most important stakeholders to collaborate to improve NYC street conditions. By leveraging information sharing technologies to identify convergent needs and schedules, all parties have the ability to undertake street-related work concurrently or in a closely-scheduled sequence, rather than excavating and surfacing streets in an uncoordinated manner.

2 NYCityMap and DOTMap

NYC DOT and the city’s Department of Information Technology & Telecommunications (DoITT) are collaborating to greatly increase the number of maps available to the public online. The public can view the city’s map portal with any of the most common Internet/web browsers. No special mapping software is needed. The anytime-anywhere availability of this information will facilitate coordination between all parties undertaking work on city streets. This

will result in fewer street excavations and better street conditions.

New York City has begun posting maps providing information about its capital projects across the full range of city agencies via the online NYCityMap. You can reach it online at <http://gis.nyc.gov/doitt/nycitymap>.

NYCityMap already features layers for the city’s Department of Design and Construction (DDC) and NYC DOT’s 10-year capital projects plan, as well as NYC DOT’s “Protected Streets” — these are streets that have been resurfaced or reconstructed within the past five years and therefore require substantially higher permit fees for street excavation work. They also require more expansive restoration if disturbed. Additional information on using NYCityMap is presented in Chapter 2.

NYC DOT has its own portal, DOTMap, within NYCityMap. You can reach it directly at <http://www.nyc.gov/dotmap>. It contains a large number of NYC DOT - related maps. NYC DOT has been working to display much of our data in contemporary GIS formats. This increases transparency and, for the purposes of this Manual, fosters additional coordination between NYC DOT and other parties performing work on city streets. NYC DOT anticipates adding scheduled street resurfacing work to DOTMap during 2011.



NYC DOT coordinates street opening and other construction on streets.

3 Incentives for Coordination and Compliance

NYC DOT and the NYC Environmental Control Board recently increased monetary penalties for four street work-related violations. Fines for opening a non-protected street without a permit were nearly doubled to \$1,500, by this action. Fines were also increased by nearly 29% for opening a Protected Street without a permit. Fines for closing streets to traffic without permits were increased by 50%. The penalty for restoring the street surface on a Protected Street without notifying NYC DOT inspectors was increased three-fold, to \$750.

Fines for improper usage of emergency permits, such as declaring an emergency when none exists, are also under review to determine whether changes are warranted.

Taken together, these actions will reduce the incidence of street work undertaken without permits, provide a stronger incentive for collaboration and coordination between city government and private sector stakeholders that engage in work on city streets and better facilitate public mobility and safety.

4 Permit and Inspection Technology Enhancements

NYC DOT has been enhancing its permit and inspection procedures. 50% of agency permits are now issued electronically, with most permits issued within 1-2 days of application. NYC DOT continues to move toward the goal of permit applications submitted anytime-anywhere online. This capability will also include the printing of permits anytime-anywhere using any printer. Registered applicants will no longer need to go in person to any office to obtain the majority of NYC DOT construction-related permits. NYC DOT will also enhance the tools its inspectors use to review street work for compliance with permit stipulations. By the end of 2011, all inspectors will use tablet computers to verify permit details and record the inspection and issue appropriate corrective action requests.


How to Use the Street Works Manual

The organization of the Street Works Manual generally follows the chronological process of planning and undertaking work in the street.

Chapter 2 describes processes and tools to enhance advance planning and coordination of street work between NYC DOT's own capital resurfacing and reconstruction programs and the street infrastructure work of other stakeholders, especially those that perform a large number of street excavations. One tool highlighted in this chapter is DOTMap, a new data sharing initiative that will allow for better coordination of planned street reconstruction and resurfacing activities with other street excavation work.

Chapter 3 describes different types of construction-related permits issued by NYC DOT and outlines the application processes for each permit type. It also provides cross-references to useful on-line forms and tools.

Chapter 4 describes the processes for executing work in the streets, after permits and approvals are obtained, and the enforcement actions NYC DOT may take to safeguard city streets.

In Chapters 3 and 4, the  symbol is used to indicate particularly time-sensitive requirements of the processes described.

Appendices to the Street Works Manual provide additional resources, including a list of common permit types and the supporting documentation required for each permit type, reference copies of applications and required forms, contact information for NYC DOT and other agencies and utilities, a list of the stipulations placed on permits under certain conditions and/or at certain locations, and useful internet links by chapter of the Manual.

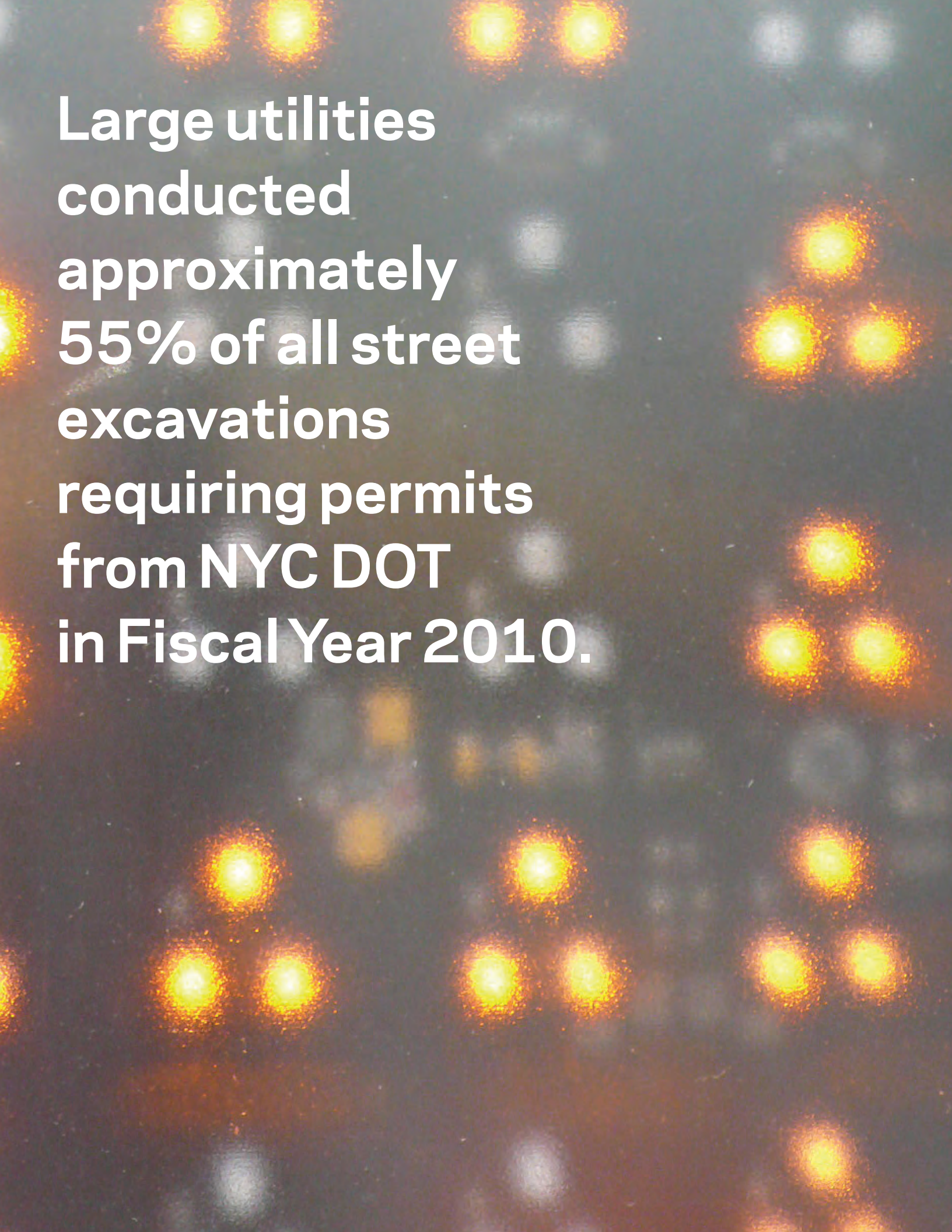
Applicability

The guidance presented in the Street Works Manual does not supersede any existing federal, state or city laws, rules and regulations. For complete NYC DOT requirements regarding the performance of work in the street, please consult the Highway Rules available at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf> and NYC DOT specifications at http://www.nyc.gov/html/dot/downloads/pdf/standard%20highway_specs_vol%201.pdf.

The Glossary and definitions found in this Manual provide a brief explanation of NYC DOT terminology. Any definitions found in existing federal, state or city laws, rules and regulations take precedence as the official and legal definitions.

NYC DOT disclaims any liability for omissions or errors that may be contained herein.

“[NYC DOT] will coordinate street and subsurface infrastructure work by city agencies, building projects and utility companies to minimize street closures and poor street surface quality and ensure that NYC DOT resources are put towards more systematic infrastructure projects.”—*Sustainable Streets. Strategic Plan for the New York City Department of Transportation (2008)*

The background of the slide is a dark, out-of-focus image of numerous bright yellow lights, likely from a construction site or a large-scale event, creating a bokeh effect.

**Large utilities
conducted
approximately
55% of all street
excavations
requiring permits
from NYC DOT
in Fiscal Year 2010.**

2. Advance Notice and Coordination of Planned Street Work

Advance notice and coordination of planned street work is one of the most effective tools for reducing the number of street excavations, especially on streets that are scheduled to be resurfaced or reconstructed. Street excavators, including utility companies and developers, can access New York City Department of Transportation (NYC DOT) data and attend NYC DOT coordination meetings to facilitate effective communication regarding planned street work.

Chapter Topics:

Section 2.1	The Goal of Advance Notice and Coordination
Section 2.2	NYCityMap, DOTMap, and Other Online Information
Section 2.3	Key Principles for Effective Notice and Coordination of Major Street Work
Section 2.4	Advance Notice and Coordination in Lower Manhattan

For a list of all the web links pertaining to this chapter, refer to Appendix E, Links.

About this Chapter

Thousands of miles of utility pipes, cables and other equipment are beneath the streets of New York City. The installation and repair of this infrastructure is crucial to maintaining and strengthening the city's competitive position in the global economy. Inevitably, street excavations to install or access this infrastructure disrupt the normal activity of New York's streets, causing frustration and confusion for local residents and businesses. Street excavations also adversely affect the condition of the streets, reducing the number of years the pavement would otherwise be expected to remain in good or excellent condition following resurfacing or reconstruction, and increasing repair and life cycle costs for the city.

The goal of advance coordination is to reduce the number of excavations in New York City streets. To this end, this chapter discusses existing mechanisms that help inform utility companies and other potential [street excavators](#) of impending NYC DOT work, including how to access information on NYC DOT's planned capital projects, weekly street resurfacing schedules, "[protected street](#)" information and other data that can help to facilitate effective communication regarding street work. It also outlines principles for coordinating with NYC DOT when proposing excavation work to help make certain that excavation on streets occurs before or in conjunction with city street work, where applicable.

Advance notice and coordination refers to project information sharing and communication activities that occur between NYC DOT and street excavators prior to the issuance of a permit.

STREET EXCAVATORS: include utility companies, developers, city and state agencies and other entities that are permitted to carry out excavation work in the street or hire contractors to do such work on their behalf.

PROTECTED STREETS: A street is considered to be in protected status for a period of five years from the date it was last resurfaced or reconstructed. The purpose of placing a street in protected status is to maintain the integrity of a new street surface.

The Street Synergy 2011 initiative discussed earlier in Chapter 1 formalizes information sharing between NYC DOT and utilities that do a large amount of street excavation work. Proposed project locations can be reviewed to identify project coordination opportunities.

All parties will have the ability to undertake more street-related work concurrently or in a closely-scheduled sequence, rather than re-excavating and re-surfacing particular streets in an uncoordinated manner.

NYC DOT project locations, protected streets, and other maps are available online at the Department of Information Technology & Telecommunications (DoITT) NYCityMap website and the DOTMap portal. Permittees can use these maps to make informed decisions while planning new projects.

Section 2.1 The Goal of Advance Notice and Coordination

Advance notice and coordination of planned street work is one of the most effective tools for reducing the number of street excavations on newly resurfaced or reconstructed streets. With advance notice of proposed excavation work, NYC DOT can sequence the timing of the large

number of roadway and utility works being undertaken across the city. Similarly, the sooner a potential street excavator knows about NYC DOT's intent to work in a particular location, the better it can make arrangements to avoid or reduce potential conflicts.

The Street Synergy 2011, NYCityMap, and DOTMap projects will all contribute to NYC DOT's vision for enhanced coordination.

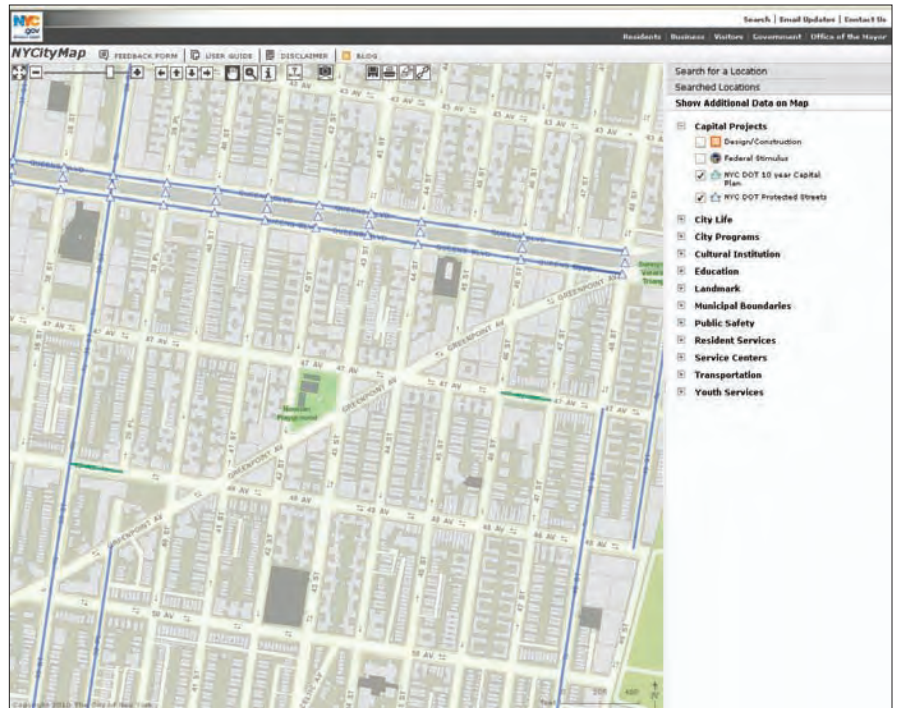


New York City streets include a complex mix of assets such as electric, gas, telephone, cable, water, sewer and steam lines, requiring coordination among the different asset owners when street work is performed.

Section 2.2 NYCityMap, DOTMap and Other Online Information

With advance notice of NYC DOT's intent to work in a particular location, utility companies and other potential street excavators are better able to make arrangements to minimize potential conflicts or to leverage the opportunity to perform their work before resurfacing or reconstruction is complete. In order to assist the goal of advanced coordination, information about planned NYC DOT projects is available via the DOTMap portal within the NYCityMap website at <http://www.nyc.gov/dotmap>. By accessing this map portal, a utility company or any other entity that performs street excavation work can find details on NYC DOT projects included in the city's 10-year Capital Budget, as well as more imminent NYC DOT and New York City Department of Environmental Protection capital projects currently in design or under construction.

Information on how to navigate and use NYCityMap and DOTMap is available online at: <http://gis.nyc.gov/doitt/webmap-conf/docs/UserGuide.pdf>



NYCityMap is the city's web-based interactive mapping application. It includes capital construction projects.

DOTMap also features a protected streets layer, enabling utilities and other potential street excavators to view which streets are protected and for what period of time. The protected streets layer is current as of the previous business day. The screen image above displays the "NYC DOT 10 year Capital Plan" projects in green and protected streets in blue.

Clicking on the "i" button at the top center of the map will change the cursor into an arrow with an "i" next to it. With this cursor, users can click on the map to get information about a particular map layer. As shown in the screen image, the pop-up for the "NYC DOT 10 year Capital Plan" layer

features a project ID, title, and the fiscal year for which the project is planned, whereas the pop-up for "NYC DOT Protected Streets" includes street name and the date to which protected status extends.

Other Online information

1 Weekly milling and resurfacing and concrete repair schedules. NYC DOT weekly milling and resurfacing schedules are available online at <http://www.nyc.gov/html/dot/html/motorist/resurfintro.shtml>.

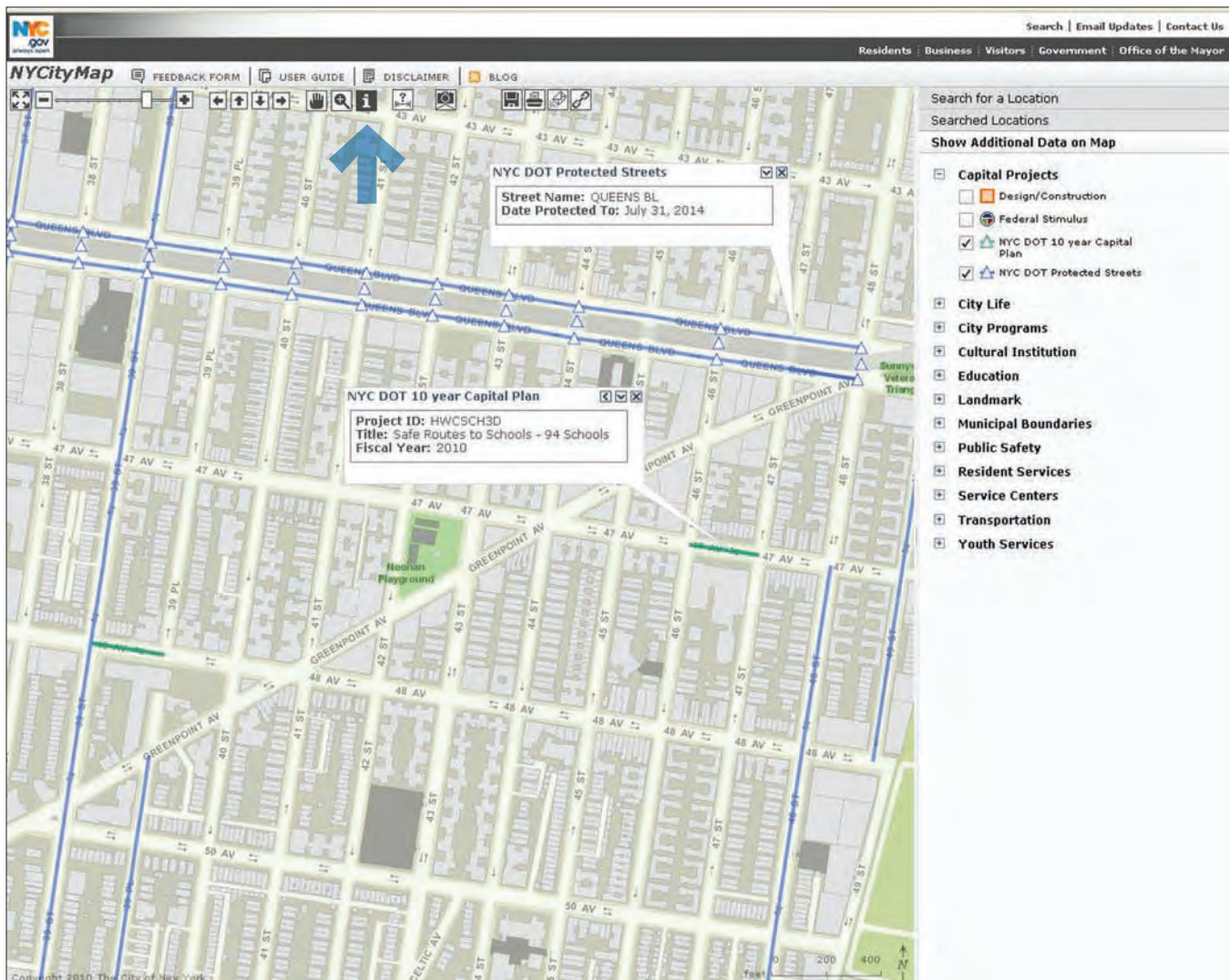
The milling and resurfacing schedules are organized by borough and are sent electronically each week to utility companies and other city agencies. A longer-term resurfacing schedule that forecasts several months of anticipated work is distributed during borough-level monthly utility coordination meetings (see Section 2.3 Key Principles for Effective Notice and Coordination of Planned Street Work). NYC DOT's

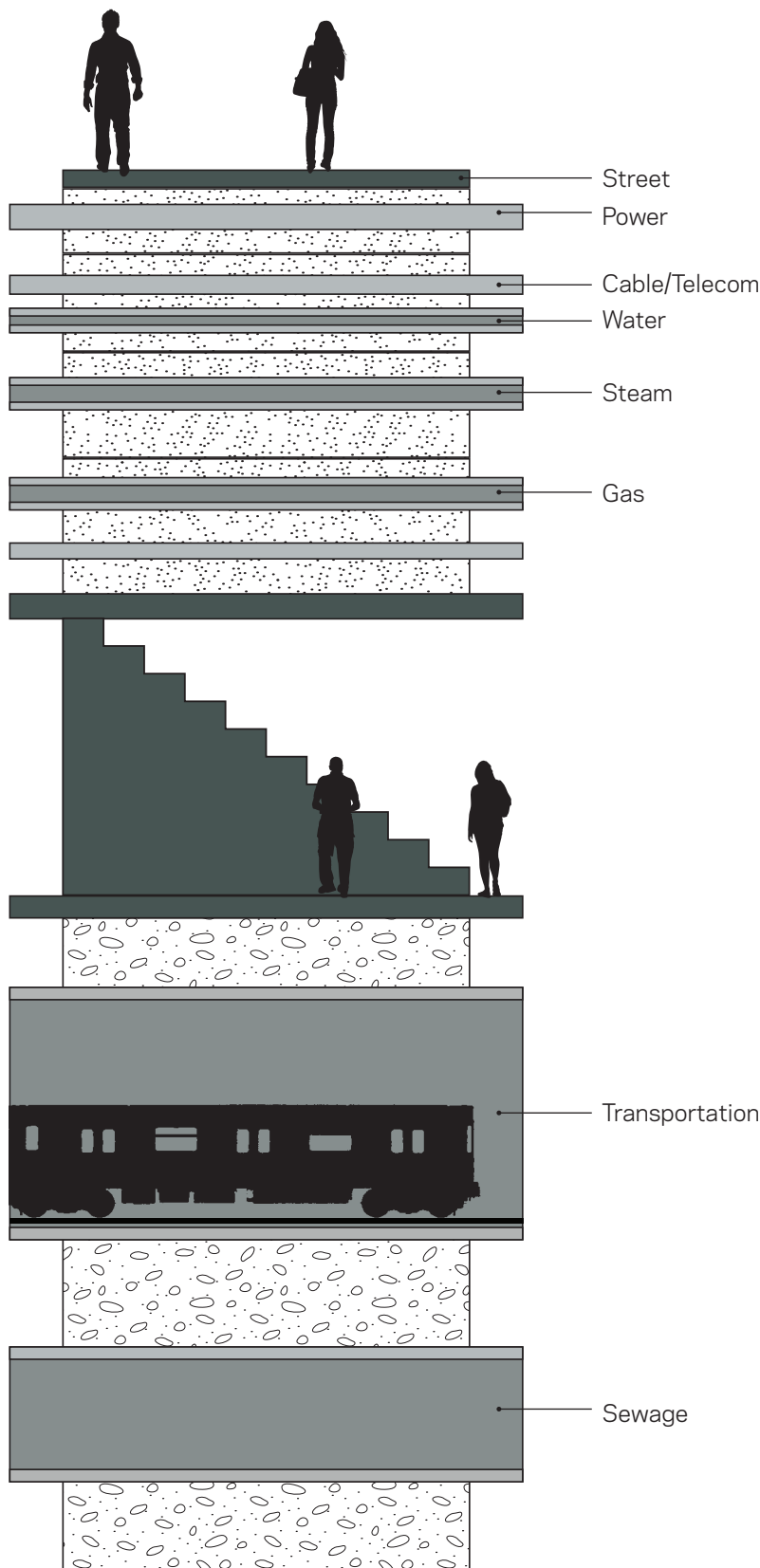
concrete repair schedule for roadways, sidewalks and other assets in the street can also be accessed from this link.

2 Embargoes. NYC DOT imposes construction "embargoes" (a temporary suspension of active permits in the affected area) for significant special events including the New York City Marathon, parades, high profile projects and the winter holiday season. A list of current construction embargoes is available online at <http://www.nyc.gov/html/dot/html/motorist/trafalrt.shtml>.

Additional information regarding embargo periods is provided in Chapter 3, Section 3.6.2.

MILLING AND RESURFACING: during street resurfacing, the top layer of existing asphalt is milled away (ground up and removed) and a new layer of asphalt is applied.





Section 2.3 Key Principles for Effective Notice and Coordination of Planned Street Work

NYC DOT is working to enhance the coordination of major planned work that impacts the streets with utility companies and other entities that perform street excavations. To this end, NYC DOT has dedicated time and resources to enhance its own systems and coordination efforts. It is important that contractors and utility companies are responsible partners as well in order for coordination to be effective. Coordinating street work in accordance with the principles of this section will help to minimize delays and disruption to road users, businesses and residents and help extend the useful life of city streets. Key principles for effective coordination include:

1 Provide notice of planned street work at earliest opportunity. The basic principle of providing adequate advance notice is the greater the disruption, the longer the notice period needed.

The notice provisions specified in Section 2-02(g) of the Highway Rules are the minimum required for street operations. The Highway Rules can be accessed at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

By mutually sharing data before detailed construction plans have been developed NYC DOT and street excavators can adjust their project plans to avoid conflict and maximize the potential opportunity for street work coordination.

2 Share long-term capital plans for planned repairs, upgrades and new service. Information on long-term capital programs from potential street excavators helps NYC DOT to effectively coordinate planned street work. It also helps NYC DOT to identify opportunities for joint bidding and to coordinate the timing of the agency's resurfacing and reconstruction activities.

3 Regular input and attendance of decision makers at coordination meetings. Regular coordination meetings allow decision makers to share information and to discuss project difficulties and constraints. Several forums are in place to provide advance notice of city capital projects. NYC DOT hosts borough-level meetings to discuss the scheduling of upcoming resurfacing

projects with utility companies and other potential street excavators. NYC DOT also routinely meets with utility companies and others who perform street excavations to inform these organizations of upcoming events and major construction projects with which NYC DOT is involved. Additionally, in the middle of each fiscal year, the New York City Department of Design and Construction (DDC) convenes a meeting with other agencies and utilities to discuss city projects under its purview that are expected to begin construction during the next four years. During the final design stage of a city project, DDC will also hold a series of alignment meetings with the utilities and other agencies to inform them about proposed changes to the location of street infrastructure that would require facility relocation.



Coordination aims to reduce street excavation work on recently repaved streets.



This aerial photograph shows most of the area covered by the NYC DOT Lower Manhattan Borough Commissioner's Office.

Section 2.4 Advance Notice and Coordination in Lower Manhattan

Permitting, coordination, and inspections in Lower Manhattan are handled differently from the rest of the city. The NYC DOT Lower Manhattan Borough Commissioner's Office (LMBCO) is responsible for the coordination of activities affecting the street among city and state agencies, private organizations, and all others involved in the reconstruction effort so that the work is accomplished with the least amount of disruption on all

streets south of Canal Street. The Lower Manhattan Construction Command Center (LMCCC) brings NYC DOT and other key stakeholders together each week to discuss the status of projects, scheduling of reconstruction work, and conditions in Lower Manhattan. LMCCC prepares 10-year forecast reports on the availability of materials, equipment and labor; detailed project schedules; and other variables (redefined on a monthly basis). The weekly coordination meetings are attended by representatives of large contractors and construction companies, utility companies, and

the New York City Police Department. All contractors that have taken out permits for work in Lower Manhattan are required to attend these meetings, with the exception of permittees working on very small projects. When multiple projects and complex coordination issues need to be addressed within a concentrated work zone, the LMCCC will schedule special meetings.

Lower Manhattan Borough Commissioner

(Manhattan south of Canal Street)

Luis Sanchez

(212) 839-7250

**NYC DOT issued
more than 244,000
construction-related
street work
permits during
Fiscal Year 2010.**

3. Permits and Approvals

Utility companies, developers, contractors, and excavators who undertake any type of construction that will impact the street or occupy it with equipment, structures or other installations must obtain a permit.

Chapter Topics:

Section 3.1	General Provisions for Construction-Related Permits
Section 3.2	The Permittee Registration Process
Section 3.3	The Permit Application Process (Non-Emergency Work)
Section 3.4	Canopy Authorizations and Permits
Section 3.5	Other Provisions Pertaining To Permits
Section 3.6	Emergency Work and Special Circumstances
Section 3.7	Vault Approvals

For a list of all the web links pertaining to this chapter, refer to Appendix E, Links.

About this Chapter

New York City is brimming with construction activity—from the building of skyscrapers, rehabilitating and reconstructing of bridges and roadways, to the digging of new subway lines. At the foundation of the city that never sleeps lays a network of streets that helps keep New York and New Yorkers moving forward. In order to maintain world-class streets, permits must be obtained for the work performed in the street.

The term “street” means a public street, avenue, road, alley, lane, highway, boulevard, concourse, parkway, driveway, culvert, sidewalk, crosswalk, boardwalk, viaduct, square or place, except those streets adjacent to any waterfront property designated as a marginal street on a city map. This chapter describes the different types of permits that are issued by the New York City Department of Transportation (NYC DOT), the one-time permittee registration process, the application procedure for each permit type, and special circumstances and procedures.



Permit windows at the central Permit Office

Section 3.1 General Provisions For Construction-Related Permits

PERMITTEE:
is an individual, corporation,
business or other entity who
secures permits for all work
regulated by NYC DOT, pursuant
to the Highway Rules.

NYC DOT's mission is to provide for the safe, efficient and environmentally responsible movement of pedestrians, goods, bicycles and vehicular traffic on the streets of the city of New York. In addition, the streets serve as the access point for the subsurface infrastructure that provides water, sewer, power, and telecommunications services for the city. NYC DOT registers permittees, and coordinates and issues permits for construction-related activity on streets.

Anytime-anywhere applications and *any printer* plain paper production of approved permits are becoming available to more NYC DOT customers. Many people and businesses who pay by credit card no longer need to visit a NYC DOT office to apply for or receive their approved permits.

Previously, electronic filing and permitting was available only to the city's large utilities. They account for over half of all street construction permit requests. Using the Internet, NYC DOT will make this convenient and efficient capability available to all applicants.

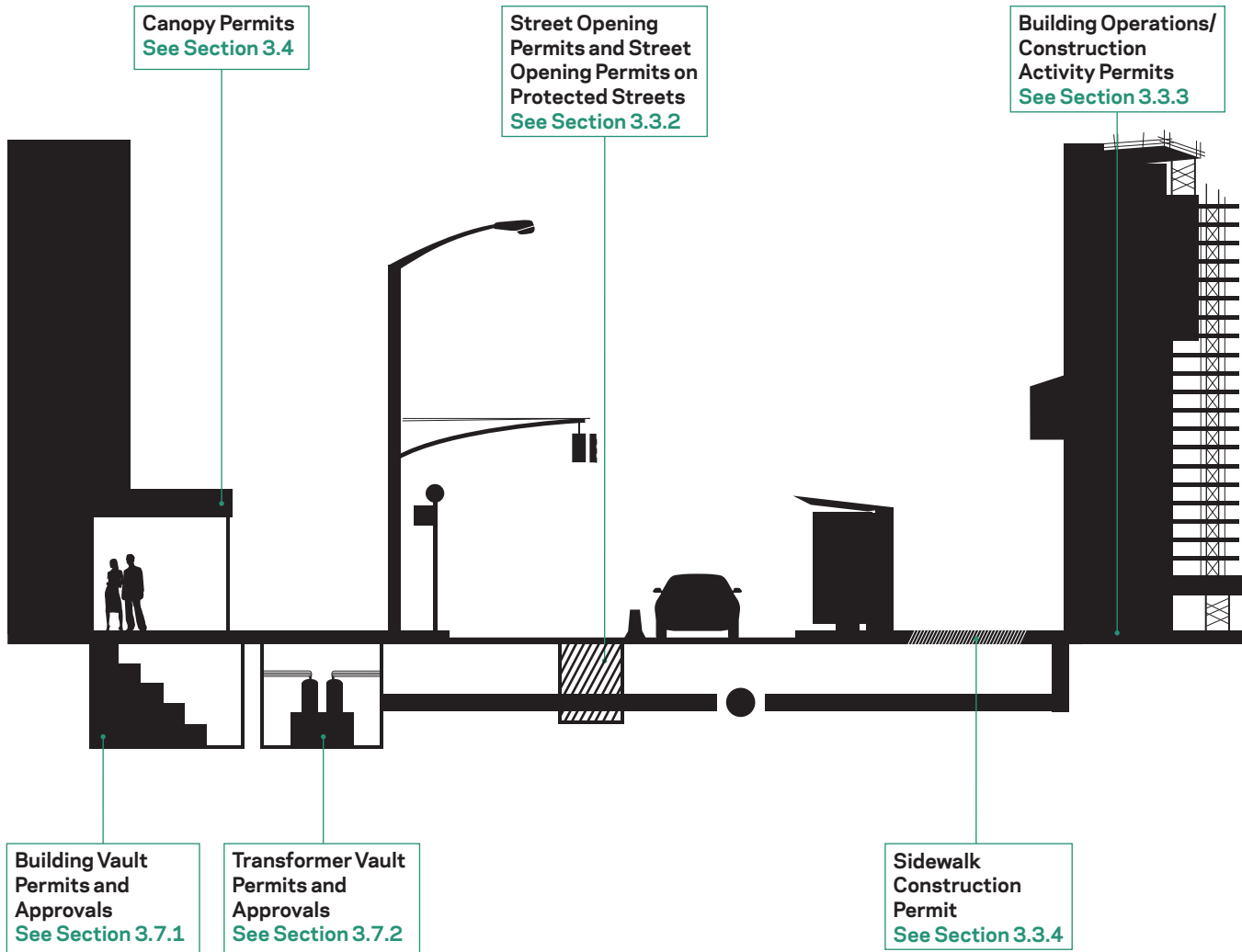
The city's new Commercial Refuse Container permit application was the first permit type available online to apply for and print approved permits *anytime-anywhere*. These permits help NYC DOT regulate and monitor the location and duration of the placement of commercial refuse containers that are placed in the street.

During the second quarter of 2011 *anytime-anywhere* applications became available for additional permit types:

- Street Opening
- Building Operations
- Sidewalk Construction
- Permit Renewals

Anytime-anywhere permit applications also enhances the efficiency of NYC DOT permitting operations. By eliminating manual steps, some applications that used to take up to five business days for approval and printing may now be approved and issued within a single business day.

NYC DOT Permits and Approvals



Who Issues Construction-Related Permits for Work on a Street?

The NYC DOT Bureau of Permit Management and Construction Control (the Bureau) is responsible for overseeing all construction-related permitting. The Bureau is comprised of two offices:

1 The Office of Permit Management (Permit Office) registers permittees, receives all construction-related permit applications, reviews them for accuracy and completeness and applies appropriate fees. There is a central Permit Office in Manhattan and borough Permit Offices in each of the other boroughs.

2 The Office of Construction Mitigation and Coordination (OCMC) reviews all construction permit applications and develops construction activity [stipulations for permits](#) to allow for work to occur with minimal disruption to businesses, motorists, bicyclists and pedestrians, and avoid conflicts with other construction projects and special events. OCMC also interfaces with project engineers, city agencies, community boards, elected officials and the general public to resolve construction issues related to mobility.



All work within the street requires a NYC DOT permit to minimize construction impacts.

PERMIT STIPULATIONS:
are terms and conditions listed on the permit that must be followed by the permittee. Permit stipulations can include allowable days and hours for work, restrictions on street usage, and provisions for the maintenance and protection of traffic.

Types of Permits

There are four categories of construction-related permits for work on a street: Street Opening, Building Operations/Construction Activity, Sidewalk Construction, and Canopy Permits. To provide an overview, each is described briefly in the remainder of this section. More specific information on each permit type, including application procedures and fee structures are described in greater detail in *Section 3.3 The Permit Application Process* of this chapter. Procedures to follow in the event of an emergency or the need to apply for a permit during an embargo period are explained in *Section 3.6 Emergency Work and Special Circumstances* later in the chapter.

Street Opening Permits

This category of permits applies to openings/excavations or other work in a street that may cause damage to the street surface or to any work that the Permit Office believes would compromise the street surface. Street Opening Permits are generally taken out by entities that need access to subsurface infrastructure, including utility companies and contractors, such as licensed master plumbers.

Building Operations/ Construction Activity Permits

This category of permits applies to construction-related activities that take place within the street and are generally associated with construction work adjacent to the street. Typically, a valid permit issued by the New York City Department of Buildings (DOB) is required prior to application for permits in this category. Some of the construction-related activities covered under this category include placement of materials, equipment and temporary structures on the street or sidewalk (e.g., building materials, cranes, boom trucks, a shanty or trailer, construction container, security structure, tool cart, or construction parking regulation signs) or movement of construction equipment across roadways and sidewalks. This category also covers installations above the street such as banners and decorative lights and permanent installations on the street such as bike racks. Building Operations/ Construction Activity Permits are generally taken out by entities that perform construction activities, including developers and contractors.



Crane placed on the street for construction activity. Cranes may require permits from DOB in addition to NYC DOT.

Sidewalk Construction Permits

This category of permits applies to any repairs, replacements or new sidewalk installations. Sidewalk Construction Permits are generally taken out by entities that need to perform work on sidewalks, including developers, contractors, and private homeowners (for sidewalk repairs and only if performing the work themselves).

Canopy Authorizations and Permits

This category of permits applies to authorizations and permits required to place a **canopy** over the sidewalk. A one-time Street Opening Permit must also be obtained to install the poles that support the canopy. Canopy permits are generally taken out by building owners, business owners, and canopy installers.

In Fiscal Year 2010, NYC DOT issued approximately:

136,000 Street Opening Permits throughout the five boroughs

88,000 Building Operations/ Construction Activity Permits

17,000 Sidewalk Construction Permits.

CANOPY:

is a supported cover, usually made of fabric, located over the sidewalk and held up by poles installed into the sidewalk.

Basic Registration Process



Section 3.2 The Permittee Registration Process


In order to apply for a permit, an applicant must first register in person with NYC DOT by submitting a completed Permittee Registration Application. Although registration is a one-time process, registered applicants must keep all insurance and general information up to date, which must be done in person at the central Permit Office.

3.2.1 Required Documentation for a Permittee Registration Application

The required documents include:

- 1** Completed Permittee Registration Application, found at <http://www.nyc.gov/html/dot/downloads/pdf/regapp.pdf> and in Appendix B, Forms.
- 2** Copy of E.I.N. or Tax I.D. number as provided by the Internal Revenue Service (IRS).
- 3** Original insurance certificates for Commercial General Liability (CGL) insurance and Worker's Compensation insurance.
 - a.* CGL insurance. The applicant must satisfy all of the requirements listed in the Highway Rules, Section 2-02(a) (3) found at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf> or at <http://www.nyc.gov/html/dot/downloads/pdf/insurancereq.pdf>. Additionally, Section 2-02(a) (3) contains an indemnification provision to which all permittees are subject.

- A Certificate of Insurance may be provided as proof of insurance coverage only if accompanied by a certification form by the insurance broker or insurance company attesting to the accuracy of the coverage described on the certificate. A sample certification form can be found at http://www.nyc.gov/html/dot/downloads/pdf/certification_broker.pdf and in Appendix B, Forms. A sample of an acceptable Certificate of Insurance can be found at <http://www.nyc.gov/html/dot/downloads/pdf/insurancercert.pdf> and in Appendix B. Applicants may provide complete copies of insurance policies instead of certificates of insurance.
- The applicant must obtain CGL insurance policies written by companies that may lawfully issue such policies, with an A.M. best rating of at least A-VII or a Standard & Poor's rating of at least AA. The CGL policy should provide coverage in the amount of no less than \$1 million combined single limit per occurrence, except for applications for permits to place a crane on a street, which requires \$3 million combined single limit per occurrence.

All CGL insurance policies must contain the following cancellation clause: *In the event of expiration or cancellation of any such policy, the company will give the Permit Office at least **30 days'**  written notice prior to such expiration or cancellation.*

b. Worker's Compensation Insurance.

Each applicant must obtain and provide Worker's Compensation insurance in accordance with the laws of the State of New York from a licensed insurance company.

4

Permit Bond. Where applicable, an applicant must submit an original Permit Bond to the Permit Office at the time of permit issuance to cover all costs and expenses that may be incurred by the city as a result of the activity for which the permit is issued or for the purpose of otherwise safeguarding the interests of the city. Permit Bonds, as described in the [Highway Rules](#), Section 2-02 (a) (4), should cover all permitted activities.

5

Copies of incorporation papers, licenses, and business certificate or filing receipt filed with the state of New York.

All addresses must be the same on all above referenced documents.

HIGHWAY RULES:
are codified in **Chapter 2 of Title 34 of the Rules of the City of New York.**

Instructions for Permittee Registration Application

The instructions below apply to both corporations and individuals. For individuals, "Not Applicable" should be filled in for all corporation-related questions. Registration applications should be printed on 8 1/2"x 14" paper.

Section A: Applicant Information

- 1 Name:** Enter the name of the individual or corporation to be registered with NYC DOT. If AKA (also known as) is applicable, enter this name.
- 2 Identification:** Enter the applicant's Tax Identification Number (AKA Employer Identification Number) or the individual's Social Security Number.
- 3 Address:** Enter the applicant's contact address (street number and name).
- 4 City, state, zip:** Enter city, state and zip code.
- 5 Telephone Number:** Enter daytime telephone number.
- 6 Fax Number:** Enter applicant's fax number.
- 7 24-Hour Emergency Telephone Number:** Enter a telephone number where the applicant can be reached at all times (for emergency situations).
- 8 Email:** Enter applicant's email address.

Section B: Applicable License Numbers

Enter the license numbers as required for each type of work to be performed, including the plumber's license number and name on license (if applicable).

Section C: Category of Work Performed

Check all types of work that will be performed by the applicant or his/her corporation.

Section D: Work in Borough

Check each borough in which the applicant expects to work.

Section E: Authorized Representatives to Obtain Permits

Enter all persons authorized to obtain permits for the applicant, their affiliation to the applicant and their telephone number, including the name of any expediter. If the applicant makes any changes to these authorized representative(s), he or she must update the Permittee Registration Application.

Section F: Company Officers/Directors/Managing Agents/etc.

Enter at least two names of corporate officers, with title.

Section G: Designated Representative(s) to Accept Service of Summons at the Applicant's Business Office:

Enter the names of at least two people who are authorized to accept summonses for his/her corporation and who are located at his/her business address.

Section H: Signature of Company Officer

Print his/her name and title and provide a signature.

NOTARIZE THE FORM.

These instructions also can be found at http://www.nyc.gov/html/dot/downloads/pdf/inst_regapp.pdf.

Homeowners applying for Sidewalk Construction permits who intend to do the work themselves do not need to register.

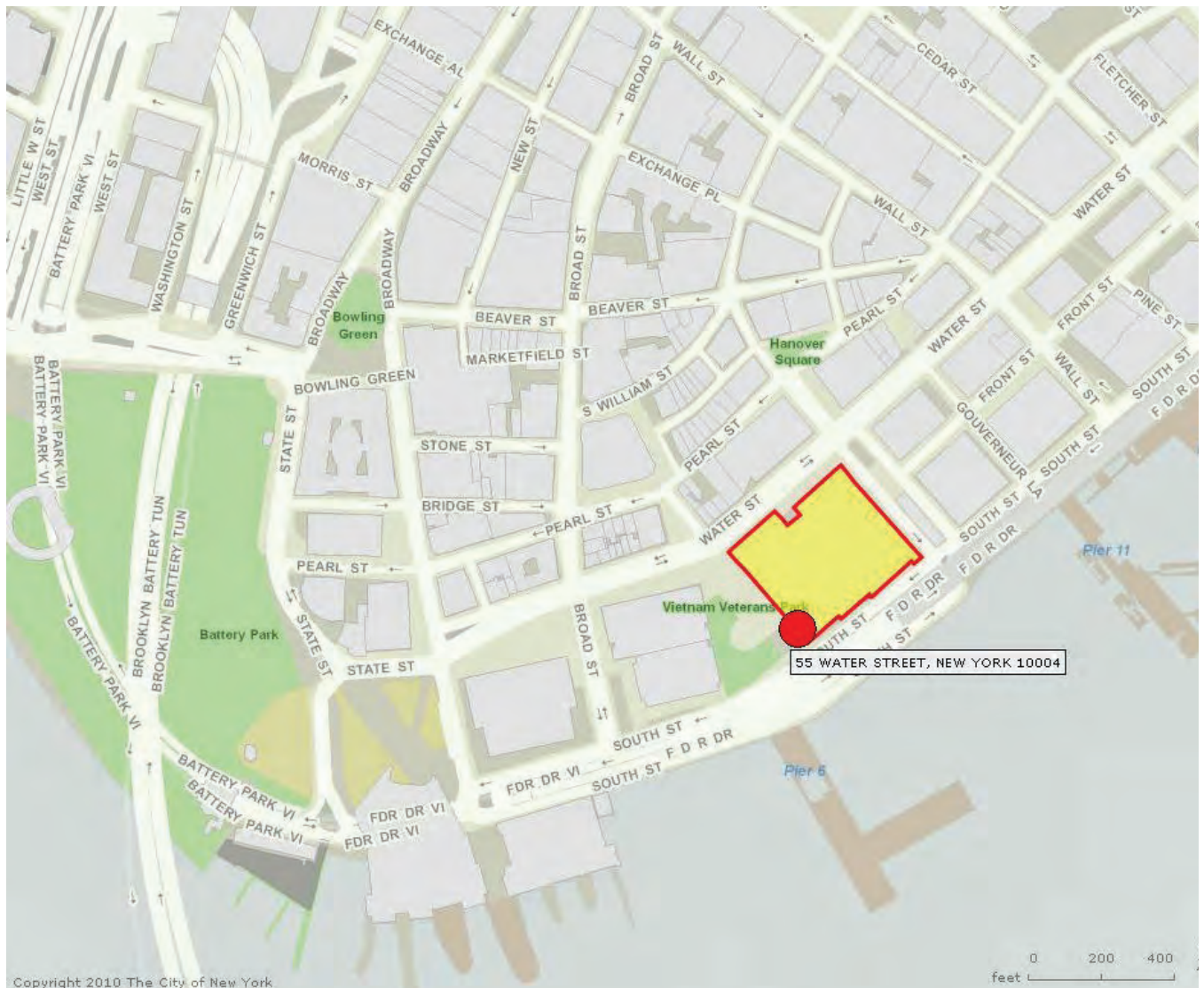
3.2.2 Permittee Registration Application Submittal

The completed Permittee Registration Application and other required documents must be submitted in person to the NYC DOT central Permit Office to complete the registration process.

A full review will typically take between two and seven days. If a new Permit Bond is being submitted as part of the registration documents, it requires an additional review.

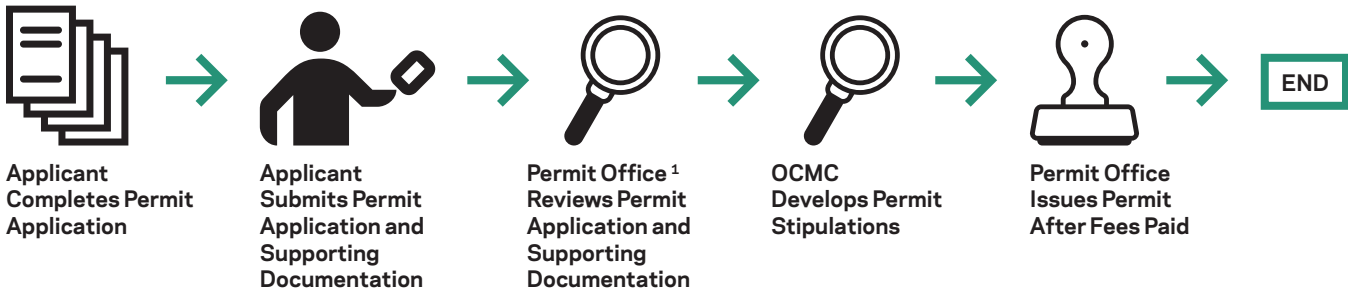
When all necessary information has been submitted and reviewed, the applicant is issued a Permittee ID Number that must be used on all permit applications. This number should be kept confidential and only used to apply for NYC DOT permits.

Questions regarding permit registration can be directed to the central Permit Office. The contact information and hours of operation can be found in Appendix C, NYC DOT Contact Information.



The central Permit Office entrance is via Vietnam Memorial Plaza between Water and South Streets.

Basic Permit Application Process for All Streets in Manhattan and Critical Streets in All Boroughs (Non-Emergency Work)



Note:

1. For Staten Island: work on critical streets in Staten Island can be submitted to the borough office

Section 3.3
The Permit Application Process (Non-Emergency Work)

There is one permit application form that covers Street Opening, Building Operations/Construction Activity, and Sidewalk Construction permits for non-governmental work. Applications for most permits can be submitted online using anytime-anywhere permitting, which can be found at <http://www.nyc.gov/dot/constructionpermits>. For applicants who prefer to apply in person, Application for Roadway/Sidewalk Permit(s), can be found at <http://www.nyc.gov/html/dot/downloads/pdf/permapp.pdf> or in Appendix B, Forms. There are separate permit applications for governmental work, Canopy Permits, and permit renewals and re-issuance, all of which are explained later in this chapter.

In some cases, applications and supporting documentation must be submitted in person. The location to which the application should be submitted depends on the location and type of construction-related work to be performed:

Central Permit Office in Manhattan — In-person applications for non-emergency work, including work on all streets in Manhattan and on all **critical streets** in Brooklyn, Queens and the Bronx; all work to be performed for sewer and water system construction; and all capital project work, all utility work, all crane requests, and all full closures of sidewalks and roadways must be submitted only to the central Permit Office in Manhattan.

Borough Permit Offices — In-person applications for all other construction-related work can be submitted to the borough office in the borough in which the work is to be performed. The Staten Island borough permit office also accepts applications for work on critical streets in Staten Island. The contact information and hours of operation for all Permit Offices can be found in Appendix C, NYC DOT Contact Information.

Permit processes may be revised as anytime-anywhere permits are increasingly used. Check <http://www.nyc.gov/permits> for updated information.

CRITICAL STREETS: are locations where construction will significantly impact pedestrians, motorists, and bicyclists. A list of all critical streets can be found in the Highway Rules, Section 2-07 (c) (5) at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

EMBARGO PERIOD: means a period of time in which permitted work is temporarily suspended due to significant events and activities as designated by NYC DOT.

Basic Permit Application Process for All Streets other than Critical Streets in Brooklyn, Queens, Staten Island and the Bronx (Non-Emergency Work)



3.3.1 Common Requirements for All Permit Types

1

Applicants must be registered with NYC DOT and have a Permittee ID Number, except in the case of a Sidewalk Repair Permit taken out by a homeowner, where the work will be performed by the homeowner.

2

Applicants must submit a completed permit application. Generally, applicants must provide business and contact information; proposed work information, including location, size of proposed work, and the work start and end date; type of permit(s) being requested; detailed work zone sketch; and date and signature of applicant or authorized representative. The permit application can be found at <http://www.nyc.gov/html/dot/downloads/pdf/permapp.pdf> or in Appendix B, Forms.

3

Applicants must obtain all applicable original permits and/or approvals from any other governmental agencies prior to applying for a permit. Common examples include approval from the New York City Department of Parks and Recreation (Parks) if any street trees or tree pits will be affected by the proposed work;

a permit from the New York City Department of Environmental Protection (DEP) if any water or sewer line will be affected; and a Certificate of Appropriateness from the New York City Landmarks Preservation Commission (LPC) if the proposed work is within an Historic District. Copies may be accepted if approved by the Permit Office in advance. A table showing the agencies that must be contacted prior to applying for certain NYC DOT permit types can be found in Appendix A, Common Permit Types and Documents Needed; a list of contact numbers for these agencies can be found in Appendix D, Other Agency and Utility Contact Information.

4

If the applicant intends to work on a contract that has been awarded by a government agency or authority, the applicant must bring a copy of the contract, Order on Letter, Notice to Proceed or a Letter of Authorization. Applicants should indicate on the application, Application for Governmental Work Permit(s), their name and the name of the governmental agency or authority for which they are working. The Application for Governmental Work Permit(s) can be found at http://www.nyc.gov/html/dot/downloads/pdf/govt_work_permit_app.pdf or in Appendix B, Forms.

5

If the applicant intends to fully close a roadway, a Request for Full Roadway Closure must be completed. The Request for Full Roadway Closure can be found at http://www.nyc.gov/html/dot/downloads/pdf/roadway_closure_app.pdf or in Appendix B, Forms.

6

If the applicant intends to do work associated with a Franchise, Concession or Revocable Consent Agreement, the applicant must have a copy of the Agreement prior to applying for a permit. Further information regarding these agreements can be found at <http://www.nyc.gov/html/dot/html/permits/franinfo.shtml>.

7

Any work is subject to suspension during an NYC DOT-issued **embargo period**, unless otherwise designated.

Questions regarding permit registration or application processes can be directed to any Permit Office. Contact information can be found in Appendix C, NYC DOT Contact Information.

3.3.2 Application Procedures for a Street Opening Permit

Street Opening Permits are required for excavations or other work in a city street that disturbs the street surface.

Outlined below are the basic application procedures for Street Opening Permits. These are in addition to the “Common Requirements” listed at the beginning of this section. Additional requirements are contained in Sections 2-02 and 2-11 of the Highway Rules at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf> and should be consulted before any work is performed on the street.

1 Street Opening Permits are designated as the “01” permit series, meaning all permits in this category begin with “01.” Listed on the following page are the most commonly requested Street Opening Permit types which may be used when completing an application. A separate permit is required for each street opening activity.

2 All Street Opening permit types usually allow for work within 300 linear feet by a width of 12 feet.

Other conditions may apply, such as a variation in the distance and width of the job, which may increase the fee required. For further information regarding fees, the applicant should refer to Section 2-03 of the Highway Rules.

3 An application for a Street Opening Permit on a protected street will automatically be placed on a Street Arterial Maintenance (SAM) hold if the proposed work is to start within 18 months of the street being resurfaced or reconstructed. The hold is to review the proposed work and set conditions for the work and/or the street restoration. More information on this and other “holds” that may be placed on permit applications can be found in *Section 3.5 Other Provisions Pertaining to Permits* of this chapter.

Information on restoration requirements following street openings/excavations can be found in **Chapter 4. Executing Work in the Street**.

Protected Streets Listing

A street is considered to be protected for five years from the date it was last resurfaced or reconstructed. The purpose of placing a street in protected status is to maintain the integrity of a new street surface.

The list of protected streets is updated daily and is accurate as of the previous business day. Prior to submitting a Street Opening Permit application, the Protected Streets Listing should be consulted in order to determine if the proposed work location is in protected status. If the proposed work location is in protected street status, the application will automatically be placed on SAM hold for further review.

Only in circumstances where the applicant can demonstrate that the work could not have been reasonably anticipated prior to the street resurfacing/reconstruction, will an application for a Street Opening Permit on a Protected Street be reviewed.

The Protected Streets Listing consists of four separate files, each covering all five boroughs:

Protected street status for segments

Protected street status for intersections

Active/Future start dates of projects for segments

Active/Future start dates of projects for intersections

All streets on the “Active/Future” lists show the anticipated start date of the project. This information should be used to plan work before streets go into protected street status.

The Protected Streets Listing can be accessed at <http://www.nyc.gov/html/dot/html/permits/protectedst.shtml#plisting>.

PROTECTED STREETS:
A street is considered to be in protected status for a period of five years from the date it was last resurfaced or reconstructed. The purpose of placing a street in protected status is to maintain the integrity of a new street surface.

Street Opening Permits (Non-Protected)				Street Opening Permits (Protected)	
Type	Name	Fee	Duration in Days	Permit No.	Fee
0100	Open Sidewalk To Install Foundation	\$135	30/90	0100P	\$135
0102	Major Installations - High Voltage	\$135	30/90	0102P	\$380
0103	Major Installation - Gas	\$135	30/90	0103P	\$380
0104	Major Installations - Steam	\$135	30/90	0104P	\$380
0105	Major Installations - Telephone	\$135	30/90	0105P	\$380
0106	Transformer Vault - In Roadway	\$135	15/30	0106P	\$380
0107	Transformer Vault - In Sidewalk Area	\$135	15/30	0107P	\$135
0108	Installation Of Poles	\$135	30	0108P	\$135
0109	Major Installations - Water	\$135	30/90	0109P	\$380
0110	Major Installations - Cable	\$135	30/90	0110P	\$380
0111	Major Installations - Sewer	\$135	30/90	0111P	\$380
0112	Rapid Transit Construct/ Alteration	\$135	30/90	0112P	\$380
0113	Repair Water	\$135	15/30	0113P	\$380
0114	Repair Sewer	\$135	15/30	0114P	\$380
0115	Repair Water - Sewer	\$135	15/30	0115P	\$380
0116	Fuel Oil Line	\$135	15	0116P	\$135
0117	Vault Construction Or Alteration	\$135	30	0117P	\$135
0118	Reset, Repair Or Replace Curb	\$135	30	0118P	\$135
0119	Pave Street-W/ Engineering & Inspection Fee	\$135	15	0119P	\$135
0120	Tree Pits	\$135	30	0120P	\$135
0121	Construct Or Alter Manhole Or Casting	\$135	15	0121P	\$380
0122	Repair Gas	\$135	30	0122P	\$380
0123	Repair Steam	\$135	30	0123P	\$380
0124	Repair Electric/Communications	\$135	30	0124P	\$380
0126	Test Pits, Cores Or Boring	\$135	15	0126P	\$380
0127	Conduit Construction And Franchise	\$135	15	0127P	\$380
0128	Erect Canopy	\$135	30		
0129	Install Street Furniture	\$135	30	0129P	\$135
0130	Land Fill	\$135	30	0130P	\$135
0131	Private Sewer	\$135	30	0131P	\$380
0132	Install Fence	\$135	30	0132P	\$135
0133	Install Traffic Signals	\$135	30	0133P	\$380
0134	Repair Petroleum Leak	\$135	30	0134P	\$380
0138	Installation Of Fire Alarm Box	\$135	30	0138P	\$135
0139	Installation Of Bus Shelter	\$135	30	0139P	\$135
0151	Installation Public Pay Telephone	\$135	30	0151P	\$135

3.3.3 Application Procedures for a Building Operations/Construction Activity Permit

Building Operations/Construction Activity Permits apply to construction activities that take place within the street and are generally associated with construction work adjacent to the street. A valid permit issued by DOB is usually required in order to apply for permits in this category. Some of the activities covered include placement of materials, equipment and temporary structures on the street or movement of construction equipment across roadways and sidewalks. It also covers installations above the street such as banners and decorative lights and permanent installations on the street such as bike racks.

Outlined below are the basic application procedures for Building Operations/Construction Activity Permits. These are in addition to the “Common Requirements” listed at the beginning of this section. Additional requirements are contained in Sections 2-02 and 2-05 of the Highway Rules at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf> and should be consulted before any work is performed on the street.

1 Building Operations/Construction Activity Permits are designated as the “02” permit series, meaning all permits in this category begin with “02”. Listed in the table are the most commonly requested Building Operations/Construction Activity Permit types, which may be used when completing an application. A separate permit is required for each construction-related activity, except where otherwise provided in the Highway Rules or by permit stipulations.

Building Operations/Construction Activity Permits

Permit No	Name	Fee	Duration
0201	Place Material On Street	\$50	90 days
0202	Crossing Sidewalk	\$50	90 days
0203	Place Crane Or Shovel On Street	\$50 +\$100 inspection fee	1 week
0204	Place Equipment Other Than Crane Or Shovel	\$50	90 days
0205	Place Shanty Or Trailer On Street	\$50	90 days
0207	Franchise Installations (Overhead Structures)	\$50	90 days
0208	Temporary Pedestrian Walk	\$50	90 days
0211	Occupancy Of Roadway As Stipulated	\$50	90 days
0214	Place Container On The Street	\$50	90 days
0215	Occupancy of Sidewalk As Stipulated	\$50	90 days

2

An Occupancy of Sidewalk Permit is required when either more than 3 feet from the property line is obstructed by a fence or a minimum of 5 feet of clear path cannot be maintained for pedestrians, or as otherwise stipulated.

3

An Occupancy of Roadway Permit is required for closing all or part of one or more lanes of roadway and/or during blasting operations.

4

A permit is required to place any construction trailer or similar structure in the street.

5

For building operations, a crane permit is required for all cranes and derricks operating in the street on building construction or related activity under the jurisdiction of DOB, with the exception of truck cranes with telescopic, hydraulic or folding booms, over 50 feet and not more than 135 feet with a maximum rated capacity of 3 tons, for which a construction activity permit has been issued. Other requirements may apply to the movement of cranes within city limits, such as daily or annual over-dimensional travel permit(s) as issued by NYC DOT.

6

For street operations, a crane permit is required for all cranes and derricks operating in the street with a maximum rated capacity greater than 20 tons and which are not related to building operations. Other requirements may apply to the movement of cranes within city limits, such as daily or annual over-dimensional travel permit(s) as issued by NYC DOT.

7

The applicant may be required to address the circumstances of a hold before a permit is released. An explanation and description of “holds” may be found in *Section 3.5 Other Provisions Pertaining to Permits* of this chapter.

3.3.4 Application Procedures for a Sidewalk Construction Permit

Sidewalk Construction Permits apply to any repairs, replacements or new sidewalk installations.

Outlined below are the basic application procedures for Sidewalk Construction Permits. These are in addition to the “Common Requirements” listed at the beginning of this section. Additional requirements are contained in Sections 2-02 and 2-09 of the Highway Rules at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf> and should be consulted before any work is performed on the street.

1 Sidewalk Construction Permits are designated as the “04” permit series, meaning all permits in this category begin with “04”. Listed in the table at the bottom of this page are the most commonly requested Sidewalk Construction Permit types, which may be used when completing an application.

A permit is not required to install, repave, reconstruct or repair any sidewalk where the work involves an area of less than 25 square feet, unless the purpose of the work is to remove a violation.

2 A separate Occupancy of Sidewalk Permit is required if a minimum of 5 feet cannot be maintained on the sidewalk for unobstructed pedestrian passage.

3 If the existing sidewalk is the structural roof of a vault or other opening, a DOB-approved plan for the restoration of the sidewalk, must be submitted as part of the application process.

4 The applicant may be required to address the circumstances of a hold before a permit is released. An explanation and description of “holds” may be found in *Section 3.5 Other Provisions Pertaining to Permits* of this chapter.

NYC DOT accepts and processes applications by mail for sidewalk repair performed by private homeowners. This unique procedure is described below.

Sidewalk Construction Permits

Permit No	Name	Fee	Duration
0401	Repair Sidewalk	\$70	30 days
0402	Construct New Sidewalk	\$70	30 days
0403	Replace Sidewalk	\$70	30 days
0404	Construct New Sidewalk With Heating Pipe	\$70	30 days
0405	Construct New Sidewalk Builders Pavement	\$70	30 days



A permit is required for new sidewalk installation, repairs, and replacements. Projects requiring sidewalk closure may require additional permits.

Applying for a Sidewalk Repair Permit by Mail (Private Homeowners ONLY)

If a private homeowner is applying for a Sidewalk Repair Permit, and will be making the repair by himself/herself, the homeowner may apply for a permit by mail. (If the homeowner is using a contractor, the contractor must be registered with NYC DOT and must take out the permit.) Outlined below are the basic procedures in applying for a Sidewalk Repair Permit by mail:

1

The private homeowner must complete the application for a Roadway/Sidewalk Permit. This permit application can be found at <http://www.nyc.gov/html/dot/downloads/pdf/permapp.pdf>, in Appendix B, Forms, or by calling 311.

2

A mandatory Affidavit of Ownership must be completed, notarized and returned with the permit application. This form can be obtained at <http://www.nyc.gov/html/dot/downloads/pdf/affidavitform.pdf> or in Appendix B, Forms. This form verifies that the person applying for the permit is the homeowner and will be performing the repairs to the sidewalk pursuant to the permit issued by NYC DOT. No permit will be issued unless the affidavit is complete and notarized.

3

The completed application, affidavit, a stamped self-addressed envelope and a certified check made payable to NYC DOT for the permit fee (currently \$70.00 for up to 300 linear feet) must be mailed to:

The New York City
Department of Transportation
Permit Management & Construction
Control Permit by Mail
55 Water Street, Concourse Level
New York, New York 10041

Upon receipt of the above and verification for completeness, a Sidewalk Repair Permit will be issued and mailed to the applicant.

Information on the restoration requirements for sidewalk repairs can be found in **Chapter 4. Executing Work in the Street.**

3.3.5 Permit Application Review and Issuance (for Street Opening, Building Operations/ Construction Activity, and Sidewalk Construction Permits)

Permit Review is the process by which NYC DOT reviews permit applications and supporting documentation and makes determinations regarding the issuance of permits and permit stipulations. In some cases, applications and supporting documentation must be submitted in person, however the majority of permit applications may be submitted online.

Review Procedures in the Central Permit Office

In-person applications for non-emergency work, including work on all streets in Manhattan and on all critical streets in Brooklyn, Queens and the Bronx; all work to be performed for sewer and water system construction; and all capital project work, all utility work, all crane requests, and all full closures of sidewalks and roadways must be submitted to the central Permit Office in Manhattan.

Following are the steps for permit application, review and issuance at the central Permit Office:

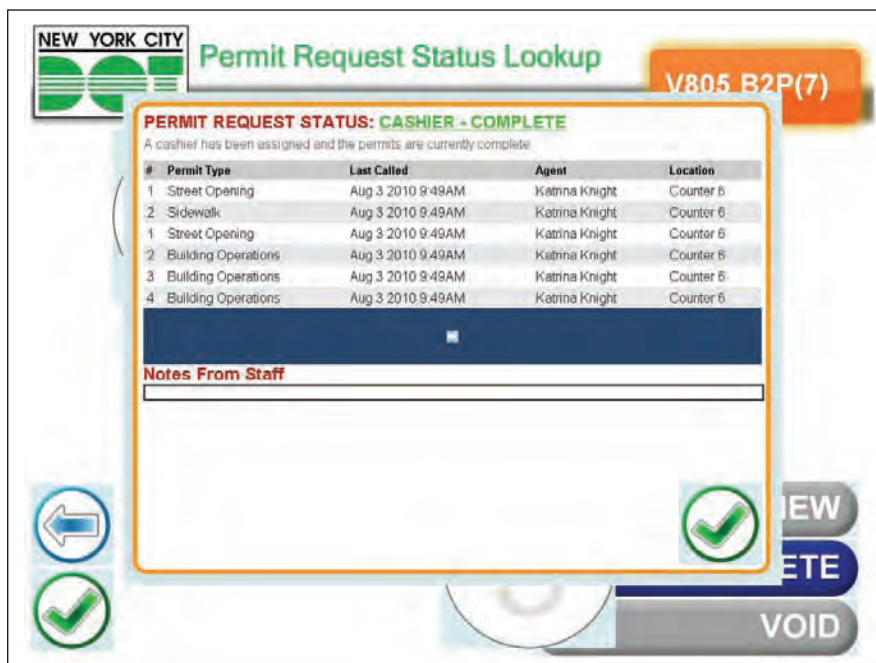
- 1 The applicant submits permit application, proof of insurance (originally supplied during the registration process) and supporting documentation for review as to accuracy and completeness.
- 2 If the application and its supporting documentation are accepted, the OCMC Project Manager (PM) reviews

the application and all associated documents and adds the permit stipulations to the permit application. The most commonly issued permit stipulations may be found at <http://www.nyc.gov/html/dot/downloads/pdf/trafstip.pdf> or in Appendix F, Permit Stipulations.

- 3 If the applicant does not accept the permit stipulations, he or she can request a review with the PM. If the applicant does not agree with the PM, he or she is informed of the appeals process.

- 4 During the processing of the permit, if there is a hold, the applicant is notified of the type of hold and the steps the applicant must take to release the hold. *Section 3.5 Other Provisions Pertaining to Permits* contains more information on holds.

- 5 If there is no hold, the permit is issued to the applicant after appropriate payment is received. The central Permit Office accepts money orders, company checks, certified checks and most major credit cards as payment for permit fees.



Applicants can check the status of their permit applications using kiosks located in the Permit Office. If they have applied online they can check their status by revisiting the anytime-anywhere website at <http://www.nyc.gov/dot/constructionpermits>

Permit applicants can check the status of their applications using the Permit Office kiosk.

Review Procedures in Borough Permit Offices

Applications for all other construction-related work, including work on critical streets in Staten Island, can be submitted to the borough office in the borough in which the work is to be performed.

Following are the steps for permit application, review and issuance at the borough Permit Offices:

1

The applicant submits permit application, proof of insurance (originally supplied during the registration process) and supporting documentation for review as to accuracy and completeness.

2

If all the documentation is accepted, pre-determined permit stipulations are added to the permit and the application is sent for processing.

3

If there is a hold during the processing of the permit, the applicant is notified of the type of hold and the steps to take to release the hold. *Section 3.5 Other Provisions Pertaining to Permits* contains more information on holds.

4

If there is no hold, the permit is issued to the applicant after appropriate payment is received. All borough Permit Offices accept money orders, company checks, certified checks and most major credit cards for permit fees.



There are borough permit offices in Brooklyn, the Bronx, Queens and Staten Island. The Queens borough permit office is located in Queens Borough Hall.

3.3.6 Permit Renewals and Re-Issuances (for Street Opening, Building Operations/Construction Activity, and Sidewalk Construction Permits)

All construction-related permits have expiration dates. If a permit is about to expire and the permittee has not completed the work, the permittee must apply for a permit renewal as all work must be performed pursuant to an active permit at all times. The permittee may apply for a renewal online, or in-person by accessing either the *Application to Renew Permits* at <http://www.nyc.gov/html/dot/downloads/pdf/permapprenew.pdf> or the *Application to Renew Governmental Permit(s)* at http://www.nyc.gov/html/dot/downloads/pdf/govt_work_permit_renew_app.pdf. These forms may also be found in Appendix B, Forms. The permittee must attach a copy of the original permit to the application when it is submitted for renewal and all applicable reviews and fees will apply. This form cannot be used if the permit has already expired.

Permits that have expired may be reissued only within **30 days** of expiration. The permittee may apply for a re-issuance online, or in-person by accessing either the *Application to Re-Issue Permits* at <http://www.nyc.gov/html/dot/downloads/pdf/permappreissue.pdf> or the *Application to Re-Issue Governmental Work Permit(s)* at http://www.nyc.gov/html/dot/downloads/pdf/govt_work_permit_app.pdf. These forms may also be found in Appendix B, Forms. Re-issued permits will not apply retroactively and are subject to new permit stipulations. The permittee must attach a copy of the original permit to the application when requesting a re-issuance and all applicable reviews and fees will apply. If the permit has been expired for more than **30 days**, a new permit application must be submitted.

Section 3.4 Canopy Authorization and Permits

Canopy authorizations and permits are required to place a canopy over the sidewalk. Canopy placement must be adequate for public safety and must be suitable to the circumstances of the proposed canopy location and not interfere with the public use of the sidewalk.

Listed in the following paragraphs are some of the requirements for canopy authorizations and permits. The full list of rules and regulations is contained in the Highway Rules, Sections 2-02 and 2-04, and should be consulted before any work is performed on the street. The Highway Rules can be accessed at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

- 1** Canopy placement must be approved by the owner of the property to which the canopy will be attached.
 - 2** Canopy design and construction must be in accordance with NYC DOT Standard Details of Construction. See most recent version of Drawing # H1029 of the NYC DOT Standard Details of Construction at http://www.nyc.gov/html/dot/downloads/pdf/nycdot_std_details_const.pdf.
 - 3** Canopy permits are not transferable from person to person or from the location of original issue.
 - 4** No attachments of any kind are permitted on a canopy, including, but not limited to temporary or permanent signs, balloons, streamers, flags, banners or pennants.
 - 5** Canopies must be well-maintained at all times.
 - 6** Canopies must be fully roofed.
- A list of partially and fully restricted streets where canopy placement is limited or prohibited can be found in the Highway Rules, Section 2-04(f).



NYC DOT authorization is required before installing a canopy over the sidewalk.

3.4.1 Application Procedure for Canopy Authorizations and Permits

Application for a canopy installation involves three major steps. First, the applicant must obtain authorization from the Highway Inspection and Quality Assurance (HIQA) unit for the placement of the canopy at the proposed location. Second, after obtaining HIQA's authorization, the applicant must obtain a permit to install the canopy at the approved location and apply for a permit to maintain the canopy once it is installed. The permit to maintain the canopy will remain on hold until after the canopy is installed and inspected. Third, following installation of the canopy, a final inspection by HIQA is required to confirm compliance with the applicant's submitted plans. After the canopy passes final inspection, HIQA will release the hold and the applicant must return to the Permit Office to obtain the permit to maintain the canopy.

Following are the specific steps for canopy authorizations and permits:

Authorization

1
To request authorization for the installation of a canopy, an applicant must initiate the process at the HIQA office in the borough where the proposed canopy will be located. At the HIQA borough office, applicants will be given a Canopy Authorization Application (Appendix B, Forms, contains a copy of this application), which outlines the requirements necessary to gain authorization. HIQA borough office locations may be found in Appendix C, NYC DOT Contact Information.

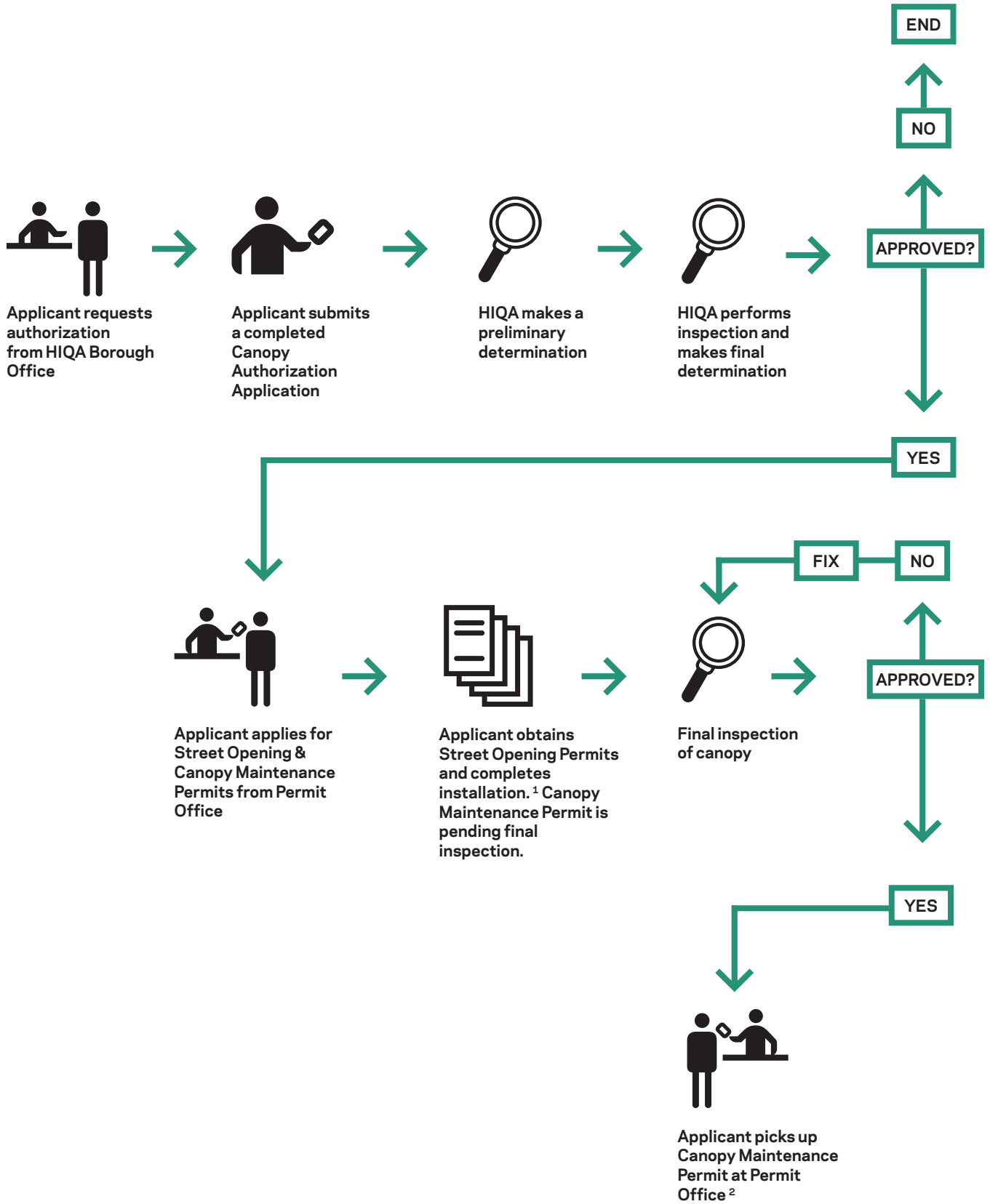
2

The applicant submits a completed Canopy Authorization Application, which must include the following:

- a. Written approval from the owner of the property to which the canopy will be attached.
- b. A statement of the basic construction details including type, description and color of the canopy covering; type, diameter and gauge of all supporting members; description of the frame, wind bracing assembly and sidewalk and building fastenings; description of proposed lettering on the canopy covering including exact wording and dimensions thereof; three 5 inch by 7 inch photographs of the proposed site.
- c. A statement that the canopy design and construction conforms to NYC DOT Standard Details of Construction. See the most recent version of Drawing # H1029, of the NYC DOT Standard Details of Construction at http://www.nyc.gov/html/dot/downloads/pdf/nycdot_std_details_const.pdf.
- d. A sketch showing the canopy dimensions, location and all street facilities and furniture within 15 feet of both sides of the proposed canopy.
- e. If applicable, a permit from the Landmarks Preservation Commission (LPC) for the placement of a canopy in an historic district or attached to a landmarked building. The permit application may be obtained from http://www.nyc.gov/html/lpc/downloads/pdf/forms/application_form_full.pdf. For additional information about historic districts, consult <http://www.nyc.gov/landmarks>.
- f. Certification by the manufacturer that the covering is flameproof. Where certification is unobtainable from the manufacturer, certification by the installer may be submitted instead.

Lessees may apply for a canopy with the written approval of the property owner.

Canopy Permit Issuance Process



Notes:

1. Canopy installer must be registered with NYC DOT (see Section 3.2).
2. Canopy Maintenance Permit expires one year after date of issuance.

3

Based on the documents submitted, HIQA makes a preliminary determination as to whether the proposed location may be suitable for a canopy. If the proposed location may be suitable, HIQA performs an inspection in order to confirm its suitability.

4

Upon completion of the inspection, HIQA makes a final determination as to whether the location is suitable for a canopy placement. If the location is deemed suitable, HIQA signs the Canopy Authorization Form indicating HIQA approval and returns it to the applicant. **If the proposed location is unsuitable, the canopy authorization is denied and the request for a canopy ends at this point. However, a new request may be submitted at a later date, if conditions at the location change.**

Obtaining Installation Permit, Installation and Application for Maintenance Permit

5

After obtaining HIQA's authorization, the applicant will be referred to the Permit Office in the borough in which the canopy will be located.

A permit must be obtained to install the canopy at the approved location (Erect Canopy Permit from the "01" Street Opening Permit series). Only a canopy installer or authorized agent that is registered with NYC DOT can apply for a permit to install the canopy.

In addition, a second permit must be applied for to maintain the canopy. The canopy maintenance permit is from the "07" Canopy Permit series; the specific permit type to be applied for depends on the land use to which the canopy is being attached. The full list of Canopy Permit types is shown in the table below. The applicant may apply directly for this permit type without being a registered permittee, provided he or she can demonstrate proof of required insurance. The applicant must maintain valid insurance and a canopy maintenance permit as long as the canopy exists.

6

Once the canopy installation permit application has been reviewed and approved by the Permit Office, the permit is issued to the canopy installer or authorized agent, and canopy installation can begin. The second permit for canopy maintenance is automatically placed on a **Canopy (CAN) hold** until a final inspection has been conducted by HIQA. *Section 3.5 Other Provisions Pertaining to Permits* contains more information on holds.

Inspection and Obtaining Maintenance Permit

7

Once the canopy is installed, the canopy installer or authorized agent must contact the HIQA borough office for a final inspection to determine whether the installed canopy conforms to the submitted plans.

8


If the installed canopy fails final inspection, HIQA will reject the canopy maintenance permit and notify the applicant of the rejection. The applicant will also be notified of any corrective action necessary and recourses available.

9

If the installed canopy passes final inspection, HIQA releases the CAN hold on the canopy maintenance permit and notifies the original applicant. The applicant will be able to pick up the permit from the Permit Office in the borough in which the canopy is located upon payment of the appropriate fee.

3.4.2.

Canopy Permit Renewals

Each canopy maintenance permit expires **one year**  after the date of issuance, unless revoked sooner by NYC DOT.

Applications for renewal of a canopy maintenance permit must be made at least one month prior to the permit expiration date and must be submitted to the Permit Office in the borough in which the canopy is located. All applicable fees will apply.

Canopy Permits

Permit Type	Name	Fee	Duration
0701	Canopy For Hotel	\$50	1 Year
0702	Canopy For Restaurant	\$50	1 Year
0703	Canopy For Residence	\$50	1 Year
0704	Canopy For Miscellaneous	\$50	1 Year
0705	Canopy In Connection With Sidewalk Café	\$25	1 Year

Section 3.5 Other Provisions Pertaining to Permits

The following section provides information on some issues that may delay the issuance of a permit or that may lead to the revocation of a permit.

3.5.1 Holds

A hold is a “do not release” order that can be placed on permits or permittees to prevent the permit from being processed. Any given permit or permittee may be subject to one or more holds. Contact information pertaining to the release of holds by NYC DOT can be found in Appendix C, NYC DOT Contact Information.

Permit Office and OCMC Holds

1

Capital Project In-House (CPI) hold.

A CPI hold is automatically placed if the proposed permit location involves a street that will be resurfaced by a NYC DOT in-house resurfacing operation in the near future.

CPI holds are regularly released by the borough Administrative Superintendent of Highway Operations (ASHO) if the proposed work does not interfere with the in-house street resurfacing operation. If the hold is not released, the applicant must contact the borough ASHO to determine the feasibility of the work being completed prior to the final resurfacing. If it is determined to be unfeasible, the pending permit will be rejected.



Permit applications near bridges are subject to approval by the Division of Bridges.

2

Street Arterial Maintenance (SAM) hold.

A Street Opening Permit request to perform work on a protected street will automatically have a SAM hold placed on it if the proposed work start date is within 18 months of the street being resurfaced/reconstructed. The hold is to review the proposed work and set conditions for the work and/or restoration.

To request a release of a SAM hold, the borough ASHO must be contacted to discuss the work and allow the ASHO to determine the extent of the restoration requirements.

3

Capital Project by Other Agency (CPO) hold.

A CPO hold is automatically placed if the proposed permit location involves a current capital street reconstruction project or one that is being planned.

For New York City Department of Design and Construction (DDC) capital projects, a CPO hold can only be released by DDC. CPO holds will typically be released by DDC if the proposed work does not interfere with its schedule. If the hold is not released, the applicant must contact DDC (DDC contact information is available in

Appendix D, Other Agency and Utility Contact Information).

For non-DDC capital projects, the applicant may contact the Permit Office to request release of a CPO hold.

4

Bridge (BOB) hold.

Any planned work requiring a Building Operations/ Construction Activity Permit that may potentially be within 100 feet of a bridge structure will be placed on a Bridge hold. If any proposed work is within 100 feet of a bridge or structure, applicants must submit a scaled drawing showing the work and exact location. If the work is more than 100 feet away from the bridge structure, applicants must send a certification by e-mail stating so. Either response must be sent to NYC DOT's Division of Bridges at bridgeshold@dot.nyc.gov for review and release prior to commencing work. Emergency work will not be placed on hold and shall proceed in accordance with Highway Rules, Section 2-11 (g).

The Bridge Hold Map shows locations where Bridge holds apply, which can be found at http://www.nyc.gov/html/dot/downloads/pdf/bridge_hold_maps.pdf.



A Full Closure Review (FCR) hold is triggered when a street is closed for 90 days.

5 Executive (EXC) hold. An EXC hold is automatically placed if the proposed permit locations involve locations deemed necessary by NYC DOT. These include major construction-related projects or planned traffic enhancements (e.g., Second Avenue subway, bus rapid transit, water tunnel route), or where there are significant traffic issues (e.g., “thru” streets, exits and entrances to major tunnels and bridges).

These holds can only be released by OCMC executive staff. Once OCMC executive staff determines the final permit stipulations, the permit will be released. However, if extraordinary conditions are present, the applicant may be asked to meet with OCMC.

6 Full Closure Review (FCR) hold. An FCR hold is automatically placed on the 90th consecutive calendar day of any full street closure. OCMC will review the project to determine if a Community Reassessment Impact and Amelioration (CRIA) statement must be submitted to NYC DOT. A CRIA statement is required if the closure is expected to last for more than 180 consecutive calendar days, as set forth in the Highway Rules, Section 2-16, at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

To release an FCR hold, the applicant must demonstrate that either he or she has begun the CRIA process or that the CRIA statement is not required. At that point, OCMC executive staff will determine if additional permit stipulations are required. If no changes are required, the permit will be released.

7 OCMC (MTC) hold. An MTC hold is automatically placed for utility companies submitting permit requests electronically.

OCMC will release the hold after it reviews the proposed work and adds the permit stipulations.

8 Poles (POL) hold. A POL hold is automatically placed if the proposed permit work is for the installation of a pole on the sidewalk, which must be reviewed, approved and released by NYC DOT Street Lighting.

To release a POL hold, the Division of Traffic Operations, Office of Street Lighting must be contacted.

9 Vault (VLT) hold. A VLT hold is automatically placed if the proposed permit work is for the installation or repair of a vault, which must be reviewed and released by the Permit Office.

To release a VLT hold, the Permit Office’s Plan Examination Unit must be contacted.

HIQA Holds

There are two categories of HIQA holds. These holds can only be released by HIQA:

a. Holds for Specific Permit Type or Unique Street Treatment

- **Cobblestone (COB) hold.** All permits issued to work on a cobblestone street are automatically placed on hold until a HIQA inspector performs an inspection of the work site to establish existing conditions before work begins.

To request release of a COB hold, the applicant must contact the HIQA borough office in the borough in which the proposed work is to be performed to arrange for an inspector to visit the work site prior to the start of the work.

- **Concrete (CON) hold.** All permits issued to work on concrete portions of the roadway are automatically placed on hold until a HIQA inspector performs an inspection of the work site to establish existing conditions before work begins.

To request release of a CON hold, the applicant must contact the HIQA borough office in the borough in which the proposed work is to be performed to arrange for an inspector to visit the work site prior to the start of the work.

- **Special Treatment Project (STP) hold.** Any permits issued to work in areas that have a special treatment such as Times Square, Madison Square, Herald Square and other pedestrian plaza areas are automatically placed on hold.

To request release of an STP hold, the applicant must contact the HIQA borough office in the borough in which the proposed work is to be performed. HIQA will determine whether an inspection of the work site is warranted to establish existing conditions before work begins.

- **Canopy (CAN) hold.** A CAN hold is automatically placed on a canopy maintenance permit application until a HIQA inspector performs a final inspection confirming the submitted plans.

To request release of a CAN hold, the applicant must contact the HIQA borough office in the borough in which the canopy is installed to arrange for a final inspection following canopy installation.

- **Re-Dig (RED) hold.** In cases where an inspection has revealed a failed restoration and permittees have been told to redo the entire restoration, a RED hold will be placed. A HIQA inspector must be present during the restoration.

To request release of a RED hold, the applicant must contact the HIQA borough office in the borough in which the proposed work is to be performed.

b. Holds that May Be Placed on Permittees

Any of these holds will prevent a permittee from applying for new permits:

– **New York City Department of Finance (DOF or Finance) hold.**

If a permittee has failed to pay previously issued summonses/ Notices of Violation (NOVs) to the New York City Environmental Control Board (ECB), all future permit requests may be placed on hold until the fees associated with the outstanding summonses/NOVs are paid. (See Chapter 4, *Section 4.5 Street Construction Inspections and Enforcement* regarding the circumstances in which summonses/NOVs may be issued.)

To request release of a DOF hold, permittees must contact Finance and either make a payment or agree to a payment schedule for all fees associated with the outstanding summonses/NOVs. Once Finance contacts HIQA, the hold(s) will be released.

– **Revenue hold.** If the permittee owes NYC DOT money for an open [Corrective Action Request \(CAR\)](#) or [Jolt Elimination Team \(JET\)](#) bill, all future permit requests may be placed on hold until the bills are paid. (See Chapter 4, *Section 4.5 Street Construction Inspections and Enforcement* regarding the circumstances in which CARs may be issued.)

To request release of a Revenue hold, the permittee must contact NYC DOT's Fiscal Affairs Office to arrange for payment of outstanding bills. Upon satisfactory payment, the hold(s) will be released.

– **Incorrect Information on File.** If a permittee's 24/7 phone number, address or other contact information is inaccurate or has changed without being updated, all future permit requests may be placed on hold until the information is updated.

To request release of the hold, the permittee must contact HIQA's central office or one of the borough offices to update the file. Upon completion of updates, the holds will be released.

– **Unsafe Conditions.** If the permittee has been notified and fails to address an unsafe condition, all future permit requests may be placed on hold until the unsafe condition has been eliminated.

To have the hold released, the permittee must correct the unsafe condition, and then contact HIQA to arrange for an inspection. Upon a satisfactory inspection, the hold(s) will be released.

– **Working Without a Permit.** If the permittee has been issued a summons/NOV for working without a permit, all future permit requests may be placed on hold until the applicant takes out a permit of record for the work that was performed.

To request release of the hold, the permittee must take out a permit of record for the work that was performed without a permit and then contact HIQA to submit a copy of the permit. Upon completion of this action, the hold(s) will be released.

CARS:
Corrective Action Requests are issued by HIQA to address inadequate street conditions.

JETS:
Jolt-Elimination Teams respond to critical or emergency street work requirements.

3.5.2 Permit Revocation

NYC DOT may revoke or refuse to renew a permit for any of the reasons listed below. The Highway Rules, Section 2-02(k) contains additional information.

1
For failure to comply with the terms or conditions of such permit, the Highway Rules or other applicable law in carrying out the activity for which the permit was issued;

2
Whenever there has been any false statement or any misrepresentation as to a material fact in the application or accompanying papers upon which the issuance of the permit was based; or

3
Whenever a permit has been issued in error and the conditions are such that the permit should not have been issued.

Prior to any permit revocation, NYC DOT will give the permittee an opportunity to be heard with not less than two days' notice.

NYC DOT may revoke a permit without affording the permittee an opportunity to be heard prior to the revocation if NYC DOT determines that an imminent peril to life or property exists. In this case, upon request of the permittee, NYC DOT will provide an opportunity to object to the permit revocation within five days after the request is received by NYC DOT.

3.5.3 Other Actions

1 Suspension of Application Review.
NYC DOT may suspend the review of applications for permits pending:

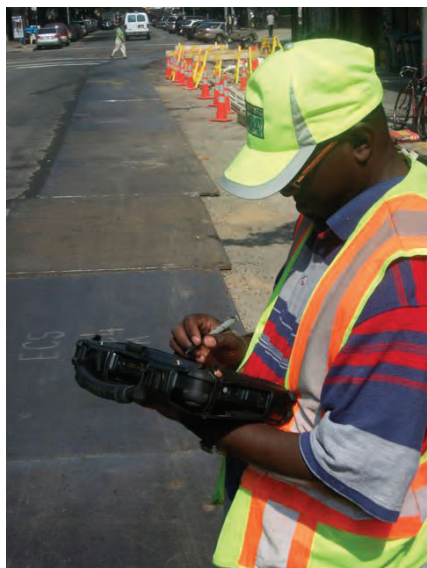
- Payment by an applicant of outstanding fines, civil penalties or judgments imposed or entered against such applicant by a court or ECB;
- Payment by an applicant of outstanding fees or other charges lawfully assessed by NYC DOT against such applicant pursuant to the Highway Rules or other applicable law; and/or
- Satisfactory compliance by an applicant with a CAR or order issued by the Commissioner. See the Highway Rules, Section 2-02(j)

2 Refusal to Issue Permit. NYC DOT may refuse to issue a permit to an applicant:

- Who has exhibited a pattern of disregard for the rules or orders of NYC DOT or the terms or conditions of permits issued by NYC DOT or for other applicable law.
- Who has been found liable by a court or in a proceeding before the ECB of a violation of a rule or order of NYC DOT or the terms or conditions of a permit issued by NYC DOT or other applicable law, which violation caused an imminent peril to life or property. See the Highway Rules, Section 2-02(l).

3 Voiding and Reissuing of Permits.
Permits may be voided and reissued only within three business days of issuance. The fee for reissuance may be found in the Highway Rules, Section 2-03 at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>. Permits reissued after **three business days** must be subject to the full permit fee.

See the Highway Rules, Section 2-02(n).



HIQA staff inspecting a work site.



Section 3.6 Emergency Work and Special Circumstances

In addition to the application procedures for the four categories of permit types, there are some situations or street conditions that require special procedures. These include:

- Emergency utility access cover openings and emergency street openings/excavations
- Embargoes

3.6.1 Emergency Utility Access Cover Openings and Emergency Street Openings

Certain circumstances are considered to be emergencies, meaning situations that endanger the public safety or cause or are likely to cause the imminent interruption of service. Special and separate procedures govern emergency work: one for utility access covers (including those for "manholes," valve covers and grates) and one for street openings/excavations. The following procedures must be followed to obtain either an emergency authorization number (EAN) for emergency utility access cover work or an Emergency Street Opening Permit Number for emergency street opening/ excavation work.

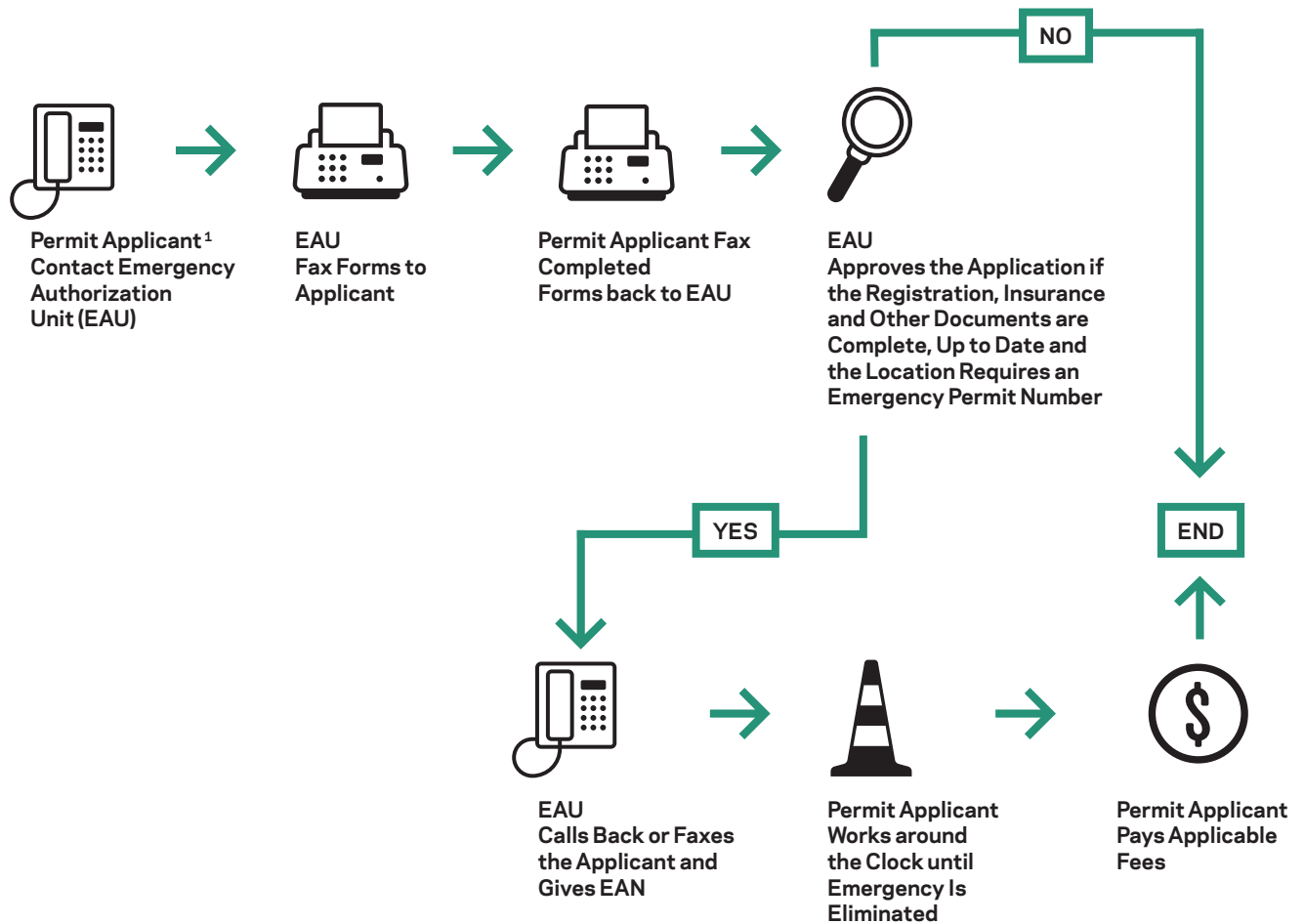
Procedures for Obtaining Authorization Numbers for Emergency Utility Access Cover Openings

Any emergency work on a street that involves opening a utility access cover to gain access to an underground facility on a critical street during restricted hours requires an EAN. NYC DOT has a separate procedure for obtaining authorization for emergency utility access cover openings so that applicants can expeditiously perform such work.

The applicant must first submit an Emergency Authorization Number Form. A copy of the form can be found at http://www.nyc.gov/html/dot/downloads/pdf/emergency_auth_number_app.pdf and in Appendix B, Forms. The form must be completed and faxed to NYC DOT's Emergency Authorization Unit (EAU), which will confirm that the applicant's insurance is current and that the location requires an EAN.

If all information is satisfactory, EAU will fax or call the applicant with an EAN, which must be available at the work site and presented to any governmental employee upon request. An EAN is required for each utility access cover opening at a location, provided that the work is performed around the clock until the emergency is eliminated, at which time the EAN expires. The Highway Rules, Section 2-07(c) (4) contains additional information. The applicant will be charged a fee of \$30 for each utility access cover opening EAN.

Emergency Number Process for Utility Access Cover Openings



Note:

1. Permit applicant must be registered with NYC DOT (see Section 3.2).

Procedures for Obtaining an Emergency Street Opening Permit

Any emergency work on a street that involves a street opening/excavation requires a Street Opening Permit. NYC DOT has a separate procedure for obtaining permits for emergency street opening/excavation work, so that applicants can expeditiously obtain such permits.

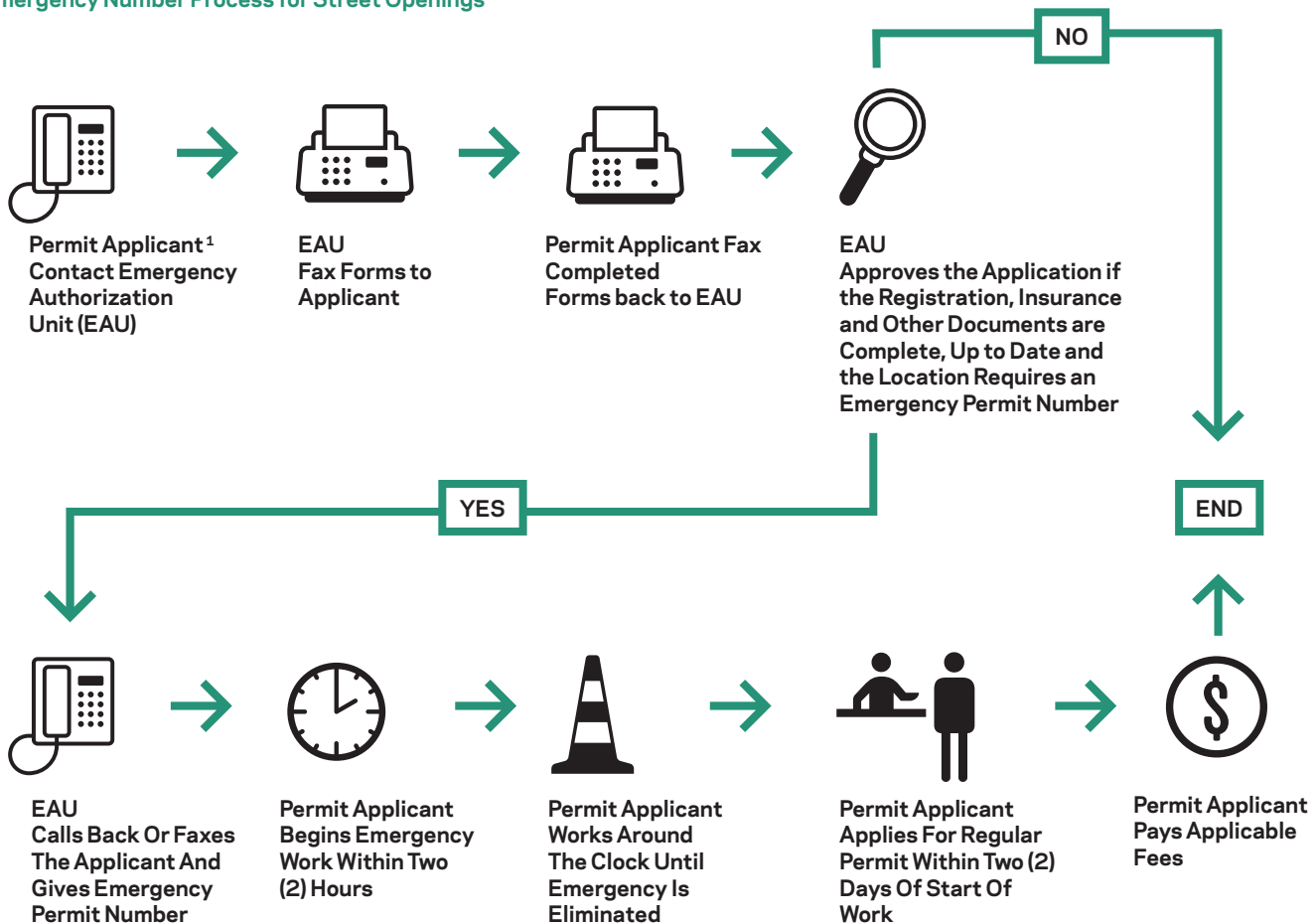
The applicant must first submit an Emergency Street Opening Permit Form. A copy of the form can be found at http://www.nyc.gov/html/dot/downloads/pdf/emergency_street_opening_app.pdf and in Appendix B, Forms. The form must be completed

and faxed to EAU, which will confirm that the applicant’s insurance is current. EAU will process the request and fax or call the applicant with an Emergency Street Opening Permit Number, which authorizes the emergency street opening/excavation work. If the insurance is not current, the request will be denied. The Emergency Street Opening Permit Number must be available at the site and presented to any governmental employee upon request. Work must begin within **two hours** after obtaining an Emergency Street Opening Permit Number and must be performed around the clock until the

emergency is eliminated, unless otherwise directed by NYC DOT. Only one Emergency Street Opening Permit Number is required for a specific work location.

Following issuance of the Emergency Street Opening Permit Number, the permittee must submit an application for a regular Street Opening Permit within **two business days** (Highway Rules, Section 2-11(g)). This Street Opening Permit retroactively covers the emergency street opening/excavation work already performed.

Emergency Number Process for Street Openings



Note:
1. Permit applicant must be registered with NYC DOT (see Section 3.2).

3.6.2 Embargoes

OCMC imposes **construction embargoes** for significant special events including the New York City Marathon, parades, high profile projects and for the winter holiday season. All active permits in the affected area(s) are suspended during the dates and times of the embargo period and no new permits may be approved, unless a waiver for the work is granted by OCMC. The suspension does not apply to emergency authorizations and permits (see *Section 3.6.1 Emergency Utility Access Cover Openings and Emergency Street Openings*).

A list of construction embargoes under way at any given time can be found under the “Special Traffic

Advisory” link on NYC DOT’s website at <http://www.nyc.gov/html/dot/html/motorist/trafadvisories.shtml> or at the borough Permit Offices.

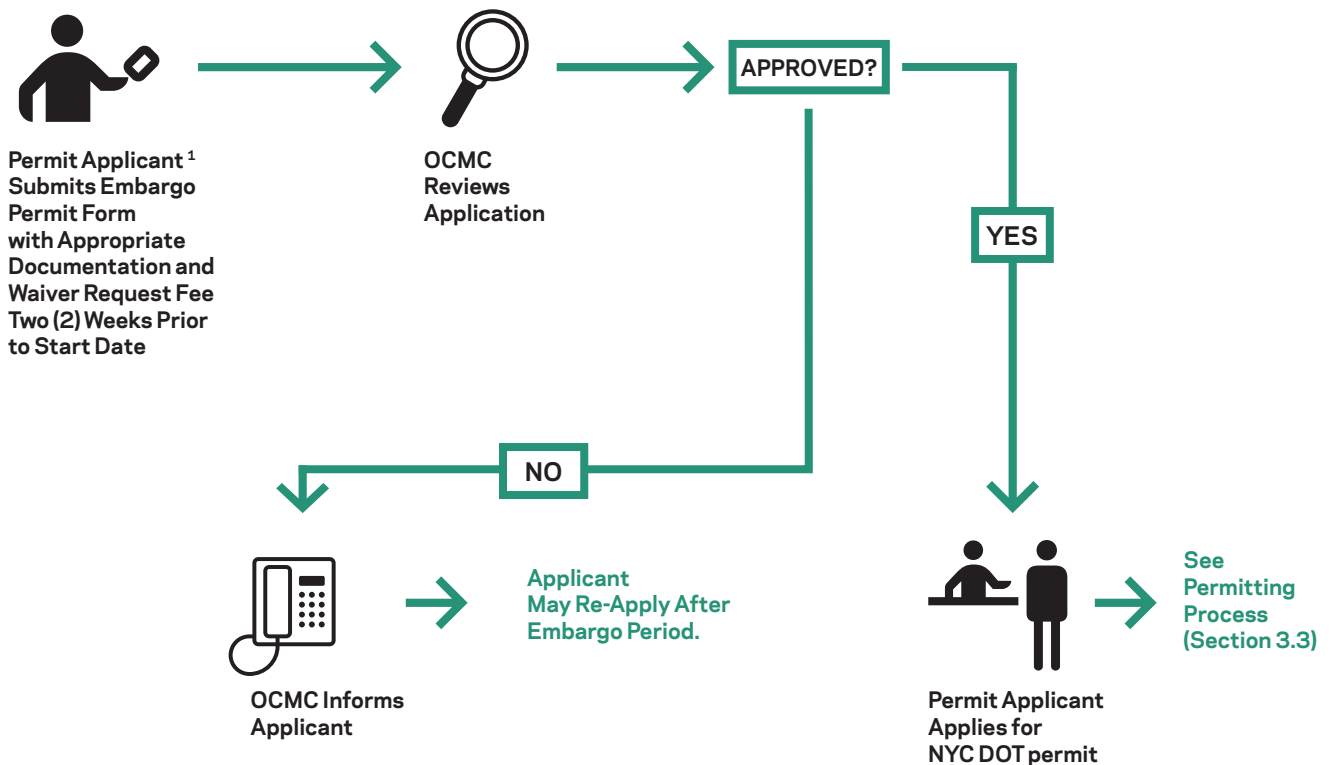
In order to apply for an embargo waiver, a Request for Roadway/ Sidewalk Permits during Embargo Periods form must be submitted for review and consideration to the Permit Office. This form can be found at <http://www.nyc.gov/html/dot/downloads/pdf/holidayembapp.pdf> and is also available in Appendix B, Forms. The applicant should submit this form with the appropriate documentation and waiver request fee. Payment of the waiver request fee, as specified in the Highway Rules, Section 2-03, does not guarantee that approval to work during the embargo period will be granted. If the request is approved or modified, then

all conditions, restrictions, fees and application procedures for obtaining a construction-related permit apply.

Winter holiday embargo: The winter holiday embargo typically starts in mid-November and lasts through January 2. Embargo waiver forms are due approximately **two weeks** prior to the start of the winter holiday embargo. Details about the exact holiday embargo dates, times, and locations are posted on NYC DOT’s Special Traffic Advisory page, generally in mid-October.

CONSTRUCTION EMBARGOES: are issued for special events such as the New York City Marathon and the Thanksgiving Day Parade.

Permitting Process During an Embargo



Note:

1. Permit applicant must be registered with NYC DOT (see Section 3.2).



Section 3.7 Vault Approvals

This section describes the application and review process for obtaining approvals to construct or repair vaults under the sidewalks of New York City streets. NYC DOT issues permits for two types of vaults: building vaults and transformer vaults.

A building vault, as described in Section 2-13 of the Highway Rules, is any opening below the surface of the street that projects outside of the property line and is covered over, except for those openings: (1) used exclusively to access, by means of steps, the cellar or basement of any building; (2) used primarily for light and ventilation; (3) constructed or maintained by utility companies (including transformer vaults); and (4) which are subways, railroads and related structures.

A transformer vault is a subsurface structure or room that houses electrical transformers and appurtenant equipment. Transformer vaults are typically installed, owned and maintained by an electric utility company. The city has master revocable consent agreements with electric utility companies that allow them to occupy and use city property for transformer vaults.

The construction, alteration or repair of any building vault or transformer vault requires a permit from NYC DOT. Most vault work also requires plan approval and a permit from DOB. In some cases, approval from the LPC (if the vault is in an historic district) or the Metropolitan Transportation Authority (MTA) (if the vault is near a subway or tunnel entrance) is required. In addition, a vault license from NYC

DOT's Office of Franchises, Concessions and Revocable Consents is required to construct a new building vault or enlarge an existing building vault.

Applications for NYC DOT vault permits are reviewed on a case-by-case basis. Applicants should contact the NYC DOT Plan Examination Unit (PEU) of the Permit Office to initiate the application process and to determine specific requirements for a permit and a license, if required. A list of the forms most commonly used during this process can be found in Appendix B, Forms. A \$35 filing fee is required for all vault applications.

3.7.1 Building Vaults

PEU performs the initial review of all applications for building vault permits and licenses. A DOB-approved plan must be obtained and submitted to PEU with the application for a final approval and permit.

If the applicant plans to construct a new vault or enlarge an existing vault, PEU will refer the applicant to NYC DOT's Office of Franchises, Concessions and Revocable Consents for a vault license. When the license is issued, the applicant must pay a one-time license fee of \$2 per square foot.

PEU also accepts applications to abandon existing vaults that are no longer in use. NYC DOT may order a vault licensee or the owner of the premises where the vault is located to fill in an abandoned vault. Specific requirements for filling in abandoned vaults can be found in Section 2-13(o) of the Highway Rules. DOB approval is also required.

3.7.2 Transformer Vaults

All applications for construction or repair of a transformer vault must be accompanied by an electric utility company layout, and must comply with the minimum clearance requirements for transformer vaults unless an approval or waiver is obtained from the appropriate agency or utility (more information is available in Appendix B, Forms). Contact PEU for further information regarding the procedure to obtain initial and final approval for a transformer vault.

3.7.3 Vaults Requiring a Revocable Consent

The construction of any vault that extends beyond the curb must be authorized under a revocable consent agreement, as required in Section 2-13(c) of the Highway Rules, in addition to approval by PEU. An explanation and instructions for obtaining a revocable consent can be found at <http://www.nyc.gov/html/dot/html/permits/franinfo.shtml>.



**NYC DOT conducted
550,000 inspections
for construction-
related street work
during Fiscal Year
2010.**

4. Executing Work in the Street

Entities that perform work in the streets — from utilities or contractors accessing subsurface infrastructure to property owners repairing sidewalks — must follow certain procedures when undertaking such work and must meet restoration requirements following its completion.

Chapter Topics:

- Section 4.1 General Requirements for Executing Work
- Section 4.2 Street Excavation Requirements
- Section 4.3 Street Restoration Requirements
- Section 4.4 Sidewalk Repairs
- Section 4.5 Street Construction Inspections and Enforcement
- Section 4.6 Sidewalk Violation Inspections and Enforcement

For a list of all the web links pertaining to this chapter, refer to Appendix E, Links.



Street work at Third Avenue and Saint Marks Place, Manhattan as part of a larger Cooper Square area reconstruction project.

About this Chapter

The way street work is executed impacts vehicular and pedestrian movement, the useful life of the street surface, and the experience of the street as a public space. The New York City Department of Transportation (NYC DOT) has adopted specifications and regulations stipulating how street work must be performed in order to minimize disruption and maintain the integrity of the street surface.

This chapter describes the basic steps for performing work in the street, for restoring the street after work is performed, and for responding to each type of notice or request that may be issued during a Highway Inspection and Quality Assurance (HIQA) inspection.

Section 4.1 General Requirements for Executing Work

1 Permits. In order to perform work in the street, it is necessary to obtain a permit from NYC DOT. Permits are available for various types of work, including Street Opening Permits, Building Operations/Construction Activity Permits, and Sidewalk Construction Permits. The requested permit must be appropriate for the type of work that is planned. Typically, permits must be kept at the work site or designated field headquarters at all times and must be made available for inspection. Further information on permits is available in **Chapter 3. Permits and Approvals.**

2 Insurance and Permit Bonds. After initial registration, active permittees must submit proof of all insurance and bonds annually. Further information on insurance and bonds is available in **Chapter 3. Permits and Approvals** and in the Highway Rules, Section 2-02(a) at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

3 Work Site Safety. All obstructions on the street must be protected by barricades, fencing, railing with flags, lights, and/or signs placed at proper intervals and at prescribed hours in accordance with the most recent version of the Manual on Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration, and the New York State Supplement. Further information is available in the Highway Rules, Section 2-02(h) at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

4 Signage. Signs must be displayed at the work site or at 100-foot intervals along a series of excavations or continuous cuts indicating the name of the entity performing the work, the

name of the entity for whom the work is being performed and, if applicable, the name(s) of the subcontractor(s). Signs must also include:

- Permittee telephone number in case of complaints
- Contractor's telephone number, if different from the permittee
- The permit number under which the work is being performed
- The purpose of the street opening/excavation
- The start and scheduled completion dates of the work

Signs must be conspicuously displayed and face the nearest curb line. They should be clear, readable and in letters at least 1" in height, and conform to all NYC DOT specifications.

Further information is available in the Highway Rules, Section 2-02(c) at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

5 Restoration. Once work in the street has been completed, permittees are required to restore the street excavation to provide a smooth riding surface. Permittees are responsible for maintaining the restoration for the duration of the "Guarantee Period" and must retain insurance for this purpose. The Guarantee Period is considered to be three years on unprotected streets, and up to five years, but at no time less than three years, on protected (recently resurfaced or reconstructed) streets commencing on the restoration completion date. This is discussed in greater detail under *Section 4.3 Street Restoration Requirements*, and in the Highway Rules, Sections 2-11(e)(15), 2-11(e)(16) and 2-11(f) at <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

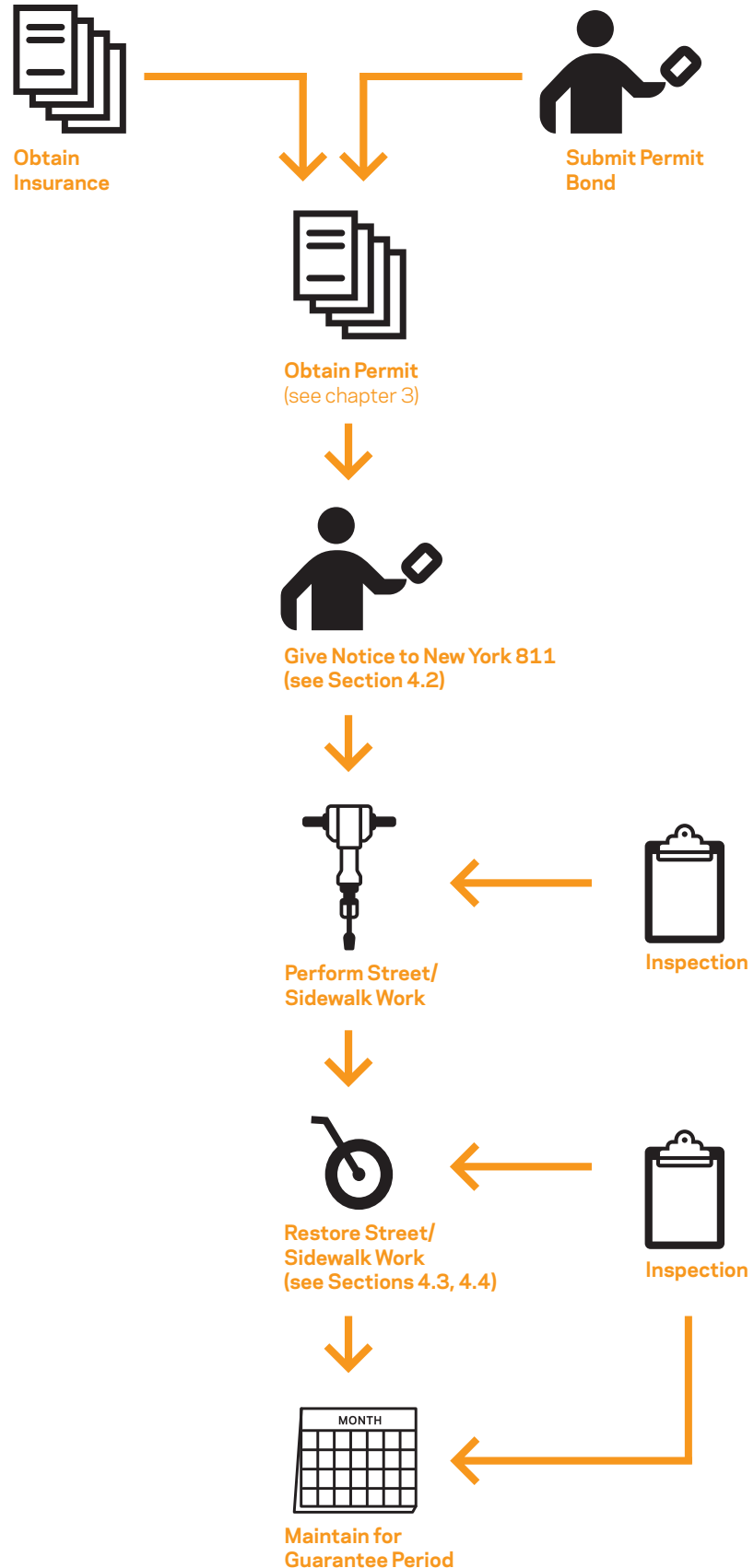
6

Inspections. All work performed in the street is subject to inspection by the HIQA unit. HIQA inspects work sites for compliance with Title 19 of the NYC Administrative Code, NYC DOT Rules and Regulations, NYC DOT specifications and NYC DOT permit stipulations. HIQA performs inspections during active construction through its completion and up to the end of the **Guarantee Period**. The HIQA unit also responds to 311 calls.

7

Existing Infrastructure. Permittees must not remove parking meters, traffic signs, street lights, street furniture, and similar items unless authorized on the permit. Unauthorized removal of muni-meters is prohibited.

Process for Performing Work in the Street




GUARANTEE PERIOD:
 the period of time that the street restoration must be maintained by the entity that performed the street work.

Section 4.2 Street Excavation Requirements

Street excavations must be performed in accordance with the Highway Rules, Section 2-11(e). For the complete requirements, refer to <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>. Some of the requirements include, but are not limited to the following, where the applicant must:

New York 811:
Acts as a link between street excavators and utility companies so that subsurface infrastructure is “marked out” prior to excavation work. This promotes safe digging and protects infrastructure.

- 1**
Give notice to New York 811. In accordance with New York State Industrial Code Rule No. 53 relating to construction, for excavation and demolition operations at or near underground facilities, permittees must contact New York 811 at least **48 hours**  prior to beginning any work. New York 811 may be reached by calling 1-800-272-4480 or 811.
- 2**
Break the existing pavement using only hand-held tools (no “ram hoes” or truck-mounted tools), unless otherwise authorized.
- 3**
Assure that tools, debris, or other materials are not allowed to block water flow in gutters.
- 4**
Use timber, sheeting or bracing for any open excavation deeper than 5 feet.
- 5**
Not perform tunneling or jacking without a permit.
- 6**
Use full trenching for all sewer repair/connections.
- 7**
Limit traffic obstruction to one lane unless otherwise authorized by NYC DOT.
- 8**
Employ and display appropriate barricades, signs, lights, and other approved traffic control devices in accordance with the most recent version of the MUTCD, published by the Federal Highway Administration, and the New York State Supplement.

- 9**
Cover all unattended street openings/excavations with plates unless otherwise directed by NYC DOT.
- 10**
Follow all permit stipulations, such as the hours and/or days in which street operations and construction may take place, and removal of applied markings pursuant to a New York 811 notification at Special Treatment Project (STP) locations. Work on critical streets may be limited to nights, weekends, or off-peak periods; however, work outside of the weekday daytime period (7:00 AM to 6:00 PM) requires a noise variance from the NYC DOT Office of Construction Mitigation and Coordination (OCMC).
- 11**
Maintain at least 5 feet of unobstructed sidewalk for pedestrians at all times. Any work that narrows the sidewalk to less than 5 feet may require a temporary Sidewalk Closing Permit.
- 12**
Store construction materials in areas adjacent to the work site only as designated on the permit. Excavated material must either be removed from the site or stockpiled at a designated curb with proper barricading. Storage of construction-related equipment, excluding cranes, must follow any special stipulations on the permit. Storage of cranes, as noted in the Highway Rules, Section 2-05(j), requires an additional permit from NYC DOT.

Section 4.2.1 New York 811, Inc. [*]

New York 811 is a nonprofit organization that acts as a communications link between utility companies and individuals planning any digging activity in the five boroughs of New York City and Nassau and Suffolk Counties on Long Island. New York State law (Article 36 of General Business Law and 16 NYCRR Part 753, AKA Industrial Code 53) requires excavators to contact New York 811, via 811, 800-272-4480 or the internet, within 2 to 10 working days before performing any digging or excavation work. New York 811 then relays digging and excavation requests to its member network of utility companies and underground facility owners, who are required to mark the location of their underground facilities within two working days. Excavators use those markings to help identify underground facility locations "in order to promote public safety and to prevent damage to public and private property." (16 NYCRR Part 753)

Tips for Excavators

- Call before you dig. 811 or 800-272-4480.
- Wait the required time.
- Confirm utility response.
- Respect the marks.
- Dig with care.

Additional information can be obtained by contacting New York 811 at 800-272-4480, or <http://www.NewYork-811.com>.


Required Information for Call


- Name of caller
- Name, address and phone number of excavator
- Excavator's field phone number
- Name of field contact person
- Address/location of work area
- Start date and time
- Means of digging and excavation
- Brief description of the planned digging and excavation


* Most of the information provided on this page was obtained from New York 811's website: <http://www.NewYork-811.com>


Marking Color Codes


When utility company representatives mark a location, they use colored flags and/or paint to identify the type of underground service:


 Red - Electric power lines, cables, conduit and lighting cables

 Yellow - Gas, oil, steam, petroleum and gaseous materials

 Orange - Communications, alarm, signal lines, cables and conduit

 Blue - Potable water

 Purple - Reclaimed water, irrigation and slurry lines

 Green - Sewers and drain lines

 Pink - Temporary survey markings

 White - Proposed excavation



Streets can hide a complex infrastructure of underground utilities. One call to New York 811 provides for where gas (yellow), electric (red) and phone (orange) are located.



It is essential to call New York 811 before digging anywhere, including sidewalks and soil. This New York 811 marking shows where a cable television line is located beneath the sidewalk.

Section 4.3 Street Restoration Requirements

WEARING COURSE:

The “wearing course” is generally the top 2-3+ inches of asphalt pavement (depending on the composition of the roadway base), which is designed to provide an even surface and withstand the wear of traffic.

TRENCH:

A “trench” is a narrow excavation which is typically greater in depth than in width. “Full trenching” refers to one continuous linear trench rather than multiple non-contiguous short trenches on the same street.

1

Permanent Restoration Upon completion of work in a street, permittees are required to restore **all** street openings/excavations in accordance with the Highway Rules, Section 2-11(e) including, but not limited to, the following required restoration elements:

- a. “Backfill” refers to the bottom layer of the restoration. All materials used for backfill must be free from bricks, blocks, excavated pavement materials and/or organic material or other debris.
- b. “Base course” refers to the layer of material below the wearing course. The concrete base must be restored at the same grade as the existing base; at no time may it be brought up to the asphalt course unless authorized by NYC DOT.
- c. **Wearing course** refers to the top layer of pavement, which is designed to provide an even surface and withstand the wear of traffic. The wearing course material must conform to NYC DOT specifications, and the finished grade of the wearing course must be flush with the surrounding pavement on all sides of the cut. The restored wearing course must extend 6 inches beyond the edge of the base course.

2

Temporary Restoration If street opening/excavation work remains unfinished at the end of the day, the permittee must perform temporary repairs in accordance with the Highway Rules, Section 2-11(e) including, but not limited to the following requirements:

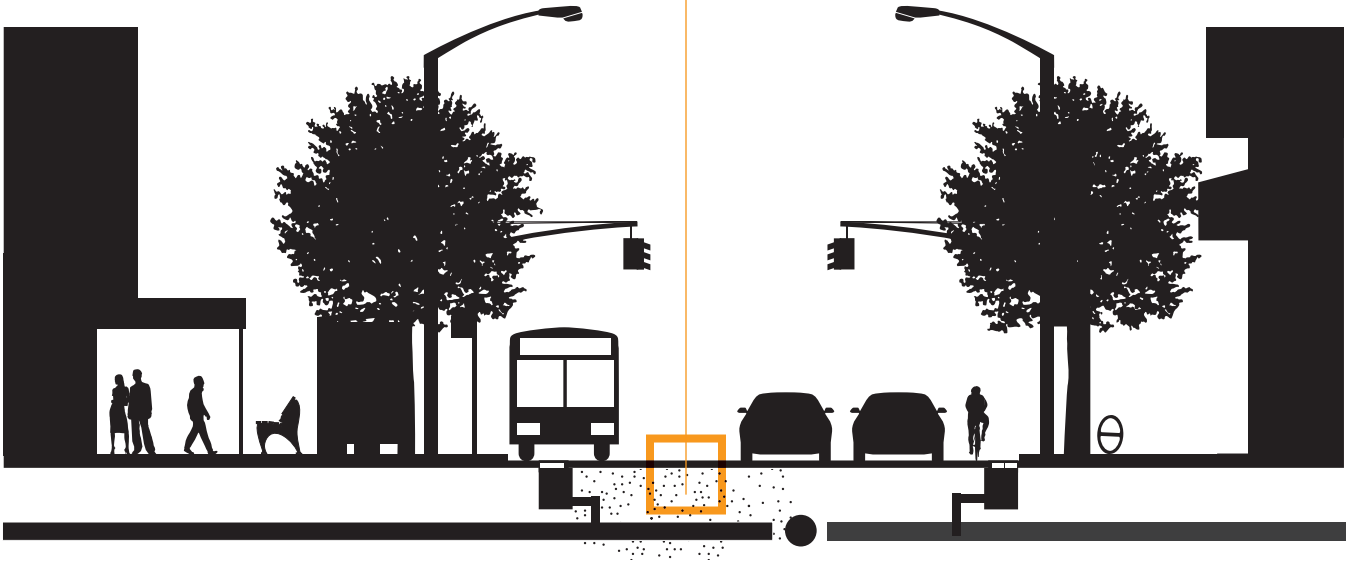
- a. Immediately upon completing the compaction of the backfill of any street opening/excavation, a temporary pavement of an acceptable asphalt paving mixture not less than 4 inches thick after compaction must be installed flush with the adjacent surfaces; or
- b. If plating or decking will be used, the size of the plate or decking must extend a minimum of 12 inches beyond the edge of the **trench**, be firmly placed to prevent rocking, and be sufficiently ramped, covering all edges of the steel plates to provide a smooth riding surface. All plating and decking must be made safe for vehicles, cyclists and/or pedestrians and be adequate to carry the load.



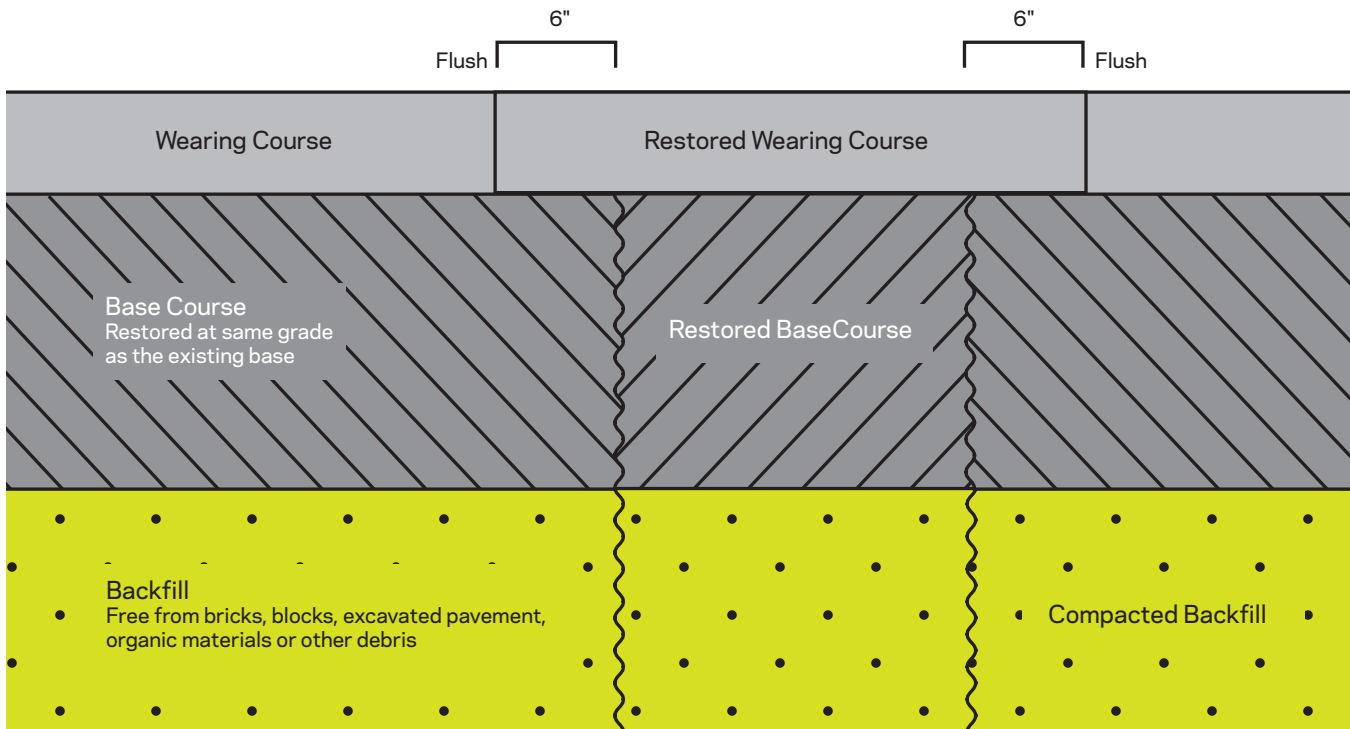
Street resurfacing in progress. NYC DOT’s street reconstruction and resurfacing programs include nearly 6,000 miles of city streets.

4.3: Street Restorations

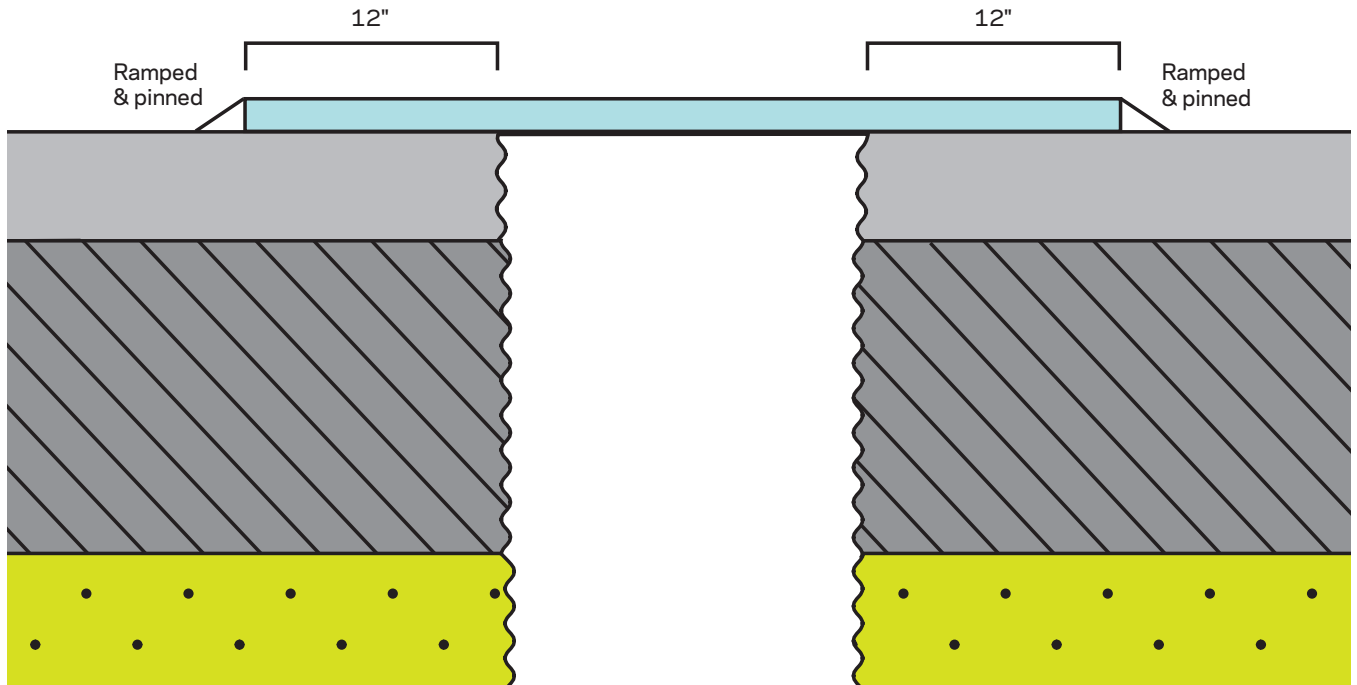
Street Restoration Types:
Permanently Restored Opening / Excavation
Temporary Repair: Plate
Temporary Repair: Fill



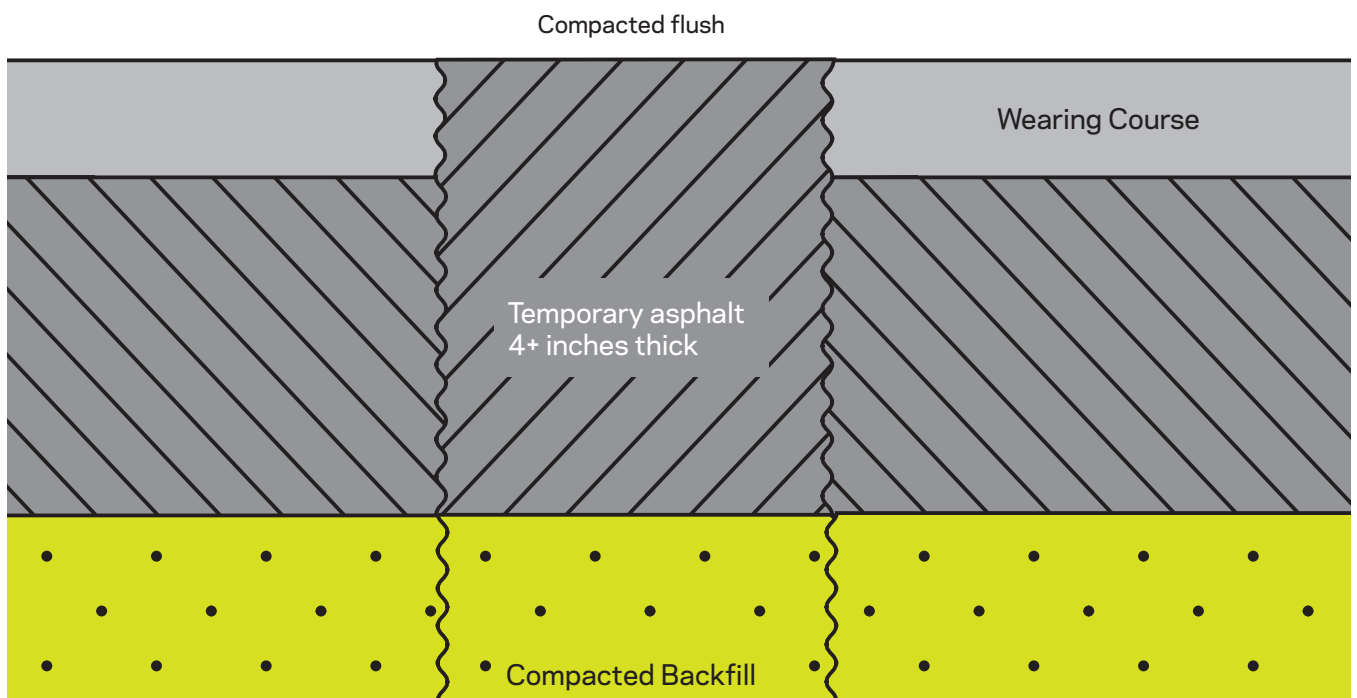
Permanently Restored Opening/Excavation



Temporary Repair: Plate



Temporary Repair: Fill



Section 4.4 Sidewalk Repairs

Upon completion of work, sidewalks must be restored according to Highway Rules, Section 2-09(f)(4) and NYC DOT Standard Highway Specifications. Some of the requirements include but are not limited to:

Some of the requirements described in Section 4.4 apply to the predominant sidewalk material, concrete. Sidewalks that are currently constructed of other materials, such as stone or pavers, generally must be repaired using the same material.

1 Expansion Joints. Expansion joints must be placed at 20-foot intervals, expansion joint filler material must be placed to the full depth of the sidewalk, and all expansion joints must be recessed and sealed.

2 Concrete must be poured and finished in accordance with NYC DOT Standard Highway Specifications at http://www.nyc.gov/html/dot/downloads/pdf/standard%20highway_specs_vol%201.pdf.

3 Sidewalk flags must be 5'x 5' where feasible. All flags containing substantial defects as defined in the Highway Rules must be replaced; patching of individual flags is not permitted.

4 Foundation Material. When replacing a concrete sidewalk, the foundation material may be retained and graded to the required subgrade. Any foundation material not meeting specifications must be removed.

5 Sidewalk Grades. Unless granted a waiver from NYC DOT, permanent sidewalks must be laid to the legal curb grades.

6 Transverse Slope. Sidewalks must be laid to pitch from the building line toward the curb. The minimum slope, calculated on a line perpendicular to the curb, must be 1" in 5', and the maximum is limited to 3" in 5'. Minimum slopes should be used wherever possible. The maximum transverse slope permitted for vault covers, gratings and other sidewalk structures is 1" in 5'.

7 Longitudinal Slope. The longitudinal slope of the sidewalk must be uniform and parallel to the curb at the curb's proper grade.



A temporary sidewalk closure while a sidewalk repair is underway.



Workers pour cement during sidewalk reconstruction.

8
Corner Treatment. The two slope lines meeting at the intersection of the two building lines must drop from a common point at the building corner toward their respective curbs at a rate within the limits prescribed in the Highway Rules. If this is not possible, sketches or drawings must be submitted, in duplicate, showing the proposed method of treatment to NYC DOT for approval.

9
Pedestrian Ramps. When a corner is constructed, reconstructed or repaired, pedestrian ramps must be installed in accordance with NYC DOT Standard Highway Specifications found at http://www.nyc.gov/html/dot/downloads/pdf/standard%20highway_specs_vol%201.pdf and in accordance with the most recent revision of Drawing H-1011 from the NYC DOT's Standard Details of Construction at http://www.nyc.gov/html/dot/downloads/pdf/nycdot_std_details_const.pdf.

10
Adjoining Existing and New Sidewalks. Junctions and transitions between new and existing sidewalks must conform to specifications.


Section 4.5 Street Construction Inspections and Enforcement

NYC DOT's HIQA unit inspects work sites for compliance with Title 19 of the NYC Administrative Code, NYC DOT Rules and Regulations, NYC DOT specifications and NYC DOT permit stipulations. HIQA performs inspections during active construction through its completion and up to the end of the Guarantee Period. HIQA may also inspect emergency street openings/excavations and utility access cover openings.

Upon inspection, HIQA may issue any of the following:


- **Corrective Action Requests (CARs)** are issued to address conditions such as inadequate street restorations, missing or cracked street hardware or street cave-ins. Any corrective action required by the CAR must be performed within **30 days** of the issuance of the CAR. For conditions that need immediate attention from the permittee, NYC DOT may issue Priority CARs [AKA Notices of Immediate Corrective Action (NICAs)]. Further information on responding to CARs may be found in the Highway Rules, Section 2-02(d).
- **Notices of Violations (NOVs)/ Summonses** are issued when there is a violation of laws, rules, regulations, specifications, or stipulations. NOVs carry a monetary fine and place the matter under the jurisdiction of the New York City Environmental Control Board (ECB). Further information on responding to ECB violations may be found at <http://www.nyc.gov/html/ecb/html/respond/respond.shtml>.
- Orders, given orally or in writing, may be issued by the Commissioner to cease and desist work or to perform remedial action. Failure to comply with an order issued by the Commissioner may result in criminal or civil penalties. Further information on responding to Orders may be found in the Highway Rules, Section 2-02(e).

SUMMONSES/NOTICES OF VIOLATION (NOVs): may be issued when there is a violation of laws, rules, regulations, specifications or stipulations. NOVs carry a monetary fine and put the matter under the jurisdiction of ECB.



CORRECTIVE ACTION REQUEST

CITY OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SIDEWALKS & INSPECTION MANAGEMENT
DIVISION OF HIGHWAY INSPECTION & QUALITY ASSURANCE



PRIORITY 1

TO: _____ BOROUGH: M BX BK QN SI _____
Permittee (Circle One) Year

PERMIT# _____ PERMIT DATE: _____ CAR DATE: _____
M D Y M D Y

LOCATION OF DEFECT(S):

NO. OF DEFECTIVE CUTS: _____ SECTOR NO. _____ PROTECTED STREET Y N _____
(Circle One)

STREET ADDRESS: _____ FEET FROM CURB: _____

FROM: _____ TO: _____
(CLOSEST CROSS STREET)

LOCATION OF OTHER DEFECTS _____ FEET FROM CLOSEST CROSS STREET: _____

LANE OF CUT (Circle) P = parking D = driving I = Intersection S = sidewalk BS = bus stop

TRAFFIC FLOW (Circle) H = heavy M = medium L = light

REASON FOR INSPECTION (Circle) 1-Active 2-Post Audit 4-Complaint 5-Pickup 8-Emg. # 9-Other

TYPE OF DEFECT

_31 UNSAFE CONDITION	_50 TEMP. MOUNDED (____ in.)	_70 PERM. MOUNDED (____ in.)	_77 SIDEWALK DEFECTS
_32 POOR HOUSEKEEPING	_51 TEMP. SUNKEN (____ in.)	_71 PERM. SUNKEN (____ in.)	_73 MISSING COLOR CODE
_34 WORK PROCEDURES	_52 CONCRETE ONLY	_72 NOT SEALED	_73 ASPHALT BROKEN/CRACK
_35 STEEL PLATES	_53 BINDER ONLY	_73 NOT ROLLED	_83 LANE MARKINGS
_80 OVERDUE FOR FINAL	_54 BACKFILL ONLY	_75 PROTECTED STREET SPEC.	_85 DEFECTIVE HARDWARE
_81 POLE OVERDUE	_82 ADDITIONAL PERMIT REQ.	_76 OTHER (see remarks)	_85 STEAM DEFECT

REMARKS: _____

Inspector Signature: _____ Date: _____ Inspector No: _____

Supervisor Signature: _____ Date: _____ (Check one) Fee No Fee

Revised 12/21/08 lbb/vm

A sample Corrective Action Request Form

Section 4.6 Sidewalk Violation Inspections and Enforcement

Private property owners are responsible for installing, repairing and maintaining sidewalks abutting their properties. NYC DOT inspects sidewalks for defects and when a defect is identified, a Sidewalk Violation is issued to the property owner and a copy is submitted to the County Clerk's office. There is no fine associated with a Sidewalk Violation. The violation provides a property owner **45 days** 🕒 to make repairs (see the Sidewalk Repairs section above for further details). If repairs have not been made within the 45-day period, the City may make the repairs and bill the property owner for the cost of the repairs.

Private homeowners applying for Sidewalk Repair Permits who will be making the repairs themselves may apply for permits by mail. If a contractor is being used, the contractor must be registered with NYC DOT and must take out the permit.

After repairs are complete, the property owner can contact 311 to schedule a Sidewalk Violation Dismissal. A dismissal inspection is always required to close out a violation. A Sidewalk Violation will be removed if the work has been satisfactorily completed. Further information on responding to Sidewalk Violations may be found at <http://www.nyc.gov/html/dot/html/faqs/sidewalkfaqs.shtml>.

Glossary of Acronyms and Common Terms



311 New York City's call-in system for government information and non-emergency services.

A

Administrative Code

The Administrative Code of the City of New York.

ASHO Administrative Superintendent of Highway Operations, a position within NYC DOT's Roadway Repair and Maintenance division.

B

Block Segment The linear stretch of the street between the curb lines of the cross streets that intersect such block. [*]

BPP Builder's Pavement Plan, issued by DOB.

Building Vault Any opening below the surface of the street that projects beyond the property line and is covered over. [**]

The Bureau NYC DOT's Bureau of Permit Management and Construction Control.

C

Canopy A supported cover, usually made of fabric, located over the sidewalk and held up by poles installed into the sidewalk.

CAR The term "corrective action request" or "CAR" means a formal notice by the Department that work performed and/or a condition created or maintained on a street is in violation of these rules or other applicable law with a request that action be taken by the person to whom such notice is addressed to correct the work and/or the condition so described. [*]

CGL Commercial General Liability insurance, required for a permittee registration application.

Critical Street A roadway where construction will significantly impact pedestrians, motorists, and bicyclists.

D

DCA New York City Department of Consumer Affairs.

DCP New York City Department of City Planning.

DDC New York City Department of Design and Construction.

DEC New York State Department of Environmental Conservation.

DEP New York City Department of Environmental Protection.

Design Commission (PDC) Public Design Commission of New York City.

DOB New York City Department of Buildings.

DoITT New York City Department of Information Technology and Telecommunications.

DOTMap is NYC DOT's presentation of mapped data within New York City's NYCityMap website. It can be accessed on the Internet at <http://www.nyc.gov/dotmap>.

E

EAN Emergency Authorization Number.

EAU NYC DOT Emergency Authorization Unit.

ECB New York City Environmental Control Board.

EDC New York City Economic Development Corporation.

Embargo Period A period of time during which street work (except for emergency work) is temporarily suspended due to a holiday, special event or other significant activity, as designated by NYC DOT. [*]

Emergency A situation endangering the public safety or causing or likely to cause the imminent interruption of service required by law, contract or franchise to be continuously maintained. [*]

Emergency Work Work necessary to correct a situation endangering the public safety or causing or likely to cause the imminent interruption of service required by law, contract or franchise to be continuously maintained (for example, by a government agency, a public utility, a franchisee). Such term shall not include work on new construction, regrades of existing hardware, continuation of an existing permit that has expired or will expire imminently or any other work that is not necessary to correct a condition to cause such imminent interruption. [*]

F

FDNY New York City Fire Department.

FHWA United States Department of Transportation Federal Highway Administration.

Finance New York City Department of Finance.

Fiscal Year the city's fiscal year runs from July 1 to June 30.

G

Guarantee Period is the period of time that the street restoration must be maintained by the entity that performed the street work.

H

HIQA NYC DOT's Highway Inspection and Quality Assurance unit is responsible for inspecting construction sites for compliance with Title 19 of the NYC Administrative Code, NYC DOT Rules and Regulations, NYC DOT Specifications and NYC DOT permit stipulations.

Highway Rules The New York City Department of Transportation Highway Rules are codified in Chapter 2 of Title 34 of the Rules of the City of New York. <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

Hold A "do not release" order that can be placed on permits or permittees to prevent the permit from being processed.

I

Intersection the area contained within the grid created by extending the curb lines of two or more streets at the point at which they cross each other. [*]

J

JETs Jolt-Elimination Teams from NYC DOT's Roadway Repair and Maintenance division respond to critical or emergency work requirements.

L

LMCCC Lower Manhattan Construction Command Center.

LPC New York City Landmarks Preservation Commission.

M

Milling mechanical removal of asphalt from a roadway prior to resurfacing the pavement.

MTA Metropolitan Transportation Authority.

MUTCD the Manual on Uniform Traffic Control Devices, a publication issued by the Federal Highway Administration containing the basic principles that govern the design and use of traffic control devices for all streets, highways, bikeways, and private roads open to public travel. <http://mutcd.fhwa.dot.gov>

N

New York 811, Inc. (formerly DigNet and One Call Center) is a nonprofit organization that acts as a communications link between utility companies and individuals planning any digging activity in the five boroughs of New York City and Nassau and Suffolk counties on Long Island so that subsurface infrastructure is "marked out" prior to excavation work to promote safe digging and protect that infrastructure. <http://www.NewYork-811.com>

NICA Notice of Immediate Corrective Action.

NOV Notice of Violation (see "summons").

NYC DOT New York City Department of Transportation.

NYS DOT New York State Department of Transportation

O

OCMC NYC DOT Office of Construction Mitigation and Coordination.

OEM New York City Office of Emergency Management.

P

Parks New York City Department of Parks and Recreation.

Permit Stipulations terms and conditions listed on the permit that must be followed by the permittee. Permit stipulations can include allowable days and hours for work, restrictions on street usage, and provisions for the maintenance and protection of traffic.

Permit Office NYC DOT Office of Permit Management.

Permittee an individual, corporation, business, or other entity who secures permits for all work regulated by NYC DOT pursuant to the Highway Rules. [*]

PEU NYC DOT Plan Examination Unit.

PM Project Manager.

Protected Street a street that has been resurfaced or reconstructed within five years prior to the date of application for a permit. [*]

R

Reconstruction when the entire street, including the base and surface pavement as well as curbs, sidewalks and related street assets, is rebuilt from building line to building line.

Resurfacing a process in which the top layer of existing asphalt is milled away (ground up and removed) and a new layer of asphalt is applied.

Roadway that portion of a street designed, improved or ordinarily used for vehicular travel, exclusive of the shoulder and slope. [*]

S

SCARA Sidewalk Curb and Roadway Application. <http://www.nyc.gov/html/dot/downloads/pdf/instfilingplan.pdf>

Sidewalk that portion of a street between the curb lines, or the lateral lines of a roadway, and the adjacent property lines, intended for the use of pedestrians. [*]

Sidewalk Flags a square of sidewalk, typically 5' x 5' in size. An entire sidewalk is comprised of multiple sidewalk flags.

Specifications the NYC DOT Standard Highway Specifications, indicating required construction materials. [*]

Standards the NYC DOT Standard Details of Construction, which contains drawings showing required dimensions of items to be constructed. [*]

Street a public street, avenue, road, alley, lane, highway, boulevard, concourse, parkway, driveway, culvert, sidewalk, crosswalk, boardwalk, viaduct, square or place, except those designated as marginal streets on a city map. [*]

Street Cut see "street excavation".

Street Excavation refers to any operation in which the street is cut open to install or access subsurface infrastructure.

Street Opening see "street excavation".

Summonses/Notices of Violation (NOVs) issued when there is a violation of laws, rules, regulations, specifications or stipulations.

T

Trench a narrow excavation which is typically greater in depth than in width.

W

Wearing Course generally the top 2-3+ inches of asphalt pavement (depending on the composition of the roadway base), which is designed to provide an even surface and withstand the wear of traffic.

* Refer to Highway Rules, Section 2-01.

** Refer to Highway Rules, Section 2-13.



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Appendices



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Appendix A**Common Permit Types and Documents Needed**

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Street Opening Permits

Permit Type	Description	Fee	Maximum Duration (Days)	Conditions	Necessary Documentation
0100	Open Swalk To Install Foundation	\$135	30/90	Requires DOB Approval or Requires DOT Franchise	DOB Permit DOT Franchise Agreement
0102	Major Installation- High Voltage	\$135/ 380	30/90	Limited To City Franchisee	N/A
0103	Major Installation- Gas	\$135/ 380	30/90	Limited To City Franchisee	N/A
0104	Major Installation- Steam	\$135/ 380	30/90	Limited To City Franchisee	N/A
0105	Major Installation- Telephone	\$135/ 380	30/90	Limited To City Franchisee	N/A
0106	Transformer Vault- On Rdway	\$135/ 380	15/30	Limited To City Franchisee	N/A
0107	Transformer Vault- On Sidewalk	\$135	15/30	Limited To City Franchisee	N/A
0108	Installation Of Poles	\$135	30	Requires DOT Street Lighting Approval	N/A
0109	Major Installation- Water	\$135/ 380	30/90	Requires DEP Approval	Requires DEP Approval
0110	Major Installation- Cable	\$135/ 380	30/90	Limited To City Franchisee	DoITT Franchise Agreement (Initial Submission Only)
0111	Major Installation- Sewer	\$135/ 380	30/90	Requires DEP Approval	DEP Sewer Slip
0113	Repair Water	\$135/ 380	15/30	Requires DEP Approval	DEP Water Slip
0114	Repair Sewer	\$135/ 380	15/30	Requires DEP Approval	DEP Sewer Slip
0115	Repair Water And Sewer	\$135/ 380	15/30	Requires DEP Approval	DEP Water And Sewer Slips
0116	Fuel Oil Line (Sidewalk Only)	\$135	15	Requires Property Owner Approval Requires Fire Department Approval	Letter From Property Owner Letter From Fire Department
0117	Vault Construction Or Alteration	\$135	30	Requires DOB Approval Requires DOT Approval	DOB Vault Permit DOT Approved Plans
0118	Reset, Repair Or Replace Curb	\$135	30	Requires DOB Approval or Requires DOT Approval	DOB Builder's Pavement Plan (BPP) Authorization Form DOT Approved SCARA Form
0119	Pave Street	\$135	15	Requires DOB Approval or Requires DOT Approval	DOB Builder's Pavement Plan (BPP) Authorization Form DOT Approved SCARA Form

Permit Type	Description	Fee	Maximum Duration (Days)	Conditions	Necessary Documentation
0120	Tree Pit	\$135	30	Requires DPR Approval or Requires DOB Approval	DPR Permit DOB Builder's Pavement Plan (BPP) Authorization Form
0122	Repair Gas	\$135/ 380	30	Limited To City Franchisee	N/A
0123	Repair Steam	\$135/ 380	30	Limited To City Franchisee	N/A
0124	Repair Electric Or Communications	\$135/ 380	30	Limited To City Franchisee	N/A
0126	Test Pits Or Cores Or Borings	\$135/ 380	15	Requires Property Owner Approval (Unless Government Contract)	Letter From Property Owner (Unless Government Contract) Engineering Plans
0127	Conduit Construction (Cable, Telecommunication) And Franchise	\$135/ 380	15	Requires City Franchise or Requires DOT Franchise	City Franchise Agreement DOT Franchise Agreement
0128	Erect Canopy	\$135	30	Requires DOT Highway Inspection Quality Assurance (HIQA) Approval	N/A
0129	Install Street Furniture	\$135	30	Requires DOT Franchise	DOT Franchise Agreement
0130	Land Fill	\$135	30	Property Owner Approval Requires DOT Approval	Letter From Property Owner
0131	Private Sewer	\$135/ 380	30	Requires DOT Franchise Requires DEP Approval	DOT Franchise Agreement DEP Approved Engineering Plans
0132	Install Fence	\$135	30	Requires DOB Approval	DOB Fence Permit
0133	Install Traffic Signals	\$135/ 380	30	Requires Approval From DOT Signals Unit or Requires DOT Contract	DOT Signals Approved Plans DOT Notice To Proceed (Initial Submission Only) DOT Signals Approved Plans
0138	Installation Of Fire Alarm	\$135	30	Requires Fire Department Contract	FDNY Notice To Proceed
0139	Installation Of Bus Shelter	\$135	30	Requires DOT Franchise	DOT Franchise Agreement
0151	Public Telephones	\$135	30	Limited To City Franchisee	DoITT Franchise Agreement (Initial Submission Only) DoITT Approval Letter (Each Location)

Building Operations/Construction Activity Permits

Permit Type	Description	Fee	Maximum Duration (Days)	Conditions	Necessary Documentation
0201	Place Material On St	\$80-140	30-90	Requires DOB Approval (If in conjunction with a new building or building alteration) Requires DOT Approval	DOB Permit In Conjunction With Other DOT Permits
0202	Crossing Sidewalk	\$50	30-90	Requires DOB Approval (If in conjunction with a new building or building alteration) Requires DOT Approval	DOB Permit In Conjunction With Other DOT Permits
0203	Crane Or Shovel On Street	\$150 1 st Wk Then \$50 Per	1 Wk- 12Wks	Requires DOB Approval May Also Require DOT Approval	DOB Cranes And Derricks Form DOB Crane Notice (Cn) (If Applicable) Engineering Plans (If Applicable) DOT Over-Dimensional Permit
0204	Place Equip. Other Than Crane Or Shovel	\$50 Per	30-90	Requires DOB Approval (If in conjunction with a new building or building alteration) Requires DOT Approval	DOB Permit In Conjunction With Other DOT Permits
0205	Place Shanty Or Trailer On Street	\$50 Per	30-90	Requires DOB Approval	DOB Permit
0207	Franchise Installation (Overhead Structure)	\$50	30-90	Requires DOT Franchise	DOT Franchise Agreement
0208	Temporary Pedestrian Walk	\$50	30-90	Requires DOB Approval (If in conjunction with a new building or building alteration) Requires DOT Approval	DOB Permit In Conjunction With Other DOT Permits
0210	Decorative Street Lights	\$50	30-90	Requires Approval From DOT Street Lighting Unit	DOT Street Lighting Approval Form
0211	Occupancy Of Roadway As Stipulated	\$50	30-90	Requires DOB Approval (If in conjunction with a new building or building alteration) Requires DOT Approval	DOB Permit In Conjunction With Other DOT Permits
0214	Place Container On Street	\$50 Per	30-90	Requires DOB Approval (If in conjunction with a new building or building alteration) Requires DOT Approval	DOB Permit In Conjunction With Other DOT Permits
0215	Occupancy Of Sidewalk As Stipulated	\$50	30-90	Requires DOB Approval (If in conjunction with a new building or building alteration) Requires DOT Approval	DOB Permit In Conjunction With Other DOT Permits
0221	Signs & Pavement Markings	\$50	30-90	Requires DOT Approval	DOT Approved Engineering Plans

Sidewalk Construction Permits

Permit Type	Description	Fee	Maximum Duration (Days)	Conditions	Necessary Documentation
0401	Repair Sidewalk	\$70 Per 300 LF	30	N/A	Plan or Sketch
0402	Construct New Sidewalk	\$70 Per 300 LF	30	Requires DOT Approval	DOT Approved SCARA Form
0403	Replace Sidewalk	\$70 Per 300 LF	30	Requires DOT Approval	DOT Approved SCARA Form
0405	New Sidewalk , Builders Pavement (BPP)	\$70 Per 300 LF	30	Requires DOB Approval	DOB Builder's Pavement Plan (BPP) Authorization Form
0500	Vault License	\$35	1 Time	DOT Franchise Approval	DOT and DOB Approved Plans

Canopy Permits

Permit Type	Description	Fee	Maximum Duration (Days)	Conditions	Necessary Documentation
0701	Hotel Canopy	\$50	1 Year	Requires DOT Highway Inspection Quality Assurance (HIQA) Approval	N/A
0702	Restaurant	\$50	1 Year	Requires DOT Highway Inspection Quality Assurance (HIQA) Approval	N/A
0703	Residence	\$50	1 Year	Requires DOT Highway Inspection Quality Assurance (HIQA) Approval	N/A
0704	Miscellaneous	\$50	1 Year	Requires DOT Highway Inspection Quality Assurance (HIQA) Approval	N/A
0705	Sidewalk Café	\$25	1 Year	Requires DOT Highway Inspection Quality Assurance (HIQA) Approval	N/A

Appendix B**Forms**

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Certificate of Insurance	2
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Emergency Authorization Number Form	4
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Application for Roadway/Sidewalk Permit(s)	13-14
Application for Governmental Work Permit(s)	15-16
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Application to Renew Governmental Work Permit(s)	19-20
Application to Reissue Permit(s)	21-22
Application to Reissue Governmental Work Permit(s)	23-24
HIQA Canopy Authorization Application	25
Engineering Package for Vault Application	26
How to Access Instructions for Filing Plans and Guidelines for the Design of Sidewalks, Curbs, Roadways and Other Infrastructure Components	27
How to Access New York City Department of Transportation Highway Rules	27
Minimum Clearance Requirements for Transformer Vaults	28

NOTE: For all forms marked SAMPLE, an original 8½" X 14" form must be submitted for NYC DOT review.

CERTIFICATION BY BROKER

The undersigned insurance broker represents to the City of New York that the attached Certificate of Insurance, dated _____, concerning insurance policy number _____ is accurate in all material respects, and that the described insurance is effective as of the date of this Certification.

_____ [Name of broker (typewritten)]

_____ [Address of broker (typewritten)]

_____ [Signature of authorized official or broker]

_____ [Name and title of authorized official (typewritten)]

Sworn to before me this
_____ day of _____, 20__

ACORD® CERTIFICATE OF INSURANCE

ISSUE DATE (MM/DD/YY):

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY **A**

COMPANY **B**

COMPANY **C**

COMPANY **D**

COMPANY **E**

COMPANY **F**

INSURED

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN ARE SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

C0. LTR.	TYPE OF INSURANCE	POLICY NUMBER	EFFECTIVE DATE	EXPIRATION DATE	LIMITS	
	GENERAL LIABILITY				GENERAL AGGREGATE	\$
	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG.	\$
	CLAIMS MADE <input checked="" type="checkbox"/> OCCUR.				PERSONAL & ADV. INJURY	\$
	OWNER'S & CONTRACTORS PROT.				EACH OCCURRENCE	\$
					FIRE DAMAGE (Any One Fire)	\$
					MEDICAL EXP. (Any One Person)	\$
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT	\$
	<input type="checkbox"/> ANY AUTOMOBILE				BODILY INJURY (Per Person)	\$
	<input type="checkbox"/> ALL OWNED AUTOMOBILES				BODILY INJURY (Per Accident)	\$
	<input type="checkbox"/> SCHEDULED AUTOMOBILES				PROPERTY DAMAGE	\$
	<input type="checkbox"/> HIRED AUTOMOBILES				EACH OCCURRENCE	\$
	<input type="checkbox"/> NON-OWNED AUTOMOBILES				AGGREGATE	\$
	<input type="checkbox"/> GARAGE LIABILITY					
	EXCESS LIABILITY					
	<input type="checkbox"/> UMBRELLA FORM					
	<input type="checkbox"/> OTHER THAN UMBRELLA FORM					
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				<input checked="" type="checkbox"/> STATUTORY LIMITS	
					EACH ACCIDENT	\$
					DISEASE - POLICY LIMIT	\$
					DISEASE - EACH EMPLOYEE	\$
	OTHER					

SAMPLE

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS:

The policy of insurance names the City of New York as additional insured and provides completed operations coverage.

CERTIFICATE HOLDER

**The City of New York
c/o DOT Office of Permit Management
55 Water Street
New York, NY 10041**

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE:



AFFIDAVIT OF OWNERSHIP

This form must be printed out. Type or print clearly. Mail to:
New York City Department of Transportation
Permit Management & Construction Control
Permit by Mail
55 Water Street, Concourse Level
New York, New York 10041

STATE OF NEW YORK
COUNTY OF: _____

I, _____, being duly sworn, depose and say the following:

1. I am the owner of premises _____
in the Borough of _____
2. I personally will perform the repairs to the sidewalk of the said premises.
3. I am aware that the law requires that if the said repairs are to be made by any person other than myself, the required Workers Compensation Insurance, and Commercial General Liability Insurance policy must be filed with the Department of Transportation.

(Signature of Owner)

State of New York, County of _____ On the _____ of _____, before me personally came _____ to

me known to be the individual described in and who executed the forgoing instrument, and acknowledged that

_____ executed the same.

Notary Public



EMERGENCY AUTHORIZATION NUMBER FORM

Rev. 8/25/10

Date	NYC DOT CONTACT NUMBERS	
/ /	BUSINESS HOURS (8:30am-3:25pm)	NON-BUSINESS HOURS (3:30pm-8:25am)
	TEL: 212.839.9660	TEL: 718.433.3340
	FAX: 212.839.9699	FAX: 718.433.3447

SECTION A: Applicant Information

1. Permittee ID#: _____ 2. Permittee Name: _____

3. Address: _____

4. Caller Name: _____ 5. Tel #:(_____) _____ - _____

6. Employee ID#: _____ 7. Fax #:(_____) _____ - _____

8. Company Official To Certify Emergency Status: _____ 9. Tel #: _____ (_____) _____ - _____

SECTION B: Nature of the Emergency

10. Is service cut off to anyone? YES NO

10a. If YES, When was the service cut off? Date: _____ / _____ / _____ Time: _____

11. What is the Nature of the Emergency? (Describe in Detail): _____

SECTION C: Location of Emergency (Check One)	SECTION D: Type of Permit Requested (Check One)
<input type="checkbox"/> MANHATTAN <input type="checkbox"/> BRONX <input type="checkbox"/> BROOKLYN <input type="checkbox"/> STATEN ISLAND <input type="checkbox"/> QUEENS	<input type="checkbox"/> 0301 TELEPHONE <input type="checkbox"/> 0304 GAS LEAK <input type="checkbox"/> 0301 ELECTRICAL <input type="checkbox"/> 0305 AIR PRESSURE <input type="checkbox"/> 0301 TELECOMMUNICATIONS <input type="checkbox"/> 0306 GAS PRESSURE <input type="checkbox"/> 0302 WATER <input type="checkbox"/> 0303 STEAM <input type="checkbox"/> OTHER: _____

Official Use Only	
On Street: _____	Recorded#: _____
Cross Street #1: _____	MOSAICS#: _____
Cross Street #2: _____	
On Street: _____	Recorded#: _____
Cross Street #1: _____	MOSAICS#: _____
Cross Street #2: _____	
On Street: _____	Recorded#: _____
Cross Street #1: _____	MOSAICS#: _____
Cross Street #2: _____	
On Street: _____	Recorded#: _____
Cross Street #1: _____	MOSAICS#: _____
Cross Street #2: _____	

Official Use Only	
DOT OPERATOR _____	Date: _____ / _____ / _____



EMERGENCY STREET OPENING PERMIT FORM

Rev. 9/15/10

Emergency Number (Official Use Only)

Date NYC DOT CONTACT NUMBERS BUSINESS HOURS (8:30am-3:25pm) NON-BUSINESS HOURS (3:30pm-8:25am) TEL: 212.839.9660 TEL: 718.433.3340 FAX: 212.839.9699 FAX: 718.433.3447

SECTION A: Applicant Information

1. Permittee ID#: 2. Permittee Name: 3. Address: 4. Caller Name: 5. Tel #:() - 6. Employee ID#: 7. Time of Request: 8. Company Official To Certify Emergency Status: 9. Tel #: () -

SECTION B: Location of Emergency

10. Borough (Check One): MANHATTAN BROOKLYN QUEENS BRONX STATEN ISLAND 11. House No.: 12. On Street: 12a. Street Work On, If Different From Above: 13. Between: (Cross Street #1) and (Cross Street #2)

SECTION C: Type of Permit Requested (Check One)

0108 INSTALL POLE 0113 REPAIR WATER 0114 REPAIR SEWER 0115 REPAIR WATER/SEWER 0116 FUEL OIL LINE 0122 REPAIR GAS 0123 REPAIR STEAM 0124 REPAIR ELECTRIC / COMMUNICATIONS (Utilities Only) 0127 CONDUIT CONSTRUCTION (CABLE, TELECOMM. AND FRANCHISE) 0156 REPAIR TRAFFIC STREET LIGHT 0157 REPAIR TRAFFIC SIGNALS 0204 STEAM STACK END DATE: / / 0204 NITROGEN TANK END DATE: / /

SECTION D: Nature of the Emergency

14. Is heavy equipment being used? YES NO 15. Is service cut off to anyone? YES NO 15a. If YES, When was the service cut off? Date: / / Time: 16. What is the Nature of the Emergency? (Describe in Detail):

FOR OFFICIAL USE ONLY

Recorded # Date: / / DOT Operator Time: / /



REQUEST FOR ROADWAY/SIDEWALK PERMITS DURING EMBARGO PERIODS

(Official Use Only) Start/End Date (Today's date): / /

Permit Number (Official Use Only)

* This form is required for all requests to allow work in embargo areas during embargo times.

Permit Type: 0169

* See reverse for instructions on how to complete this form.

Rev. 9/27/10

SECTION A: Applicant Information
1. Permittee ID#:
2. Permittee Name:
3. Address:
4. Tel #:() -
5. E-Mail:

SECTION B: Work Information
6. Borough: MN BK QN BX SI
7. OCMC File: - -
8. House No.:
9. On Street:
9a. Street Work On, If Different From Above:
10. Between: (Cross Street #1) and (Cross Street #2)
11. For the Purpose of:
12. Work Start Date: / /
13. Work End Date: / /

SECTION C: Reason for Request
14. State the Reasons for this Request (In Detail):

SECTION D: Additional Information/Attachments
Please attach a detailed, scaled drawing of the entire work site as it relates to all work performed outside the property line for which NYC DOT permits are being requested.
This form, the attached scaled drawing and the original application must be signed and submitted to the Project Manager for further review.
Please do not call NYC DOT. Upon OCMC's determination of your appeal, we will notify the contact person immediately.
15. Contact Person Name:
16. Tel #:() -
17. Contact Person E-mail Address:

SECTION E: Acknowledgements and Agreements by Authorized Representative of the Applicant
THIS IS NOT A PERMIT. This is a request for consideration to allow work to occur during an embargo period. Should OCMC approval be granted, the Applicant must follow existing procedures for obtaining the necessary permits.
18. Applicant Name (Please Print):
19. Applicant Signature: (Authorized Representative of Applicant)
20. Date: / /

SECTION F: OCMC Determination (Official Use Only)
Request Approved
Request Denied
Request Modified
Comments:

OCMC Approval by: Date: / /

INSTRUCTIONS FOR COMPLETING WORK DURING EMBARGO PERIOD APPLICATION PROPERLY

To ensure the proper processing of your application, please print all information *CLEARLY*.

SECTION A: Applicant Information

1. **Permittee ID#:** Provide the unique 5 digit identification number the Permittee received when he/she registered their company with the Department of Transportation. Permits will not be issued without a Permittee ID Number.
2. **Permittee Name:** Provide the name of the company to whom the permits will be issued and to whom the above Permittee ID# is assigned.
3. **Address:** Provide the Permittee's business mailing address.
4. **Tel #:** Provide the Permittee's daytime telephone number.
5. **E-mail:** Provide the Permittee's e-mail address.

SECTION B: Work Information

6. **Borough:** Check the Borough in which the proposed work will be performed (MN-Manhattan, BK-Brooklyn, QN-Queens, BX-Bronx, SI-Staten Island).
7. **OCMC File:** If one exists, provide the OCMC file number pertaining to the proposed work (e.g. MEC-08-001).
8. **House No.:** Provide the house number of the building where the proposed work will occur.
9. **On Street:** Provide the name of the street where the proposed work will occur.
9a. Street Work On, If Different From Above: Provide the name of the street where the physical proposed work will occur if it is not occurring on the same street to which the address applies. (e.g.: Work being performed for 55 Water Street, but excavation is on Old Slip).
10. **Between: and :** Provide the names of the two streets with which the On Street intersects (Cross Streets).
11. **For the Purpose of:** Provide the reason why you are applying for permits (e.g.: New Bldg. Construction, Repair Defective Sidewalk, etc.).
12. **Work Start Date:** Provide the date when the proposed work is expected to commence. (May be changed by NYC DOT to reflect permit restrictions)
13. **Work End Date:** Provide the anticipated completion date of the proposed work. (May be changed by NYC DOT to reflect permit restrictions)

SECTION C: Reason for Request

14. **State the Reasons for this Request (In Detail):** Provide a clear, detailed description of the nature of the proposed work and why you are submitting this request.

SECTION D: Additional Information/Attachments

Provide a detailed, scaled drawing of the entire work site as it relates to all work performed outside the property line for which NYC DOT permits are being requested.

15. **Contact Person Name:** Provide the name of the person who should be contacted with OCMC's appeal determination.
16. **Tel #:** Provide the telephone number of the contact person for this appeal.
17. **Contact Person E-mail Address:** Provide the e-mail address for the contact person for this appeal.

SECTION E: Acknowledgements and Agreements by Authorized Representative of the Applicant

18. **Applicant Name:** Print the name of the person who is submitting this application for review and approval.
19. **Applicant Signature:** The person submitting this application must be an authorized representative of the applicant and must provide his/her original signature.
20. **Date:** Provide the date of application submittal.

SECTION F: OCMC Determination

This is where OCMC will make their determination as to whether to Approve or Deny the request, or to Modify existing requirements (ongoing projects). DO NOT WRITE IN THIS AREA.



REQUEST FOR FULL ROADWAY CLOSURE

Permit Number (Official Use Only)

* See reverse for instructions on how to complete this form.

Rev. 9/15/10

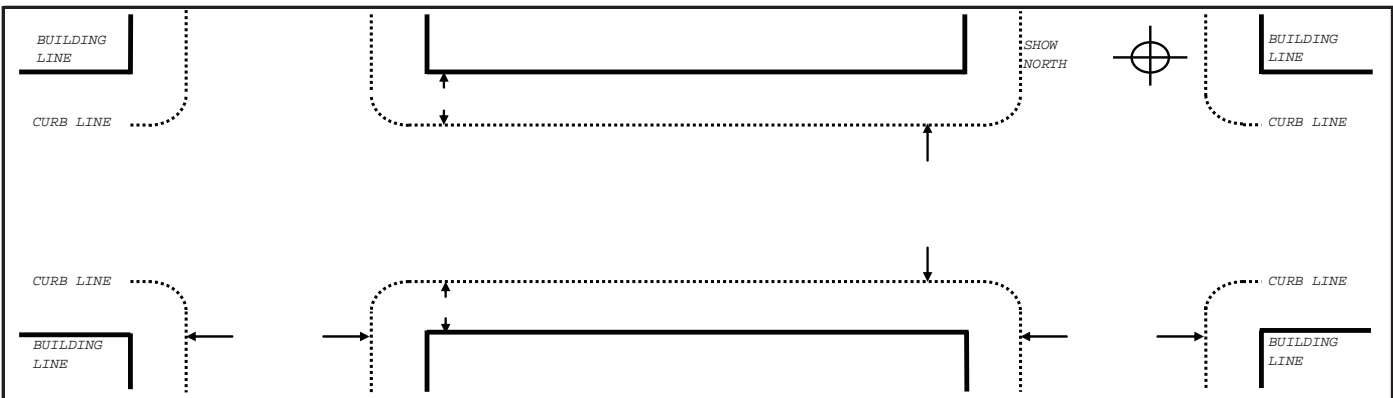
SECTION A: Applicant Information

1. Permittee ID#: _____ 2. Permittee Name: _____
3. Address: _____
4. Tel #:(_____) _____ - _____ 5. E-Mail: _____

SECTION B: Work Information

6. Borough: [] MN [] BK [] QN [] BX [] SI 7. OCMC File: _____ - _____ - _____
8. Type of Pavement: a. Roadway _____ b. Sidewalk _____ 9. DOB#: _____
10. House No.: _____ 11. On Street: _____
11a. Street Work On, If Different From Above: _____
12. Between: _____ and _____
(Cross Street #1) (Cross Street #2)
13. For the Purpose of: _____
14. Work Start Date: _____ / _____ / _____ 15. Work End Date: _____ / _____ / _____

SECTION C: Work Zone Sketch (Include On Street, both Cross Streets, North Arrow, Sidewalk/Roadway widths and proposed Work Zone)



SECTION D: Proposed Permit Stipulations (For Official Use Only)

Special Stipulations: _____

Required Notification Signage: _____ Variable Message Sign (VMS) _____ Fixed Orange Construction Sign

OCMC Approval by: _____ Date: _____ / _____ / _____

SECTION E: Acknowledgements and Agreements by Authorized Representative of the Applicant

THIS IS NOT A PERMIT. The Applicant/Permittee is required to send written notice to Police, Fire, EMS, Community Board, affected NYC Transit or private bus companies and property owners on the segment of the street in which the permit applies a minimum of seven (7) days prior to the full roadway closure. A copy of this notification must be presented to OCMC with the necessary permit application before the above permit stipulations will be approved.

16. Submitted by: _____ (Please Print) 17. Tel #:(_____) _____ - _____

18. Signed by: _____ (Authorized Representative of Applicant) 19. Date: _____ / _____ / _____

INSTRUCTIONS FOR COMPLETING FULL ROADWAY CLOSURE APPLICATION PROPERLY

To ensure the proper processing of your application, please print all information *CLEARLY*.

SECTION A: Applicant Information

1. **Permittee ID#:** Provide the unique 5 digit identification number the Permittee received when he/she registered their company with the Department of Transportation. Permits will not be issued without a Permittee ID Number.
2. **Permittee Name:** Provide the name of the company to whom the permits will be issued and to whom the above Permittee ID# is assigned.
3. **Address:** Provide the Permittee's business mailing address.
4. **Tel #:** Provide the Permittee's daytime telephone number.
5. **E-mail:** Provide the Permittee's e-mail address.

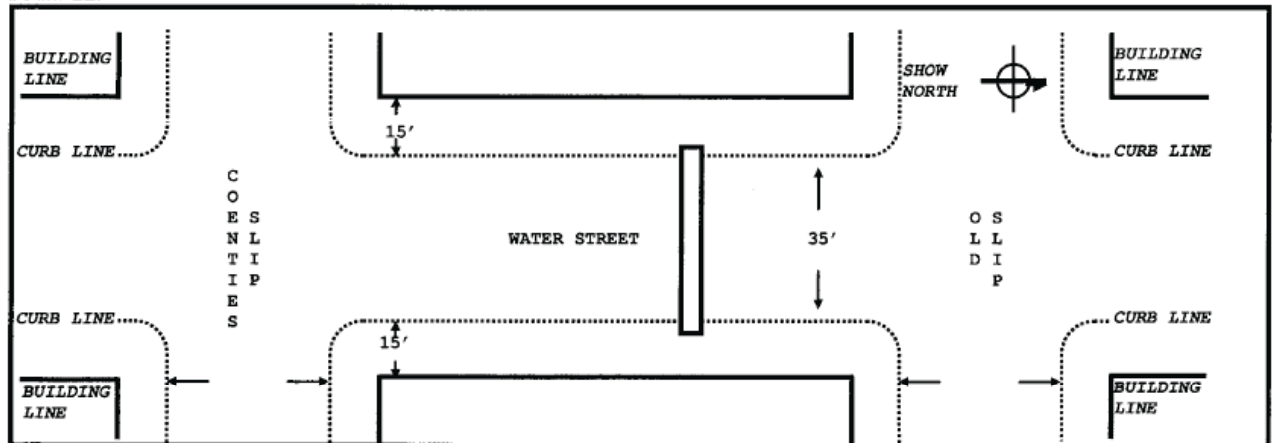
SECTION B: Work Information

6. **Borough:** Check the Borough in which the proposed work will be performed (MN-Manhattan, BK-Brooklyn, QN-Queens, BX-Bronx, SI-Staten Island).
7. **OCMC File:** If one exists, provide the OCMC file number pertaining to the proposed work (e.g. MEC-08-001).
8. **Type of Pavement:**
 - a. **Roadway:** If working in the roadway, provide the surface material of the roadway where the proposed work will occur (e.g. Asphalt)
 - b. **Sidewalk:** If working in the sidewalk, provide the surface material of the sidewalk where the proposed work will occur (e.g. Concrete)
9. **DOB#:** Provide any applicable Department of Buildings permit numbers.
10. **House No.:** Provide the house number of the building where the proposed work will occur.
11. **On Street:** Provide the name of the street where the proposed work will occur.
 - 11a. **Street Work On, if Different From Above:** Provide the name of the street where the physical proposed work will occur if it is not occurring on the same street to which the address applies. (e.g.: Work being performed for 55 Water Street, but excavation is on Old Slip).
12. **Between: and :** Provide the names of the two streets with which the On Street intersects (Cross Streets).
13. **For the Purpose of:** Provide the reason why you are applying for permits (e.g.: New Bldg. Construction, Repair Defective Sidewalk, etc.).
14. **Work Start Date:** Provide the date when the proposed work is expected to commence.
15. **Work End Date:** Provide the anticipated completion date of the proposed work. (May be changed by NYC DOT to reflect permit restrictions)

SECTION C: Work Zone Sketch

Provide a diagram of the proposed work location for which you are requesting a permit. Show all pertinent information including On Street, both Cross Streets, North Arrow, Sidewalk/Roadway widths and location of excavations or placement of construction equipment/material, etc. NOTE: If completing this form online, On Street, Cross Streets, North Arrow and Sidewalk/Roadway widths may be filled in, however the work zone sketch must be hand-drawn after printing this form.

EXAMPLE:



SECTION D: Proposed Permit Stipulations (For Official Use Only)

This area is for OCMC Project Managers' use only. This is where you will see what permit stipulations will be issued and printed on the approved permit(s). DO NOT WRITE IN THIS AREA.

SECTION E: Acknowledgements and Agreements by Authorized Representative of the Applicant

16. **Submitted By:** Print the name of the person who is submitting this application for review and approval.
17. **Tel #:** Provide a valid daytime telephone number of the person submitting this application.
18. **Signed By:** The person submitting this application must be an authorized representative of the applicant and must provide his/her original signature.
19. **Date:** Provide the date of application submittal.



PERMITEE REGISTRATION APPLICATION

Permittee Number (Official Use Only)

Rev. 9/15/10

SECTION A: Applicant Information	
1. Name: _____	
AKA: _____	
2. Tax I.D. Number (E.I.N) or Social Security Number: _____	
3. Address (Post Office Box Not Accepted): _____	
4. City: _____	State: _____ Zip: _____
5. Tel #:(_____) _____ - _____	6. Fax #:(_____) _____ - _____
7. 24-Hour Emergency Telephone Number (Must be able to make immediate contact): (_____) _____ - _____	
8. E-Mail: _____	

SECTION B: Applicable License Number(s)	
Consumer Affairs: _____	Name of Company on License: _____
Sign Hanger: _____	
Master Rigger: _____	
* Plumber: _____	
* NOTE: NYCDOT will only issue permits in the name of the licensed plumber or the company name as shown on the Department of Buildings Plumbers License (Must attach a copy of the license). If the company name being registered is NOT the same as above, you will not be issued and water/sewer permits by NYCDOT.	

SECTION C: Category of Work Performed (Check All That Apply)				
<input type="checkbox"/> General Contractor	<input type="checkbox"/> Government Contractor	<input type="checkbox"/> Authority Contractor	<input type="checkbox"/> Sidewalk Contractor	<input type="checkbox"/> Crane
<input type="checkbox"/> Commercial Refuse Container: BIC License or Registration Number: _____				
<input type="checkbox"/> Other (Identify): _____				

SECTION D: Work in Borough (Check All That Apply)				
In what Borough(s) will you be working? <input type="checkbox"/> Manhattan <input type="checkbox"/> Brooklyn <input type="checkbox"/> Queens <input type="checkbox"/> Bronx <input type="checkbox"/> Staten Island				

SECTION E: Authorized Representatives to Obtain Permits - USE REVERSE FOR ADDITIONAL ENTRIES		
Name	Affiliation	Telephone

SECTION F: Company Officers / Directors / Managing Agents / etc. (NAME AT LEAST 2) - USE REVERSE FOR ADDITIONAL ENTRIES	
Name	Title

SECTION G: Designated Representative(s) to Accept Service of Summons at Your Business Office (NAME AT LEAST 2)	
Name	Name

SECTION H: Signature of Company Officer	
Company Official: _____	Title: _____
(Please Print)	
Signature: _____	Date: ____ / ____ / ____

THIS FORM MUST BE NOTARIZED

County of _____ State of New York,

On the _____ of _____, before me personally came _____

to me known to be the individual described in and who executed the foregoing instrument, and acknowledged that _____

executed the same.

(For Official Use Only)	
Approval by: _____	Date: ____ / ____ / ____

INSTRUCTIONS FOR COMPLETING THE PERMITTEE REGISTRATION APPLICATION PROPERLY

To ensure the proper processing of your application, please print all information *CLEARLY*.

The instructions below apply to both corporations and individuals. For individuals, "Not Applicable" should be filled in for all corporation-related questions. Registration applications should be printed on 8 1/2"x 14" paper.

SECTION A: Applicant Information

1. **Name:** Enter the name of the individual or corporation to be registered with NYC DOT. If AKA (also known as) is applicable, enter this name.
2. **Identification:** Enter the applicant's Tax Identification Number (AKA Employer Identification Number) or the individual's Social Security Number.
3. **Address:** Enter the applicant's contact address (street number and name).
4. **City, state, zip:** Enter city, state and zip code.
5. **Tel #:** Enter daytime telephone number.
6. **Fax #:** Enter applicant's fax number.
7. **24-Hour Emergency Telephone Number:** Enter a telephone number where the applicant can be reached at all times (for emergency situations).
8. **E-mail:** Enter applicant's e-mail address.

SECTION B: Applicable License Number(s)

Enter the license number(s) as required for each type of work to be performed, including plumber's license number and name on license (if applicable).

SECTION C: Category of Work Performed

Check all types of work that will be performed by the applicant or his/her corporation.

SECTION D: Work in Borough

Check each borough in which the applicant expects to work.

SECTION E: Authorized Representatives to Obtain Permits

Enter all persons authorized to obtain permits for the applicant, their affiliation to the applicant and their telephone number, including the name of any expediter. If the applicant makes any changes to these authorized representatives, he or she must update the Permittee Registration Application.

SECTION F: Company Officers/Directors/Managing Agents/etc.

Enter at least two names of corporate officers, with title.

SECTION G: Designated Representative(s) to Accept Service of Summons at the Applicant's Business Office

Enter the names of at least two people who are authorized to accept summonses for his/her corporation and who are located at his/her business address.

SECTION H: Signature of Company Officer

Print his/her name and title and provide a signature.

NOTARIZE THE FORM.



Department of Transportation

APPLICATION FOR ROADWAY/SIDEWALK PERMIT(S)

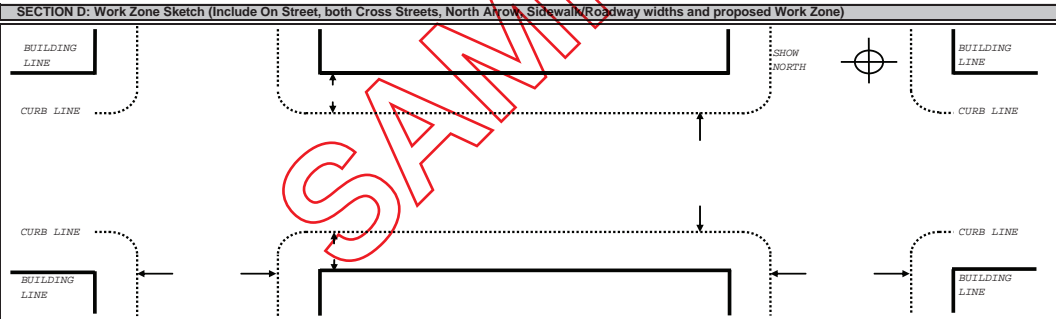
* See reverse for instructions on how to complete this form.

Rev. 9/15/10

SECTION A: Applicant Information
1. Permittee ID#:
2. Permittee Name:
3. Address:
4. Tel #:() -
5. E-Mail:

SECTION B: Work Information
6. Borough: MN BK QN BX SI
7. OCMC File:
8. Type of Pavement: a. Roadway b. Sidewalk
9. DOB#:
10. House No.:
11. On Street:
11a. Street Work On, If Different From Above:
12. Between: (Cross Street #1) and (Cross Street #2)
13. For the Purpose of:
14. Number of Openings:
15. Area Size: (In Square Feet)
16. Frontage Length: (In Linear Feet)
17. Work Start Date: / /
18. Work End Date: / /

SECTION C: Type of Permit Requested (Check All That Apply)
STREET OPENING PERMITS
0100 OPEN SIDEWALK TO INSTALL FOUNDATION
0111 MAJOR INSTALLATION SEWER
0113 REPAIR WATER
0114 REPAIR SEWER
0115 REPAIR WATER/SEWER
0116 FUEL OIL LINE
0117 VAULT CONSTRUCTION OR ALTERATION
0118 RESET, REPAIR OR REPLACE CURB
0119 PAVE STREET
0126 TEST PITS, CORES OR BORINGS
0127 CONDUIT CONSTRUCTION (CABLE, TELECOMM. AND FRANCHISE)
0132 INSTALL FENCE
BUILDING OPERATIONS PERMITS
0201 PLACE MATERIAL ON STREET
0202 CROSSING SIDEWALK
0203 PLACE CRANE OR SHOVEL ON STREET
0204 PLACE EQUIPMENT OTHER THAN CRANE OR SHOVEL ON STREET
0205 PLACE SHANTY OR TRAILER ON STREET
0208 TEMPORARY PEDESTRIAN WALKWAY
0211 OCCUPANCY OF ROADWAY AS STIPULATED
0214 PLACE CONTAINER ON STREET
0215 OCCUPANCY OF SIDEWALK AS STIPULATED
0221 TEMPORARY CONSTRUCTION SIGN/MARKINGS
CANOPY PERMITS
0701 CANOPY FOR NOVEL
0702 CANOPY FOR RESTAURANT
0703 CANOPY FOR RESIDENCE
0704 CANOPY FOR MISCELLANEOUS
0705 CANOPY FOR SIDEWALK CAFÉ
Other Type of Permit



SECTION E: Permit Stipulations (For Official Use Only)
Table with columns: Permit Type, Fee, Permit Stipulations, Permit Number. Includes a section for Special Stipulations and Additional Fees.

OCMC Approval by: Date: / /

SECTION F: Acknowledgements and Agreements by Authorized Representative of the Applicant
Approved for the Commissioner by:
The permit to be granted is subject to the following conditions:
The applicant agrees to comply with all laws and rules of the Department and any other applicable laws and rules.
No permit shall be issued unless all applicable insurance and permit bonds are on file.
19. Submitted by: (Please Print)
20. Tel #:() -
21. Signed by: (Authorized Representative of Applicant)
22. Date: / /

INSTRUCTIONS FOR COMPLETING ROADWAY/SIDEWALK PERMIT APPLICATION PROPERLY

To ensure the proper processing of your application, please print all information *CLEARLY*.

SECTION A: Applicant Information

1. **Permittee ID#:** Provide the unique 5 digit identification number the Permittee received when he/she registered their company with the Department of Transportation. Permits will not be issued without a Permittee ID Number.
2. **Permittee Name:** Provide the name of the company to whom the permits will be issued and to whom the above Permittee ID# is assigned.
3. **Address:** Provide the Permittee's business mailing address.
4. **Tel #:** Provide the Permittee's daytime telephone number.
5. **E-mail:** Provide the Permittee's e-mail address.

SECTION B: Work Information

6. **Borough:** Check the Borough in which the proposed work will be performed (MN-Manhattan, BK-Brooklyn, QN-Queens, BX-Bronx, SI-Staten Island).
7. **OCMC File:** If one exists, provide the OCMC file number pertaining to the proposed work (e.g. MEC-08-001).
8. **Type of Pavement:**
 - a. **Roadway:** If working in the roadway, provide the surface material of the roadway where the proposed work will occur (e.g. Asphalt)
 - b. **Sidewalk:** If working in the sidewalk, provide the surface material of the sidewalk where the proposed work will occur (e.g. Concrete)
9. **DOB#:** Provide any applicable Department of Buildings permit numbers.
10. **House No.:** Provide the house number of the building where the proposed work will occur.
11. **On Street:** Provide the name of the street where the proposed work will occur.
11a. Street Work On, If Different From Above: Provide the name of the street where the physical proposed work will occur if it is not occurring on the same street to which the address applies. (e.g.: Work being performed for 55 Water Street, but excavation is on Old Slip).
12. **Between: and ;** Provide the names of the two streets with which the On Street intersects (Cross Streets).
13. **For the Purpose of:** Provide the reason why you are applying for permits (e.g.: New Bldg. Construction, Repair Defective Sidewalk, etc.).
14. **Number of Openings:** Provide the number of proposed open excavations to be made.
15. **Area Size:** Provide the total square footage of the proposed work area.
16. **Frontage Length:** Provide the total linear footage of all proposed work. Provide total building's frontage length if performing new building or building alteration work.
17. **Work Start Date:** Provide the date when the proposed work is expected to commence. (May be changed by NYC DOT to reflect permit restrictions)
18. **Work End Date:** Provide the anticipated completion date of the proposed work. (May be changed by NYC DOT to reflect permit restrictions)

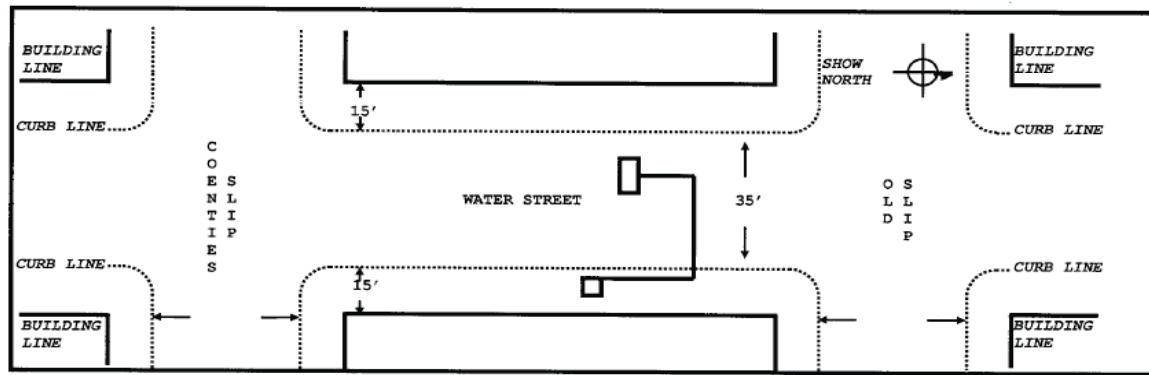
SECTION C: Type of Permit Requested

Check all permit types that you wish to apply for today based on your proposed work.

SECTION D: Work Zone Sketch

Provide a diagram of the proposed work location for which you are requesting a permit. Show all pertinent information including On Street, both Cross Streets, North Arrow, Sidewalk/Roadway widths and location of excavations or placement of construction equipment/material, etc. NOTE: If completing this form online, On Street, Cross Streets, North Arrow and Sidewalk/Roadway widths may be filled in, however the work zone sketch must be hand-drawn after printing this form.

EXAMPLE:



SECTION E: Permit Stipulations (For Official Use Only)

This area is for OCMC Project Managers' use only. This is where you will see what permit stipulations will be issued and printed on the approved permit(s). DO NOT WRITE IN THIS AREA.

SECTION F: Acknowledgements and Agreements by Authorized Representative of the Applicant

19. **Submitted By:** Print the name of the person who is submitting this application for review and approval.
20. **Tel #:** Provide a valid daytime telephone number of the person submitting this application.
21. **Signed By:** The person submitting this application must be an authorized representative of the applicant and must provide his/her original signature.
22. **Date:** Provide the date of application submittal.



Department of Transportation

APPLICATION FOR GOVERNMENTAL WORK PERMIT(S)

Rev. 9/15/10

SECTION A: Applicant Information

1. Permittee ID#: _____ 2. Permittee Name: _____
3. Address: _____
4. Tel #:(_____) _____ 5. E-Mail: _____

SECTION B: Contract Information

6. Borough: [] MN [] BK [] QN [] BX [] SI 7. OCMC File: _____ - _____ - _____
8. Contract Number: _____ 9. DOB#: _____
10. Sponsoring Agency: [] DEP [] DDC [] DOT [] DPR [] EDC [] MTA [] PANY/NJ [] SCA [] OTHER
11. Project Engineer Name: _____ 12. Tel #:(_____) _____ - _____
13. Resident Engineer Name: _____ 14. Tel #:(_____) _____ - _____
15. Project Description: _____
16. Contract Start Date: _____ / _____ / _____ 17. Contract End Date: _____ / _____ / _____
18. Type of Pavement: a. Roadway _____ b. Sidewalk _____

SECTION C: Type of Street Opening Permit Requested (Check All That Apply) - SEE REVERSE FOR BUILDING OPERATIONS

[] 110 MAJOR INSTALLATION CABLE [] 133 INSTALL TRAFFIC SIGNALS
[] 111 MAJOR INSTALLATION SEWER [] 135 FINAL RESTORATION
[] 112 RAPID TRANSIT CONSTRUCTION [] 136 DEP CONTRACTOR MAJOR INSTALLATIONS-WATER
[] 113 REPAIR WATER [] 137 DEP CONTRACTOR MAJOR INSTALLATIONS-SEWER
[] 114 REPAIR SEWER [] 157 REPAIR TRAFFIC SIGNALS
[] 116 FUEL OIL LINE [] 158 DDC CONTRACTOR MAJOR RECONSTRUCTION
[] 118 RESET, REPAIR OR REPLACE CURB [] 159 EDC CONTRACTOR MAJOR RECONSTRUCTION
[] 119 PAVE STREET [] 160 SIDEWALK RECONSTRUCTION CONTRACTS
[] 120 TREE PIT [] 161 NYCDOT BRIDGES RECONSTRUCTION
[] 121 CONSTRUCT OR ALTER MANHOLE AND / OR CASTING [] 162 NYC PARKS RECONSTRUCTION CONTRACT
[] 126 TEST PITS, CORES OR BORINGS [] 163 SCA CONTRACT WORK
[] 132 INSTALL FENCE [] 164 NYSDOT CONSTRUCTION

SECTION D: Work Zones

Table with columns: On Street, Cross Street #1, Cross Street #2, Linear Feet, Start Date, End Date. Rows 1-10 with 'Permit Stipulations:' field below each.

Special Stipulations: _____
OCMC Approval by: _____ Date: _____ / _____ / _____

SECTION E: Acknowledgements and Agreements by Authorized Representative of the Applicant

(For Official Use Only) Approved for the Commissioner by: _____ Date: _____ / _____ / _____
The permit to be granted is subject to the following conditions:
The applicant agrees to comply with all laws and rules of the Department and any other applicable laws and rules.
No permit shall be issued unless all applicable insurance and permit bonds are on file.
19. Submitted by: _____ (Please Print) 20. Tel #:(_____) _____ - _____
21. Signed by: _____ (Authorized Representative of Applicant) 22. Date: _____ / _____ / _____

SECTION F: Type of Building Operations Permit Requested (Check All That Apply) - SEE FRONT FOR STREET OPENINGS

- | | |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <input type="checkbox"/> 201 PLACE MATERIAL ON STREET | <input type="checkbox"/> 208 TEMPORARY PEDESTRIAN WALKWAY |
| <input type="checkbox"/> 202 CROSSING SIDEWALK | <input type="checkbox"/> 211 OCCUPANCY OF ROADWAY AS STIPULATED |
| <input type="checkbox"/> 203 PLACE CRANE OR SHOVEL ON STREET | <input type="checkbox"/> 214 PLACE CONTAINER ON STREET |
| <input type="checkbox"/> 204 PLACE EQUIPMENT OTHER THAN CRANE OR SHOVEL ON STREET | <input type="checkbox"/> 215 OCCUPANCY OF SIDEWALK AS STIPULATED |
| <input type="checkbox"/> 205 PLACE SHANTY OR TRAILER ON STREET | <input type="checkbox"/> 221 TEMPORARY CONSTRUCTION SIGN/MARKINGS |

SECTION G: Work Zones

On Street	Cross Street #1	Cross Street #2	Linear Feet	Start Date	End Date
Permit Type	Permit Stipulations (Official Use Only):				Permit Number
1.					
2.					
3.					
4.					
5.					
Special Stipulations:					

On Street	Cross Street #1	Cross Street #2	Linear Feet	Start Date	End Date
Permit Type	Permit Stipulations (Official Use Only):				Permit Number
1.					
2.					
3.					
4.					
5.					
Special Stipulations:					

On Street	Cross Street #1	Cross Street #2	Linear Feet	Start Date	End Date
Permit Type	Permit Stipulations (Official Use Only):				Permit Number
1.					
2.					
3.					
4.					
5.					
Special Stipulations:					

On Street	Cross Street #1	Cross Street #2	Linear Feet	Start Date	End Date
Permit Type	Permit Stipulations (Official Use Only):				Permit Number
1.					
2.					
3.					
4.					
5.					
Special Stipulations:					

On Street	Cross Street #1	Cross Street #2	Linear Feet	Start Date	End Date
Permit Type	Permit Stipulations (Official Use Only):				Permit Number
1.					
2.					
3.					
4.					
5.					
Special Stipulations:					

SAMPLE



Department of Transportation

APPLICATION TO RENEW PERMIT(S)

Permit(s) CANNOT be expired to use this form. Copies of CURRENT permits must be attached.

* See reverse for instructions on how to complete this form.

Rev. 9/15/10

SECTION A: Applicant Information
1. Permittee ID#: _____ 2. Permittee Name: _____
3. Address: _____
4. Tel #:(_____) _____ 5. E-Mail: _____

SECTION B: Work Information
6. Borough: MN BK QN BX SI 7. OCMC File: _____
8. Type of Pavement: a. Roadway _____ b. Sidewalk _____ 9. DOB#: _____
10. House No.: _____ 11. On Street: _____
11a. Street Work On, If Different From Above: _____
12. Between: _____ and _____
(Cross Street #1) (Cross Street #2)
13. For the Purpose of: _____

SECTION C: Permit Information

If permit type is a building operation (for example: 203, 204, 205, etc.) you must indicate the number of items.
Example: 2 Cement Mixers - indicate "204 (x2)". FAILURE TO DO SO MAY RESULT IN YOUR PERMIT BEING VOIDED.

Table with 5 columns: Current Permit Number, Permit Type, New End Date, Fee (Official Use Only), New Permit Number (Official Use Only). Rows 1-12 with 'Permit Stipulations:' sub-rows.

Special Stipulations: _____

OCMC Approval by: _____ Date: ____/____/____

(For Official Use Only) SECTION D: Acknowledgements and Agreements by Authorized Representative of the Applicant
Approved for the Commissioner by: _____
Date: ____/____/____
14. Submitted by: _____ (Please Print) 15. Tel #:(_____) _____
16. Signed by: _____ (Authorized Representative of Applicant) 17. Date: ____/____/____

INSTRUCTIONS FOR COMPLETING PERMIT RENEWAL APPLICATION PROPERLY

To ensure the proper processing of your application, please print all information *CLEARLY*.

SECTION A: Applicant Information

1. **Permittee ID #:** Provide the unique 5 digit identification number the Permittee received when he/she registered their company with the Department of Transportation. Permits will not be issued without a Permittee ID Number.
2. **Permittee Name:** Provide the name of the company to whom the permits will be issued and to whom the above Permittee ID# is assigned.
3. **Address:** Provide the Permittee's business mailing address.
4. **Tel #:** Provide the Permittee's daytime telephone number.
5. **E-mail:** Provide the Permittee's e-mail address.

SECTION B: Work Information

6. **Borough:** Check the Borough in which the proposed work will be performed (MN-Manhattan, BK-Brooklyn, QN-Queens, BX-Bronx, SI-Staten Island).
7. **OCMC File:** If one exists, provide the OCMC file number pertaining to the proposed work (e.g. MEC-08-001).
8. **Type of Pavement:**
 - a. **Roadway:** If working in the roadway, provide the surface material of the roadway where the proposed work will occur (e.g. Asphalt)
 - b. **Sidewalk:** If working in the sidewalk, provide the surface material of the sidewalk where the proposed work will occur (e.g. Concrete)
9. **DOB#:** Provide any applicable Department of Buildings permit numbers.
10. **House No.:** Provide the house number of the building where the proposed work will occur.
11. **On Street:** Provide the name of the street where the proposed work will occur.
 - 11a. **Street Work On, If Different From Above:** Provide the name of the street where the physical proposed work will occur if it is not occurring on the same street to which the address applies. (e.g.: Work being performed for 55 Water Street, but excavation is on Old Slip).
12. **Between: and :** Provide the names of the two streets with which the On Street intersects (Cross Streets).
13. **For the Purpose of:** Provide the reason why you are applying for permits (e.g.: New Bldg. Construction, Repair Defective Sidewalk, etc.).

SECTION C: Permit Information

Provide the permit number of all current / active permits you wish to renew. Provide the Permit Type of each permit you wish to renew. Provide the New End Date (when you wish the renewed permit(s) to expire). The Fee and a New Permit Number will be added by Permit Management Staff. **DO NOT WRITE IN THESE AREAS.**

Stipulations – This area is for OCMC Project Managers' use only. This is where you will see what permit stipulations will be issued and printed (if changed from your original permit(s) on the approved permit(s)). **DO NOT WRITE IN THIS AREA.**

EXAMPLE:

	Current Permit Number	Permit Type	New End Date	Fee (Official Use Only)	New Permit Number (Official Use Only)
1.	B022010100-001	204	9/12/2010	\$50.00	B022010179-150
	Stipulations:				
2.					
	Stipulations:				
3.					
	Stipulations:				

SECTION D: Acknowledgements and Agreements by Authorized Representative of the Applicant

14. **Submitted By:** Print the name of the person who is submitting this application for review and approval.
15. **Tel #:** Provide a valid daytime telephone number of the person submitting this application.
16. **Signed By:** The person submitting this application must be an authorized representative of the applicant and must provide his/her original signature.
17. **Date:** Provide the date of application submittal.



Department of Transportation

APPLICATION TO RENEW GOVERNMENTAL WORK PERMIT(S)

Permit(s) CANNOT be expired to use this form. Copies of CURRENT permits must be attached.

* See reverse for instructions on how to complete this form.

Rev. 9/15/10

SECTION A: Applicant Information
1. Permittee ID#:
2. Permittee Name:
3. Address:
4. Tel #:() -
5. E-Mail:

SECTION B: Contract Information
6. Borough: MN BK QN BX SI
7. OCMC File:
8. Contract Number:
9. DOB#:
10. Sponsoring Agency: DEP DDC DOT DPR EDC MTA PANY/NJ SCA OTHER
11. Project Engineer Name:
12. Tel #:() -
13. Resident Engineer Name:
14. Tel #:() -
15. Project Description:
16. Contract Start Date: / /
17. Contract End Date: / /
18. Type of Pavement: a. Roadway b. Sidewalk

SECTION C: Permit Information

If permit type is a building operation (for example: 203, 204, 205, etc.) you must indicate the number of items. Example: 2 Cement Mixers - indicate "204 (x2)". FAILURE TO DO SO MAY RESULT IN YOUR PERMIT BEING VOIDED.

Table with 5 columns: Current Permit Number, Permit Type, New End Date, Fee (Official Use Only), New Permit Number (Official Use Only). Rows 1-12 for permit details and Special Stipulations.

OCMC Approval by: Date: / /

SECTION D: Acknowledgements and Agreements by Authorized Representative of the Applicant
Approved for the Commissioner by:
Date: / /
19. Submitted by: (Please Print) 20. Tel #:() -
21. Signed by: (Authorized Representative of Applicant) 22. Date: / /

INSTRUCTIONS FOR COMPLETING GOVERNMENTAL WORK PERMIT RENEWAL APPLICATION PROPERLY

To ensure the proper processing of your application, please print all information **CLEARLY**.

SECTION A: Applicant Information

1. **Permittee ID#:** Provide the unique 5 digit identification number the Permittee received when he/she registered their company with the Department of Transportation. Permits will not be issued without a Permittee ID Number.
2. **Permittee Name:** Provide the name of the company to whom the permits will be issued and to whom the above Permittee ID# is assigned.
3. **Address:** Provide the Permittee's business mailing address.
4. **Tel #:** Provide the Permittee's daytime telephone number.
5. **E-mail:** Provide the Permittee's e-mail address.

SECTION B: Contract Information

6. **Borough:** Check the Borough in which the proposed work will be performed (MN-Manhattan, BK-Brooklyn, QN-Queens, BX-Bronx, SI-Staten Island).
7. **OCMC File:** If one exists, provide the OCMC file number pertaining to the proposed work (e.g. MEC-08-001).
8. **Contract Number:** Provide the sponsoring agency's Contract Number, which is registered with NYCDOT.
9. **DOB#:** Provide any applicable Department of Buildings permit numbers.
10. **Sponsoring Agency:** Identify the agency responsible for the work performed under this contract.
11. **Project Engineer Name:** Provide the name of the Permittee's Project Engineer for this contract, who may be contacted by NYCDOT if needed.
12. **Tel #:** Provide the Project Engineer's telephone number.
13. **Resident Engineer:** Provide the name of the sponsoring agency's Resident Engineer for this contract, who may be contacted by NYC DOT if needed.
14. **Tel #:** Provide the Resident Engineer's telephone number.
15. **Project Description:** Provide a brief description of the project (e.g.: Installation of Water Mains / Sewers in Water Street)
16. **Contract Start Date:** Provide the date when the contract is to commence (Identified in the sponsoring agency's Notice to Proceed letter)
17. **Contract End Date:** Provide the date when the contract is to end (Identified in the sponsoring agency's Notice to Proceed letter)
18. **Type of Pavement:**
 - a. **Roadway:** If working in the roadway, provide the surface material of the roadway where the proposed work will occur (e.g. Asphalt)
 - b. **Sidewalk:** If working in the sidewalk, provide the surface material of the sidewalk where the proposed work will occur (e.g. Concrete)

SECTION C: Permit Information

Provide the permit number of all current / active permits you wish to renew. Provide the Permit Type of each permit you wish to renew. Provide the New End Date (when you wish the renewed permit(s) to expire). The Fee and a New Permit Number will be added by Permit Management Staff. **DO NOT WRITE IN THESE AREAS.**

Stipulations – This area is for OCMC Project Managers' use only. This is where you will see what permit stipulations will be issued and printed (if changed from your original permit(s)). **DO NOT WRITE IN THIS AREA.**

EXAMPLE:

	Current Permit Number	Permit Type	New End Date	Fee (Official Use Only)	New Permit Number (Official Use Only)
1.	B012010100-001	137	9/12/2010	\$135.00	B012010179-150
	Stipulations:				
2.					
	Stipulations:				
3.					
	Stipulations:				

SECTION D: Acknowledgements and Agreements by Authorized Representative of the Applicant

19. **Submitted By:** Print the name of the person who is submitting this application for review and approval.
20. **Tel #:** Provide a valid daytime telephone number of the person submitting this application.
21. **Signed By:** The person submitting this application must be an authorized representative of the applicant and must provide his/her original signature.
22. **Date:** Provide the date of application submittal.



Department of Transportation

APPLICATION TO REISSUE PERMIT(S)

Permit(s) MUST have expired within 1 month of date of application to use this form. Copies of EXPIRED permits must be attached.

* See reverse for instructions on how to complete this form.

Rev. 9/15/10

SECTION A: Applicant Information
1. Permittee ID#: _____ 2. Permittee Name: _____
3. Address: _____
4. Tel #:(_____) _____ 5. E-Mail: _____

SECTION B: Work Information
6. Borough: MN BK QN BX SI 7. OCMC File: _____
8. Type of Pavement: a. Roadway _____ b. Sidewalk _____ 9. DOB#: _____
10. House No.: _____ 11. On Street: _____
11a. Street Work On, If Different From Above: _____
12. Between: _____ and _____
(Cross Street #1) (Cross Street #2)
13. For the Purpose of: _____

SECTION C: Permit Information

If permit type is a building operation (for example: 203, 204, 205, etc.) you must indicate the number of items.
Example: 2 Cement Mixers - indicate "204 (x2)". FAILURE TO DO SO MAY RESULT IN YOUR PERMIT BEING VOIDED.

Table with 6 columns: Current Permit Number, Permit Type, New Start Date, New End Date, Fee, New Permit Number (Official Use Only). Rows 1-12 with 'Permit Stipulations:' sub-rows.

Special Stipulations: _____

OCMC Approval by: _____ Date: ____/____/____

(For Official Use Only) SECTION D: Acknowledgements and Agreements by Authorized Representative of the Applicant
Approved for the Commissioner by: _____
Date: ____/____/____
The permit to be granted is subject to the following conditions:
The applicant agrees to comply with all laws and rules of the Department and any other applicable laws and rules.
No permit shall be issued unless all applicable insurance and permit bonds are on file.
14. Submitted by: _____ (Please Print) 15. Tel #:(_____) _____
16. Signed by: _____ (Authorized Representative of Applicant) 17. Date: ____/____/____



INSTRUCTIONS FOR COMPLETING PERMIT REISSUE APPLICATION PROPERLY

To ensure the proper processing of your application, please print all information *CLEARLY*.

SECTION A: Applicant Information

1. **Permittee ID #:** Provide the unique 5 digit identification number the Permittee received when he/she registered their company with the Department of Transportation. Permits will not be issued without a Permittee ID Number.
2. **Permittee Name:** Provide the name of the company to whom the permits will be issued and to whom the above Permittee ID# is assigned.
3. **Address:** Provide the Permittee's business mailing address.
4. **Tel #:** Provide the Permittee's daytime telephone number.
5. **E-mail:** Provide the Permittee's e-mail address.

SECTION B: Work Information

6. **Borough:** Check the Borough in which the proposed work will be performed (MN-Manhattan, BK-Brooklyn, QN-Queens, BX-Bronx, SI-Staten Island).
7. **OCMC File:** If one exists, provide the OCMC file number pertaining to the proposed work (e.g. MEC-08-001).
8. **Type of Pavement:**
 - a. **Roadway:** If working in the roadway, provide the surface material of the roadway where the proposed work will occur (e.g. Asphalt)
 - b. **Sidewalk:** If working in the sidewalk, provide the surface material of the sidewalk where the proposed work will occur (e.g. Concrete)
9. **DOB#:** Provide any applicable Department of Buildings permit numbers.
10. **House No.:** Provide the house number of the building where the proposed work will occur.
11. **On Street:** Provide the name of the street where the proposed work will occur.
 - 11a. **Street Work On, If Different From Above:** Provide the name of the street where the physical proposed work will occur if it is not occurring on the same street to which the address applies. (e.g.: Work being performed for 55 Water Street, but excavation is on Old Slip).
12. **Between: and :** Provide the names of the two streets with which the On Street intersects (Cross Streets).
13. **For the Purpose of:** Provide the reason why you are applying for permits (e.g.: New Bldg. Construction, Repair Defective Sidewalk, etc.).

SECTION C: Permit Information

Provide the permit number of all expired permits you wish to have reissued. Provide the Permit Type of each permit you wish to have reissued. Provide the New Start Date (when you wish the reissued permits to go into effect) and the New End Date (when you wish the reissued permit(s) to expire). The Fee and a New Permit Number will be added by Permit Management Staff. **DO NOT WRITE IN THESE AREAS.**

Stipulations – This area is for OCMC Project Managers' use only. This is where you will see what permit stipulations will be issued and printed (if changed from your original permit(s)). **DO NOT WRITE IN THIS AREA.**

EXAMPLE:

	Current Permit Number	Permit Type	New Start Date	New End Date	Fee	New Permit Number (Official Use Only)
1.	B022010100-001	204	6/2/2010	9/2/2010	\$50.00	B022010179-150
	Stipulations:					
2.						
	Stipulations:					
3.						
	Stipulations:					

SECTION D: Acknowledgements and Agreements by Authorized Representative of the Applicant

14. **Submitted By:** Print the name of the person who is submitting this application for review and approval.
15. **Tel #:** Provide a valid daytime telephone number of the person submitting this application.
16. **Signed By:** The person submitting this application must be an authorized representative of the applicant and must provide his/her original signature.
17. **Date:** Provide the date of application submittal.



Department of Transportation

APPLICATION TO REISSUE GOVERNMENTAL WORK PERMIT(S)

Permit(s) MUST have expired within 1 month of date of application to use this form. Copies of EXPIRED permits must be attached.

* See reverse for instructions on how to complete this form.

Rev. 9/15/10

SECTION A: Applicant Information

1. Permittee ID#: _____ 2. Permittee Name: _____
3. Address: _____
4. Tel #:(_____) _____ - _____ 5. E-Mail: _____

SECTION B: Contract Information

6. Borough: [] MN [] BK [] QN [] BX [] SI 7. OCMC File: _____ - _____ - _____
8. Contract Number: _____ 9. DOB#: _____
10. Sponsoring Agency: [] DEP [] DDC [] DOT [] DPR [] EDC [] MTA [] PANY/NJ [] SCA [] OTHER _____
11. Project Engineer Name: _____ 12. Tel #:(_____) _____ - _____
13. Resident Engineer Name: _____ 14. Tel #:(_____) _____ - _____
15. Project Description: _____
16. Contract Start Date: _____ / _____ / _____ 17. Contract End Date: _____ / _____ / _____
18. Type of Pavement: a. Roadway _____ b. Sidewalk _____

SECTION C: Permit Information

If permit type is a building operation (for example: 203, 204, 205, etc.) you must indicate the number of items.
Example: 2 Cement Mixers - indicate "204 (x2)". FAILURE TO DO SO MAY RESULT IN YOUR PERMIT BEING VOIDED.

Table with 7 columns: Current Permit Number, Permit Type, New Start Date, New End Date, Fee, New Permit Number (Official Use Only). Rows 1-12 with 'Permit Stipulations' sub-rows.

Special Stipulations: _____

OCMC Approval by: _____ Date: ____/____/____

SECTION D: Acknowledgements and Agreements by Authorized Representative of the Applicant

Approved for the Commissioner by: _____
Date: ____/____/____
19. Submitted by: _____ (Please Print) 20. Tel #:(_____) _____ - _____
21. Signed by: _____ (Authorized Representative of Applicant) 22. Date: ____/____/____

INSTRUCTIONS FOR COMPLETING GOVERNMENTAL WORK PERMIT REISSUE APPLICATION PROPERLY

To ensure the proper processing of your application, please print all information *CLEARLY*.

SECTION A: Applicant Information

1. **Permittee ID#:** Provide the unique 5 digit identification number the Permittee received when he/she registered their company with the Department of Transportation. Permits will not be issued without a Permittee ID Number.
2. **Permittee Name:** Provide the name of the company to whom the permits will be issued and to whom the above Permittee ID# is assigned.
3. **Address:** Provide the Permittee's business mailing address.
4. **Tel #:** Provide the Permittee's daytime telephone number.
5. **E-mail:** Provide the Permittee's e-mail address.

SECTION B: Contract Information

6. **Borough:** Check the Borough in which the proposed work will be performed (MN-Manhattan, BK-Brooklyn, QN-Queens, BX-Bronx, SI-Staten Island).
7. **OCMC File:** If one exists, provide the OCMC file number pertaining to the proposed work (e.g. MEC-08-001).
8. **Contract Number:** Provide the sponsoring agency's Contract Number, which is registered with NYCDOT.
9. **DOB#:** Provide any applicable Department of Buildings permit numbers.
10. **Sponsoring Agency:** Identify the agency responsible for the work performed under this contract.
11. **Project Engineer Name:** Provide the name of the Permittee's Project Engineer for this contract, who may be contacted by NYC DOT if needed.
12. **Tel #:** Provide the Project Engineer's telephone number.
13. **Resident Engineer:** Provide the name of the sponsoring agency's Resident Engineer for this contract, who may be contacted by NYC DOT if needed.
14. **Tel #:** Provide the Resident Engineer's telephone number.
15. **Project Description:** Provide a brief description of the project (e.g.: Installation of Water Mains / Sewers in Water Street)
16. **Contract Start Date:** Provide the date when the contract is to commence (Identified in the sponsoring agency's Notice to Proceed letter)
17. **Contract End Date:** Provide the date when the contract is to end (Identified in the sponsoring agency's Notice to Proceed letter)
18. **Type of Pavement:**
 - a. **Roadway:** If working in the roadway, provide the surface material of the roadway where the proposed work will occur (e.g. Asphalt)
 - b. **Sidewalk:** If working in the sidewalk, provide the surface material of the sidewalk where the proposed work will occur (e.g. Concrete)

SECTION C: Permit Information

Provide the permit number of all expired permits you wish to have reissued. Provide the Permit Type of each permit you wish to have reissued. Provide the New Start Date (when you wish the reissued permits to go into effect) and the New End Date (when you wish the reissued permit(s) to expire). The Fee and a New Permit Number will be added by Permit Management Staff. DO NOT WRITE IN THESE AREAS.

Stipulations – This area is for OCMC Project Managers' use only. This is where you will see what permit stipulations will be issued and printed (if changed from your original permit(s)). DO NOT WRITE IN THIS AREA.

EXAMPLE:

	Current Permit Number	Permit Type	New Start Date	New End Date	Fee	New Permit Number (Official Use Only)
1.	B022010100-001	204	6/2/2010	9/2/2010	\$50.00	B022010179-150
	Stipulations:					
2.						
	Stipulations:					
3.						
	Stipulations:					

SECTION D: Acknowledgements and Agreements by Authorized Representative of the Applicant

19. **Submitted By:** Print the name of the person who is submitting this application for review and approval.
20. **Tel #:** Provide a valid daytime telephone number of the person submitting this application.
21. **Signed By:** The person submitting this application must be an authorized representative of the applicant and must provide his/her original signature.
22. **Date:** Provide the date of application submittal.



DEPARTMENT OF TRANSPORTATION
CANOPY AUTHORIZATION APPLICATION

BOROUGH: BLOCK #: LOT #: DATE:

Application is hereby made for authorization to install and maintain a canopy over the sidewalk at the entrance to the building or premises located at:

[Empty box for address]

(Address of property where canopy will be installed)

Canopy dimensions: Length: Width: Height: Clearance:

Canopy type:

Hotel Residence Restaurant Miscellaneous Sidewalk CafZ

Other: (Please specify)

Applicants for canopy authorization must submit to the Highway Inspection and Quality Assurance Unit (HIQA) the following:

- 1. Notarized written consent from the property owner to install and maintain the canopy.
2. A statement of the basic construction details including the following: type, description and color of the canopy covering; type, diameter and gauge of all supporting members; description of the frame, wind bracing assembly and sidewalk and building fastenings; description of proposed lettering on the canopy covering including exact wording and dimensions thereof; three five inch by seven inch photographs of the proposed site.
3. A statement that the canopy design and construction conforms to the standard details of construction H1029. Canopy shall be fully roofed.
4. A sketch showing the canopy; dimensions, location and all street facilities and furniture within 15 feet of both sides of the canopy.
5. Certification by the manufacturer that the covering is flameproof. Where certification is unobtainable from the manufacturer, certification by the installer may be submitted instead.
6. If applicable, consent of the Landmarks Preservation Commission (LPC) for the installation of a canopy in a designated landmark, historic district or attached to a building that has LPC historic designations.
7. If this application is made in connection with a Sidewalk CafZ, the applicant must submit written approval from the NYC Department of Consumers Affairs.

The authorization to be granted is subject to the following conditions:

The applicant agrees to comply with all laws and rules of the Department and any other applicable laws and rules.

Applicant Signature and Acknowledgment:

Print: Sign: Date: (Applicant Print) (Applicant Sign)

Approved by: Date: (HIQA Borough Coordinator Signature)

After obtaining HIQA canopy authorization, the following must be submitted to the Office of Permit Management:

- 1. Permit applications:
a. Permit to install - Issued to contractors for new canopies,
b. Permit to maintain - Issued to property owners for new and existing canopies.
2. Permit Bond. See DOT Highway Rules Section 2-02 (a) (4) - Necessary for installation permit only.
3. Commercial General Liability Insurance and certification by broker.

IMPORTANT: The permit office will accept major credit cards, money orders, company checks and certified checks. PERSONAL CHECKS WILL NOT BE ACCEPTED.

NYC Department of Transportation
Highway Inspection and Quality Assurance
55 Water Street --7th Floor North
New York, NY 10041
www.nyc.gov/dot



Department of Transportation

JANETTE SADIK-KHAN, Commissioner

ENGINEERING PACKAGE FOR VAULT APPLICATION

All plans must comply with SCARA format except that plan size must be 11 x 17 and to scale [any scale used must be legible]. Every page must be sealed and signed by professional engineer/architect.

The following must be shown on plans:

1. **The Cover Sheet** (see SCARA Appendix B-1) including:
 - Project Name, Building Address– Block, Lot and Location – on street, from street, to street; Owner Info; DOT Waiver Box (Appendix B-2).
 - General Notes (Appendix B-3).
 - Appropriate Certification Block (Appendix B-4).
 - DOT Approval Box (Appendix B-5).
 - List of Estimated Quantities Box (Appendix B-6).
 - Key Plan: The distance from the lot property line to the nearest corner property line.
 - Detailed Scope of Work; Condition Report for Existing Vaults (Include description of damage/deterioration – historical data: Year built).
2. **Detailed Sidewalk Plan** indicating work limits property line, curb line, all street furniture within 25 feet each side of job limit. The entire extent of the vault or vaults, length and width, not just the area of work must be identified in the drawings. Location of all existing or proposed steps, gratings, open areas, coal holes/chutes/slides, entrances, cellar doors, building encroachments, and all other installations in sidewalk area.
3. **Detailed Full Cross-Section** – show overall dimensions including curb, vault wall, location, wall thickness, and material, indicate elements whether existing to remain, repair, and replace.
4. **Sidewalk Profile**: profiles along all sides of the proposed improvement of existing grade and curb line, including elevations at 25 feet and 50 feet past the project limit lines (for projects involving new grades for sidewalk).
5. **Photo Log** with description for location - Inside/Outside pictures to present condition (and photo index describing location of photos taken).
6. **Detailed drawings for all hatches/hold doors**, and any opening on sidewalk (grating) manufacturer cut sheet.
7. **Pedestrian level of service study** (if applicable).
8. **Location Feasibility Study** (if applicable).
9. **Con Edison layout** (for Transformer Vaults only).
10. **BPP, First Floor and Cellar Floor plans or Structural plans (for existing/new Building vaults)** approved by Department of Buildings.

Revised 5/3/2010

NYC Department of Transportation
 Bureau of Permit Management and Construction Control
 Plan Examination Unit
 55 Water Street, New York, NY 10041
 T: 212-839-4396
 www.nyc.gov/dot

How to Access Instructions for Filing Plans and Guidelines for the Design of Sidewalks, Curbs, Roadways and Other Infrastructure Components

- 1 Log onto www.nyc.gov/dot
- 2 On left-hand side, click on “Permits/Franchises” and under that click on “Street and Sidewalks Construction Permits”
- 3 Scroll down and click on:

Instructions for Filing Plans and Guidelines for the Design of Sidewalks, Curbs, Roadways and Other Infrastructure Components (pdf)

How to Access New York City Department of Transportation Highway Rules

- 1 Log onto www.nyc.gov/dot
- 2 On left-hand side, click on “Motorists” and under that click on “Highway and Traffic Rules”
- 3 At the top of the screen click on:

Highway Rules (pdf)

Minimum Clearance Requirements for Transformer Vaults

Item	Obstruction Type	Clearance	Agency	Contact
1	Bench	5 ft	DOT	Franchises, Concessions and Revocable Consents (212) 839-6550
2	Bicycle Rack	5 ft	DOT	Bicycle group-(212) 839-7240
3	Bus Stop Sign	5 ft	DOT	Borough Engineering-see Appendix C for borough office
4	Bus Zone	Not Permitted	MTA	MTA/NYCT-Bus Operations (646) 252-5517 or (646) 252-5544
5	Canopy	3 ft	DOT	HIQA-see Appendix C for borough office
6	Cellar Door/ Hatch Door	Prefer 3 ft along the same line	DOT	Plan Examination Unit
7	Corner Quadrant	5 ft	DOT	Plan Examination Unit
8	Curb Cut	3 ft	DOT	Plan Examination Unit
9	Curb Offset	18 inches (maximum 24 inches) from the grating edge perpendicular to curb	DOT	Plan Examination Unit
10	Driveways	3ft out of driveway cut	DOT	Plan Examination Unit
11	All Entrances	3 ft each side	DOT	Plan Examination Unit
12	Fire Hydrant	5 ft	DEP	Division of Review & Construction Compliance (718) 595-5223 or Plan Review Section (718) 595-5191
13	Areaway, Grating, Opening	*Maintain minimum Clear Path requirement (Below)	DOT	Plan Examination Unit
14	Mailbox	3 ft	USPS	General customer service: (800) ASK-USPS
15	Newsstands	5 feet offset along the curb line (Not Permitted in front)	DOT	Department of Consumer Affairs-311 or (212)-NEW YORK outside the five boroughs
16	Parking Meter	3 ft	DOT	Parking Engineering: (718) 786-6984
17	Sign Posts	3 ft	DOT	Borough Engineering-see Appendix C for borough office
18	Standpipe	3 ft	NYFD	(718) 999-2457
19	Street Light	3 ft	DOT	Street Lighting: (718) 786-2788
20	Telephone Booth	5 ft		Owner
21	Tree Pit	7 ft (prefer 10 ft)	DPR	Department of Parks see Appendix C for borough office
22	Utility Access Cover	3 ft	Utility	Con Ed, Verizon, National Grid, etc see Appendix D for contact info
23	Utility Pole	3 ft	Utility	Con Ed, Verizon, National Grid, etc. see Appendix D for contact info
24	Water Line	3 ft	DEP	See #12 above
25	Landscaped Grass Strip	Not Permitted		Plan Examination Unit

**NYC Department of Transportation
Bureau of Permit Management and Construction Control
Plan Examination Unit**
55 Water Street, New York, NY 10041,
T: 212-839-4396, www.nyc.gov/dot

* Note: Clear Path (pedestrian walkway): This directive is intended to provide pedestrians with the maximum amount of safety and space to traverse the sidewalk. This requires a minimum distance on narrow sidewalks (10-12 feet Secondary Streets) of 5 ft., or a minimum distance on wide sidewalks (Larger than 12 feet Main Streets) of 8 ft. DOT's preference is that there is no split in Pedestrian Flow.
Note: All distances indicate measurements from nearest edge of any object to closest edge of vault.

Appendix C**NYC DOT Contact Information**

Administrative Superintendent of Highway Operations (ASHO) Offices	1
Permit Offices	1
Highway Inspection and Quality Assurance (HIQA) Offices	2
Other NYC DOT Office Contacts	2

Administrative Superintendent of Highway Operations (ASHO) Offices

The ASHO in each borough releases Capital Project In-House (CPI) holds and Street Arterial Maintenance (SAM) holds. See Section 3.5.1 Holds for more information.

The Bronx

1400 Williamsbridge Road, 2nd Floor
Bronx, NY 10461
(212) 748-6670
Office hours: 8:30 AM-4:30 PM

Brooklyn

16 Court Street, 16th floor
Brooklyn, NY 11211
(718) 222-7307/7285
Office hours: 8:30 AM-4:30 PM

Manhattan

59 Maiden Lane, 37th floor
New York, NY 10038
(212) 839-8980
Office hours: 8:30 AM-4:30 PM

Queens

120-55 Queens Boulevard, 2nd floor
Kew Gardens, NY 11424
(212) 839-2480
Office hours: 8:30 AM-4:30 PM

Staten Island

10 Richmond Terrace, Room 309
Staten Island, NY 10301
(212) 839-2399
Office hours: 8:30 AM-4:30 PM

Permit Offices

Applications for most permit types can be submitted to the Manhattan Central Permit Office. Some permit types can also be processed at the relevant borough office. See Chapter 3 Permits and Approvals for more information.

The Bronx

1400 Williamsbridge Road, 1st Floor
Bronx, NY 10461
(212) 748-6648/49
Office hours: 8:30 AM-3:30 PM

Brooklyn

16 Court Street, 15th floor
Brooklyn, NY 11211
(718) 222-7225/26/27
Office hours: 8:30 AM-3:30 PM

Manhattan / Central Permit Office

55 Water Street, Concourse Level
New York, NY 10041
(212) 839-9594/95
Office hours: Applications accepted, only from 8:30 AM to 11:30 AM; However the permit window remains open until 5:00 PM to pick up permits.

Queens

120-55 Queens Boulevard, 1st floor, Room 1-240
Kew Gardens, NY 11424
(212) 839-2475
Office hours: 8:30 AM-3:30 PM

Staten Island

10 Richmond Terrace, Room 308
Staten Island, NY 10301
(212) 839-2387/88/89
Office hours: Applications accepted, only from 8:30 AM to 12:30 PM; However the permit window remains open until 3:15 PM to pick up permits.

Highway Inspection and Quality Assurance (HIQA) Offices

To request authorization for the installation of a canopy, an applicant must initiate the process at the HIQA office in the borough where the proposed canopy will be located. See Section 3.4 Canopy Authorization and Permits for more information.

HIQA also releases many holds. See Section 3.5.1 Holds for more information.

HIQA Central Office

(212) 839-8847

(212) 839-8857

(212) 839-8856

The Bronx

1400 Williamsbridge Road, 1st floor

Bronx, NY 10461

For Holds: (212) 748-6609

All other inquiries: (212) 748-6610

Office hours: 8:30 AM–5:00 PM

Brooklyn

16 Court Street, 15th floor

Brooklyn, NY 11211

For Holds: (718) 222-7231

All other inquiries: (718) 222-7207

Office hours: 8:30 AM–5:00 PM

Manhattan

59 Maiden Lane, 34th Floor

New York, NY 10038

(212) 839-4700

Office hours: 8:30 AM–5:00 PM

Queens

120-55 Queens Boulevard, Ground Floor, Room G-210

Kew Gardens, NY 11424

(212) 839-2430

Office hours: 8:30 AM–3:30 PM (in person)

Telephone inquiries: 8:30 AM–4:30 PM

Staten Island

10 Richmond Terrace, Room 427

Staten Island, NY 10301

(212) 839-2410

Office hours: 8:30 AM–5:00 PM

Other NYC DOT Office Contacts

Street Lighting

(718) 786-2788

Franchises, Concessions and Revocable Consents

(212) 839-6550

Plan Examination Unit

(212) 839-4396

Bridges (for Over Dimensional Vehicle permit)

(212) 839-6335

Fiscal Affairs: Revenue & Accts Receivable

(212) 839-9270

Emergency Authorization Unit

To obtain forms:

From 7:00 AM to 3:30 PM

Monday to Friday, call: (212) 839-9660/61/62

All other times: (718) 433-3340

To fax forms:

From 7:00 AM to 3:30 PM

Monday to Friday: (212) 839-9697/99 or 9688

All other times: (718) 433-3447

Appendix D**Other Agency and Utility Contact Information**

Department of Design and Construction (DDC) Construction Director Offices	1
Department of City Planning (DCP) Borough Offices	1
Department of Buildings (DOB) Borough Offices	2
Department of Parks and Recreation (DPR) Borough Offices	2
Environmental Control Board (ECB) Borough Offices	3
Other City and State Offices	4
Utility Contacts	5

Department of Design and Construction (DDC) Construction Director Offices

The Bronx and North Queens (north of the Long Island Expressway)

30-30 Thomson Avenue, 4th Floor
Long Island City, NY 11101
(718) 391-1008
Office hours: 8:30 AM-4:30 PM

South Queens (south of the LIE)

30-30 Thomson Avenue, 4th Floor
Long Island City, NY 11101
(718) 391-1958
Office hours: 8:30 AM-4:30 PM

Brooklyn

30-30 Thomson Avenue, 4th Floor
Long Island City, NY 11101
(718) 391-1937
Office hours: 8:30 AM-4:30 PM

Lower Manhattan (south of Canal Street)

40 Worth Street 8th Floor
New York, NY 10013
(212) 442-1890
Office hours: 8:30 AM-4:30 PM

Manhattan

40 Worth Street 8th Floor
New York, NY 10013
(212) 442-7962
Office hours: 8:30 AM-4:30 PM

Staten Island

30-30 Thomson Avenue, 4th Floor
Long Island City, NY 11101
(718) 391-1110
Office hours: 8:30 AM-4:30 PM

Department of City Planning (DCP) Borough Offices

The Bronx

One Fordham Plaza, 5th Fl.
Bronx, NY 10458-5891
Phone: (718) 220-8500
Fax: (718) 584-8628

Brooklyn

16 Court Street, 7th Fl.
Brooklyn, NY 11241-0103
Phone: (718) 780-8280
Fax: (718) 596-2609

Central Office

22 Reade Street
New York, NY 10007-1216
Phone: (212) 720-3300
Fax: (212) 720-3219

Manhattan

22 Reade Street, 6th Fl. West
New York, NY 10007-1216
Phone: (212) 720-3480
Fax: (212) 720-3488

Queens

120-55 Queens Blvd., Room 201
Kew Gardens, NY 11424
Phone: (718) 286-3170
Fax: (718) 286-3183

Staten Island

130 Stuyvesant Place, 6th Fl.
Staten Island NY 10301
Phone: (718) 556-7240
Fax: (718) 556-7305

Department of Buildings (DOB) Borough Offices

The Bronx

1932 Arthur Avenue, 5th Floor
Bronx, NY 10457
Customer Service: (718) 579-6920

Brooklyn

210 Joralemon Street, 8th Floor
Brooklyn, NY 11202
Customer Service: (718) 802-3675

Manhattan

280 Broadway, 3rd Floor
New York, NY 10007
Customer Service: (212) 566-0042

Queens

120-55 Queens Boulevard
Kew Gardens, NY 11424
Customer Service: (718) 286-0600

Staten Island

10 Richmond Terrace
Borough Hall, 2nd Floor
Staten Island, NY 10301
Customer Service: (718) 816-2300

Department of Parks and Recreation (DPR) Borough Offices

The Bronx

NYC Parks & Recreation
Attn: FORESTRY
1 Bronx River Parkway
Bronx, NY 10462
Bronx.Forestry@parks.nyc.gov
Fax: (718) 430-4663
Phone: (718) 430-1877

Brooklyn

NYC Parks & Recreation
Attn: FORESTRY
95 Prospect Park West
Brooklyn, NY 11215
Brooklyn.Forestry@parks.nyc.gov
Fax: (718) 965-7753
Phone: (718) 965-7750

Manhattan

NYC Parks & Recreation
Attn: FORESTRY
24 West 61st St., 5th Fl.
New York, NY 10023
Manhattan.Forestry@parks.nyc.gov
Fax: (212) 860-1359
Phone: (212) 860-1845

Queens

NYC Parks & Recreation
Attn: FORESTRY
80-30 Park Lane
Kew Gardens, NY 11415
Queens.Forestry@parks.nyc.gov
Fax: (718) 699-7491
Phone: (718) 699-4700

Staten Island

NYC Parks & Recreation
Attn: FORESTRY
1150 Clove Rd.
Staten Island, NY 10301
StatenIsland.Forestry@parks.nyc.gov
Fax: (718) 816-9194
Phone: (718) 390-2080

Environmental Control Board (ECB) Borough Offices

The Bronx

3030 Third Avenue

Bronx, NY 10455

Phone: (718) 993-6110

Fax: (718) 993-3077

- For hearings, Monday to Friday from 8:30 AM to 3:30 PM.
- For questions, Monday to Friday from 8:30 AM to 5:00 PM.

Brooklyn

233 Schermerhorn Street, 11th Floor

Brooklyn, NY 11201

Phone: (718) 875-7428

Fax: (718) 858-0069

- For hearings, Monday to Friday from 8:30 AM to 3:30 PM.
- For questions, Monday to Friday from 8:30 AM to 5:00 PM.

Manhattan

66 John Street, 10th Floor

New York, NY 10038

Phone: (212) 361-1400

Fax: (212) 361-1900

- For hearings, Monday to Friday from 8:30 AM to 3:30 PM.
- For questions, Monday to Friday from 8:30 AM to 5:00 PM.

Queens

144-06 94th Avenue, Main Floor

Jamaica, NY 11435

Phone: (718) 298-7300

Fax: (718) 298-7075

- For hearings, Monday to Friday from 8:30 AM to 3:30 PM.
- For questions, Monday to Friday from 8:30 AM to 5:00 PM.

Staten Island (part-time office)

350 St. Marks Place, Main Floor

Staten Island, NY 10301

Phone: (718) 815-8541 on hearing days

Fax: (718) 815-8391

- For hearings, 1st, 2nd, 3rd, and 4th Wednesdays and Thursdays of the month from 8:30 AM to 3:30 PM.
- For questions, Mon-Fri 8:30 AM to 5:00 PM.

Other City and State Offices

New York City Department of Consumer Affairs (DCA)

42 Broadway, New York, NY 10004
Phone: 311; or (212) NEW-YORK outside the five boroughs
Hours: Monday–Friday 9:00 AM–5:00 PM

New York City Department of Environmental Protection (DEP)

Division of Review & Construction Compliance
(718) 595-5223 or
Chief Plan Review Section, DEP/BWSO
(718) 595-5191

New York City Fire Department (FDNY)

Permits (hazardous storage/operations) (718) 999-2457

New York City Department of Information Technology and Telecommunications (DoITT)

75 Park Place, 9th Floor, New York, NY 10007
(212) 788-6600

New York City Landmarks Preservation Commission (LPC)

Municipal Building
1 Centre Street, 9th Floor, New York, NY 10007
Phone: (212) 669-7817
Fax: (212) 669-3844

New York City Office of Emergency Management (OEM)

165 Cadman Plaza East, Brooklyn, NY 11201
Phone: 311 or (718) 422-8700

Public Design Commission of the City of New York (PDC)

City Hall, Third Floor, New York, NY 10007
Phone: (212) 788-3071
Fax: (212) 788-3086

New York State Department of Environmental Conservation (DEC)

47-40 21st Street, 7th Floor, Long Island City, NY 11101
(718) 482-4516
Visit the DEC website at the following address to determine the appropriate contact <http://www.dec.ny.gov/63.html>

Metropolitan Transportation Authority (MTA) Bus Operations

(646) 252-5517 or (646) 252-5544

New York State Department of Transportation (NYSDOT)

Hunters Point Plaza
47-40 21st Street, Long Island City, NY 11101
(718) 482-4825

Utility Contacts

Company	Web Site	Phone
Con Edison	www.coned.com/customercentral	(800) 752-6633
National Grid	www.nationalgrid.com	(718) 643-4050
Time Warner	www.timewarner.com/corp/contacts_support.html	(212) 484-8000
Verizon	www.verizon.com	(212) 757-9940

Appendix E**Links**

Chapter 1: Introduction	1
Chapter 2: Advance Notice and Coordination of Planned Street Work	1
Chapter 3: Permits and Approvals	1-2
Chapter 4: Executing Work in the Street	3

Chapter 1: Introduction

NYCityMap: <http://gis.nyc.gov/doitt/nycitymap>
 DOTMap: <http://www.nyc.gov/dotmap>
 NYC DOT Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>
 NYC DOT specifications: http://www.nyc.gov/html/dot/downloads/pdf/standard%20_highway_specs_vol%201.pdf

Chapter 2: Advance Notice and Coordination of Planned Street Work

Section 2.2: NYC DOT's Capital Project Map Portal And Other Online Information

DOTMap: <http://www.nyc.gov/dotmap>
 Guide to using NYCityMap and DOTMap: <http://gis.nyc.gov/doitt/webmap-conf/docs/UserGuide.pdf>
 Weekly milling, resurfacing and concrete repair schedules: <http://www.nyc.gov/html/dot/html/motorist/resurfintro.shtml>
 NYC DOT Construction Embargo List: <http://www.nyc.gov/html/dot/html/motorist/trafalrt.shtml>

Section 2.3: Key Principles For Effective Notice And Coordination Of Major Planned Street Work

NYC DOT Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

Chapter 3: Permits and Approvals

Section 3.2 The Permittee Registration Process

3.2.1 Required Documentation for a Permittee Registration Application

Permittee Registration Application: <http://www.nyc.gov/html/dot/downloads/pdf/regapp.pdf.pdf>
 Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>
 Insurance and Indemnification Requirements from Title 34, Rules of the City of New York: <http://www.nyc.gov/html/dot/downloads/pdf/insurancereq.pdf>
 Certification by Broker form: http://www.nyc.gov/html/dot/downloads/pdf/certification_broker.pdf
 Certificate of Insurance form: <http://www.nyc.gov/html/dot/downloads/pdf/insurancercert.pdf>
 Instructions for Permittee Registration Application: http://www.nyc.gov/html/dot/downloads/pdf/inst_regapp.pdf

Section 3.3: The Permit Application Process (Non-Emergency Work)

Anytime-Anywhere Permit Application: <http://www.nyc.gov/dot/constructionpermits>
 Permit Information: <http://www.nyc.gov/permits>
 Roadway/Sidewalk Permit Application: <http://www.nyc.gov/html/dot/downloads/pdf/permapp.pdf>
 Critical Streets list in the Highway Rules, Section 2-07 (c) (5): <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>.

3.3.1 Common Requirements for All Permit Types

Roadway/Sidewalk Permit Application: <http://www.nyc.gov/html/dot/downloads/pdf/permapp.pdf>
 Application for Governmental Work Permit: http://www.nyc.gov/html/dot/downloads/pdf/govt_work_permit_app.pdf
 Request for Full Roadway Closure: http://www.nyc.gov/html/dot/downloads/pdf/roadway_closure_app.pdf
 Franchise, Concession or Revocable Consent: <http://www.nyc.gov/html/dot/html/permits/franinfo.shtml>

3.3.2 Application Procedures for a Street Opening Permit

Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>
 Protected Street list files: <http://www.nyc.gov/html/dot/html/permits/protectedst.shtml#plisting>

3.3.3 Application Procedures for a Building Operations/

Construction Activity Permit
 Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

3.3.4 Application Procedures for a Sidewalk Construction Permit

Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

Roadway/Sidewalk Permit Application: <http://www.nyc.gov/html/dot/downloads/pdf/permapp.pdf>

Affidavit of Ownership: <http://www.nyc.gov/html/dot/downloads/pdf/affidavitform.pdf>

3.3.5 Permit Application Review and Issuance (for Street Opening, Building Operations/Construction Activity, and Sidewalk Construction Permits)

Permit Stipulations: <http://www.nyc.gov/html/dot/downloads/pdf/trafstip.pdf>

Anytime-anywhere permit application status: <http://www.nyc.gov/dot/constructionpermits>

3.3.6 Permit Renewals and Re-Issuances (for Street Opening, Building Operations/Construction Activity, and Sidewalk Construction Permits)

Application to Renew Permits: <http://www.nyc.gov/html/dot/downloads/pdf/permapprenew.pdf>

Application to Renew Government Permits: http://www.nyc.gov/html/dot/downloads/pdf/govt_work_permit_renew_app.pdf

Application to Re-Issue Permits: <http://www.nyc.gov/html/dot/downloads/pdf/permappreissue.pdf>

Application to Re-issue Government Permits: http://www.nyc.gov/html/dot/downloads/pdf/govt_work_permit_reissue_app.pdf

Section 3.4: Canopy Authorization and Permits

Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

NYC DOT Standard Details of Construction: http://www.nyc.gov/html/dot/downloads/pdf/nycdot_std_details_const.pdf

3.4.1 Application Procedure for Canopy Authorizations and Permits

NYC DOT Standard Details of Construction: http://www.nyc.gov/html/dot/downloads/pdf/nycdot_std_details_const.pdf

Work that Requires LPC Approval: http://www.nyc.gov/html/lpc/downloads/pdf/forms/application_form_full.pdf

Additional information about historic districts: <http://www.nyc.gov/landmarks>

Section 3.5: Other Provisions Pertaining to Permits

3.5.1 Holds

Bridge Hold Map: http://www.nyc.gov/html/dot/downloads/pdf/bridge_hold_maps.pdf

Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

3.5.3 Other Actions

Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

Section 3.6: Emergency Work and Special Circumstances

3.6.1 Emergency Utility Access Cover Openings and Emergency Street Openings

Emergency Authorization Number Form: http://www.nyc.gov/html/dot/downloads/pdf/emergency_auth_number_app.pdf

Emergency Street Opening Permit Form: http://www.nyc.gov/html/dot/downloads/pdf/emergency_street_opening_app.pdf

3.6.2 Embargoes

Construction Embargoes at the Special Traffic Advisory link: <http://www.nyc.gov/html/dot/html/motorist/trafadvisories.shtml>

Request for Roadway/Sidewalk Permits during Embargo Periods: <http://www.nyc.gov/html/dot/downloads/pdf/holidayembapp.pdf>

Section 3.7: Vault Approvals

3.7.3 Vaults Requiring a Revocable Consent

Franchise, Concession or Revocable Consent: <http://www.nyc.gov/html/dot/html/permits/franinfo.shtml>

Chapter 4: Executing Work in the Street

Section 4.1: General Requirements For Executing Work

NYC DOT Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

Section 4.2: Street Opening/Excavation Requirements

NYC DOT Highway Rules: <http://www.nyc.gov/html/dot/downloads/pdf/hwyrules.pdf>

Section 4.2.1: New York 811, Inc.

New York 811: <http://www.NewYork-811.com>

Section 4.4: Sidewalk Repairs

NYC DOT Highway Specifications: http://www.nyc.gov/html/dot/downloads/pdf/standard%20highway_specs_vol%201.pdf

NYC DOT Standard Details of Construction: http://www.nyc.gov/html/dot/downloads/pdf/nycdot_std_details_const.pdf

Section 4.5: Street Construction Inspections And Enforcement

Response Form for ECB Violations: <http://www.nyc.gov/html/ecb/html/respond/respond.shtml>

Section 4.6: Sidewalk Violation Inspections And Enforcement

Information regarding sidewalk violations: <http://www.nyc.gov/html/dot/html/faqs/sidewalkfaqs.shtml>

Appendix F

Permit Stipulations

1 - 11

NOTE: This list of permit stipulations is provided as a reference tool, for informational purposes only. The stipulation text on a NYC DOT permit is the official text, with which a permittee must comply.

STIP	Description
010	This permit may be extended once only, for a period of 14 days at \$40. However it must be presented for extension no later than 5 business days prior to expiring.
011	Post signs meeting NYC DOT specifications for directing pedestrians to opposite sidewalk. Signs must be posted at work zones as well as both intersections of affected sidewalk.
012	Flag person must be provided to stop pedestrian and/or vehicle traffic while lifting materials overhead and also when crossing sidewalk in conjunction with Crossing Sidewalk Permits.
013	Maintain minimum 5-foot clear sidewalk.
014	Maintain a 5-foot clear pedestrian walkway in roadway. Walkway must meet NYC DOT specifications. Walkway must be ramped at entry to sidewalk for handicapped accessibility.
015	Maintain 8-foot clear pedestrian walkway on sidewalk.
016	Full width of sidewalk shall be opened to pedestrians when site is unattended.
017	Contractors shall notify Police, Fire, EMS, Community Boards, and abutting property owners 48 hours prior to construction.
018	No noisy operations may occur after 10:00 PM
019	Work 7 AM–6 PM, Monday through Friday.
020	Restore all travel lanes to traffic. Contractor may contain a maximum of 25 linear feet, 8 feet adjacent to the curb during non-work hours. Use of metered, authorized parking and no standing zones prohibited. This does not allow for storage of material.
021	Maintain one 12-foot lane for local and emergency access at all times
022	Place barricades and post signs meeting “Federal Manual of Uniform Traffic Control Devices (MUTCD)” standards stating “road closed to through traffic.”
023	Maintain one 11-foot lane for traffic.
024	Maintain two 11-foot lanes for traffic.
025	Maintain three 11-foot lanes for traffic.
026	Maintain four 11-foot lanes for traffic.
027	Maintain 2 lanes for traffic, 1 lane in each direction.
028	Maintain 4 lanes for traffic, 2 lanes in each direction.
029	Coordinate construction activity with theatre groups prior to work.
030	Occupy a maximum of 12 ft. of roadway for asbestos removal only between the hours of 7 PM–6 AM
031	Maintain two 11-foot lanes, one 11-foot lane on each side of the existing double yellow center line.
032	Maintain four 11-foot lanes, two 11-foot lanes on each side of the existing double yellow center line.
033	Maintain two 11-foot lanes, one 11-foot lane on each side of the existing center mall.
034	Maintain four 11-foot lanes, two 11-foot lanes on each side of the existing center mall.
035	Maintain one 11-foot lane for 2-way through traffic with flaggers at each end of work zone.
036	No work may extend more than 8 feet from curb without explicit authorization of OCMC.
037	Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.

STIP	Description
038	Warning signs and traffic safety devices shall be provided, installed, maintained, and removed by the permittee in accordance with the Federal MUTCD. The manual may be obtained at http://mutcd.fhwa.dot.gov .
039	Occupy 8-foot width of roadway adjacent to curb.
040	Occupy 12-foot width of roadway; full width of roadway restored to traffic when site is unattended.
041	Occupy one 11-foot lane.
042	Occupy two 11-foot lanes.
043	Occupy three 11-foot lanes.
044	Occupy four 11-foot lanes.
045	Occupy 12-foot width of roadway. Restore all travel lanes when site is unattended. Contractor may contain a maximum of 25 linear feet, 8 feet adjacent to the curb during non-work hours. Containment only to restrict parking; use of meter is not for storage of material.
047	Occupy 8-foot width of roadway adjacent to north curb line.
048	Occupy 8-foot width of roadway adjacent to south curb line.
049	Occupy 8-foot width of roadway adjacent to east curb line.
050	Occupy 8-foot width of roadway adjacent to west curb line.
051	Occupy 11-foot width of roadway adjacent to north curb line.
052	Occupy 11-foot width of roadway adjacent to south curb line.
053	Occupy 11-foot width of roadway adjacent to east curb line.
054	Occupy 11-foot width of roadway adjacent to west curb line.
055	Occupy 20-foot width of roadway adjacent to north curb line.
056	Occupy 20-foot width of roadway adjacent to south curb line.
057	Occupy 20-foot width of roadway adjacent to east curb line.
058	Occupy 20-foot width of roadway adjacent to west curb line.
060	Work may occur 24 hours a day, seven days a week. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
061	All work operations must be restricted within 11 feet of the northeast quadrant of the intersection.
062	All work operations must be restricted within 11 feet of the northwest quadrant of the intersection.
063	All work operations must be restricted within 11 feet of the southeast quadrant of the intersection.
064	All work operations must be restricted within 11 feet of the southwest quadrant of the intersection.
065	Work crossing the roadway can not extend more than 11 feet at a time. Backfill or plate before proceeding.
066	Do not place materials, trailers, cranes, containers, or equipment in front of driveways, bus stops, within 15 feet of a fire hydrant, in authorized parking zones, or blocking access to DEP water testing boxes.

STIP	Description
067	Work 9 PM to 6 AM, Monday to Friday, maintain two 11-foot lanes for traffic, restore full width to traffic when site is unattended. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
068	Work 11 PM to 5 AM, Monday to Friday, maintain two 11-foot lanes for traffic, restore full width when site is unattended. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
069	Work 12:01 AM-5 AM, Monday to Friday and/or Sunday 12:01 AM to 8 AM, full closure of roadway, restore full width when site is unattended. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
070	Work hours are eastbound 7 AM to 3 PM or westbound 10 AM to 4 PM, Monday through Friday.
071	Work 10 AM-4 PM, Monday to Friday.
072	Work 9 AM-4 PM, Monday to Friday.
073	Work Monday to Friday 10 AM-4 PM, Saturday and Sunday, with no noisy operations after midnight.
074	Work Saturday, 8 AM-6 PM and Sunday 9 AM-6 PM Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
075	Work 7 PM Friday to 6 AM Monday and 7 PM-6 AM weeknights. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
076	Work Saturday and Sunday. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
077	No noisy operations after midnight.
078	Full width of roadway shall be opened to traffic when site is unattended.
079	Work 7 PM-10 AM weeknights. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
080	Work 7 PM-6 AM weeknights, no weekends. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
081	Work 10 AM-7 PM, Monday through Friday. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
082	Work 7 AM-4 PM, Monday through Friday.
083	Work 9 AM to 2 PM Monday to Friday.
084	Work 8 AM to 7 PM Monday to Friday. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
085	Work from 7 PM Friday through 6 AM Monday. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
086	Work 7 AM-3 PM, Monday through Friday.
087	Work 9 AM-3 PM, Monday through Friday.
088	Work 10 AM-3 PM, Monday through Friday.
089	Work 9 AM to 7 PM except Sunday. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.

STIP	Description
090	Before work, must coordinate and obtain approval from NYSDOT 9a EIC. Must meet all requirements as set forth in RTE 9a Reconstruction Project Repair Details for replacement of 50 years concrete pavement and sidewalk dated 9/7/2001.
091	This permit activity may not start until the permittee coordinates all work and restoration requirements with the resident engineer.
092	Requires OCMC review.
093	Work hours are northbound 7 AM to 3 PM or southbound 10 AM to 4 PM, Monday through Friday.
094	Work hours are northbound 10 AM to 4 PM or southbound 7 AM to 3 PM, Monday through Friday.
095	Work hours northbound 7 AM to 3 PM or southbound 10 AM to 6 PM, Monday through Friday
096	Work hours are northbound 10 AM to 6 PM or southbound 7 AM to 3 PM, Monday through Friday.
097	Work hours are eastbound 10 AM to 4 PM or westbound 7 AM to 3 PM, Monday through Friday.
098	Work hours are eastbound 7 AM to 3 PM or westbound 10 AM to 6 PM, Monday through Friday.
099	This permit is void if insurance is not renewed to cover period of this permit.
100	Work hours are eastbound 10 AM to 6 PM or westbound 7 AM to 3 PM, Monday through Friday.
101	The permittee is required to install, maintain, and remove all necessary temporary parking and regulatory signs and pavement markings and restore to their original condition per NYC DOT standards prior to the expiration of the permit. Permittee must notify NYPD/Traffic Management Center 48 hours prior to changing any signs/markings. Approved plans must be on site.
102	Work 10 PM to 6 AM nightly. Section24-224 Administrative Code Variance granted for hours and days stipulated herein.
103	Parking of private vehicles on the street (roadway and sidewalk) work areas is prohibited.
104	Local and emergency access must be provided from each end of the block at the intersections with use of flaggers and signage.
105	Designated cobblestone street. Roadway must be restored in kind. Approval from NYC DOT HIQA Borough Offices required before work commences. Contractor must call HIQA at 212-839-8856 before replacing cobblestones so HIQA can monitor there placement.
106	Contractors shall notify in writing by letter Police, Fire, EMS, Community Boards, and all property owners on the affected street segment a minimum of 7 calendar days prior to closure. When applicable, NYCT or private bus companies must also be notified.
107	Loading and unloading, standing or parking in a lane adjacent to the work zone in the roadway is prohibited. This applies to permittees and all of their subcontractors.
108	NYC Administrative Code, 19-142, workers on excavations: a person to whom a permit may be issued, to use or open a street, shall be required, before such permit may be issued, to agree that none but competent workers, skilled in the work required of them, shall be employed thereon, (continued on Stip 109)
109	...And that the prevailing scale of union wages shall be the prevailing wage for similar titles as established by the fiscal officer pursuant to sec. Two Hundred Twenty of the Labor Law, paid to those so employed.

STIP	Description
110	A VMS board must be placed a minimum of 7 calendar days prior to closure within a legal parking space entering the street to be closed. The VMS board must state the street to be closed and the dates and times of such closure. VMS board must be removed upon completion of the approved closure.
111	A 4' x 4' fixed orange construction sign with 5" black lettering must be placed a minimum of 7 calendar days prior to closure at a location entering the street to be closed. The sign must be placed at a height of 7 to 10 feet and state the street to be closed and the dates and times of the closure. Fixed sign must be removed upon completion of the approved closure.
112	Maintain one 11-foot lane on one-way streets and two 11-foot lanes on two-way streets.
113	Work 9 AM to 7 PM Saturday and 10 AM to 7 PM Sunday. Section 24-224 Administrative Code variance granted for hours and days stipulated herein.
115	This permit becomes void when the building structure first-floor level is covered by a roof, second floor or a second-floor slab.
116	Requires OCMC and executive review.
117	Requires OCMC and Lower Manhattan review.
118	Requires Bureau of Bridges approval prior to work.
119	The traffic stipulations on this permit do not go into effect as long as the contractor continues to work non-stop, around the clock, to correct the emergency situation
121	The contractor will conduct a field survey in coordination with the Downtown Alliance (DTA) staff prior to work to remove flag-mounted, orientation columns or heritage-trail site markers. The contractor will be required to turn signage over to the DTA for storage
204	This permit includes authorization for the storage of equipment and materials on the job site only, including jersey barriers if applicable. Off-site storage must be permitted separately.
205	All work must be pre-approved by Landmark Preservation Commission.
207	This segment is Partially Designated Landmark.
221	This permit includes authorization for installation of temporary roadway pavement markings and/or temporary construction parking or regulatory signs as agreed to by NYC DOT OCMC, and in accordance with approved plans. A separate 221 Permit is not required for this
410	Variance granted to work during the "holiday" embargo—November to January—as stipulated by the OCMC office.
411	Waiver to work during green light for midtown embargo.
452	Maintenance and protection of traffic setup and all restoration work should meet the contract plans and specification of Contract HWM207BW.
454	Permittees shall comply with all applicable laws, rules and specifications of the NYC Department of Transportation and with the terms and conditions of the permit. Failure to comply may result in revocation of the permit by the Commissioner.
460	Permittee is required to contact Rockefeller Center Organization 48 hours prior to commencing work.
461	Special procedures to follow when restoring trenches in recently reconstructed roadways: 1-Beveled saw cut in roadway; 2-Vermeer cut of trench; 3-Comply with DOT Standard #H1042c; 4-Backfill/compact in 12-inch lifts; 5-Restore concrete base; 6-Restore pavement.

STIP	Description
900	Red-light camera conduit is located in your proposed work area. Prior to beginning any work, to ensure that you restore the area in-kind, you must contact the NYC DOT red-light camera unit to obtain the construction and markings plans for this work area.
901	One speed reducer is located in the roadway of your proposed work area. Prior to beginning any work, to ensure that you restore the area in-kind, you must contact the NYC Traffic Planning Division to obtain the construction and marking plans for speed reducers.
902	Two speed reducers are located in the roadway of your proposed work area. Prior to beginning any work, you must contact the NYC Traffic Planning Division to obtain the construction and marking plans for speed-reducer installation and any signage associated with the reducer.
903	Three speed reducers are located in the roadway of your proposed work area. Prior to beginning any work, to ensure that you restore in-kind, you must contact the NYC Traffic Planning Division to obtain the construction and marking plans for speed-reducer installation
904	Four speed reducers are located in the roadway of your proposed work area. Prior to beginning any work, to ensure that you restore in-kind, you must contact the NYC Traffic Planning Division to obtain the construction and marking plans for speed-reducer installation.
905	Five or more speed reducers are located in the roadway of your proposed work area. Prior to beginning any work, to ensure that you restore in-kind, you must contact the NYC Traffic Planning Division to obtain the construction and marking plans for speed reducer.
910	Speed reducers are proposed for the roadway of your work area. Prior to beginning any work, you must contact the NYC Traffic Planning Division to obtain the construction and marking plans for speed-reducer installation and any signage associated with the reducer.
1/2+5'	Permittee is responsible for milling and paving of 1/2 + 5 feet of roadway per builders pavement plan. Permittee is required to call NYC DOT HIQA office at 212-839-8856 within 24 hours of final paving.
1/2RES	This permit is being issued with the understanding that the permittee is responsible for 1/2 roadway plus 5 feet restoration as agreed to with the Borough ASHO's office.
1FTRES	This permit is being issued with the understanding that the permittee is responsible for 12" beyond furthest cut to curb line for all cuts as agreed to with the borough ASHO's office.
8FTRES	This permit is being issued with the understanding that the permittee is responsible for restoration of cut confined to within 8 feet of the curb line in accordance with NYC DOT Rules and Regulations for protected streets.
BIKE01	If work is affecting a bike route/lane, contractor must post advance warning signs 350' and 200' prior to work zone "Construction in Bike Lane Ahead, Proceed With Caution" and also post sign at work zone "Construction in Bike Lane, Proceed With Caution." Such signs shall be orange, 3'x3', diamond-shape, with 4" black lettering. Signs shall be posted in accordance with Federal MUTCD.
BIKE02	If work is affecting a bike route/lane, contractor must post advance warning signs 350' and 200' prior to work zone "Construction in Bike Lane Ahead, Proceed With Caution" and also post sign at work zone "Construction in Bike Lane, Proceed With Caution." Such signs shall be orange, 3'x3', diamond-shape, with 4" black lettering. Signs shall be posted in accordance with Federal MUTCD.
BIKE03	If work is affecting a bike route/lane, contractor must post advance warning signs 350' and 200' prior to work zone "Construction in Bike Lane Ahead, Proceed With Caution" and also post sign at work zone "Construction in Bike Lane, Proceed With Caution." Such signs shall be orange, 3'x3', diamond-shape, with 4" black lettering. Signs shall be posted in accordance with Federal MUTCD.

STIP	Description
BIKELN	If work is affecting a bike route/lane, contractor must post advance warning signs 350' and 200' prior to work zone "Construction in Bike Lane Ahead, Proceed With Caution" and also post sign at work zone "Construction in Bike Lane, Proceed With Caution." Such signs shall be orange, 3'x3', diamond-shape, with 4" black lettering. Signs shall be posted in accordance with Federal MUTCD.
BLKRES	This permit is being issued with understanding that the permittee is responsible for block-segment curb-to-curb restoration as agreed to with the Borough ASHO's office.
BLNRES	This permit is being issued with the understanding that the permittee is responsible for building-line-to-building curb-to-curb restoration as agreed to with the Borough ASHO's office.
BRIDGE	If the location of your proposed work maybe within 100 feet of a bridge structure, you must survey the site. If the work is within 100 feet of a bridge structure, you must submit a scaled drawing showing the work and exact location. If the work is more than 100 feet away, you must forward certification. Either response must be sent to NYC DOT Div. of Bridges bridgeshold@dot.nyc.gov prior to working.
CNRRES	This permit is being issued with the understanding that the permittee is responsible for corner-quad-rant restoration as agreed to with the Borough ASHO's office.
COLRDW	Colored roadway and/or special markings are located on the roadway of your proposed work area. Prior to beginning any work, to ensure that you restore the area in-kind, you must contact the NYC DOT Traffic Operations Division to obtain the restoration plans for this roadway including color markings and any other installation required.
CORES	Permittee is participating in core-drilling pilot program.
CPIS	This project requires a construction-project informational sign as required in DOT Highway Rule Section 2-02, 4 and 5. Criteria and prototype may be found on NYC DOT web site http://www.nyc.gov/html/dot/pdf/constructionsign.pdf and http://www.nyc.gov/html/dot/html/permits/constructionsigns.shtml .
CRBRES	This permit is being issued with the understanding that the permittee is responsible for curb-lane-only restoration as agreed to with the Borough ASHO's office.
CTCRES	This permit is being issued with the understanding that the permittee is responsible for curb-to-curb restorations agreed to with the Borough ASHO's office.
CURE01	Maximum of 11 feet of roadway may remain closed after working hours only for concrete curing. Full width of roadway not required during concrete-curing period. Only for corrective action for special events.
DEP001	May also work 7 PM to 11 PM weekdays only for the purpose of DEP inspection with inspector on site. No excavation or noisy operation permitted during this time period. If permit allows work to 6 PM weekdays, work may also occur from 6 PM to 11 PM weekdays for the purpose of DEP inspection only with inspector on site.
EMBRGO	This is not a permit to perform work.
ETMRES	This permit is being issued with the understanding that the permittee is responsible for extended trench more than regular cut-back as agreed to with the Borough ASHO's office.
GRNBIK	Restoration of roadway which has green-colored bike-lane marking must be restored as follows: four coats of green # 105953 ride-a-way coating material manufactured by Flint Trading Inc. or equivalent. Phone # (508) 429-6023. Streetbond colorant is added to provide color.
HIQA01	This permit only allows for the closure of a roadway or sidewalk as stipulated. Any storage of material or storage of equipment requires a separate permit.

STIP	Description
INTRES	This permit is being issued with the understanding that the permittee is responsible for full intersection restoration as agreed to with the Borough ASHO's office.
L00001	Work 7 AM to 10 PM Monday through Friday.
L00002	Work 10 AM to 10 PM Saturday and Sunday.
L00004	Contractor must notify the Alliance for Downtown New York, 120 Broadway, Suite 3340, New York, New York 10271, (212) 566-6700, at least 3 business days prior to starting work.
L00005	As a condition of this permit, a construction manager familiar with this project is required to attend weekly Tuesday meetings at 1 Liberty Plaza, 29th floor of the I.M.C.C.C.
L00006	No noisy work 10 PM to 7 AM Monday to Friday, 10 PM Friday to 8 AM Saturday, 10 PM Saturday to 9 AM Sunday and 10 PM Sunday to 7 AM Monday.
LIGHTS	Lights must be installed prior to 11/16 and removed between 01/02 and 01/15.
MILL01	When grinding pavement in mainly residential, low-traffic-volume streets narrower than 30-foot wide, the contractor may be permitted to close the roadway but shall be required to maintain access for local and emergency traffic at all times.
MILL02	Effective 3/19/08, all remaining work may only occur 7 PM-11 PM
NOISE1	By submitting this application and/or renewal request, the permittee certifies its compliance with all applicable citywide construction-noise mitigation requirements including, but not limited to, the development of a compliant noise-mitigation or alternate noise-mitigation plan. Please contact the NYC Department of Environmental Protection (www.nyc.gov/dep) for further information.
OCCMC02	Permittee must work hours and days allowed by this permit. Permittee may be issued violations if found not to be working during days and times allowed.
OCCMC03	Work 9 PM to 6 AM nightly. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
OCCMC05	No noisy operations between 12:01 AM and 7:00 AM, NYPD Agents and VMS Boards required as per MEC01-36.
OCCMC06	Must maintain 40 feet clear roadway.
OCCMC07	Work includes: curb/sidewalk repair as needed; roadway milling/repair and resurfacing; removal of center median; resetting utility opening; removal/reinstallation of traffic signals including conduit; installation of pavement markings and parking signage. All work to meet or exceed NYC DOT standards.
OCCMC09	Work hours 9 PM to 5 AM Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
OCCMC11	work also allowed 10 AM to 6 PM Saturday. Section 24-224 administrative code variance granted for hours and days stipulated herein.
OCCMC12	Full sidewalk closure allowed for sidewalks less than 15 feet wide. Post signs meeting NYC DOT specs at work zone and at both intersections directing pedestrians to opposite sidewalk. Maintain 5 feet for pedestrians on sidewalks 15 feet or more in width. After working hours minimum of 5 feet of sidewalk must be maintained for pedestrians in both cases.
OCCMC15	Work hours 7 AM-10 PM Monday-Friday, and 10 AM-7 PM Saturday and Sunday.
OCCMC16	One 11-foot lane may remain closed for the weekend for concrete curing only.

STIP	Description
OCMC17	Work allowed 8 AM to 4 PM Saturday. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
OCMC18	Work nightly 9 PM-6 AM Sunday night to Friday morning and 9 PM Friday to 6 AM Sunday. As coordinated with Community Board, ConEd. Must comply with DEP noise requirements.
OCMC19	Work in accordance with OCMC stipulation sheet and location sheet which must be attached to permit and onsite.
OCMC20	Work in accordance with OCMC stipulation sheet which must be attached to permit and onsite.
OCMC21	Full sidewalk closure with walkway in roadway, weekday nights 7 PM to 6 AM and Friday night 7 PM through Monday 6 AM On weekdays from 6 AM to 7 PM must work behind barrier while maintaining half sidewalk (minimum 5 feet) for pedestrians and no use of roadway. Section 24-224 Administrative Code
OCMC24	Work allowed 8 PM to 6 AM nightly. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
OCMC25	Work allowed 7 PM to 6 AM nightly. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
OCMC27	Occupy one 11-foot lane 10 PM to 12 PM nightly. Occupy two 11-foot lanes 12:01 AM to 5 AM nightly. Maintain 5' sidewalk at all times. Full width of sidewalk and roadway must be restored after working hours.
OCMC29	Must coordinate with NYPD Precinct C.O. and NYCTA.
OCMC30	Maintain one 11-foot lane for through traffic 9 AM to 2 PM and 3:30 PM to 6 PM Monday to Friday. When school is out, maintain one 11-foot lane for through traffic 7 AM to 6 PM Monday to Friday. Other times, occupy 11 feet adjacent to south curb only.
OCMC32	Work one day per week 7:00 AM to 4:00 PM
OCMC37	Work hours 7 AM-10 PM Monday to Friday, and 8 AM-10 PM Saturday, and 9 AM to 10 PM Sunday. Section 24-224 Administrative Code Variance granted for hours and days stipulated herein.
OCMC38	Fire/emergency access/evacuation points for all buildings cannot be encroached. Construction-zone layout must be in accordance and compatible with any and all NYC Department of Buildings (DOB) and NYC Fire Department (FDNY) fire and emergency evacuation regulations
OCMC39	In areas where a fence/barricade usage is permitted, the fence/barricade cannot obstruct, restrict or compromise the sight lines of pedestrian/vehicular interface.
OCMC48	Maintain one 13-foot lane eastbound and one 15-foot lane westbound. May also close sidewalk on north side fronting development.
OCMC51	May also work Saturday and Sunday 7 AM to 6 PM, as well as nightly 10 PM to 5 AM
OCMC52	Work hours are 7 AM-8 PM Monday to Friday and 9 AM-6 PM Saturday. One additional lane adjacent to the enclosed work zone may occur 12:01 AM-5 AM nightly with no noise operations.
OCMC53	All mitigations including: variable message boards, NYPD Intersection Traffic Agents, construction, parking, and bus-stop signage must be in place and maintained for the life of the project.
OCMC61	If location is in school zone as specified in school stipulation, may only work 9 AM to 2 PM Monday to Friday when school is in session (083 Stipulation).

STIP	Description
OCMC62	Between 6 AM and 10 AM Monday to Friday, maintain two 11-foot lanes westbound and one 11-foot lane eastbound. Between 10 AM and 3 PM Monday to Friday maintain one 11-foot lane westbound and two 11-foot lanes eastbound on proper side of yellow line. All other times full width of roadway open.
OCMC69	Curb lane may be occupied at all times. For pumping operation, may also take one of two northbound travel lanes 7 AM-4 PM Monday to Friday only. For drilling operation, may work 7 AM-6 PM Monday to Friday in curb lane and part of sidewalk only. Provide 5 feet for pedestrians.
OCMC72	Maintain one 11-foot lane on one-way streets and two 11-foot lanes on two-way streets. Restore all travel lanes when site is unattended. Contractor may contain a maximum of 25 linear feet, 8 feet adjacent to the curb during non-working hours. Containment only to restrict parking. Not for storage of material, use of metered parking, authorized and no standing prohibited.
OCMC76	Contractor may not remove or relocate parking meters without first obtaining approval from NYC DOT Parking Meter Division at 718-894-8651.
OCMC90	Work 10 AM to 2 PM Monday to Friday.
OCMC91	One 11-foot lane may remain closed for concrete curing only for maximum of 48 hours.
OCMC92	During working hours, sidewalk may be closed provided flaggers are at each intersection and at both ends of work site to safely cross pedestrians. During non-working hours, pedestrian walkway must be maintained on sidewalk or on roadway.
OCMC93	Prior to any work, permittee must call NYC EDC 212-312-3628, ext. 3752, regarding soil handling procedures.
ODTRES	This permit is being issued with the understanding that the permittee is responsible for origin to destination for distance of trench curb to curb as agreed to with the Borough ASHO's office
ODV	All over-dimensional crane/trailers require an additional permit from the New York City Department of Transportation Division of Bridges. All permits must be on site.
OEM001	Permittee must call/fax: OEM regarding emergency situation. Phone # 718-422-8700, fax: # 718-422-8710.
POLES	The permittee must have approval from NYC DOT Street Lighting for installation and/or replacement of poles.
REDBUS	Restoration of roadway which has red-colored bus lane marking must be restored as follows: four coats of terracotta #103856 ride-a-way coating material manufactured by Flint Trading Inc. or equivalent. Phone # (508) 429-6023. Streetbond colorant is added to provide color.
RE-DIG	Permittee is required to call NYC DOT HIQA office at 212-839-8856 to schedule their re-dig.
SCA001	During working hours, sidewalk may be closed provided flaggers are at each intersection and at both ends of worksite to safely cross pedestrians. During non-working hours, pedestrian walkway must be maintained on sidewalk or on roadway. This stipulation is necessary to assist SCA meet deadline for school opening.
SCAPE1	The permittee is not permitted to enter, occupy or use any publicly owned or privately owned, non-paved, landscaped or non-landscaped location without specific written permission. When the landscape is within the right of way of a limited-access arterial highway. Written approval from the NYC DOT OCMC Highways is required. When the landscape is within the right of way of a public (continued...)

STIP	Description
SCAPE2	...park, written approval from the City of New York Parks and Recreation Department is required. When the landscape is within the right of way of any other jurisdiction such as private property, state, federal etc., it is the permittee's responsibility to determine the property owner and obtain the written approval.
SCHOOL	No work is to be performed within a block fronting a school, including intersections for one hour prior to school start time through one hour after end of school time. Permittee must notify school principal in writing 48 hours prior to beginning any work. This stipulation voids any/all other conflicting stipulations on this permit unless accompanied with Variance Stipulation Var001.
SECSTR	At the expiration of this permit, the permittee agrees to remove all listed structures, to restore the affected property of the city, and to notify DOT in writing that the structures have been removed. In order to maintain these structures after the expiration date, an NYC DOT Revocable Consent must be in effect pursuant to Title 34, Chapter 7 of the Rules of the City of New York.
SHED01	Working hours are defined as 8 PM-6 AM Monday-Friday, and 10 PM Friday through 6 AM Monday. All construction activity must comply with DEP Noise Code requirements. During working hours sidewalk may be closed on one side along crosstown streets while maintaining a minimum of 5 feet.
SIGNS	Contractor/permittee is required to post and maintain advisory signs a minimum of 48 hours prior to changing existing parking-regulation signs to approved temporary construction-parking regulation signs. The signs should be posted on all poles and drive rails on the segment affected indicating the date of the change, the new regulations, and a telephone number to obtain information.
STLRES	This permit is being issued with the understanding that the permittee is responsible for specific travel-lane restoration as agreed to with the Borough ASHO's office.
TRFLRW	Restoration of roadway which has truffle-colored marking must be restored as follows: four coats of truffle color #106675 ride-a-way coating material manufactured by Flint Trading Inc. or equivalent. Phone # (508) 429-6023. Streetbond colorant is added to provide color.
VAR001	Variance granted to work during school hours as stipulated by OCMC Office.
VAULTS	Permittee is required to obtain plan approval from DOT/Permit Management/Engineering Review at 212-839-4396.
WAGE01	NYC Administrative Code, 19-142, workers on excavations: a person to whom a permit may be issued, to use or open a street, shall be required, before such permit may be issued, to agree that none but competent workers, skilled in the work required of them, shall be employed thereon, (continued on stipulation Wage02)
WAGE02	...and that the prevailing scale of union wages shall be the prevailing wage for similar titles as established by the fiscal officer pursuant to Section Two Hundred Twenty of the Labor Law, paid to those so employed.

ATTACHMENT D

REAL-TIME MONITORING INSTRUMENTATION

SPECIFICATION SHEETS

MultiRAE Plus

One-to-Five Gas Monitor with VOC Detection

The **MultiRAE Plus** combines a PID (Photoionization Detector) with the standard four gases of a confined space monitor (O₂, LEL, and two toxic gas sensors) in one compact monitor with sampling pump. Like the Leatherman™ tool, the **MultiRAE Plus** gets the job done in more circumstances than any other gas detector. With more than 10,000 units in the field today, its versatility makes it the gas meter of choice for some of the highest profile HazMat/WMD teams in the United States. The **MultiRAE Plus** is quickly and easily changed from a sophisticated technician instrument to a simple text-only monitor. The same monitor can be used as a personal monitor, a hand-held sniffer or as a continuous-operation area monitor.

Key Features

- **O₂, LEL, PID and any two plug-in "smart" toxic sensors:** CO, H₂S, SO₂, NO, NO₂, Cl₂, HCN, NH₂, PH₂
- **0-2,000 ppm measurement of VOCs** (volatile organic compounds) with 0.1 ppm resolution
- **Measure more chemicals than with any other PID** With over 60 Correction Factors built into the **MultiRAE Plus** memory and the largest printed list of Correction Factors in the world (300+), RAE Systems offers the ability to accurately measure more ionizable chemicals than any other PID!
- **Drop-in Battery** When work schedules require putting in more than the 14 hours supplied by the advanced Lithium-ion (Li-ion) battery, the drop-in alkaline pack supplied with every **MultiRAE Plus** allows you to finish the job.

- **User friendly screens** make it easy to use for simple applications and flexible enough for sophisticated options.
- **Rugged Rubber Boot** assures that the **MultiRAE Plus** survives the bumps and knocks of tough field use
- **Strong, built-in sample pump** draws up to 100 feet (30m) horizontally or vertically. Large external filter and automatic low flowage
- **Large keys** are operable with 3 layers of gloves
- **Easy-to-read display** with backlight
- **Store up to 80 hours of data** at one minute interval for all 5 sensors for download to PC (with the optional datalogging)
- **Loud audible alarm** that varies for different alarm conditions and an optional external vibration alarm for noisy areas
- **Access sensors and battery in seconds** with the new, improved case

Applications

HazMat/Homeland Security

- Initial PPE (personal protective equipment) assessment
- Leak detection
- Perimeter establishment and maintenance
- Spill delineation
- Decontamination
- Remediation

Confined Space Entry

- Aviation/wing tank entry with jet fuel
- Shipyard and maritime confined spaces with diesel fuel
- Pulp and paper industry for confined space entry in turpentine environments

Environmental

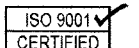
- Soil and water headspace analysis
- Leaking underground storage tanks (LUST)
- Landfill monitoring

Industrial Hygiene, Plant Health & Safety

- Confined Space Entry
- Indoor Air Quality (IAQ)



ATEX



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Tel: 852.2669.0828



Specifications*

Sensor Specifications

Sensor	Range	Resolution
Oxygen	0-30%	0.1%
Combustible Gas	0-100% LEL	1% LEL
VOCs	0-200 ppm 200-2000 ppm	0.1 ppm 1 ppm
Carbon Monoxide	0-500 ppm	1 ppm
Hydrogen Sulfide	0-100 ppm	1 ppm
Sulfur Dioxide	0-20 ppm	0.1 ppm
Nitric Oxide	0-250 ppm	1 ppm
Nitrogen Dioxide	0-20 ppm	0.1 ppm
Chlorine	0-10 ppm	0.1 ppm
Hydrogen Cyanide	0-100 ppm	1 ppm
Ammonia	0-50 ppm	1 ppm
Phosphine	0-5 ppm	0.1 ppm

Detector Specifications

Size	4.65"L x 3.0"W x 1.9"H (11.8 x 7.6 x 4.8 cm)
Weight	16 oz. with battery (454g)
Sensors	Up to 5 sensors including: <ul style="list-style-type: none"> • Photoionization detector for VOCs, 10.6 eV lamp standard • Protected catalytic bead for combustible gases • Interchangeable electrochemical sensors for oxygen and toxic gases (2)
Battery	<ul style="list-style-type: none"> • Interchangeable Li-ion and alkaline battery packs • Rechargeable units include Lithium-ion battery pack with internal smart charging, 120V AC/DC wall adapter, and spare alkaline battery pack
Operating Hours	<ul style="list-style-type: none"> • 14 hours continuous with Li-ion (typical) • Unit will run and charge simultaneously
Display	2 line, 16 digit LCD with LED backlighting automatically in dim light or alarm condition
Keypads	1 operation and 2 programming keys
Direct Readout	Instantaneous values (up to 5): <ul style="list-style-type: none"> • Oxygen as percentage by volume • Combustible gas as percentage of lower explosive level (LEL) • Toxic gases and VOCs as parts per million by volume (VOC scaleable using correction factors) • High and low values for all gases • STEL and TWA values of toxic gases and VOCs • Battery and shut down voltage • Date, time, elapsed time, temperature
Alarms	90 dB buzzer and flashing red LED to indicate exceeded preset limits: <ul style="list-style-type: none"> • High: 3 beeps and flashes per second • Low: 2 beeps and flashes per second • STEL and TWA: 1 beep and flash per second • Automatic reset or latching with manual override • Additional diagnostic alarms and display messages for low battery and pump stall
EM/RFI	Highly resistant to EMI/RFI. Compliant with EMC Directive 89/336/EEC
IP Rating	IP-55: protected against dust, protected against low pressure jets of water from all directions
Datalogging & Communication	Optional 80 hours, 5 channels at one minute intervals download to PC with serial number of unit, user ID, site number, and calibration date
Calibration	Two-point field calibration for zero span gas
Sampling Pump	Internal two-speed pump. Flow rates: <ul style="list-style-type: none"> • Low: ~150 cc/min • High: ~250 cc/min
Low Flow Alarm	Auto shut-off pump at low flow condition

Detector Specifications (continued)

Hazardous Area Approval	<ul style="list-style-type: none"> • US and Canada: UL, cUL, Classified as Intrinsically Safe for use in Class I, Division I Groups A, B, C, D, T3C • Europe: ATEX II 2G EEx ia d IIC T3 & T4
Temperature	-4° to 113 °F (-20 to 45°C)
Humidity	0% to 95% relative humidity (non-condensing)
Attachment	Durable yellow boot with belt clip and wrist strap; Shoulder strap; optional tripod/wall mounting bracket
Warranty	Lifetime on non-consuming components (per RAE Systems Standard Warranty), 2 years for O ₂ , LEL, CO, and H ₂ S sensors, 1 year all other sensors, 1 year pump, 1 year battery, 1 year for 10.6eV PID lamp

*Ongoing projects to enhance our products means that these specifications are subject to change

MultiRAE Plus Accessories

Monitor only includes:

- Sensors as specified
- Calibration adapter
- Training CDROM
- Operation and maintenance manual
- Rubber boot with belt clip
- Alkaline battery adapter
- Rechargeable units additionally include:
 - Standard Lithium-ion (Li-ion), optional extended duration Lithium-ion battery, or ATEX-certified charger and barrier kit
 - 120/230 V AC/DC Wall Adapter (if specified)
- 3 external filters
- 3-inch inlet probe

Monitor with accessories kit also includes:

- Hard transport case with pre-cut foam
- Sampling wand with 15 feet (5m) of self-coiling Teflon® tubing
- Tool Kit

Black boot is available for tactical operations (part number 027-3042-000)

Optional calibration kit also includes:

- Four-gas mix in a 34L cylinder; (50% LEL, 20.9% O₂, 25 ppm Hydrogen Sulfide, 50 ppm Carbon Monoxide)
- 100 ppm Isobutylene in 34L cylinder
- Calibration regulator(s) and tubing

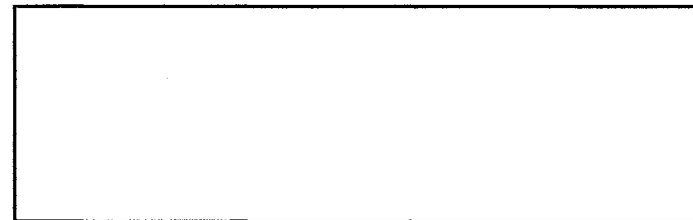
Datalogging Monitors also include:

- Software ProRAE Suite Package for Windows 98, NT, 2000 and XP
- Computer interface cable

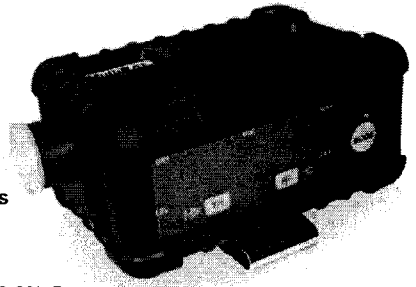
Optional Guaranteed Cost of Ownership Program:

- 4-year repair and replacement guarantee
- Annual maintenance and servicing

DISTRIBUTED BY:



MULTIRAE Plus



DUSTTRAK™ II AEROSOL MONITORS MODELS 8530, 8530EP AND 8532

DESKTOP OR HANDHELD
UNITS FOR ANY ENVIRONMENT,
ANY APPLICATION

DustTrak™ II Aerosol Monitors are battery-operated, data-logging, light-scattering laser photometers that give you real-time aerosol mass readings. They use a sheath air system that isolates the aerosol in the optics chamber to keep the optics clean for improved reliability and low maintenance. From desktop and desktop with external pump models to a handheld model, the DustTrak II offers a suitable solution for harsh industrial workplaces, construction and environmental sites and other outdoor applications, as well as clean office settings. The DustTrak II monitors measure aerosol contaminants such as dust, smoke, fumes and mists.



Features and Benefits

All Models

- + Real-time mass concentration readings and data-logging allow for data analysis during and after sampling.
- + Simultaneously measure size-segregated mass fraction concentrations corresponding to PM1, PM2.5, Respirable, PM10, and Total PM size fractions
- + Easy-to-use graphical user interface with color touch-screen for effortless operation

Desktop Models (8530 and 8530EP)

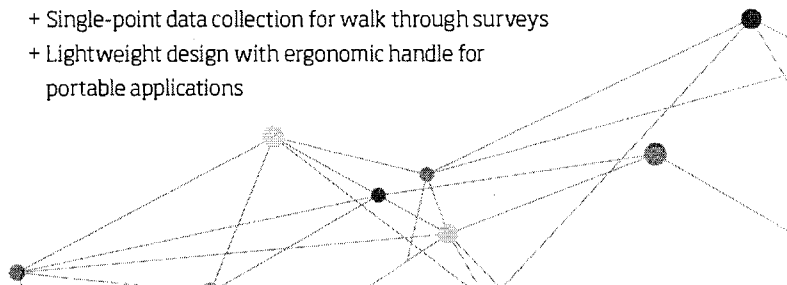
- + Energy-efficient, long lasting external pump for continuous, unattended, 24/7, outdoor monitoring applications (Model 8530EP only)
- + Long life internal pump for shorter work-shift or IAQ sampling applications (Model 8530)
- + Gravimetric reference sampling capability for custom reference calibrations
- + Automatic zeroing (with optional zero module) to minimize the effect of zero drift
- + STEL alarm setpoint for tracking 15-minute average mass concentrations

Handheld Model (8532)

- + Long life internal pump for continuous sampling
- + Single-point data collection for walk through surveys
- + Lightweight design with ergonomic handle for portable applications



UNDERSTANDING, ACCELERATED



Desktop Models: Ideal for Long-Term Surveys and Remote Monitoring Applications

The DustTrak II is offered as a standard desktop (Model 8530), as well as a desktop with external pump (Model 8530EP.) Both models have manual and programmable data logging functions, making them ideal for unattended applications. The standard desktop model is most suitable for indoor, continuous monitoring, while the desktop with external pump is designed for 24/7 unattended, remote monitoring outdoors.

The DustTrak II desktop models come with USB (device and host), Ethernet, and analog and alarm outputs allowing remote access to data. User adjustable alarm setpoints for instantaneous or 15-minute short-term excursion limit (STEL) are also available on desktop models. The alarm output with user-defined setpoint alerts you when upset or changing conditions occur.

The DustTrak II desktop monitors have several unique features:

- + Measure aerosols in high concentrations up to 400 mg/m³.
- + External pump (Model 8530EP) with low power consumption for continuous, unattended monitoring in remote outdoor locations.
- + Gravimetric sampling capability using a 37-mm filter cassette which can be inserted in-line with the aerosol stream allowing you to perform an integral gravimetric analysis for custom reference calibrations.
- + Zeros automatically using the external zeroing module. This optional accessory is used when sampling over extended periods of time. By zeroing the monitor during sampling, the effect of zero drift is minimized.
- + STEL alarm feature for tracking 15-minute average mass concentrations when alarm setpoint has been reached for applications like monitoring fugitive emissions at hazardous waste sites.

Handheld Models: Perfect for Walk-Through Surveys and Single-Point Data Collection Applications

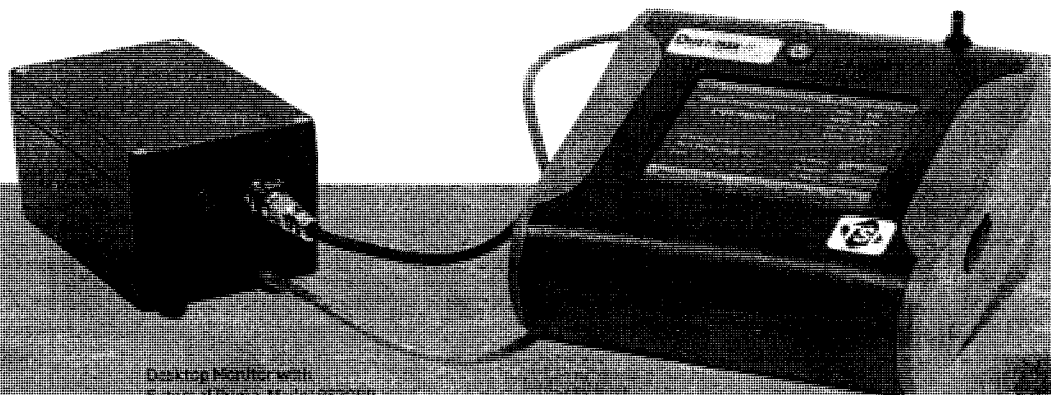
The DustTrak II Handheld Model 8532 is lightweight and portable. It is perfect for industrial hygiene surveys, point source location monitoring, indoor air quality investigations, engineering control evaluations/validation, and for baseline trending and screening. Like the desktop models, it has manual and programmable data logging functions. In addition, the handheld model also has a single-point data logging capability. Single-point data collection is used for walk-through industrial hygiene surveys and indoor air quality investigations.

Applications	Desktop	Handheld
Aerosol research studies	+	+
Baseline trending and screening	+	+
Engineering control evaluations		+
Engineering studies		+
Epidemiology studies	+	+
Indoor air quality investigations	+	+
Industrial/occupational hygiene surveys	+	+
Point source monitoring		+
Outdoor environmental monitoring	+	
Process monitoring	+	+
Remote monitoring	+	

Battery Performance		
Models 8530 and 8530EP (Typical) 6600 mAH Li-Ion Battery Pack (P/N 801680)	1 Battery	2 Batteries
Battery runtime (hours)	Up to 6	Up to 12
Charge time* (hours) in DustTrak	4	8
Charge time* (hours) in external battery charger (P/N 801685)	4	8

Model 8532 (Typical) 3600 mAH Li-Ion Battery Pack (P/N 801681)	Battery
Battery runtime (hours)	Up to 6
Charge time* (hours) in DustTrak	4
Charge time* (hours) in external battery charger (P/N 801686)	4

* Of a fully depleted battery



Desktop Monitor with
External Pump Model 8530EP

DustTrak II Aerosol Monitor Features

All Models

- + Li-Ion rechargeable batteries
- + Internal and external battery charging capabilities
- + Outlet port for isokinetic sampling applications
- + User serviceable sheath flow and pump filters
- + Logged test pause and restart feature
- + Logged test programming
 - + Color touch screen—either manual mode or program mode
 - + TrakPro™ Data Analysis Software via a PC
- + User adjustable custom calibration settings
- + Instantaneous alarm settings with visual and audible warnings
- + Real-time graph display
- + View statistical information during and after sampling
- + On-screen instrument status indicators:
FLOW, LASER and FILTER
- + Filter service indicator for user preventative maintenance

Desktop Models (8530 and 8530EP)

- + Long life external pump (8530EP)
- + Internal pump (8530)
- + Hot swappable batteries
- + Gravimetric reference sample capability
- + Auto zeroing module (optional accessory)
- + STEL alarm setpoint

Handheld Model (8532)

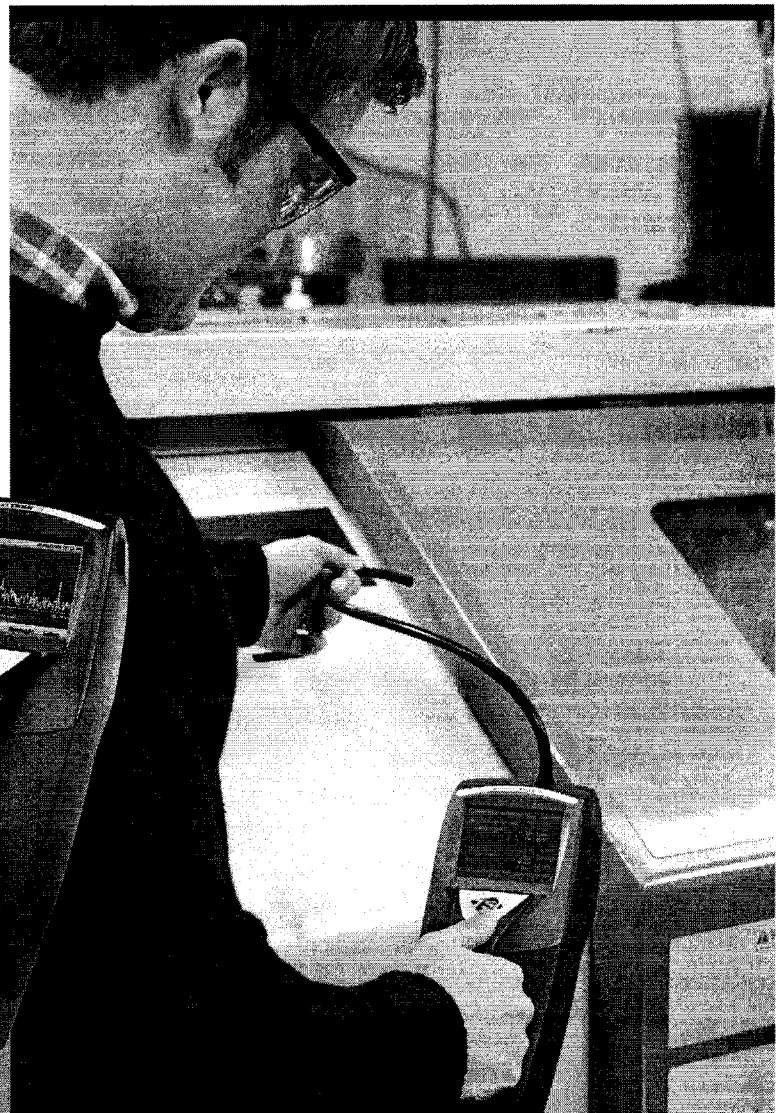
- + Long life internal pump
- + Single-point data collection for walk through surveys

Easy to Program and Operate

The graphical user interface with color touch-screen puts everything at your fingertips. The easy-to-read display shows real-time mass concentration and graphical data, as well as other statistical information along with instrument pump, laser and flow status, and much more. Perform quick walk-through surveys or program the instrument's advanced logging modes for long-term sampling investigations. Program start times, total sampling times, logging intervals, alarm setpoints and many other parameters. You can even set up the instrument for continuous unattended operation.

TrakPro™ Software Makes Monitoring Easier than Ever

TrakPro™ Data Analysis Software allows you to set up and program directly from a PC. It even features the ability for remote programming and data acquisition from your PC via wireless (922 MHz or 2.4 GHz) communications or over an Ethernet network. As always, you can print graphs, raw data tables, and statistical and comprehensive reports for record keeping purposes.



Handheld Monitor, Model 8532

SPECIFICATIONS

DUST TRAK™ II AEROSOL MONITORS MODELS 8530, 8530EP, AND 8532

Sensor Type

90° light scattering

Particle Size Range

0.1 to 10 µm

Aerosol Concentration Range

8530 Desktop 0.001 to 400 mg/m³
8530EP Desktop with External Pump 0.001 to 400 mg/m³
8532 Handheld 0.001 to 150 mg/m³

Resolution

±0.1% of reading or 0.001 mg/m³, whichever is greater

Zero Stability

±0.002 mg/m³ per 24 hours at 10 sec time constant

Flow Rate

3.0 L/min set at factory, 1.40 to 3.0 L/min, user adjustable

Flow Accuracy

±5% of factory set point, internal flow controlled

Temperature Coefficient

+0.001 mg/m³ per °C

Operational Temp

32 to 120°F (0 to 50°C)

Storage Temp

-4 to 140°F (-20 to 60°C)

Operational Humidity

0 to 95% RH, non-condensing

Time Constant

User adjustable, 1 to 60 seconds

Data Logging

5 MB of on-board memory (>60,000 data points)
45 days at 1 minute logging interval

Log Interval

User adjustable, 1 second to 1 hour

Physical Size (H x W x D)

Handheld 4.9 x 4.8 x 12.5 in.
(12.5 x 12.1 x 31.6 cm)
Desktop 5.3 x 8.5 x 8.8 in.
(13.5 x 21.6 x 22.4 cm)
External Pump 4.0 x 7.0 x 3.5 in.
(10.0 x 18.0 x 9.0 cm)

Weight

Handheld 2.9 lb (1.3 kg),
3.3 lb (1.5 kg) with battery
Desktop 3.5 lb (1.6 kg),
4.5 lb (2.0 kg)-1 battery,
5.5 lb (2.5 kg)-2 batteries
External Pump 3.0 lb (1.4 kg)

Communications

8530

USB (host and device) and Ethernet. Stored data accessible using flash memory drive

8530EP

USB (host and device) and Ethernet. Stored data accessible using flash memory drive plus, cable assembly for external pump

8532

USB (Hose and device). Stored data accessible using flash memory drive

Power-AC

Switching AC power adapter with universal line cord included, 115-240 VAC

Analog Out

8530/8530EP

User selectable output, 0 to 5 V or 4 to 20 mA. User selectable scaling range

Alarm Out

8530/8530EP

Relay or audible buzzer
Relay
Non-latching MOSFET switch
+ User selectable set point
+ -5% deadband
+ Connector 4-pin, Mini-DIN connectors
Audible buzzer

8532

Screen

8530

8532

5.7 in. VGA color touchscreen
3.5 in. VGA color touchscreen

Gravimetric Sampling

8530/8530EP

Removable 37 mm cartridge (user supplied)

CE Rating

Immunity
Emissions

EN61236-1:2006
EN61236-1:2006

Specifications are subject to change without notice.

TSI and the TSI logo are registered trademarks, and DustTrak and TrakPro are trademarks of TSI Incorporated.



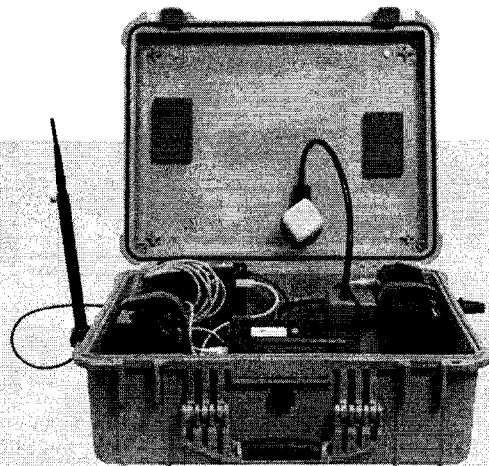
UNDERSTANDING, ACCELERATED

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Germany Tel: +49 241 523030

DUSTTRAK™ AEROSOL MONITOR ENVIRONMENTAL ENCLOSURE MODEL 8535

The DustTrak™ II and DRX Aerosol Monitor Models 8530, 8530EP, 8533 and 8533EP are portable, battery-operated, laser-photometers that measure and record airborne dust concentrations. The DustTrak Aerosol Monitors have a custom-designed, weatherproof Environmental Enclosure Model 8535 for making the same accurate and precise measurements outdoors.



Applications

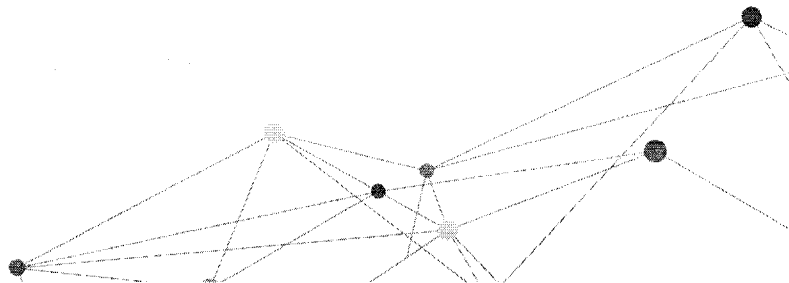
- + Outdoor environmental monitoring
 - Fugitive emissions monitoring
 - Site perimeter monitoring
 - Fence-line monitoring
 - Dust control operations
 - Environmental research studies
- + Construction sites
- + Harsh industrial environments
- + Urban pollution studies

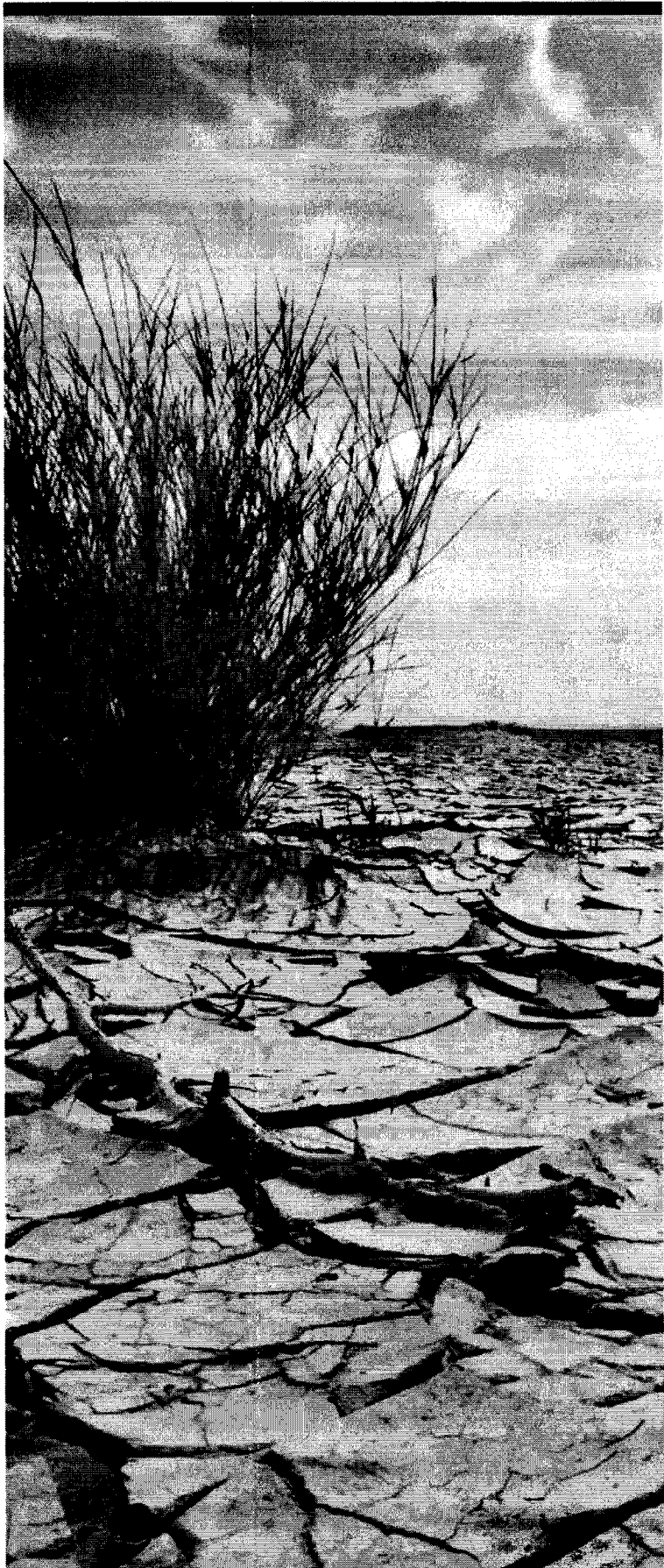
Features and Benefits

- + Optional accessories
 - Internal Battery System
 - Heat Shield
 - Solar Power System
 - Wireless Radio Modem
- + 360° omni-directional sampling inlet specifically designed to sample efficiently in a broad range of wind conditions
- + Mount enclosure to a standard survey tripod equipped with a 3/8"-11 threaded stud
- + Water trap that prevents precipitation from entering the instrument
- + Rugged enclosure provides a secure method of deploying the DustTrak Aerosol Monitor and its accessories



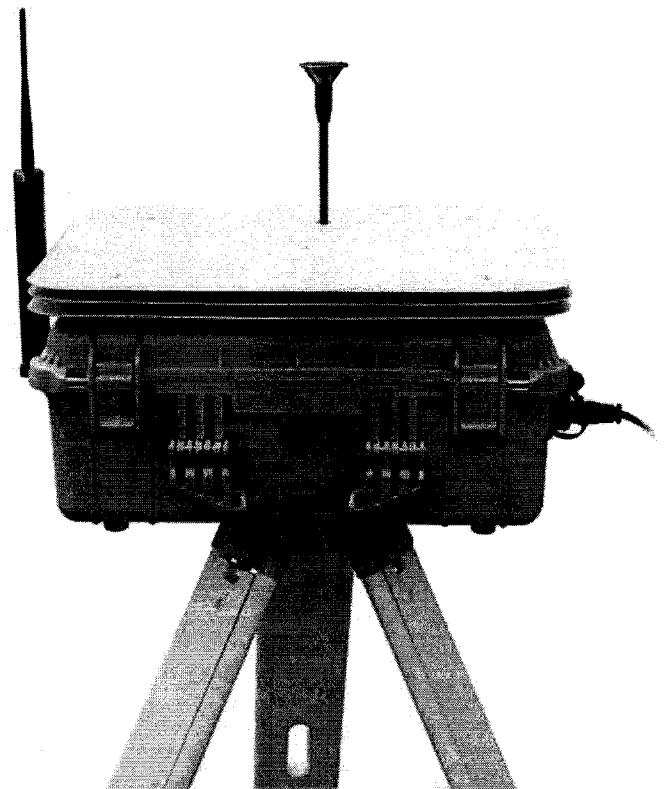
UNDERSTANDING, ACCELERATED





Any Environment, Any Application

The DustTrak Environmental Enclosure Model 8535 can be used in conjunction with a DustTrak Aerosol Monitor for many different applications. While its primary use is in outdoor applications, it may also be advantageous in indoor industrial applications to provide additional security and protection for the instrument. The enclosure should be set up in a location where it can easily sample the aerosols of interest. It should be placed away from obstructions which may affect wind currents. The sampling inlet on the Environmental Enclosure samples most efficiently from 0 to 22 mph (0 to 36 kph).



Optional Accessories

Internal Battery System—this internal power system will provide continuous power to the DustTrak Aerosol Monitor and the wireless radio modems when dedicated AC power is not available, allowing autonomous, 24-hour operation of the DustTrak Environmental Enclosure. This optional accessory is supplied with two batteries, allowing one battery to be charged while the other is in operation. It includes; two 22 Ah lead acid batteries, and battery charger with universal line cord.

Heat Shield—is mounted directly to the top of the Environmental Enclosure and is for use in applications where the enclosure needs to be shielded from direct sunlight.

Solar Power System—is an external power system that provides continuous power to the DustTrak Aerosol Monitor and wireless radio modem when dedicated AC power is not available for remote, long-term unattended sampling applications. It will power all equipment and charge the external battery during the daytime, and then automatically switches to battery power during the night or in low-light conditions. It includes; two solar panels with stand, weatherproof battery and charge regulator enclosure, charge regulator, extended-life lead acid battery, and DC power cables.

Wireless Radio Modem—provides for two-way communications between the DustTrak II or DRX aerosol monitor using TrakPro™ Data Analysis Software. You can set up and program your DustTrak II or DRX Aerosol Monitor for remote sampling and retrieve data remotely using this new system. It includes; wireless radio (922 MHz or 2.4 GHz) modems for computer and instrument (sold separately), USB cable, dipole antenna, modem configuration software CD, and manual.

TO ORDER

Model 8535 DustTrak Environmental Enclosure

Specify	Description
8535	Weatherproof Case with Survey Tripod Mount 360° Omni-directional Sampling Inlet, Water Trap Bottle, internal equipment bracket with VELCRO® brand Straps, Dust Caps, Tubing, Plug, O-rings, and external weatherproof AC/DC Power Supply.

Optional Accessories

Specify	Description
801807	Internal Battery System
801810	Heat Shield
801811	Solar Power System
801820	922 MHz Modem with Antenna Mount for Enclosure
801821	922 MHz Computer Modem
801825	2.4 GHz Modem with Antenna Mount for Enclosure
801826	2.4 GHz Computer Modem
801685	External Battery Charger
3332-10	Dilution System (10:1 dilution ratio)
3332-100	Dilution System (100:1 dilution ratio)
8535	Environmental Enclosure

Specifications are subject to change without notice.

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SPECIFICATIONS

DUSTTRAK™ AEROSOL MONITOR ENVIRONMENTAL ENCLOSURE MODELS 8535

Sampling Conditions

Wind Speed	0 to 22 mph (0 to 36 kph)
Operating Temperature	32 to 120°F (0 to 50°C)
Storage Temperature	-4 to 140°F (-20 to 60°C)

Physical

External Dimensions (H x W x D)	8.1 x 16.9 x 20.6 in. (21 x 43 x 52 cm)
Weight (with Internal Battery System and DustTrak)	38 lb (17 kg)

Clean Inlet

Weekly, under normal conditions, or daily if concentrations are over 30 mg/m³

Re-grease O-rings

As needed

INTERNAL BATTERY SYSTEM

Power Requirements

Internal Battery Pack	12 VDC, 22 Ah
-----------------------	---------------

Battery Run-time

DustTrakII/DRX with External Pump	21 - 24 hours (typical)
DustTrakII/DRX with Internal Pump	34 - 36 hours (typical)
Dual Battery Wiring Harness #B01817, two 22Ah battery packs #B01808	Run-time is typically using this setup twice the time quoted for a single battery pack for either internal or external pump configurations.

Battery Charge Time

8-9 hours at 72°F (22°C) (New battery, deep discharge to 95% charge)

SOLAR POWER SYSTEM

Power Requirements

Solar System Run-time	Continuous (with adequate sunlight)
Rated Power	80 x 2 watts
Power Tolerance	±5%
Nominal Voltage	12 volts
External Battery Pack	12 VDC, 100 Ah
Battery Run-time	90 to 120 hours (typical)
Battery Charge Time	<10 hours at 72°F (22°C) (New battery, deep discharge to 95% charge, with adequate sunlight)
Operating Temperature	32 to 120°F (0 to 50°C)
Storage Temperature	-4 to 140°F (-20 to 60°C)

Physical (Solar Panels)

Dimensions (H x W x D)	2 x 43 x 48 in. (5 x 109 x 122 cm)
Weight	34 lb (15.3 kg)

Physical (Battery and Case)

Dimensions (H x W x D)	8.5 x 15.3 x 17 in. (22 x 39 x 43 cm)
Weight	85 lb (38.3 kg)

WIRELESS RADIO MODEM

Power Requirements

Power Supply Voltage	5-12 V
Receive Current	-90 mA @ 922 MHz -115 mA @ 2.4 GHz
Transmit Current	-185 mA @ 922 MHz -200 mA @ 2.4 GHz
Power Down Current	50 mA

Operating Temperature

32° F to 158° F (0° C to 70° C)

Storage Temperature

-4° F to 158° F (-20° C to 70° C)

Physical

Dimensions (H x W x D)	1.12 x 5.50 x 2.75 in. (3 x 14 x 7 cm)
Weight	7.1 oz (200 g)

Country specific wireless transmission information

US, Canada, Australia, New Zealand	922 MHz
Europe, Asia	2.4 GHz

Transmission Ranges (typical-line-of-sight)

Indoor/Urban Range with 2.1 dB dipole antenna
+ Up to 1500 feet (450 m) @ 922 MHz
+ Up to 600 feet (180 m) @ 2.4 GHz

Outdoor RF line-of-sight range

With 2.1 dB dipole antenna
+ Up to 7 mi (11 km) @ 922 MHz
With high gain antenna
+ Up to 3 mi (5 km) @ 2.4 GHz

Outdoor RF line-of-sight range

+ Up to 20 mi (32 km) @ 922 MHz
+ Up to 10 mi (16 km) @ 2.4 GHz

Transmit Power Output

+ 100 mW (20 dBm) @ 922 MHz
+ 50 mW (17 dBm) @ 2.4 GHz

Data Rate

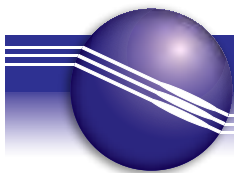
9,600 bps



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Germany	Tel: +49 241 523030		



QRAE Plus

Four-Gas Confined Space Gas Detector

Advanced and Compact Four-Gas Confined Space Gas Detector

The **QRAE Plus** is a full-featured, compact, two- to four-sensor confined space gas detector. Key features include easy-to-change, externally accessed battery packs (available in both alkaline and rechargeable versions) and a water-resistant case. The rechargeable, Lithium-ion battery pack provides up to 20 hours of continuous operation. The **QRAE Plus** includes 16,000 datalogging points of storage capacity for download to any PC compatible with Windows 98, NT, 2000 and XP.

Key Features

One to four plug-in "smart" sensors

- Combustibles
- Oxygen
- Hydrogen sulfide
- Carbon monoxide

Optional toxic sensors

- Sulfur Dioxide (SO₂)
- Nitric Oxide (NO)
- Nitrogen Dioxide (NO₂)
- Chlorine (Cl₂)
- Hydrogen Cyanide (HCN)
- Ammonia (NH₃)
- Phosphine (PH₃)

Rechargeable Lithium-ion battery pack provides up to 20 hours of continuous operation

Rugged housing with stands use in harsh environments

- Water- and dust-resistant case
- Strong protective rubber boot

Additional Advantages

- Highly resistant to radio-frequency and other electromagnetic interference
- Strong, built-in sample draw pump draws up to 100 feet (30 meters horizontally or vertically)
- Also available in diffusion configuration
- One-button calibration with auto-zero capability
- Loud audible alarm
- Bright visible alarm
- Interchangeable Lithium-ion and alkaline battery packs

Applications

Confined Space Entry

- Waste-water treatment plants
- Marine and off-shore oil wells
- Landfill operations
- Trenches, silos, railcars
- Coal mines
- Cruise ships
- Sewers and manholes
- Tunnels

Refineries and petrochemical plants including off-shore drilling and plant shutdowns

Power plants

Pulp and paper industry

Steel mills



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Specifications*

QRAE Plus

Sensor Specifications

Gas Monitor	Range	Resolution
Oxygen	0-30.0%	0.1%
Combustible	0-100% LEL	1% LEL
Carbon Monoxide	0-500 ppm	1 ppm
Hydrogen Sulfide	0-100 ppm	1 ppm
Sulfur Dioxide	0-20.0 ppm	0.1 ppm
Nitric Oxide	0-250 ppm	1 ppm
Nitrogen Dioxide	0-20.0 ppm	0.1 ppm
Chlorine	0-10.0 ppm	0.1 ppm
Hydrogen Cyanide	0-100 ppm	1 ppm
Ammonia	0-50 ppm	1 ppm
Phosphine	0-5.0 ppm	0.1 ppm

Detector Specifications

Size	4.5"L x 3.0"W x 1.8"H (11.5 x 7.6 x 4.6 cm)
Weight	15 oz (425 g) with battery w/o rubber boot
Sensors	<ul style="list-style-type: none">• Combustible: Protected dual-mode catalytic bead• Oxygen: Electrochemical fuel-cell• Toxic: Interchangeable electrochemical for CO, H₂S, SO₂, NO, NO₂, Cl₂, HCN, NH₃, and PH₃
Battery	<ul style="list-style-type: none">• Interchangeable Li-ion and alkaline battery packs• Rechargeable units include Li-ion battery pack with internal smart charging, 120V AC/DC wall adapter, and spare alkaline battery pack
Operating Hours	<ul style="list-style-type: none">• Diffusion: Up to 20 hours continuous operation with Li-ion battery, up to 18 hours with alkaline battery (typical without alarm)• Pump: Up to 16 hours continuous operation with Li-ion battery, up to 12 hours with alkaline battery (typical without alarm)
Display	2 line, 16 digit LCD with LED back light automatically in dim light or alarm condition
Keypad	1 operation and 2 programming keys
Direct Readout	<ul style="list-style-type: none">• Instantaneous reading of up to four sensors• Oxygen as percentage by volume• Combustible gas as percentage of lower explosive limit (LEL) (scalable using Correction Factors)- Thermal conductivity mode as percent volume (option)• Toxic gases as parts per million by volume• High and low values for all gases• STEL and TWA values of toxic gases• Battery and shutdown voltage• Date, time, elapsed time, temperature
Alarms	<ul style="list-style-type: none">• 95dB buzzer (at 30 cm) and flashing red LED to indicate exceeded preset limits• High: 3 beeps, vibrations and flashes per second• Low: 2 beeps, vibrations and flashes per second• STEL and TWA: 1 beep, vibration and flash per second• Alarms latching with manual override or automatic reset• Additional diagnostic alarm and display message for low battery and pump stall
EMI/RFI	Highly resistant to EMI/RFI. Compliant with EMC Directive 89/336/EEC
IP Rating	IP-55, protected against dust and low-pressure jets of water from all directions
Datalogging	Standard 67 hours at one-minute intervals, with serial number of unit, user ID, site number, calibration date
Calibration	Two-point calibration for zero and span, user-selectable three-point calibration for oxygen
Sampling Pump	Optional, internal pump with user selectable flow-rate: High: ~250cc/min, Low: ~150cc/min
Low Flow Alarm	Auto shut-off pump at low flow condition

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Detector Specifications (continued)

Hazard Area Approval	<ul style="list-style-type: none">• US and Canada: UL, CSA (pump only), Classified as Intrinsically Safe for use in Class I, Division I Groups A, B, C, D, T3C• Europe: ATEX II 2G EEx ia d IIC T3 & T4
Approval	-4 to 113 F (-20 to 45 C)
Temperature Humidity	0% to 95% relative humidity (non-condensing)
Attachments	Belt Clip on rugged black rubber boot
Warranty	Lifetime on non-consuming components (per RAE Systems Standard Limited Warranty) 2 years for O ₂ , LEL and CO, and H ₂ S sensors 1 year for all other electrochemical sensors 1 year for pump and battery

* Ongoing projects to enhance our products mean that these specifications are subject to change

Monitor-only includes:

- Monitor as specified
- Sensors as specified
- Calibration adapter
- Quick reference guide
- Operation and maintenance manual
- Training CDROM
- Rubber boot with belt-clip
- Pumped units additionally include:
 - 3 external filters
 - External filter adapter
 - Inlet probe 3"
- ProRAE Suite Software Package for Windows 98, 2000, NT and XP
- Computer interface cable

Battery Options

- Alkaline-only includes standard alkaline battery pack
- Rechargeable units include:
 - Lithium-ion battery pack
 - 120 V or 230 V AC/DC wall adapter
 - Spare alkaline battery pack

Monitor with Accessories Kit

- Hard transport case with pre-cut foam
- 15 feet (5 meters) Tygon® tubing
- Constant-flow hand pump (for diffusion models)
- Tool Kit

Optional Calibration Kit

- Four-gas mix in a 34L cylinder (50% LEL, 20.9% O₂, 10 ppm Hydrogen Sulfide, 50 ppm Carbon Monoxide)
- Calibration regulator and tubing

DISTRIBUTED BY:



Product Overview

All these applications
in one small unit

- Indoor air quality monitoring
- Walk-through surveys
- Personal exposure monitoring
- Time & motion studies
- Workplace & plant monitoring
- Fixed-point continuous monitoring
- Remediation personal surveillance
- Remote alarming
- Mobile monitoring in vehicles & aircraft
- Toxicology & epidemiology studies
- Emergency response
- Testing air filtration efficiency



personalDataRAM™ Series

Measures airborne particulate concentration in real time

- pDR-1000AN
For passive air sampling applications
- pDR-1200
For active air sampling applications

pDR-1000AN Hand-held and fixed-point, real-time aerosol monitor/datalogger

Measure airborne particulate concentration in real-time

The *personal*DataRAM (pDR-1000AN) measures mass concentrations of dust, smoke, mists, and fumes in real time, and sounds an audible alarm whenever the user-defined level is exceeded. Conventional filter-based monitoring methods cannot indicate dangerous, real-time dust levels. In contrast, the pDR-1000AN alerts you to a problem within seconds, allowing you to take immediate action. With the datalogging enabled, the instrument automatically tags and time stamps the data collected, and stores it for subsequent retrieval, printing, or graphing through a computer.

Highest performance of any real-time personal particulate monitor

With a measurement range from 0.001 to 400 mg/m³ (auto-ranging), and an optical feedback stabilized sensing system, the pDR-1000AN sets the standard for sensitivity, long-term stability and reliability.

The palm-sized pDR-1000AN weighs only 18 oz (0.5 kg) for easy portability and attachment to a belt or a shoulder strap. The absence of any moving parts, such as pumps, motors and valves, and the use of low-power semiconductors housed in a ruggedized case ensures long life and dependable operation.

High correlation with gravimetric measurement

The pDR-1000AN is a light-scattering photometer (i.e., nephelometer) incorporating a pulsed, high output, near-infrared light emitting diode source, a silicon detector/hybrid preamplifier, and collimating optics and a source reference feedback PIN silicon detector. The intensity of the light scattered over the forward angle of 50° to 90° by airborne particles passing through the sensing chamber is linearly proportional to their concentration. This optical configuration produces optimal response to particles in the size range of 0.1-10 µm, achieving high correlation with standard gravimetric measurements of the respirable and thoracic fractions.

Simple zeroing and calibration

The pDR-1000AN arrives practically ready to use after the easy zeroing step. The unit comes gravimetrically calibrated in mg/m³ (NIST traceable) using standard SAE Fine test dust (ISO Fine). Zeroing with particle-free air is accomplished quickly and effectively under field conditions using the zeroing kit included with the instrument. Internal firmware controls an automatic calibration check. To maximize efficiency in the field, gravimetric calibration can be performed by comparison with a filter sampler and programming of the calibration constant.

Standard Accessories

- Universal voltage power supply
- PC communications software
- Zeroing kit
- Belt clip kit
- Instruction manual
- Carrying case
- Signal output cables

Optional Accessories

- Rechargeable battery pack (NiMH)
- Active sampling kit (converts pDR-1000AN to pDR-1200)
- Portable pump unit
- Shoulder strap
- Remote alarm interface
- Wall mounting bracket



pDR-1200 Active aerosol monitor/datalogger, plus aerodynamic sizing

Designed for active particulate monitoring applications

The *personaDataRam*[™] (model pDR-1200) performs active sampling applications and aerosol sizing. The pDR-1200 requires a vacuum pump module to perform particle size selective measurements under field conditions. The separate pump (not included) is required for active sampling and aerosol sizing. With optional inlet accessories, the pDR-1200 is excellent for ambient air measurements under variable wind and high humidity conditions. It is ideal for respirable, thoracic, and PM_{2.5} monitoring, as well as continuous emission and test chamber monitoring. With an isokinetic sampling set, the pDR-1200 can be used for stack and duct extractive sampling monitoring. Membrane filters can be used to capture particles for subsequent laboratory analysis.

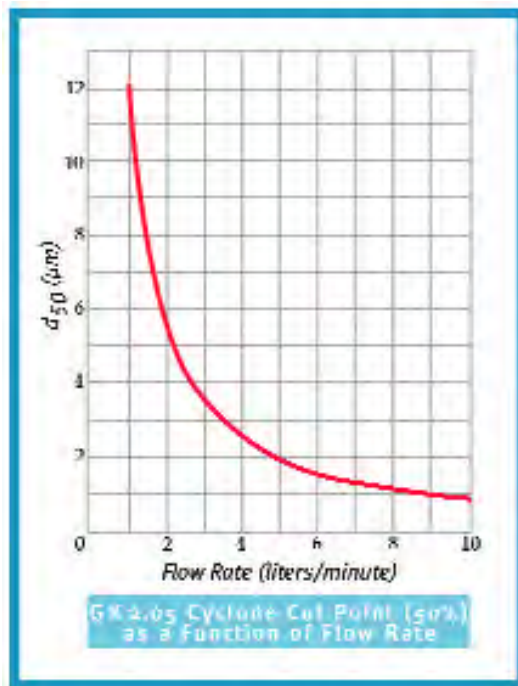
Aerodynamic particle sizing

The pDR-1200 incorporates an optimally designed metal cyclone (BGI Model GK 2.05) or the optional low flow cyclone (BGI Model Triplex SCC1.062-CUST) especially selected for PM_{2.5} collection at 1.5 LPM.

By operating the pump at specific sampling flow rates, the pDR-1200 cyclone preseparator provides precisely defined particle size cuts.

Primary calibration and particle samples by filter collection

An integral filter holder directly downstream of the photometric sensing stage accepts 37 mm filters. The calibration constant of the pDR-1200 is simply adjusted to coincide with the filter-determined concentration. Primary gravimetric calibration of the instrument concentration readout is easily accomplished under actual field conditions by means of this integral filter. Use membrane filters for chemical analysis or concurrent gravimetric measurements.



pDR-PU Attachable Pump Module

This optional accessory is designed for use with the *personaDataRAM* Model pDR-1200. It incorporates a dual-chamber diaphragm pump, a volumetric flow sensing, and control unit. The pump module operates from either an optional, rechargeable NiMH battery pack or from AC line current using the power supply/charger supplied with the *personaDataRAM*. The pDR-PU is designed as a modular unit that can be used in various combinations.

- Flow rate (user adjustable):
1 to 4 liters/minute
- Typical Conditions: 2 LPM @
10 in H₂O (25 mbar) for up to
4 hours
- Maximum Conditions: 2 LPM @
30 in H₂O
- Precision of constant flow rate
control: ±2%
- Power: 9 VDC, 200 mA at
4 liters/minute (approximate)
- Dimensions:
4 in (100 mm) H x
3.6 in (90 mm) W x
1.8 in (45 mm) D
- Weight: 1 lb (0.45 kg)

personaDataRAM[™] Series

At last,
a compact,
versatile,
real-time
aerosol monitor

Specifications

Concentration Measurement Range (auto-ranging)

Referred to gravimetric calibration with SAE
Fine test dust ($mmd = 2$ to 3 mm $sg = 2.5$, as aerosolized)
0.001 to 400 mg/m³

Scattering Coefficient Range

1.5×10^{-6} to 0.6 m⁻¹ (approx) @
 $\lambda = 880$ nm

Precision/Repeatability Over 30 Days (2-sigma at constant temperature and full battery voltage)

- $\pm 2\%$ of reading or ± 0.005 mg/m³, whichever is larger, for 1 second averaging time
- ± 0.5 of reading or ± 0.0015 mg/m³, whichever is larger, for 10 second averaging time
- $\pm 0.2\%$ of reading or ± 0.0005 mg/m³, whichever is larger, for 60 second averaging time

Accuracy

Referred to gravimetric calibration with SAE
Fine test dust ($mmd = 2$ to 3 mm, $sg = 2.5$, as aerosolized)
 $\pm 5\%$ of reading \pm precision

Resolution

0.1% of reading or 0.001 mg/m³, whichever is larger

Particle Size Range of Maximum Response

0.1 to 10 μ m

Flow Rate Range (model pDR-1200)

1-10 liters/min (external pump required)

Aerodynamic Particle Sizing Range

1.0 to 10 μ m (pDR-1200 only)

Concentration Display Updating Interval

1 second

Concentration Display Averaging Time (user selectable)

1 to 60 seconds

Alarm Level Adjustment Range (user selectable)

Selectable over entire measurement range

Alarm Averaging Time (user selectable)

Real-time (1 to 60 seconds) or STEL (15 minutes)

Datalogging Averaging Periods (user selectable)

1 second to 4 hours

Total Number of Data Points That Can Be Logged in Memory

More than 13,300

Number of Data Tags (data sets)

99 (maximum)

Logged Data

- Each data point: average concentration, time/date, and data point number
- Run summary: overall average and maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration, and time/date of occurrence, averaging (logging) period, calibration factor, and tag number

Analog Signal Output

0 to 5 V and 4 to 20 mA, with selectable full scale ranges between 0.1 and 400 mg/m³

Power

- Internal battery 9 V alkaline, 20 hour run time (typical)

- Internal battery 9 V lithium, 40 hour run time (typical)
- AC source universal voltage adapter (included) 100-250 volts, 50-60 Hz (CE marked)
- Optional battery pack rechargeable NiMH, 72 hour run time typical (pDR-BP)

Readout Display

LCD 16 characters (4 mm height) x 2 lines

Serial Interface

RS232, 4800 baud

Computer Requirements

PC compatible, 486 or higher, Windows 95® or higher

Storage Environment

-20°C to 70°C (-4°F to 158°F)

Operating Environment

-10°C to 50°C (14°F to 122°F), 10 to 95% RH, non-condensing

Dimensions (max external)

153 mm (6.0 in) H x 92 mm (3.6 in) W x 63 mm (2.5 in) D (pDR-1000AN)
160 mm (6.3 in) H x 205 mm (8.1 in) W x 60 mm (2.4 in) D (pDR-1200 including cyclone and filter holder)

Weight

0.5 kg (18 oz) (pDR-1000AN)
0.68 kg (24 oz) (pDR-1200)

Approvals

- Intrinsic safety approval by US Mine Safety & Health Administration (MSHA) coal-mining environments containing methane gas (the pDR-PU pump is not approved by MSHA)
- US FCC Rules (Part 15)
- CE certified

About Thermo

Thermo Electron Corporation, the world's leading maker of high-tech instruments, provides instruments, equipment, software, and solutions that help laboratory and industrial customers advance scientific knowledge, enable drug discovery, improve manufacturing

processes, and protect people and the environment. With annual revenue exceeding \$2 billion, Thermo is a global leader employing 11,000 people in 30 countries worldwide. The company is based in Waltham, Massachusetts.

LITPERSONALDATARAMSERIES 4.03

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Analyze • Detect • Measure • Control™

Thermo
ELECTRON CORPORATION

CEL-630 Series Sound Level Meters



Applications

Occupational Noise Measurement

- Workplace noise assessments according to ISO9612
- Selection of hearing protection
- Calculation of noise exposure
- Ensuring compliance with workplace noise legislation

Environmental Noise Measurement

- Boundary noise assessments
- Noise nuisance complaints
- Measurements according to ISO1996, BS4142
- Construction section 61 notices

Designed to make occupational and environmental noise measurements with confidence!

The CEL-630 is an easy to use instrument designed to undertake the measurement requirements of workplace and environmental noise. It also complies with the latest IEC and ANSI international standards for sound level meters. Just switch on the instrument, auto-calibrate and start measuring with one of the predefined views. Regardless of the view selected, all data is measured and stored simultaneously so no mistakes can be made.

By implementing the latest digital technology, the meter has a single measurement range so no range adjustment is required, ensuring the highest levels of performance with all noise sources. Models are available for both environmental and/or occupational noise with the availability of frequency analysis and advance functions such as data markers, timers and logging of time history data. Even with such advanced functionality, the CEL-630 Series remains very simple to use.

Audio recording is a standard feature of the CEL-630, all models having a voice notes capability. This allows you to speak into the microphone before or after a measurement in order to annotate the result, so you don't need to write things down. Data can also be 'marked' during a measurement to signify either an anomalous or significant event and audio is also recorded for later noise source identification. If the instrument is used for unattended measurements, audio recording can be triggered by a condition such as a given level being exceeded for a period of time. In this case additional data will be collected along with the audio. This can be especially useful where the noise source of interest is transient.

Key Features

- Ideal for environmental or occupational monitoring
- Easy to use switch-on-and-go functionality
- Latest digital technology with a high resolution colour TFT display
- Pre-configured setups for occupational and environmental measurements
- Voice notes to annotate measurements
- Single measurement range up to 140dB, no range adjustment required
- Data markers, back erase function and audio recording
- Level triggered events for transient measurements
- Real-time octave & 1/3 octave measurements
- Simultaneous measurement of all parameters with all frequency and time weightings
- Class 1 or Class 2 models available
- 2GB memory for more than 1 year of data storage
- Removable pre-amp
- Environmental outdoor kit available

Noise measurements could not be easier - a step by step guide on how simple the CEL-630 is to use!

Step 1

Switch On

When powered up the CEL-630 will show battery status and memory capacity, as well as the measurement view currently selected.

- 2GB of memory stores more than 1 year of continuous data
- Automatically powers up in the last setup used
- Up to 15 hours of battery life



For Occupational Noise

- Simultaneous measurements of all workplace noise parameters
- Standard setups for workplace noise legislation
- Measures parameters for hearing protection selection by the SNR, HML and octave band method
- Analyse time history of noise levels (CEL-632 and CEL-633)
- Optional high range microphone, up to 165dB

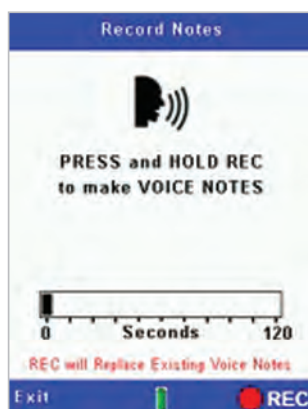
The CEL-630 Series is designed to make workplace noise measurements as quick and simple as possible. The displayed information can be made as simple or comprehensive as required and all measurement parameters are stored simultaneously, so no incorrect measurements can be made.

When the unit is calibrated with the CEL-120 calibrator, the calibration dates and times are stored and downloaded to Casella insight software, validating the accuracy of measurements.

Average, peak, and octave band measurements are performed at the same time, so only one measurement needs to be made for all workplace noise applications.



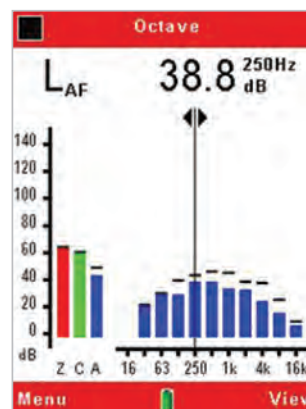
Small and lightweight with a bright colour display, the CEL-630 makes workplace noise measurements easy



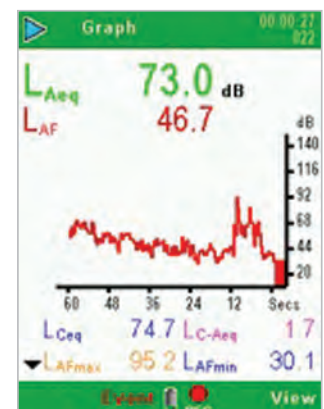
Record voice notes to easily identify measurements



Simple icon based user interface



Octave measurements for the selection of PPE



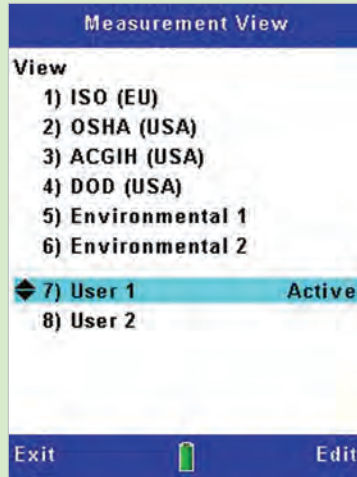
See the time history of noise levels

Step 2

Select Data to View

Pick from a selection of workplace or environmental views, or define your own.

- Make displayed data as simple or comprehensive as needed
- Regardless of data viewed, stores ALL parameters
- Pick from a selection of workplace or environmental views, or make your own



Step 3

Calibration

Calibration is important to validate your measurement data. Once the CEL-120 calibrator is placed on the microphone, the CEL-630 recognises when a calibration tone is present and enters the calibration mode, it will then automatically adjust to the calibration level.



- Automatic calibration
- Stores calibration level, time and date to validate results
- Can store pre and post measurement calibration values

For Environmental Noise

- Simultaneous broadband and frequency measurement
- Data markers
- Back erase function
- Real-time frequency analysis
- Single measurement range
- Triggered 'event' capture

Data can be marked to signify any significant events, the data from which can be removed afterwards in insight software.

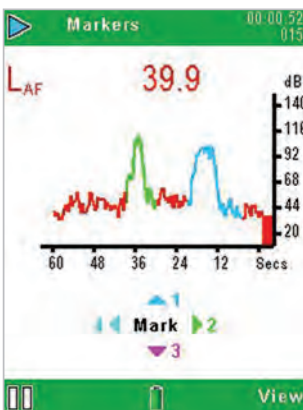
Up to 60 hours of audio files can be stored, commonly used for noise source identification. Stored audio can be played back on the instrument using headphones or downloaded to Casella insight software.

For unattended monitoring, event mode (CEL-633) allows trigger levels (dB) to be set, so additional data (e.g. Leq, Lmax) is stored together with the audio file for later analysis, as well as a profiles down to 10ms intervals.

An environmental noise monitoring kit is available which protects the instrument and microphone from the weather and allows unattended monitoring for up to 10 days.



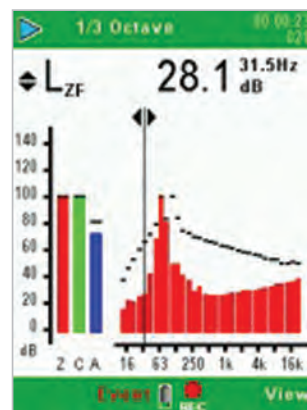
A dedicated environmental kit is available



Significant noise events can be marked



Listen to audio files from the CEL-630 Series



Realtime frequency analysis and single measurement range



Set 2 levels of time history storage



Step 4

Record Voice Notes

Once the 'play' key has been pressed you can record an audio (voice) note to define the measurement. Once this is done your measurement will begin.

- Record voice notes to identify your measurement
- Record audio during measurements
- Automatic 'events' trigger audio recording

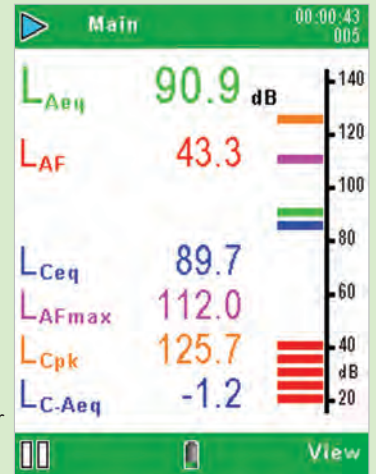


Step 5

Start a Measurement

When the measurement is started the status bars at the top and bottom of the screen go green (like a traffic light), when the measurement is stopped the bars go red. During a measurement, simply press the 'view' key to scroll through the data. All parameters are stored together so there is no need for multiple measurements. Once the measurement is stopped, data can be reviewed in the instrument memory.

- Single measurement range, no adjustment required
- Colour coded, easy to read measurements
- The most important parameters displayed on screen
- Simultaneous measurement of broadband and frequency data



CEL-630 Series Model Selection

Model Functionality

There are 4 models available, please see the model selection table below for the one you require (e.g. CEL-632). Then select your frequency analysis requirements by adding 'A' for broadband, 'B' adds octave band and 'C' adds 1/3 octave e.g. CEL-632C. Then add your class, '1' for class 1 and '2' for class 2 e.g. CEL-632C1 for a class 1 instrument. Each instrument comes complete with a standard kit case, windshield and calibration certificate.

Model	630	631	632	633
Cumulative Results	Y	Y	Y	Y
Period Results			Y	Y
Profile Results			Y	Y
Statistical Values (Ln%)		Y		Y
Audio Voice Notes	Y	Y	Y	Y
Marker Events			Y	Y
Level Events				Y
External Events			Y	Y

Accessories

CEL-6840	Standard kit case*
196030C	Executive kit case**
CEL-251	Microphone Class 1*
CEL-252	Microphone Class 2*
CEL-120/1	Acoustic Calibrator Class 1**
CEL-120/2	Acoustic Calibrator Class 2**
PC18	Universal power supply
CMC51	USB download cable*
CEL-6718	Lightweight tripod
CMC73	Portable printer kit (fits in 196030 kit case)
MIC1	High range microphone (to 165dB)
MPA1	High range microphone adaptor (for use with MIC1)

* included with instrument

**included with instrument kit (with CEL-63XY/K1 where 'X' and 'Y' represent the model numbers)

Instrument Kits

For an instrument kit add /K1 to the instrument part number e.g. CEL-632C1/K1. Instrument kits include the relevant instrument, acoustic calibrator (CEL-120), USB download cable, batteries, calibration certificates and an executive kit case.



Casella Insight Data Management Software

- Analysis of noise level time history
- Replay voice notes and event audio
- Intuitive user interface
- Remove anomalous data from results
- Analysis of time history
- Generate comprehensive reports
- Store data by, person, place, location
- Manage multiple instruments and calibration

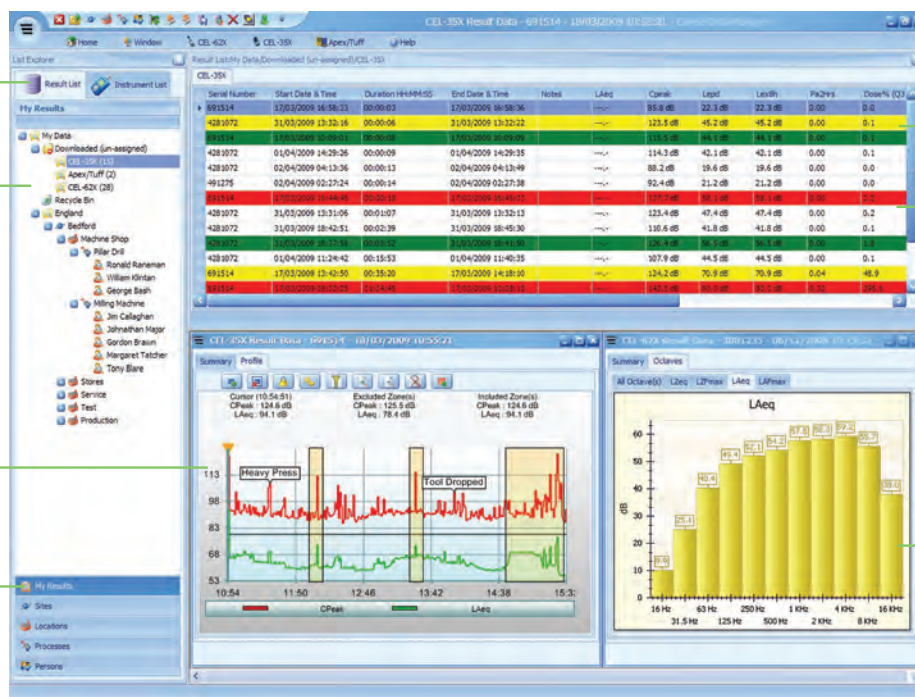


Switch between managing data or instruments with simple tabs

Simple tree structure to manage data e.g. person, place, etc

Time history may be viewed, analysed and annotated as required

Sort data by person, process, etc



Multiple parameters can be displayed and sorted simultaneously

Data can be dragged and dropped to the tree structure as required

Data is automatically graphed and can be copied to other applications

Casella insight data management software is a powerful yet simple tool to download, analyse and report from either workplace or environmental noise data.

Once the CEL-630 series is connected by the USB cable, insight software automatically recognises that the instrument is connected and downloads the data. Data is automatically saved to a database so data cannot accidentally be deleted and the database can be backed up to a server.

Noise exposure or environmental exceedance levels can be colour coded by a simple 'traffic light' system, it is easy to see which measurements have exceeded specific levels. For instruments that have stored the time history of levels (CEL-632 and CEL-633), the stored data can be analysed and graphs zoomed in to look at specific times. Graphs can be coloured as required, and notes inserted to illustrate important events.

Graphs can be further analysed by adding 'zones' which subsequently recalculates levels inside and outside these zones, this can be used to see what effect on overall levels is coming from specific environmental noise sources, or in the case of workplace noise, to investigate 'what if' scenarios, taking noise exposure levels out of a workers day.

A simple 'tree view' can be created with which to store and manage data by person, place or process. Once data is downloaded, files can be dragged and dropped to the relevant tree location and all data is stored within a central database. Templates are provided to view data for local legislation (e.g.OSHA) or can be customised, displayed and reported simply or comprehensively as required. Exposure data from multiple hazards such as noise and dust can be viewed and reported simultaneously. Reports can be stored in multiple formats (e.g .pdf, .jpg, or .csv) allowing them to be shared and viewed easily, as well as exported to other applications. To create a report, simply 'right click' on the appropriate part of the tree view and the report wizard allows creation of a report for people, processes etc from that part of the tree. The integral report wizard allows reported parameters to be selected as required and report settings are retained for the next time it is used. Written notes can be added to data (on top of any audio notes recorded when taking a measurement), which appear on reports as required.

Technical Specification

Standards

IEC61672: 2002 Class 1 and 2, ANSI S1.4: Type 1 and 2 (1983)

Filters: IEC61260: Class 0, ANSI S1.43: (1996)

Note: IEC61672 replaces 2 obsolete standards, IEC60651 and IEC60804

General

Measurement range:	20-140dB RMS (143.3dB peak)
Total Noise floor:	19dB(A) Class 1, 25dB(A) Class 2
Time weightings:	Fast, Slow and Impulse simultaneously
Frequency weightings:	A, C and Z (un-weighted) simultaneously
Frequency bands:	11 Octave bands 16Hz-16kHz (B&C models) 33 Octave bands 12.5Hz-20kHz (C models)
Amplitude weighting (Q):	3, 4 and 5 simultaneously
Back erase:	Last 10s in cumulative mode (all models)
Timers:	Duration 1s-24h,
On/Off timers:	6 sets with selectable times and a repeat function

Physical

Tripod mount:	1/4" Whitworth socket
Batteries:	3x AA Alkaline, 10-15 hours dependent on back light
External power:	9-14V DC at 150mA
Weight:	332g including batteries
Size:	230x72x31mm inc preamp and microphone

Measured Parameters

Broadband: LXY, LXYmax, LXYmin, LXeq, LXpeak, Lavg, LC-LA, LXleq, LTM3, LTM5, LAE. Workplace dose values are calculated within insight software.

Octaves & 1/3 octaves: LXY, LXeq, LXYmax, 5x Ln% (on CEL-631 and CEL-633). Where X is the frequency weighting A, C or Z and Y represents time weighting Fast (F), Slow (S) or Impulse (I). All weightings simultaneously measured where appropriate.

CEL-631 and CEL-633 models additionally store 5x Ln values in broadband and octave modes.

CEL-632 and CEL-633 models additionally stores time history data, all parameters are logged for period times plus 6 selectable profile parameters (plus 5x Ln values on CEL-633).

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电子邮件: info@casellameasurement.cn
网址: www.casellachina.cn

Memory

Memory: 2GB (>1 year logging when set to 1 second interval, 999 runs). All parameters stored and accessible via Casella insight. Total measurement runs: 999.

Events: 999 events/run. 10 hours of audio recording in high quality mode, 60 hours in low quality mode. For long term unattended monitoring the CEL-630 takes a new run daily for up to a total of 400 days.

Audio Recording

Low Quality:	8,000 samples/s @ 8bit (64kb/s), up to 4kHz
High Quality:	24,000 samples/s @ 8 bit (192kb/s), up to 12kHz

Environmental

Operating Relative humidity of 5 to 90% (non condensing)

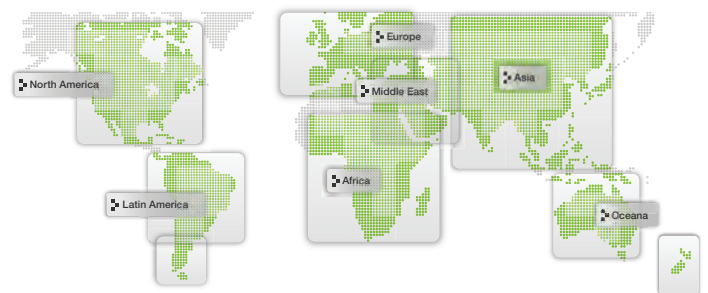
Conditions: Temperature of -10 to +50°C (Class 1) and 0 to 40°C (Class 2) Atmospheric pressure of 65 to 108kPa.

Languages

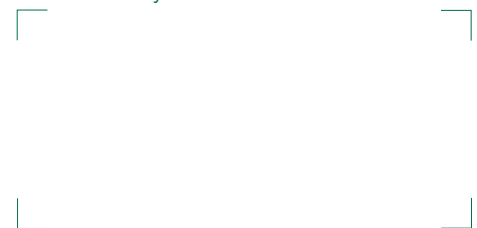
User interface can be changed via the menu: English, French, German, Spanish, Italian, Portuguese, Chinese.

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ATTACHMENT E

GENERIC COMMUNITY AIR MONITORING PLAN

Appendix 1A

New York State Department of Health Generic Community Air Monitoring Plan

Overview

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

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

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

Community Air Monitoring Plan

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

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

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

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

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

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

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

December 2009

APPENDIX D – QUALITY ASSURANCE PROJECT PLAN

**KLIEGMAN BROTHERS SITE
OPERABLE UNIT NO. 2
CITY OF GLENDALE
QUEENS COUNTY, NEW YORK
NYSDEC SITE NUMBER: 2-41-031**

QUALITY ASSURANCE PROJECT PLAN

**Prepared For:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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Albany, New York 12233**

**Prepared By:
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MARCH 2016

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is designed to provide an overview of quality assurance/quality control (QA/QC) procedures and programs which will be adhered to during the post-remediation long-term monitoring activities, as described in the Site Management Plan (SMP) (URS, 2016) under New York State Department of Environmental Conservation (NYSDEC) Work Assignment (WA) #D007622-03.1. The QAPP will identify specific methods and QA/QC procedures for chemically testing environmental samples collected from the Kliegman Brothers OU #2 Site, located in the City of Glendale, Queens County, New York (NYSDEC Site Number: 2-41-031).

2.0 PROJECT/SITE DESCRIPTION

A complete project description of the Kliegman Brothers OU #2 site is provided in Section 2.0 of the Kliegman Brothers OU #2 Site Management Plan (URS, 2016).

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The Project QA Officer is responsible for verifying that corporate QA procedures are followed and will ensure that all project deliverables undergo a thorough QA review by senior staff members who are qualified and experienced in appropriate disciplines.

The Project Manager will be responsible for technical and financial management of the project, and for overall coordination and review of component work activities. The Project Manager will serve as the initial and primary contact with the client throughout the project and will be responsible for successful implementation of the field QA/QC activities. The Project Manager may delegate a portion of the tasks required for successful implementation of the work plans to a qualified individual who will be on site during the investigation (e.g., the Onsite Environmental Scientist). This person will work under the direction of the Project Manager and will be responsible for implementing applicable QC procedures in the field and verifying that all other field personnel adhere to these procedures and perform all activities as described in the project work plans.

The onsite Environmental Scientist is responsible for verifying that QA procedures are followed in the field so that valid, representative samples are collected. The onsite Environmental Scientist also will be responsible for coordinating the activities of all personnel involved with implementing the project in the field, and will be in daily communication with the Project Manager. This person will verify that all field work is carried out in accordance with the approved project plans.

The Project Chemist is responsible for verifying that the analytical laboratory adheres to the QA/QC requirements specified in this QAPP. The Project Chemist will be the point-of-contact for the Laboratory Project Manager and will be in continual contact to verify that all efforts are being made to perform sample analyses in a manner such that the resulting data will be of sufficient quality for its intended purpose.

The analytical laboratory to be used for the analysis of groundwater samples shall hold applicable New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certifications for the analyses to be performed. The QA Manager of

the laboratory will be responsible for performing project-specific audits and for overseeing the quality control data generated. Also, the Laboratory Project Manager will be in daily communication with the Project Chemist.

4.0 DATA QUALITY OBJECTIVES

4.1 Background

Data quality objectives (DQOs) are qualitative and quantitative statements, which specify the quality of data required to support the post-remediation activities at the Kliegman Brothers OU #2 site. The project DQOs focus on the identification of the end use of the data to be collected. The project DQOs will be achieved utilizing definitive data categories, as outlined in *Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA QA/G-4, EPA/240/B-06/001, USEPA (February 2006). The definitive data are generated using rigorous analytical methods, such as approved United States Environmental Protection Agency (USEPA) reference methods. The analytical methods to be used are presented in Table 4-1.

The project DQOs for data collected during the site management of Kliegman Brothers OU #2 activities are to:

- Evaluate the effectiveness of the post-remediation activities for the remediation of contaminated groundwater at the site.
- Perform annual sampling and analysis of groundwater samples.
- Sample quantitation limits for groundwater must not exceed NYSDEC, Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, June 1998, as listed on Table 4-2.

4.2 QA Objectives For Chemical Data Measurement

For the definitive data category described above, the data quality indicators of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) will be measured during offsite chemical analysis.

4.2.1 Precision

Precision examines the distribution of the reported values about their mean. The distribution of reported values refers to how different the individual reported values are from the average reported value. Precision may be affected by the natural variation of the matrix or

contamination within that matrix, as well as by errors made in the field and/or laboratory handling procedures. Precision is evaluated using analyses of a laboratory matrix spike/matrix spike duplicate (MS/MSD) and field duplicate samples, which not only provide a measure of sampling and analytical precision, but also indicate analytical precision through the reproducibility of the analytical results. Relative percent difference (RPD) is used to evaluate precision. RPD criteria for all analyses being performed as part of this work assignment shall meet method-specific QC requirements.

4.2.2 Accuracy

Accuracy measures the analytical bias in a measurement system. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. Sampling accuracy may be assessed by evaluating the results of rinse and trip blanks. These data help to assess the potential contamination contribution from various outside sources. The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical methods on samples of the same matrix. The percent recovery criterion is used to estimate accuracy based on recovery in the MS/MSD and laboratory control sample (LCS)/matrix spike blank (MSB). The MS/MSD analyses, which will give an indication of matrix effects that may be affecting target compounds, are also a good gauge of method efficiency. Surrogate recovery results will also be measured. Acceptable for all analyses being performed as part of this work assignment shall meet method-specific QC requirements.

4.2.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter, which is most concerned with the proper design of the sampling program or subsampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives. The sampling procedures, as described in Sections 2.0, 3.0, and 4.0 of the Kliegman Brothers OU #2 Field Sampling and Analysis Plan (FSAP) have been selected with the goal of obtaining representative samples for the media of concern.

4.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. An objective for this program is to produce data with the greatest possible degree of comparability. This goal is achieved through using standard techniques to collect and analyze representative samples, and reporting analytical results in appropriate units. Complete field documentation using standardized data collection forms will support the assessment of comparability. Comparability is limited by the other parameters (e.g., precision, accuracy, representativeness, and completeness), because only when precision and accuracy are known can data sets be compared with confidence. For data sets to be comparable, it is imperative that the analytical methods and procedures be explicitly followed.

4.2.5 Completeness

Completeness is defined as a measure of the amount of valid data obtainable from a measurement system compared to the amount that was expected to be obtained under normal conditions. To meet project needs, it is important that appropriate QC procedures be maintained to verify that valid data are obtained. For the data generated, a goal of 90% is required for completeness (or usability) of the analytical data. If this goal is not met, then NYSDEC and contractor project personnel will determine whether the deviations may cause the data to be rejected, and what further actions, if any, need to be taken.

4.2.6 Sensitivity

Sensitivity, as it pertains to analytical methods/instrumentation, is defined as the lowest concentration that can be distinguished from background noise. Sensitivity is measured by method detection limit (MDL) determinations, which are performed by laboratories for each analyte and matrix following procedures specified in 40 CFR Part 136, Appendix B. The MDL is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. MDLs are determined by the laboratory on an annual basis.

Analytical results are typically reported down to the quantitation limit (QL), which represents the lowest point of the calibration curve, and are typically 3-10 times higher than MDLs. Analytical results reported above the MDL but below the QL are considered estimated

values (qualified “J”). QLs for the parameters to be analyzed as part of this work assignment, where applicable, are presented in Table 4-2.

5.0 SAMPLING LOCATIONS AND PROCEDURES

Sampling locations and procedures are discussed in Sections 4.0 of the Kliegman Brothers OU #2 FSAP (URS, 2016).

6.0 SAMPLE CUSTODY AND HOLDING TIMES

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presenting sample analytical results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The procedures used in these investigations will follow the chain-of-custody guidelines of *NEIC Policies and Procedures*, prepared by the National Enforcement Investigations Center (NEIC) of the USEPA Office of Enforcement.

6.1 Custody Definitions

- Chain-of-Custody Officer - The employee responsible for oversight of all associated chain-of-custody activities is the Onsite Geologist (or his/her designee).
- Under Custody - A sample is "Under Custody" if:
 - It is in one's possession, or
 - It is in one's view, after being in one's possession, or
 - It was in one's possession and one locked it up, or
 - It is in a designated secure area.

6.2 Responsibilities

The onsite Environmental Scientist will be responsible for monitoring all chain-of-custody activities and for collecting legally admissible chain-of-custody documentation for the permanent project file. The onsite Environmental Scientist will be responsible for:

- Initially reviewing sample labels or tags, closure tapes, and chain-of-custody record forms. The onsite Environmental Scientist shall document this review for the project file.

- Training all field sampling personnel in the methodologies for carrying out chain-of-custody and the proper use of all chain-of-custody forms and record documents.
- Monitoring the implementation of chain-of-custody procedures.
- Submit copies of the completed chain-of-custody forms to the Project Manager daily.

6.3 Chain-of-Custody

Chain-of-custody is initiated in the laboratory when the sample containers are cleaned, packed, and shipped to the site for use in the field. When the containers are received from the laboratory, they will be checked for any breach of custody including, but not limited to incomplete chain-of-custody records, broken chain-of-custody seals, or any evidence of tampering. Upon receipt of the samples, the laboratory will check for breach of custody as previously described.

6.4 Sample Containers and Holding Times

Table 6-1 identifies the analytical method, container, preservation, and holding time requirements. All holding times begin with the date/time of sample collection, except where noted otherwise in Table 6-1.

7.0 ANALYTICAL PROCEDURES

Table 4-1 identifies the specific methods to be performed on the individual matrices. All analyses will be performed in accordance with the following document:

- *New York State Department of Environmental Conservation Analytical Services Protocol, July 2005 Edition.*

8.0 CALIBRATION PROCEDURES AND FREQUENCY

In order to obtain a high level of precision and accuracy during sample processing procedures, laboratory instruments must be calibrated properly. Several analytical support areas must be considered so the integrity of standards and reagents is upheld prior to instrument calibration. The following sections describe the analytical support areas and laboratory instrument calibration procedures.

8.1 Analytical Support Areas

Prior to generating quality data, several analytical support areas must be considered:

Standard/Reagent Preparation - Primary reference standards and secondary standard solutions shall be obtained from National Institute of Standards and Technology (NIST), or other reliable commercial sources to verify the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished per the methods referenced in Table 4-1. All standards and standard solutions are to be formally documented (i.e., in a bound logbook) and should identify the supplier, lot number, purity/concentration, receipt/preparation date, preparer's name, method of preparation, expiration date, and any other pertinent information. All standard solutions shall be validated prior to use. Care shall be exercised in the proper storage and handling of standard solutions (e.g., separating volatile standards from nonvolatile standards). The laboratory shall continually monitor the quality of the standards and reagents through well documented procedures.

Balances - The analytical balances shall be calibrated and maintained in accordance with American Society of Testing Materials (ASTM) specifications. Calibration is conducted with two Class-1 weights that bracket the expected balance use range. The laboratory shall check the accuracy of the balances daily and properly document results in permanently bound logbooks.

Refrigerators/Freezers - The temperature of the refrigerators and freezers within the laboratory shall be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised and the integrity of the analytical samples is upheld. Appropriate acceptance ranges ($4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for refrigerators) shall be clearly posted on each unit in service.

Water Supply System - The laboratory must maintain a sufficient water supply for all project needs. The grade of the water must be of the highest quality (analyte-free) in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for organic analyses. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis.

Air Supply System - The laboratory must maintain a sufficient clean (analyte free) air supply for all project needs if required. The grade of the air must be of the highest quality (analyte-free) in order to eliminate false-positives from the analytical results. Appropriate documentation of the quality of the air supply system(s) will be performed on a regular basis by the laboratory.

8.2 Laboratory Instruments

Calibration of instruments is required to verify that the analytical system is operating properly and at the sensitivity necessary to meet method established quantitation limits. Each instrument for organic analysis shall be calibrated with standards appropriate to the type of instrument and linear range established within the analytical method(s). Calibration of laboratory instruments will be performed according to methods specified in Table 4-1.

Calibration of an instrument must be performed prior to the analysis of any samples (initial calibration) and then at periodic intervals (continuing calibration) during the sample analysis to verify that the instrument is still properly calibrated. If the contract laboratory cannot meet the method-required calibration requirements, corrective action shall be taken as discussed in Section 11.0. All corrective action procedures taken by the contract laboratory are to be documented, summarized within the case narrative, and submitted with the analytical results.

9.0 INTERNAL QUALITY CONTROL CHECKS

Internal QC checks are used to determine if analytical operations at the laboratory are in control, as well as determining the effect sample matrix may have on data being generated. Two types of internal checks are performed - batch QC and matrix-specific QC procedures. The type and frequency of specific QC samples performed by the laboratory will be determined by the specified analytical method and project specific requirements. Acceptable criteria and/or target ranges for these QC samples shall meet method-specific QC requirements.

QC results, which vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers, and/or an assessment of the impact these corrective measures have on the established data quality objectives. Quality control samples including any project-specific QC will be analyzed are discussed below.

9.1 Batch QC

Method Blanks - A method blank is defined as laboratory demonstrated analyte free water or solid that is carried through the entire analytical procedure. The method blank is used to determine the level of laboratory background contamination. Method blanks are analyzed at a frequency of one per analytical batch.

Matrix Spike Blank Samples - An MSB or LCS is an aliquot of demonstrated analyte free water or solid spiked (fortified) with all or a representative group of the analytes being analyzed. The MSB or LCS is a measure of precision and accuracy used to verify that the analysis being performed is in control. An MSB or LCS will be performed for each matrix as required by the analytical methods referenced in Table 4-1. Acceptable criteria and/or target ranges for these QC samples shall meet method-specific QC requirements.

9.2 Matrix-Specific QC

Matrix Spike Samples - An aliquot of sample is spiked with known concentrations of specific compounds as stipulated by the methodology. The MS/MSD samples are subjected to the entire analytical procedure in order to assess both accuracy and precision of the method for the matrix by measuring the percent recovery of each analyte and RPD between the concentrations of each analyte in the two spiked samples. The samples are used to assess matrix

interference effects on the method, as well as to evaluate instrument performance. MS/MSDs are analyzed at a frequency of one each per twenty samples, as listed in Table 4-1. Acceptable criteria and/or target ranges for these QC samples shall meet method-specific QC requirements.

9.3 Additional QC

Rinsate (Equipment) Blanks – Rinsate blanks are not required when dedicated disposable sampling equipment are used. A rinsate blank is a sample of laboratory demonstrated analyte-free water passed over or through the cleaned sampling equipment. A rinsate blank is used to indicate potential contamination from sample instruments used to collect and transfer samples. The water must originate from one common source within the laboratory and must be the same water used by the laboratory performing the analysis. The rinsate blank should be collected, transported, and analyzed in the same manner as the samples acquired that day. Rinsate blanks will be performed at the rate listed in Table 4-1.

Trip Blanks - Trip blanks are not required for nonaqueous matrices. Trip blanks are required for aqueous sampling events. They consist of a set of sample bottles filled at the laboratory with laboratory demonstrated analyte-free water. These samples then accompany the bottles that are prepared at the laboratory into the field and back to the laboratory, along with the collected samples for analysis. These bottles are never opened in the field. Trip blanks must return to the laboratory with the same set of bottles they accompanied to the field. Trip blanks will be analyzed for volatile organics only. Trip blanks will be analyzed at the frequency stated in Table 4-1.

Field Duplicates – A field duplicate (FD) sample pair are independent samples, which are collected as close as possible to the same point in space and time. They are two separate samples taken from the same source, stored in separate containers, and analyzed independently. Field duplicates are useful in documenting the precision of the sampling process. Blind field duplicates will be collected at the frequency listed on Table 4-1. The field duplicates will be labeled so that the laboratory cannot determine or identify the location from, which the field duplicate was collected.

10.0 CALCULATION OF DATA QUALITY INDICATORS

10.1 Precision

Precision is evaluated using results from field duplicate and/or MS/MSD analyses. The RPD between the parent sample/field duplicate or between the MS/MSD concentrations is used to evaluate precision and calculated by the following formula:

$$RPD = \left[\frac{|X_1 - X_2|}{(X_1 + X_2) / 2} \right] \times 100\%$$

where:

X_1 = Measured value of sample or matrix spike

X_2 = Measured value of duplicate or matrix spike duplicate

RPD criteria for this project shall meet method-specific QC requirements.

10.2 Accuracy

Accuracy is defined as the degree of difference between the measured or calculated value and the true value. Analytical accuracy is expressed as the %R of a compound that has been added to the environmental sample or laboratory demonstrated analyte free matrix at known concentrations before analysis. Accuracy will be determined from MS, MSD, MSB (or LCS) samples as well as from surrogate compounds and is calculated as follows:

$$\% R = \frac{(X_s - X_u)}{K} \times 100\%$$

where:

X_s - Measured value of the spike sample

X_u - Measured value of the unspiked sample

K - Known amount of spike in the sample

%R criteria for this project shall meet method-specific QC requirements.

10.3 Completeness

Completeness is calculated on a per matrix basis for the project and is calculated as follows:

$$\% \text{ Completeness} = \frac{(N - X_n)}{N} \times 100\%$$

where:

X_n - Number of invalid measurements

N - Number of valid measurements expected to be obtained

11.0 CORRECTIVE ACTIONS

Laboratory corrective actions shall be implemented to resolve problems and restore proper functioning to the analytical system when errors, deficiencies, or out-of-control situations exist at the laboratory. Full documentation of the corrective action procedure needed to resolve the problem shall be filed in the project records, and the information summarized in the analytical report case narrative. A discussion of the corrective actions to be taken is presented in the following sections.

11.1 Incoming Samples

Problems noted during sample receipt shall be documented by the laboratory. The Project Chemist (or designee) shall be contacted immediately for problem resolution. All corrective actions shall be documented thoroughly.

11.2 Sample Holding Times

If any sample extractions and/or analyses exceed method holding time requirements, the Project Chemist (or designee) shall be notified immediately for problem resolution. All corrective actions shall be documented thoroughly.

11.3 Instrument Calibration

Sample analysis shall not be allowed until all laboratory instrumentation is properly calibrated in accordance with method requirements. If any initial/continuing calibration standards exceed method QC limits, recalibration must be performed and, if necessary, samples back to the previous acceptable continuing calibration standard must be reanalyzed.

11.4 Quantitation Limits

The laboratory must meet all quantitation limits listed in Table 4-2. If difficulties arise in achieving these limits due to a particular sample matrix, the laboratory must notify the URS project chemist for problem resolution. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must report the results from initial analyses and

secondary dilution analyses. Dilution will be permitted only to bring target analytes within the linear range of calibration. If samples are analyzed at a dilution with no target analytes detected, the Project Chemist (or designee) will be immediately notified so that appropriate corrective actions can be initiated.

11.5 Method QC

All QC, including blanks, matrix spikes, matrix spike duplicates, surrogate recoveries, matrix spike blank samples, and other method-specified QC samples, shall meet the requirements of the methods referenced in Table 4-1 and Table 4-2. Failure of method-required QC will result in the possible qualification of all affected data. If the laboratory cannot find any errors, the affected sample(s) shall be reanalyzed within method-required holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria as defined by the data validation guidelines identified in Section 12.2. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed. The Project Chemist shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

11.6 Calculation Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review, calculation and/or reporting errors exist, the laboratory will be required to reissue the analytical data report with the corrective actions appropriately documented in the case narrative.

12.0 DATA REDUCTION, VALIDATION, AND USABILITY

For all analyses, NYSDEC ASP Category B deliverable requirements will be employed for documentation and reporting of all data. The standard NYSDEC Data Package Summary will be completed by the analytical laboratory and included in the deliverable data packages. In addition, analytical results will be reported in a NYSDEC EQuIS electronic data deliverable (EDD) format.

12.1 Data Reduction

Laboratory analytical data are first generated in raw form at the instrument. These data may be either graphic or printed tabular form. Specific data generation procedures and calculations are found in each of the referenced methods. Analytical results must be reported consistently. Data for aqueous samples will be reported in concentrations of micrograms per liter ($\mu\text{g/L}$) or milligrams per liter (mg/L).

Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or other reliable commercial sources. Individuals experienced with a particular analysis and knowledgeable of requirements will perform data reduction.

12.2 Data Validation

Data validation is a systematic procedure of reviewing a body of data against a set of established criteria to provide a specified level of assurance of validity prior to its intended use.

Data validation will be performed by the Project Chemist and/or environmental chemists under his/her supervision. All analytical samples collected will receive a limited data review. This review will include a review of holding times; completeness of all required deliverables; review of QC results (surrogates, spikes, duplicates, and instrument calibration data blanks) to determine if the data is within the protocol-required limits and specifications; a determination that all samples were analyzed using established and agreed upon analytical protocols; an evaluation of the raw data to confirm the reported sample results; and a review of laboratory data qualifiers. The methods referenced in Table 4-1 as well as the general guidelines presented in the following USEPA Region II document will be used to aid the chemist during the data review:

- *Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry, SW-846 Method 8260B & 8260C*, SOP No. HW-24, Revision 4, October 2014;

12.3 Data Usability

A Data Usability Summary Report (DUSR) will be prepared in accordance with NYSDEC Division of Environmental Remediation *DER-10 Guidance for the Development of Data Usability Summary Reports*, dated May 2010, and will describe the samples and the analytical parameters. Data deficiencies, analytical protocol deviations, and quality control problems are identified and their effect on the data will be discussed. The DUSR, which will be submitted to the NYSDEC, will also include recommendations on resampling/reanalysis.

13.0 PREVENTIVE MAINTENANCE

The laboratory is responsible for maintaining its analytical equipment. Preventive maintenance is provided on a regular basis to minimize down-time and the potential interruption of analytical work. Instruments are maintained in accordance with the manufacturer's recommendations. If instruments require maintenance, only trained laboratory personnel or manufacturer-authorized service specialists are permitted to do the work. Maintenance activities will be documented and kept in permanent logs. These logs will be available for inspection by auditing personnel.

14.0 PERFORMANCE AND SYSTEM AUDITS

Audits are evaluations of both field and laboratory QC procedures, and are performed before or shortly after systems are operational. Performance audits are conducted by introducing control samples into the data production process. These control samples may include performance evaluation samples, or field samples spiked with known amounts of analytes.

System audits are onsite qualitative inspections and reviews of the quality assurance system used by some part of or the entire measurement system. They provide a quantitative measure of the quality of the data produced by one section or the entire measurement process. The audits are performed against a set of requirements, which may be a quality assurance project plan or work plan, a standard method, or a project statement of work. The primary objective of the systems audits is to verify that the QA/QC procedures are being followed.

14.1 Performance and External Audits

In addition to conducting internal reviews and audits, as part of its established quality assurance program, the laboratory is required to take part in regularly scheduled performance evaluations and laboratory audits from state and federal agencies. They are conducted as part of the certification process and to monitor the laboratory performance. The audits also provide an external quality assurance check of the laboratory, and provide reviews and information on the management systems, personnel, standard operating procedures, and analytical measurement systems. Acceptable performance on evaluation samples and audits is required for certification and accreditation. The laboratory shall use the information provided from these audits to monitor and assess the quality of its performance. Problems detected in these audits shall be reviewed by the QA Manager and Laboratory Management, and corrective action shall be instituted as necessary.

14.2 Systems/Internal Audits

As part of its Quality Assurance Program, the Laboratory Quality Assurance Manager shall conduct periodic checks and audits of the analytical systems. The purpose of these is to verify that the analytical systems are working properly, and that personnel are adhering to established procedures and documenting the required information. These checks and audits also assist in determining or detecting where problems are occurring.

The QA Manager periodically will submit laboratory control samples. These samples will serve to check the entire analytical method, the efficiency of the preparation method, and the analytical instrument performance. The results of the control samples are reviewed by the QA Manager who reports the results to the analyst and the Laboratory Director. When a problem is indicated, the QA Manager will assist the analyst and laboratory management in determining the reason and in developing solutions. The QA Manager will also recheck the systems as required.

REFERENCES

- Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Quality Assurance Manual, Final Copy , Revision I, October 1989.
- National Enforcement Investigations Center of USEPA Office of Enforcement. *NEIC Policies and Procedures*. Washington: USEPA.
- New York State Department of Environmental Conservation (NYSDEC), 1998. Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitation*. June.
- NYSDEC. 2005. Analytical Services Protocol, July.
- NYSDEC. 2010. Division of Environmental Remediation, *DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 2B, Guidance for Data Deliverables and the Development of Data Usability Summary Reports*. May.
- USEPA. 1987. *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87-001, (OSWER Directive 9355.0-14). December. Cincinnati, OH: USEPA.
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- USEPA. 2014. *Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry, SW-846 Method 8260B & 8260C*, SOP No. HW-24, Revision 4. Region II. October.

TABLES

TABLE 4-1
SUMMARY OF SAMPLES TO BE COLLECTED AND ANALYTICAL PARAMETERS
KLIEGMAN BROTHERS OU #2 SITE
NYSDEC SITE NUMBER: 2-41-031

Parameter	Analytical Method ¹	Estimated Number of Samples	Field QA/QC Samples ²				Total No. of Annual Samples
			Field Duplicates	MS/MSD Pairs	Rinsate Blanks	Trip Blanks	
I. Groundwater Samples - Annual Monitoring							
Target Compound List (TCL) VOCs	SW8260C	14	1	1	1	2	20

Notes:

1. NYSDEC Analytical Services Protocol (ASP), July 2005 Edition.
2. Field duplicates and matrix spike/matrix spike duplicate (MS/MSD) pairs will be collected at a frequency of 1 per 20 samples per matrix per sampling event. Rinsate blanks will be collected at a frequency of 1 per sampling equipment type per sampling event only when non-dedicated/disposable equipment are used. Trip blanks will be collected per sample shipment.

TABLE 4-2
GROUNDWATER QUANTITATION LIMITS AND NYSDEC AMBIENT WATER QUALITY
STANDARDS AND GUIDANCE VALUES
KLIEGMAN BROTHERS OU #2 SITE
NYSDEC SITE NUMBER: 2-41-031

Matrix: Groundwater			
Analytical Method ¹	Parameter	PQL (ug/L)	GW Class GA Criteria ² (ug/L)
SW8260C - VOCs	1,1,1-Trichloroethane	1	5
	1,1,2,2-Tetrachloroethane	1	5
	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5
	1,1,2-Trichloroethane	1	1
	1,1-Dichloroethane	1	5
	1,1-Dichloroethene	1	5
	1,2,3-Trichlorobenzene	1	5
	1,2,4-Trichlorobenzene	1	5
	1,2-Dibromo-3-chloropropane	1	0.04
	1,2-Dibromoethane	1	0.006
	1,2-Dichlorobenzene	1	3
	1,2-Dichloroethane	1	0.6
	1,2-Dichloropropane	1	1
	1,3-Dichlorobenzene	1	3
	1,4-Dichlorobenzene	1	3
	1,4-Dioxane	100	NS
	2-Butanone	5	50
	2-Hexanone	5	50
	4-Methyl-2-pentanone	5	NS
	Acetone	5	50
	Benzene	1	1
	Bromochloromethane	1	5
	Bromodichloromethane	1	50
	Bromoform	1	50
	Bromomethane	1	5
	Carbon disulfide	1	60
	Carbon tetrachloride	1	5
	Chlorobenzene	1	5
	Chloroethane	1	5
	Chloroform	1	7
	Chloromethane	1	5
	cis-1,2-Dichloroethene	1	5
	cis-1,3-Dichloropropene	1	0.4
	Cyclohexane	1	NS
	Dibromochloromethane	1	50
	Dichlorodifluoromethane	1	5
	Ethylbenzene	1	5
	Isopropylbenzene	1	5
	Methyl acetate	1	NS
	Methyl tert-butyl ether	1	10
	Methylcyclohexane	1	NS
	Methylene chloride	1	5
	Styrene	1	5
Tetrachloroethene	1	5	
Toluene	1	5	
trans-1,2-Dichloroethene	1	5	
trans-1,3-Dichloropropene	1	0.4	
Trichloroethene	1	5	
Trichlorofluoromethane	1	5	
Vinyl chloride	1	2	
Xylene (total)	2	5	

Notes:

1. NYSDEC Analytical Services Protocol (ASP), July 2005 Edition.
2. NYSDEC Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998.

VOCs - Volatile Organic Compounds

PQL - Practical Quantitation Limit

ug/L - Micrograms per Liter

NA - Not Applicable

TABLE 6-1
SAMPLE CONTAINER, PRESERVATION, AND HOLDING TIME REQUIREMENTS
KLIEGMAN BROTHERS OU #2 SITE
NYSDEC SITE NUMBER: 2-41-031

Analytical Parameter	Container Size/Type*	Containers Per Sample	Preservation	Maximum Holding Time**
I. Groundwater Samples				
TCL VOCs	40 mL glass vial	3	HCl to pH<2, 4 °C	Analysis: 14 days (7 days if not preserved to pH<2)

Notes:

* Number and size of containers may vary based on laboratory sample volume requirements.

** - Holding times are from date of sample collection.

APPENDIX E – FIELD SAMPLING AND ANALYSIS PLAN

**KLIEGMAN BROTHERS SITE
OPERABLE UNIT NO. 2
CITY OF GLENDALE
QUEENS COUNTY, NEW YORK
NYSDEC SITE NUMBER: 2-41-031**

FIELD SAMPLING AND ANALYSIS PLAN

**Prepared For:
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MARCH 2016

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Figure 1	Site Location Map
Figure 2	Groundwater Monitoring Well Locations
Figure 3	Low Flow Groundwater Purging/Sampling Log
Figure 4	Chain-of-Custody Record

1.0 INTRODUCTION

This Field Sampling and Analysis Plan (FSAP) is designed to provide detailed step-by-step procedures for the field activities performed during the post-remediation long-term groundwater monitoring program at the Kliegman Brothers OU #2 site (Site) located in the City of Glendale, Queens County, New York (Figure 1). It will serve as the field procedures manual to be strictly followed by all project personnel. Adherence to these procedures will ensure the quality and defensibility of the field data collected. In addition to the field procedures outlined in this document, all personnel performing field activities must do so in compliance with: (1) the Quality Assurance/Quality Control (QA/QC) measures outlined in the existing Quality Assurance Project Plan; (QAPP); (2) the appropriate Health and Safety guidelines found in the example Health and Safety Plan (HASP); and (3) the scope of work outlined in the Site Management Plan (SMP) (URS, 2015). Groundwater monitoring well locations are shown on Figure 2. A groundwater level measurement will be recorded at each sampled monitoring well. Table 1 lists, on an annual basis, which monitoring wells will undergo annual water level measurements and water quality sampling.

2.0 GROUNDWATER SAMPLING AND ANALYSIS PROCEDURES

2.1 Water Level Monitoring Procedures

Summary: Determination of groundwater depths in monitoring wells is necessary to calculate required purge volumes prior to groundwater sampling and to make potentiometric surface maps. Water levels in monitoring wells scheduled to be sampled during the field work will be measured using an electronic interface probe/water level indicator. During each monitoring event, water levels to be used to generate potentiometric groundwater surface contour maps will be collected from all sampled monitoring wells. Water level measurement procedures are presented below.

Procedure:

- 1) Clean the water level probe and the lower portion of cable following standard decontamination procedures and test water level meter to ensure that the batteries are charged.
- 2) Lower the probe slowly into the monitoring well until the solid audible alarm indicates water.
- 3) Read the depth to the nearest hundredth of a foot from the graduated cable using the V-notch on the riser pipe as a reference.
- 3) Repeat the measurement for confirmation and record the water level.
- 4) Lower the probe slowly to the bottom of the monitoring well. Record the bottom depth of the well.
- 6) Remove the probe from the well slowly, drying the cable and probe with a clean paper towel.
- 7) Replace the well cap.
- 8) Decontaminate the water level meter if additional measurements are to be taken.

2.2 Well Purging Procedures

Well purging will be completed using the low-flow purging technique as follows:

- 1) The well cover will be carefully removed to avoid having any foreign material enter the well
- 2) Using an electronic interface probe, the water level below top of casing will be measured. The depth of the well will be measured to determine the volume of water in the well. The end of the probe will be decontaminated between wells. The depth to bottom of the well will be recorded from the V notch in the top of the casing.
- 3) Calibrate field instruments [e.g., pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), specific conductance, temperature, and turbidity].
- 4) Start the flow rate low and maintain it between 100 and 500 ml/min, optimally 250 ml/min.
- 5) Purge the required water volume (i.e., until stabilization of pH, DO, ORP, temperature, specific conductivity, and turbidity) using a low-flow pump (e.g., bladder pump) and dedicated high density polyethylene (HDPE) tubing. During purging, it is permissible to by-pass the flow cell until the groundwater has cleared. New dedicated tubing and bladder will be used for each well.
- 6) Purge the well until the water quality parameters have stabilized. Collect groundwater parameters every five minutes until the well has stabilized. The respective measurements of the parameters must fall within the stated range for three consecutive readings. If, after four hours, stability has not been achieved for the parameters listed below, the well can be sampled. The stabilization criteria are: DO \pm 10% full-scale range; ORP \pm 10%; specific conductivity \pm 3% full-scale range; pH \pm 0.10 pH unit; temperature \pm 0.2°C, and turbidity \pm 10% if greater than 50 nephelometric turbidity unit (NTU).
- 7) Purging of three well volumes is not necessary if the indicator parameters are stable. However, a minimum of thirty minutes of purging is required before sampling, even if the parameters are stable. During purging, it is permissible to by-pass the flow cell until the groundwater has cleared.
- 8) Well purging data are to be recorded on the Low Flow Groundwater Purging/Sampling Log (Figure 3).

2.3 Groundwater Sampling Procedures

The following groundwater sampling procedures will be used for monitoring wells after purging has been conducted:

Procedures

- 1) After well purging is completed, the flow cell will be disconnected and drained and a sample will be collected into the appropriate laboratory supplied containers from the well tubing well, without changing the purge rate.
- 2) Direct water flow toward the inside wall of the sample container to minimize volatilization. Fill volatile sample containers so no headspace (air bubbles) is present. If containers are pre-preserved, do not overfill sample containers. Note if effervescence is observed.
- 3) All sample bottles will be labeled in the field using a waterproof permanent marker.
- 4) Samples will be collected into laboratory-provided sample bottles (containing required preservatives) and placed on ice in coolers for processing (preservation and packing) prior to shipment to the analytical laboratory. A chain-of-custody (COC) record (Figure 4) will be initiated. The analytical laboratory will provide certified analyte-free sample bottles.
- 5) After the required sample containers have been filled, remove dedicated/disposable HDPE tubing and bladder pump. Decontaminate the bladder pump with laboratory grade soap and distilled water and rinse with distilled water before reassembling with an unused bladder.
- 6) Well sampling data are to be recorded in the field notebook and on the Well Purging Log.
- 7) Groundwater samples will be placed on ice, and delivered to the laboratory either by the laboratory courier or common courier (e.g. FedEx) under COC control. The volume of sample required, bottle type and required quality assurance/quality control (QA/QC) may be found in the QAPP, Table 6-1. Groundwater samples will be collected for the parameters referenced in the

QAPP, Table 4-1 (i.e., VOCs). In lieu of field filtering, metals samples may be sent to the laboratory unpreserved, whereupon they will be filtered upon receipt using a disposable 0.45 micron filter, prior to preservation. Samples must be received by the laboratory less than 24 hours after collection.

Any observations of sheen, blebs, free-phase product/tar, staining or coating of the sampling equipment, odor, etc. that were made during sampling of groundwater are to be included in the groundwater sample collection log.

2.4 Sample Labeling

Summary: In order to prevent misidentification and to aid in the handling of environmental samples collected during the field investigation, the following procedures will be used:

Procedure: Each container will have the following information placed on the laboratory supplied sample label:

- Site name
- Sample identification
- Project number
- Date/time
- Sampler's initials
- Analysis required and preservatives

Sample identification numbers will be assigned based on the well identification and will be the same for all parameters collected. For example, a groundwater sample extracted from monitoring well MW-04S would have the same identifier assigned, MW-04S for VOCs, metals, etc.

Field duplicate samples will be assigned a unique identification alphanumeric code that specifies the date of collection, the letters DUP (for field duplicate) and an ascending number that records the number of duplicate samples collected that day. For example, the first field duplicate collected on November 17, 2015 would be assigned the following sample number using the code shown below:

DUP-MMDDYY = DUP-111715

Subsequent duplicates collected on the same day would be assigned FD-111715-2, FD-111715-3, etc. The field duplicate IDs are “blind”, so that the laboratory cannot trace them to their parent samples. Field sampling crew will record the duplicate sample information on the appropriate Sampling Field Data Sheets and also in the field notebook. The sample will be added to the COC with the time of collection of 0000.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples will use the same well identification name as the groundwater sample, with the acronym MS/MSD after it; for example, MW-04S (MS/MSD). The sample will be added to the COC with the same time of collection as the groundwater sample.

Rinsate (Equipment) Blank samples will be labeled with the letters RB (rinsate blank) and the date of collection in the same order as for the field duplicate and added to the COC (e.g., using the same date as above, RB-111715).

Trip blanks will be labeled with the letters TB (trip blank) and the date in the same order as the field duplicate and added to the COC (e.g., for example, using the same date as above, TB-111715).

2.5 Quality Assurance/ Quality Control Sampling

QA/QC procedures are described in the Quality Assurance Procedure Plan (QAPP). QA/QC groundwater samples will be collected as follows:

- Field duplicates will be collected at the rate of one per twenty (5%) groundwater samples collected. It will be collected directly following the groundwater sample collected at the selected well for the same parameters as the groundwater sample.
- Matrix Spike/ Matrix Spike Duplicate (MS/MSD) samples will be collected at a rate of one per twenty (5%) groundwater samples collected. It will be collected directly following the groundwater sample collected at the selected well for the same parameters as the groundwater sample.

- Rinsate (Equipment) Blank samples will be collected one time per event. Laboratory provided deionized water will be run through the bladder pump and collected for the same parameters as the groundwater sampling program. If dedicated, disposable sampling equipment is used; rinsate blanks will not be collected.
- Trip Blanks will be provided by the laboratory filled with analyte-free water and returned at the rate of one per sample pickup.

3.0 FIELD DOCUMENTATION

Field notebooks will be used during all on-site work. A dedicated permanently-bound field notebook will provide a legal record and will be maintained by the field technician overseeing the site activities. Entries will be written with waterproof ink and will be of sufficient detail that a complete daily record of significant events, observations, and measurements is developed. At the conclusion of each day of fieldwork, entries will be signed and dated. Erroneous entries will be corrected by the field technician that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing/dating the correction.

The field sampling team will maintain the daily field notebook and logs, which will minimally include the following information:

1. Project name and location of field activity
2. Date and time of entry
3. Names and titles of field team members onsite
4. Names, titles of any site visitors, as well as date and time entering and leaving site
5. Weather information (e.g., temperature, precipitation, cloud coverage, wind speed and direction, etc.)
6. Purpose of field activity and detailed description of fieldwork conducted
7. Sample media to be collected
8. Sample Identification
9. Date and time of sample collection
10. Field observations and measurements (e.g., PID, water levels)
11. Sampling methods and devices
12. Purge volumes (groundwater)
13. Groundwater purge parameters e.g., pH, temperature, ORP, DO, conductivity, water levels, turbidity, etc.
14. Chain-of-custody and shipping information.

4.0 SAMPLE SHIPPING

Summary: Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody (COC) procedures. COC procedures are essential for presentation of sample analytical chemistry results as evidence in litigation or at administrative hearings held by regulatory agencies. COC procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The procedures used in this study follow the chain-of-custody guidelines outlined in NEIC Policies and Procedures, prepared by the National Enforcement Investigations Center (NEIC) of the U.S. Environmental Protection Agency Office of Enforcement.

Procedure:

- 1) A COC record is initiated at the analytical laboratory performing the sample analyses and will accompany the sample containers during preparation, delivery of the sample containers to the field, and during return shipment to the laboratory.
- 2) The COC record (Figure 4) should be completely filled out by field personnel with all applicable/relevant information as samples are collected and packed for shipment e.g., project name and number, field technician name, sample ID, date/time of collection, matrix, requested parameters, number of sample bottles, relinquishing/receipt signatures, method of sample shipment with shipper air-bill number, name of analytical laboratory, etc. Any erroneous markings will be crossed-out with a single line and initialed by the author.
- 3) The original COC accompanies the samples. It should be placed in a Ziploc bag and placed inside the cooler containing the samples. The sampler should retain a copy of the COC for the project records.
- 4) All groundwater samples should be placed and stored on ice immediately after sample collection in the laboratory supplied coolers.

- 5) If the laboratory provides a courier to collect the samples from the site, samples should be picked up on the day of collection. If that is not possible, the samples shall be stored on ice in a secure area then delivered to the laboratory the next day, or as soon as possible. Samples should not to be held onsite for more than two days.
- 6) If the courier is not provided, samples can be shipped via common courier. Pack the coolers with the samples wrapped in bubble wrap, place ice in plastic baggies to prevent any melt from leaking out of the cooler, and make sure samples will not shift in the cooler. Place the lab address on top of sample box/cooler. Affix numbered custody seals across the cooler lid. Cover seals with wide, clear tape.
- 7) Ship samples via overnight carrier the same day that they are collected and must be delivered to the laboratory within 48 hours of collection.
- 8) The COC seal must be applied in a manner where they must be broken in order to open the shipping container. Breakage of the seal before receipt at the laboratory may indicate tampering. If tampering is evident, the laboratory must immediately contact the laboratory Project Manager, whom further contacts the URS Project Manager for further instructions (i.e., cancel or proceed with analyses).

5.0 FIELD SAMPLING INSTRUMENTATION

URS-owned and rented field sampling equipment will require no maintenance beyond decontamination between sampling locations. Calibration procedures for electronic instruments can be found in the equipment operating manuals. Calibration and maintenance procedures for the common instrumentation that will be used during field investigations are discussed in the equipment operating manuals. A copy of the manufacturer's operating manual for each instrument will be kept with the instrument or the operator. All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions. The calibration procedures and results will be recorded in the field notebook. All changes to instrumentation will be noted in the field notebook.

The following field instruments will be used during project site work:

- 1) Multi-Parameter Meter (MultiRAE PLUS PGM-50 Monitor (10.6 eV lamp) with PID, %LEL) - Calibration of the meter and a battery check will be performed daily in accordance with manufacturer's specifications. Standards used for calibration will be National Institute of Standards and Technology (NIST) traceable. All calibration data will be recorded in the field notebook.
- 2) Turbidity Meter – The turbidity meter will be checked daily in accordance with manufacturer's specifications. All daily data will be recorded in the field notebook.
- 3) Horiba U-22 Multi-Parameter Meter – Calibration of the meter will be performed daily in accordance with manufacturer's specifications. All daily data will be recorded in the field notebook.

6.0 SAMPLING EQUIPMENT DECONTAMINATION PROCEDURES

Summary: To assure that no outside contamination will be introduced into the samples/data, thereby invalidating the samples/data, the following cleaning protocols will apply for all equipment used to collect samples/data during the field investigations.

Procedures:

- 1) Thoroughly clean equipment with laboratory-grade soap and water, until all visible contamination is gone.
- 2) Rinse with water, until all visible evidence of soap is removed.
- 3) Rinse several times with deionized water.
- 4) Air dry before using.
- 5) If equipment will not be used immediately, wrap in aluminum foil.
- 6) Decontamination materials will be collected and placed in 55 gallon drums.

7.0 INVESTIGATION-DERIVED WASTE CHARACTERIZATION AND DISPOSAL

All decontamination water and purge water will be contained in a locked on-site above ground storage tank (AST).

Since investigation-derived wastes (IDW) were properly characterized during site remediation activities, there is no reason for further characterization of the IDW during the post-remediation long-term groundwater monitoring program.

The IDW subcontractor will be responsible for removing IDW from the work site as needed. All waste will be disposed of at a permitted off-site disposal facility.

8.0 ANALYSIS

Each groundwater sample will be analyzed by a NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory for those parameters referenced in the QAPP, Table 4-1 (i.e., VOCs). Field personnel will coordinate with the laboratory for the collection and delivery of the samples to the laboratory.

TABLES

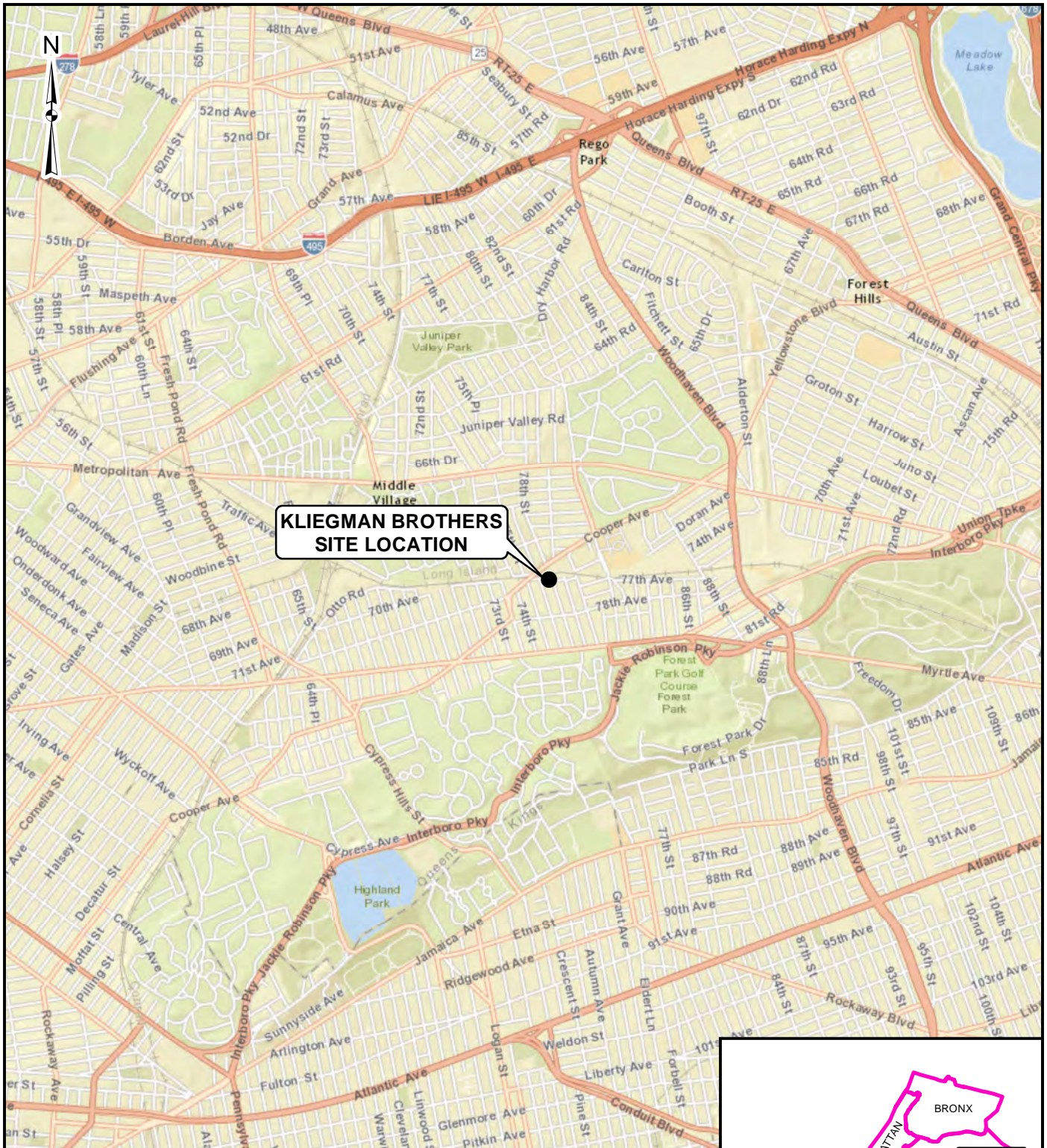
Table 1
Water Level Measurements and Water Quality Sampling

Sampling Location	Water Level Measurements	VOCs (Method 8260C)	Frequency
MW-03D	x	x	Annually
MW-04D	x	x	Annually
MW-05D	x	x	Annually
MW-12H	x	x	Annually
MW-14DR	x	x	Annually
MW-14H	x	x	Annually
MW-23D	x	x	Annually
MW-24D	x	x	Annually
MW-24H	x	x	Annually
MW-30M	x	x	Annually
MW-31D	x	x	Annually
MW-32D	x	x	Annually
MW-33D	x	x	Annually

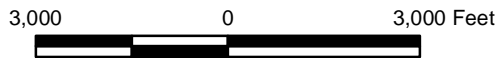
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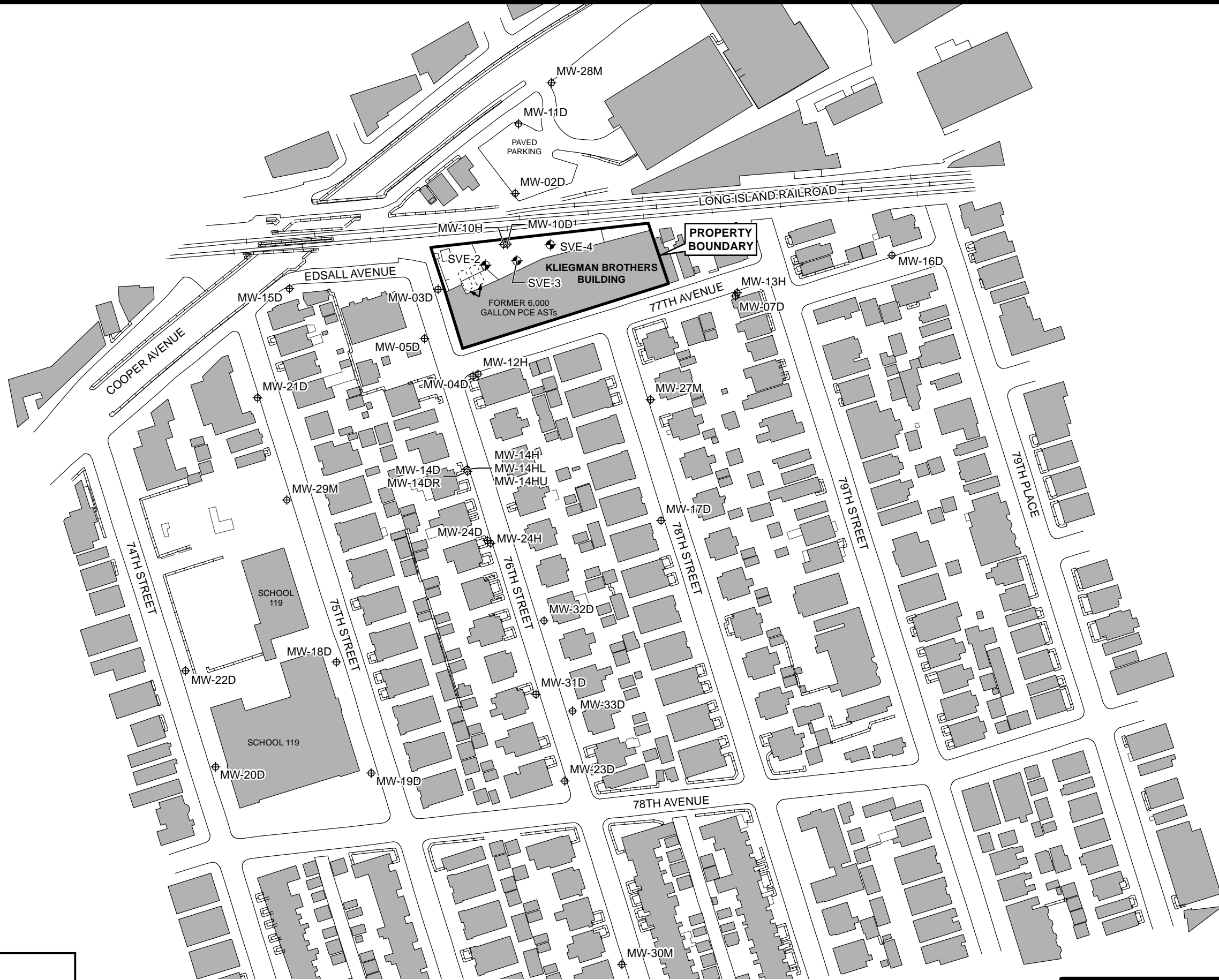
VOC - Volatile Organic Compounds

FIGURES



Source: ESRI World Street Map 2012

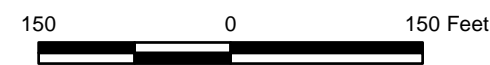




Legend

- ⊕ Monitoring Well Location
- ⊕ Sampling Location and Soil
- ⊕ Vapor Extraction Well Location

Well Suffixes:
 D - Screened at water table
 H - Below water table (based on HP readings)
 M - Screen at highest hydropunch reading



**KLIEGMAN BROTHERS
 SITE PLAN**



FIGURE 2

APPENDIX F – SITE MANAGEMENT FORMS

**KLIEGMAN BROTHERS SITE
OPERABLE UNIT #2
NYSDEC SITE NO. 2-41-031
INSPECTION FORM**

GENERAL INFORMATION

Date:		Inspector:	
Weather:		Signature:	
Temperature:		Company:	
Season (circle one): Winter Spring Summer Fall			

SITE INSPECTION LOG SHEET*

Evidence of Site-Wide Disturbance(s)	Yes No	Description of Disturbance(s)	
Evidence of Cover System Disturbance(s)	Yes No	Description of Disturbance(s)	
Evidence of Site-Wide Excavation	Yes No	Description of Excavation	
Evidence of Cover System Excavation	Yes No	Description of Demolition	
Evidence of Building Construction	Yes No	Description of Building Construction	
Evidence of Change in Site Use	Yes No	Description of New/Additional Site Use	
Comments:			

* If answering Yes, attach map showing locations and any other information as required.

**KLIEGMAN BROTHERS SITE
OPERABLE UNIT #2
NYSDEC SITE NO. 2-41-031
Summary of Green Remediation Metrics for Site Management**

Site Name: Kliegman Brothers Site Site Code: 2-41-031
 Address: 76-01 77" Avenue City: Glendale
 State: New York Zip Code: 11385 County: Queens

Initial Report Period (Start Date of period covered by the Initial Report submittal)

Start Date: _____

Current Reporting Period

Reporting Period From: _____ To: _____

Contact Information

Preparer's Name: _____ Phone No.: _____

Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	Total to Date
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	Total to Date (tons)
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	Total to Date (miles)
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-site from various sources.

	Current Reporting Period (gallons)	Total to Date (gallons)
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	Total to Date (acres)
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:

Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

CERTIFICATION BY CONTRACTOR	
<p>I, _____ (Name) do hereby certify that I am _____ (Title) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including that last day of the period covered by this application.</p>	
_____	_____
Date	Contractor

APPENDIX G – REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR KLIEGMAN BROTHERS SITE OPERABLE
UNIT NO. 2

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APPENDIX H – RESPONSIBILITIES OF OWNER AND REMEDIAL PARTY

Responsibilities

The responsibility for implementing the SMP for the Kliegman Brothers Operable Unit #2 site number 2-41-031 (the “site”), is the Remedial Party, as defined below.

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party (RP) refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the NYSDEC is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7017

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

Site Owner’s Responsibilities:

There is no “Site Owner”. The site comprises of various monitoring wells along several parcels as shown in Figure 2.

Remedial Party Responsibilities

- 1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

- 2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.
- 3) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC.
- 4) The RP shall notify the NYSDEC of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at <http://www.dec.ny.gov/chemical/76250.html>.
- 5) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 1.3- Notifications of the SMP.
- 6) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site.
- 7) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.