October 2, 2012

New York State Department
of Environmental Conservation
625 Broadway
Albany, New York 12233-7013

Attention: Ms. Jessica LaClair
Regional Hazardous Engineer

RE: Corrective Measure Implementation Plan
Parts and Repair Service Center
General Electric International, Inc.
Tonawanda, New York
Permit ID: 9-1464-00044/00001

Dear Ms. LaClair:

On behalf of General Electric International, Inc. (GE), URS Corporation – New York (URS) has prepared this *Corrective Measure Implementation Plan* (*CMIP*) for the GE Parts and Repair Service Center in Tonawanda, New York. This *CMIP* has been prepared in accordance with the terms of GE's July 2012 *Part 373 Hazardous Waste Management Permit* (*373 Permit*).

This *CMIP* includes a discussion of the changes in site conditions, a summary of the Corrective Measures, and presents the stages of work (obtaining access, pre-design investigation, design, contracting, construction, and reporting), along with a project schedule. This *CMIP* discusses the project plans necessary for the work, and includes a site-specific Health and Safety Plan and a site-specific Quality Assurance Project Plan.

We look forward to your comments on this plan. Please contact myself, or Ms. Dawn Varacchi-Ives of GE at 978-353-3738, if you have any questions or comments regarding this material. GE and URS appreciate the NYSDEC's continued assistance with this project.

Very truly yours,
URS Corporation – New York

Karen Peppin
Project Manager

Enclosure

cc: Ms. Dawn Varacchi-Ives, GE
Ms. Pam Cook, GE

ecc: Ms. Kathleen Emery, NYSDEC
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NYSDEC ID NUMBER: 9-1464-00044

PARTS AND REPAIR SERVICE CENTER
GENERAL ELECTRIC INTERNATIONAL, INC.
175 MILENS ROAD
T0NAWANDA, NEW YORK

CORRECTIVE MEASURE IMPLEMENTATION PLAN

OCTOBER 2, 2012

Prepared for:

GENERAL ELECTRIC INTERNATIONAL, INC.
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URS

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

1.0 INTRODUCTION

On behalf of General Electric International, Inc. (GE), URS Corporation – New York (URS) has prepared this *Corrective Measure Implementation Plan* (*CMIP*) for GE's Parts and Repair Service Center at 175 Milens Road, in Tonawanda, New York. This *CMIP*, is being prepared pursuant to the requirements of the 6NYCRR Part 373 Hazardous Waste Management Permit (373 Permit) issued by the New York State Department of Environmental Conservation (NYSDEC) on July 5, 2012. The 373 Permit (Permit ID 9-1464-00044/00001) was issued under the Resource Conservation and Recovery Act (RCRA) under Title 27, Title 9, and requires GE to perform Corrective Measures at the facility.

This CMIP contains background information on the site (Section 2.0), including a brief site history, a discussion of changes in site conditions since submission of the Revised Corrective Measure Study Final Report in July 2001, and a summary of the Corrective Measures. Section 3.0 presents an overview of the design scope, design investigations that will be undertaken, and the plans that will be utilized during the project. Section 4.0 summarizes the permits and access agreements that will be necessary to perform the work. An overview of the Corrective Measure Implementation elements and the project schedule is presented in Section 5.0. Section 6.0 presents a summary of the post-construction plans that will be developed and additional long-term requirements.

2.0 SITE BACKGROUND

This section presents a brief summary of the site history and the previous reports, provides an overview of the approved Corrective Measures, and describes changes to Areas of Concern that have occurred since submission of the *Revised Corrective Measure Study Final Report* in July 2001. Figure 2 is a site plan.

2.1 SITE HISTORY

GE's Parts and Repair Service Center (or shop) is located on an approximately 5.8 acre parcel at 175 Milens Road, in Tonawanda, New York (Figure 1). As shown on Figure 2, the site is secured with a chain link fence and gate, and is improved with a 69,000-square foot, slab-on-grade building. The northern portion of the building was constructed in 1968 and 1969. A building addition was constructed in 1978.

GE uses the service center to repair industrial equipment such as electric motors, transformers, turbines, pumps, and compressors. Hazardous wastes generated during routine operations were stored in either the RCRA Container Storage Area or the Commercial PCB Storage Area, depending on their nature. These storage areas have been closed, and no remedial measures are necessary for the storage areas.

2.1.1 Geology and Hydrogeology

The soils underlying the site consist of very dense glaciolacustrine sediments, which are predominantly clays and silts. These sediments are approximately 60 to 70 feet thick. There are isolated areas of fill, which may contain perched groundwater, present near the building in utility excavations. The unsaturated zone extends to at least 15 feet below ground surface. The depth to groundwater in the one deep monitoring well (MW-5 on Figure 2) installed at the site indicates the depth to groundwater in native soils at the site is approximately 25 feet. Four shallow monitoring wells (MW-1-4) were installed in filled areas and the depth to groundwater is approximately six to nine feet.

2.1.2 Summary of RCRA Corrective Actions

The service center is subject to RCRA Corrective Action under the terms of the prior 373 Permit, which was issued May 1996. Corrective Actions included a RCRA Facility Assessment (RFA), which was completed in 1988, a RCRA Facility Investigation (RFI), which was conducted in 1998, and a Corrective Measure Study. In a letter dated February 18, 2003, NYSDEC approved the *Revised Corrective Measure Study Final Report*, which was dated July 31, 2001. Numerous supplemental investigations and interim corrective measures have been performed at the site.

The RFI identified five locations for which Corrective Measures were warranted due to concentrations of PCBs in surface soil, subsurface soil, or sediment. In addition, the RFI identified an area with elevated concentrations of volatile organic compounds (VOCs) in soil and perched groundwater within a former rinse tank excavation. The six areas, which are shown on Figures 2 and 3, identified as requiring Corrective Measures were:

- The surface soils near the rail spur;

- The former rinse water underground storage tank (UST) excavation;
- The sewer lines east of the building near the former rinse water tank;
- The area near the old oil water separator (OWS-1);
- The on-site storm sewers and drains; and
- The storm sewer along Milens Road.

Supplemental investigations were performed during closure of the RCRA Container Storage Area (CSA) in 2002, and in conjunction with closure of the Commercial PCB Storage Area, which was decommissioned in November 2000. Samples collected in conjunction with closure of the RCRA CSA indicate that soils near the CSA have not been significantly impacted. Samples collected in conjunction with closing the Commercial PCB Storage Area indicated that the pavement surface south of the building, referred to as the transportation corridor, and the concrete floor slab of the shop were impacted by PCBs. These areas, which are shown on Figure 4, were the subject of a *Focused Corrective Measure Study*.

Off-site impacts include Two-Mile Creek sediments, for which Interim Corrective Measure have been performed. Additional Interim Corrective Measures are necessary and are not covered in this *CMIP*. Interim Corrective Measures for the creek are anticipated to be undertaken prior to implementation of the Corrective Measures described in this *CMIP*.

2.2 CURRENT SITE CONDITIONS AND PROPOSED CORRECTIVE MEASURE CHANGES

This section describes changes in site use and conditions that have occurred since submission of the *Revised Corrective Measure Study Final Report* in July 2001. As a result of these changes and updated information on facility conditions, several minor changes to the approved Corrective Measures are proposed.

Ramp of Depressed Loading Dock

The concrete ramp of the depressed loading dock (Figure 4) was not sampled during the RFI or supplemental investigations. The *Focused Corrective Measure Study* identified the ramp as an area that should be sampled, and dependent on the sample results, be subject to Corrective Measures. Therefore, this area will be subject to a design phase investigation. Corrective Measures for this area will be proposed, if necessary based on the results of the investigation.

Sanitary Sewer Lines East of the Building and Old Oil Water Separator

Since 2001, the facility has made changes to the handling of shop process water in an effort to eliminate the low concentrations of PCBs intermittently detected in sanitary and industrial effluent from the site, which is routinely monitored in accordance with the terms of the discharge permit issued by the Town of Tonawanda. An updated plan of the site storm, sanitary, and process sewers is presented in Figure 5. Historical flows to the old oil water separator (OWS-1) and the associated discharge to the sanitary line east of the shop building have been eliminated. Further efforts to eliminate PCBs in sanitary effluent included identifying and evaluating potential inputs to the sewers in August 2011, and cleaning of all shop sanitary sewers from points of origin to sanitary manhole SANI-1 in late 2011. During this effort a significant

quantity of sediment was found in the line from OWS-1 to the sanitary manhole (known as the 'east line'). In addition, the portion of the east line north of the building bump-out at the southeast corner of the shop exhibited signs of deterioration, which inhibited the cleaning effort. The continued detection of PCBs in sanitary effluent led the facility to conduct a sanitary sewer investigation in July and August 2012. This investigation, which was performed by URS, indicated that the PCBs in site sanitary effluent are likely originating in the east line. The facility is planning to undertake additional corrective actions in fall 2012 for the east sewer line that may include filling or plugging the unused portion of the line, and re-cleaning the portion of the line that serves the upstairs bathroom in the southeast corner of the shop. Filling the unused portion of the east line is intended to be interim action to break a potential migration pathway until Corrective Measure Implementation (CMI)

GE is proposing minor changes to the approved Corrective Measures due to the changes in site conditions. Rather than removing and replacing the sanitary sewer line in areas of subsurface excavation east of the building, GE is proposing removal only of this portion of the sanitary line during CMI. In addition, because the old oil water separator is no longer in use, GE is proposing to remove it during the CMI work, if feasible. If PCBs continue to be detected during routine monitoring of sanitary effluent after the filling and re-cleaning the east line that is anticipated to occur in fall 2012, GE may propose additional actions, such as lining of the in-use portion of the east line. GE believes that because these modifications to the approved Corrective Measures are very minor and more protective of human health and the environment than the approved measures, that they do not warrant a modification to the Part 373 Permit or public notice activities.

Northeast Floor Drain and Spray Booth Drains

Over the years, the facility has made many changes in regards to the floor drains at the shop and process water flows. During the fall 2011 site inspection, the drain shown on historical site plans in the northeast part of the shop was found not to exist. A sump for the vertical boring machine, which is located in the same general area, was verified in the fall of 2011 to be a closed system with no discharge to the sewers. Therefore, discharge flows from the northeast floor drain identified in the 2001 *Revised Corrective Measure Study Final Report* have already been addressed by changes in conditions at the facility, and sealing of this drain will be removed from the CMI scope of work.

Use of the spray booths and associated trench drains is an integral part of work performed at the facility. Currently, shop process water from trench drains in the spray booths is collected into a wastewater above ground storage tank (WW AST). The WW AST is periodically emptied, with the wastewater being disposed off-site at properly licensed facilities. Facility personnel report that the plumbing for the spray booths was rerouted in conjunction with installation of the WW AST, and URS confirmed this in August 2011. Therefore, due to the changes in process water flow, cleaning of the lines from the drains in the spray booths is no longer warranted, and cleaning of these lines will be removed from the CMI scope of work.

The remaining storm sewers and drains at the facility will be cleaned or replaced as proposed in the *Revised Corrective Measure Study Final Report*. Included in this effort are: the trench drain and associated piping near the bay doors for the railroad tracks, the drain in the depressed

loading dock and associated sump, and the trench drain in the concrete ramp to the depressed loading dock and associated piping. In August 2011, URS confirmed that the railroad track trench drain and the depressed loading dock drain and sump are not connected to either the storm sewer system or the sanitary sewer system.

2.3 UPDATED CORRECTIVE MEASURES

This section provides an update to the Corrective Measures selected for the site due to additional site knowledge, measures undertaken by GE to address impacts, and changes in site conditions. As discussed previously, since submission and approval of the 2001 *Revised Corrective Measure Study* collection of samples from areas not investigated previously led to the discovery of additional historical impacts to the site. Since 2001 GE has undertaken measures to address impacts to portions of the site, and the facility has made changes to operations and site structures. Furthermore, through the Statement of Basis process for selecting the Corrective Measures for the site, the NYSDEC added requirements for future investigation and potential Corrective Action. The summary below presents an updated list of the Corrective Measures for the site that incorporates these changes.

Presented below is a summary of the Corrective Measures already implemented, the Corrective Measures to be included in CMI, and the anticipated future actions.

2.3.1 Implemented Corrective Measures

GE has undertaken interim measures to address PCB impacts in the four areas discussed below.

Storm Sewer Manhole Sediment Removal

In February 2002, PCB impacted sediments were removed from the two storm sewer manholes (on-site manhole STMH-3 and off-site manhole MH-1), shown on Figures 2 and 3, that exhibited the highest concentrations of PCBs in sediment as determined by sampling conducted in 2000 and 2001. The work was described in the *Manhole Sediment Removal Report*, dated May 17, 2002. Additional actions to address PCB-impacted sediment in the storm sewers are part of the planned Corrective Measures discussed in Section 2.3.2.

Concrete Slab of Shop Floor

As discussed previously, impacts to the concrete floor slab of the shop were discovered during closure of the Commercial PCB Storage Area. To address the PCBs present in the concrete floor slab of the shop, GE addressed the area in accordance with the requirements of the Toxic Substance Control Act (TSCA) for the continued use of PCB-impacted porous surfaces (40 CFR Part 761.30(p)). The concrete floor was double washed and double rinsed followed by double epoxy coating in contrasting colors and labeling the floor with the PCB (M_L) mark in accordance with the procedures proscribed in TSCA. The *Closure Certification Report – Commercial PCB Storage Area* (*Certification Report*), dated April 11, 2006, documented the cleaning and coating of the shop floor.

NYSDEC subsequently requested that the shop floor be subjected to a focused Corrective Measure Study. The *Focused Corrective Measure Study* (dated July 2011) determined that

removal of the PCB-impacted concrete is not feasible at an operating facility, and the implementation of the TSCA 761.30(p) cleaning prevents any human exposure to the residual PCB impacts in the concrete. Therefore, additional corrective measures will not be undertaken at this time and are not included in the scope of this *CMIP*. However, the shop floor will be subject to a Site Management Plan and subject to future actions (Section 2.3.3).

Transportation Corridor

Samples collected in conjunction with closing the Commercial PCB Storage Area indicated that the pavement surface south of the building, referred to as the transportation corridor, was impacted by PCBs (Figure 4). To address the PCBs in asphalt south of the shop building, GE elected to remove the top inch of asphalt from the areas of the transportation corridor that were not used for equipment storage. After removal of the top inch of asphalt, the area was repaved with 1.5 inches of new asphalt that serves as an asphalt cover. Residual PCBs present in the transportation corridor are present at concentrations that meet the federal cleanup criteria for low occupancy areas as defined in 40 CFR Part 761.61(a)(4)(i)(B). This work was documented in the *Closure Certification Report – Commercial PCB Storage Area* (*Certification Report*), dated April 11, 2006.

NYSDEC subsequently requested that the transportation corridor be subjected to a focused Corrective Measure Study. The *Focused Corrective Measure Study* (dated July 2011) determined that removal of the PCB-impacted asphalt was not feasible at an operating facility with limited access, that investigation and possible remedial action (if necessary) was not currently feasible for the areas that were used for equipment storage, and that the work conducted was protective of human health and the environment. Therefore, additional corrective measures will not be undertaken at this time and are not included in the scope of this *CMIP*. However, when the areas used for equipment storage (Figure 4) become accessible, they will be investigated, and the asphalt cover will be extended to those areas, if needed based on the investigation results. The entire transportation corridor will be subject to a Site Management Plan (Section 2.3.3).

Two Mile Creek

As a result of supplemental investigation to assess potential off-site impacts, it was discovered that sediments in Two Mile Creek had been impacted by low-levels of PCBs. In 2008, the impacted sediment was removed in conjunction with a Town of Tonawanda drainage improvement project. One limited area of low-level PCB impacts remain along the bank of Two Mile Creek. The remaining impacted materials are anticipated to be removed as an Interim Corrective Measure prior to CMI, and therefore are not included in this *CMIP*.

2.3.2 Corrective Measures Included in this *CMIP*

The Corrective Measures included in this *CMIP* are summarized below and incorporate measures proposed in the 2001 *Revised Corrective Measure Study* and the *Focused Corrective Measure Study*, changes in site conditions, and additional requirements set forth by NYSDEC in the November 2011 *Statement of Basis* and March 2012 *Final Corrective Measures and Response to Comments on the Statement of Basis*. The Corrective Measures for the site that are included in this *CMIP* are:

- Excavation and off-site disposal of surface soil with PCB concentrations greater than 1 milligram per kilogram (mg/kg) from these areas of the site:

    - Rail spur;
    - East of building;
    - Small areas near fence east of building;
    - Small areas between building and east fence;
    - Off-site soil south of rail spur; and
    - Off-site soil north of rail spur.

- Excavation and off-site disposal of subsurface soil with PCB concentrations greater than 10 mg/kg from the former rinse water tank excavation.

- Removal of the old oil water separator (OWS-1) on the east side of the building, if feasible.

- Replacement of the storm sewer line that passes through the subsurface excavation areas on the east side of the building.

- Removal of the sanitary sewer line, which is anticipated to be removed from service via filling or plugging in the fall of 2012, that passes through the subsurface excavation areas on the east side of the building.

- Backfilling excavations with clean fill.

- Removal and off-site disposal of sediments in these structures at and near the site:

    - Trench drain within the concrete ramp of the depressed loading dock;
    - Rail bay trench drain and associated sump and piping;
    - Depressed loading dock drain and associated piping and sump;
    - On-site storm sewer, including manholes and catch basins; and
    - Off-site storm sewer along Milens Road, including manholes MH-1 through MH-4.

- Cleaning of the on-site storm sewers (including manholes, catch basins, and trench drain) and approximately 1340 linear feet of off-site storms sewers along Milens Road to remove residual contamination.

- Cleaning of the on-site drain features formerly connected to the storm sewers (including the depressed loading dock drain and sump, and the rail bay trench drain and sump).

- Investigation and if necessary removal and replacement of the concrete truck ramp.

- Proper off-site disposal of removed materials and excavated soils at properly licensed facilities.

- On-site treatment with permitted discharge through the storm or sanitary sewers or proper off-site disposal of wastewaters generated through the remedial effort.

2.3.3 Anticipated Future Actions

In conjunction with the Corrective Measures summarized above, the NYSDEC is requiring an environmental easement on the property that:

- Restricts the facility to commercial use;
- Requires the facility owner to submit a RCRA Facility Investigation work plan that includes a Report on Current Conditions for the inaccessible Sub-slab Area of Concern (AOC) no later than 180 calendar days prior to the date when the AOC becomes accessible for such an investigation; and
- Requires compliance with an approved Site Management Plan.

The Site Management Plan will include a Groundwater Monitoring Plan detailing a five-year groundwater monitoring program to confirm that the underlying groundwater continues to not be impacted by site activities. In addition, it will provide provisions for maintaining the epoxy coating and asphalt covering areas.

When the asphalt on the east and south edges of the transportation corridor (Figure 4) becomes accessible, these areas will be investigated, and if necessary the asphalt cover will be extended by removing 1 inch of the existing asphalt and replacing with 1.5 inches of new asphalt, consistent with the former remedial work undertaken for the transportation corridor.

3.0 DESIGN SCOPE AND DESIGN-PHASE INVESTIGATIONS

This section provides an overview of the design phase investigation(s) that GE plans to undertake at the site and presents plans that will be used to conduct the investigation(s) and perform CMI. Details of the investigation(s) will be provided in a separate Work Plan(s).

3.1 REMEDIAL GOALS

The primary objective of the design will be remediating the site to meet cleanup objectives established during the CMS process. The corrective action objectives for the site, which were established in the CMS Task I Report and approved by the NYSDEC, are to:

- Remove or prevent contact with and off-site transport of sediments that contain PCBs at concentrations greater than the Recommended Soil Cleanup Objective (RSCO) of 1 mg/kg;
- Remove or prevent contact with, off-site transport of, and infiltration of precipitation through surface soils that contain PCBs at concentrations greater than the RSCO of 1 mg/kg;
- Remove or prevent contact with, and infiltration through, subsurface soils that contain PCBs or VOCs at concentrations greater than the RSCOs listed in Table 1; and
- Prevent or control the migration of perched groundwater that contains PCBs or VOCs at concentrations that exceed New York State groundwater standards.

Specific cleanup criteria for the PCBs and VOCs detected in the soil, sediments, and perched groundwater at the Tonawanda facility were presented in the *Revised Corrective Measure Study Final Report* and are reproduced in Table 1.

Additional cleanup objectives were established in the *Revised Closure Plan* for the Commercial PCB Storage Area that was developed in accordance with the Toxic Substance Control Act (TSCA), and reiterated in the *Focused Corrective Measure Study*. The objective of the *Revised Closure Plan* was to ensure that surfaces of the facility that may have been impacted by operation of the Commercial PCB Storage Area were cleaned in accordance with the levels specified in 40 CFR Part 761 Subpart G – PCB Spill Cleanup Policy. Closure-related sampling investigations indicated the presence of additional historical PCBs impacts at the facility, which were addressed to allow continued use of the PCB-impacted shop floor as authorized in 40 CFR Part 761.30(p) and to allow continued use of the asphalt south of the shop as a low occupancy area (40 CFR Part 761.61(a)(4)(i)(B)).

3.2 DESIGN CONSIDERATIONS

The GE service center is an active facility and minimizing impacts to shop operations while achieving the remedial objectives is an important design consideration. A meeting to discuss the proposed Corrective Measures and impacts to the facility is planned for October 2012. Items that will be discussed include:

- The impact to operations with the loss of the east portion of the site during CMI;
- Scheduling and sequencing of work to minimize impacts to operations;
- Facility requirements for restoration of disturbed areas; and

- Possible changes in shop operations that may impact the proposed remedial work, such as the already identified changes in sanitary and process sewers.

3.3 DESIGN INVESTIGATIONS

Additional information regarding the site is necessary before the design can be completed. Several of the information gaps are well defined, and others need further consideration and discussion with facility personnel and neighboring property owners.

3.3.1 Identified Information Gaps

As noted in the Focused Corrective Measures Study, the concrete ramp for the depressed loading dock needs to be sampled to determine if the concrete is impacted by PCBs. An investigation to determine if either the base or sidewalls of the ramp contain PCB concentrations greater than the project cleanup objectives will be performed. A Work Plan summarizing the investigation will be prepared and submitted for NYSDEC review and approval prior to conducting the investigation.

As discussed in Section 2.2, the eastern portion of the sanitary sewers at the site have been impacted by PCBs, and the east line of the sanitary sewers may require Corrective Measures beyond those anticipated at the CMS stage in 2001. In the fall of 2012 the facility plans to plug the out of service portion of the line and re-clean the in-use portion of the line, followed by sampling of the effluent from the line. It is anticipated that the monitoring data collected monthly by the facility will be sufficient to determine whether the measures described above will adequately address residual PCBs present in this line. Because the routine monitoring of site discharge will be utilized to evaluate the success of these measures, a work plan for investigation will not be necessary.

3.3.2 Potential Additional Data Collection and Data Review

Some aspects of the project require a more detailed data review and input from neighboring property owners or facility personnel. These discussions may lead to the collection of additional soil data prior to completing the design. Additional soil investigation may be performed to refine the extent of PCB impacts in certain areas of the site and to determine the extent of soils that can be segregated for disposal purposes.

3.4 PROJECT PLANS

Several project-related plans have been or will be developed to protect human health and the environment and to ensure data quality during the project. These plans are further described below. Work Plans detailing proposed design investigation activities will be prepared separately.

3.4.1 Health and Safety Plan

URS has prepared a site-specific Health and Safety Plan (HASP), which is presented as Appendix A. This HASP will be utilized by URS personnel during the design investigation and oversight of the remedial work. Contractors utilized to perform the Corrective Measures will be required to prepare their own project-specific Health and Safety Plans.

3.4.2 Community Air Monitoring Plan

The contractor selected to perform the Corrective Measures will be required to prepare and submit a project-specific Community Air Monitoring Plan (CAMP), which will be utilized during the soil excavation and associated waste management activities undertaken during CMI. The CAMP will meet the requirements of the New York State Department of Health Generic Community Air Monitoring Plan and the Fugitive Dust and Particulate Monitoring guidance that are published as Appendix 1A and 1B, respectively, to the NYSDEC's DER-10 – *Technical Guidance for Site Investigation and Remediation* (DER-10). The CAMP will be implemented in conjunction with excavation and management of impacted soils.

3.4.3 Quality Assurance Project Plan

A site-specific Quality Assurance Project Plan (QAPP) has been prepared and is presented in Appendix B. The QAPP will be utilized during the design phase investigations, implementation of Corrective Measures, and groundwater monitoring activities to ensure that data on which remedial decisions are based are of sufficient quality to support the decisions.

3.4.4 Storm Water Pollution Prevention Plan

A Storm Water Pollution Prevention Plan (SWPPP) is anticipated to be needed. It will be prepared after design uncertainties, such as whether the concrete ramp will be subject to Corrective Measures, have been resolved. The SWPPP will be utilized during excavation and restoration activities, and the selected remedial contractor will be responsible for implementing the SWPPP.

4.0 PERMITS AND ACCESS AGREEMENTS

In order to implement the selected Corrective Measures, several permits and access agreements will be necessary. This section provides an overview of those that will be or may be needed and the plans for obtaining the necessary permits and access agreements.

4.1 ACCESS AGREEMENTS

Off-site impacts have been identified in three locations off the GE property. Limited areas of soil impacts extend on to the adjacent properties to the north and the east. In order to implement Corrective Measures and design phase investigations, access agreements with each property owner will need to be negotiated. The first step will be to identify each property owner and point of contact for discussions.

Off-site impacts to the Town of Tonawanda storm sewers along Milens Road were also identified. PCB containing sediment was found in storm sewer manholes during the off-site storm sewer investigation performed in early 2001. In order to clean the storm sewers along Milens Road, an access agreement will need to be obtained from the Town of Tonawanda. The first step to obtaining access will be to talk to personnel with Town of Tonawanda sewer department.

Obtaining access from neighboring property owners and the Town of Tonawanda is a critical step towards Corrective Measure Implementation, and therefore will be undertaken immediately following approval of this Corrective Measure Implementation Plan, if not before.

4.2 PERMITS

Permits that may need to be obtained to perform Corrective Measures include a discharge permit, a building permit, and a State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities.

Discharge Permit

During Corrective Measure Implementation, remedial wastewater will be generated from dewatering activities, storm sewer cleaning activities, and decontamination activities. During the design phase the quantity of wastewater from each source will be estimated and an evaluation performed to determine whether it more cost effective to dispose the wastewater off-site or to treat it on-site and discharge it to the Town of Tonawanda sewers under the terms of a discharge permit. If discharging treated wastewater to the town sewers seems to be more cost-effective, discussions with the town will be undertaken to determine if discharge of treated wastewater would be within the scope of the existing facility discharge permit or if a separate permit would be needed. If GE elects to dispose remedial wastewater off-site at appropriately licensed facilities, a discharge permit will not be necessary.

Building Permit

A building permit from the Town of Tonawanda may be necessary. After impacted soil has been excavated, the disturbed areas will need to be restored. The extent of construction activities

necessary for restoration, such as the replacement of rail road tracks and reconstruction or the concrete ramp, is currently uncertain and will be determined during discussions with the facility and the design investigation. The Town of Tonawanda will be contacted to determine if a building permit is necessary once the scope of reconstruction activities has been determined.

SPDES Permit

A SPDES General Permit for Stormwater Discharges from Construction Activities is not anticipated to be necessary because this project is a hazardous waste site remediation that will be performed under an approved work plan. However, a Storm Water Pollution Prevention Plan (SWPPP) is anticipated to be necessary.

5.0 CORRECTIVE MEASURE IMPLEMENTATION AND SCHEDULE

This section provides an overview of the Corrective Measure Implementation elements and an overview of the project schedule.

5.1 CORRECTIVE MEASURE IMPLEMENTATION ELEMENTS

In order to implement Corrective Measures at GE's Tonawanda shop, these nine steps will be undertaken:

- Obtain access from neighboring property owners;
- Obtain input from facility on proposed Corrective Measures;
- Develop scope and perform design phase investigation(s);
- Perform remedial design;
- Obtain permits (if necessary);
- Prepare bid documents;
- Select remedial contractor;
- Perform Corrective Measures and site restoration; and
- Prepare and submit Corrective Measure Completion Final Report.

During CMI, reports summarizing the progress of the corrective measure activities undertaken in a calendar month will be submitted by the 10th day of the following month, or the next business day. In accordance with the Part 373 Permit, the reports will include: a description of the work completed, summaries of findings and changes, summaries of contacts with community representatives and public interest groups, summaries of problems or potential problems encountered and the steps taken to rectify problems, changes in personnel conducting or managing the corrective action activities, and description of the work planned for the next reporting period. Submission of monthly progress reports will be suspended after submission of the Corrective Measure Completion Final Report.

Access from neighboring property owners will be necessary to address off-site impacts, and depending upon their response to initial contact, may lead to additional soil investigation and project approach. Input from the facility regarding the proposed work and impact to operations is also anticipated to influence the scope of potential additional soil investigation and overall project approach.

The scope of the design phase investigation(s) will be developed based on input from the facility, the initial response of neighboring property owners, and review of the existing data. Work plans for design phase investigation will be submitted to NYSDEC for review and approval. Data gathered during the investigation(s) will be submitted to NYSDEC.

The remedial design will be based on existing data, information gathered during the design investigation(s), and input from the facility, neighboring property owners, and the Town of Tonawanda. The remedial design will include: plans showing the excavation limits and areas of soil that needs to be segregated for disposal purposes, details of remedial wastewater management, and plans for restoration. The remedial design will be utilized to identify the permits necessary for performing the work and to prepare bid documents. Remedial design

documents, such as updated plans showing the areas to be excavated, will be submitted to NYSDEC for review and approval prior to soliciting bids.

The contractor selection process will include identifying potential contractors, pre-screening potential contractors, providing potential contractors with bid documents, a bid walk, and reviewing bids. It is anticipated that GE will retain separate contractors for remedial construction activities and remedial oversight activities. GE may elect to contract separately for waste disposal.

After access agreements and permits (if necessary) are obtained, waste disposal facilities are chosen, and the remedial contractor is selected, performing Corrective Measures will be undertaken. It is anticipated that soil excavation activities, and if necessary corrective measures for the concrete ramp, will be undertaken prior to the cleaning of storm sewers. Backfill and restoration activities will occur after post-excavations soil samples indicate the remedial objectives have been achieved or for areas where pre-sampling has defined the excavation boundaries, after those boundaries have been reached. The work will be scheduled to avoid working in winter.

After the remedial work has been completed, the project documentation will be utilized to prepare the Corrective Measure Completion Final Report. Project documentation is expected to include: a survey of excavation limits and post-restoration conditions and elevations; analytical results for post-excavation soil samples, waste characterization samples, and possibly treated water samples; and manifests documenting off-site waste disposal.

5.2 CORRECTIVE MEASURE IMPLEMENTATION SCHEDULE

The tentative CMI schedule is presented in Figure 6. As shown, key elements of the schedule include obtaining access from neighboring property owners, receiving approval of this CMIP and design investigation Work Plan(s) from NYSDEC, and performing the design investigations. Currently, the tentative schedule works out to performing the design phase soil investigation during winter months, which may not be feasible. In the event that significant winter weather occurs before the design phase soil investigation can be completed, the schedule will need to be adjusted.

Assuming the design phase investigations can be completed as shown, we anticipate that phases of CMI would include:

- Complete Remedial Design – approximately 60 days from completion of pre-design investigation,
- NYSDEC Approval of Remedial design – approximately 28 days from submission of design;
- Obtain Remedial Contractor – approximately 60 days from NYSDEC approval of design;
- Begin Primary Remedial Construction – approximately 28 days from contract award; and
- Submission of the Corrective Measure Completion Final Report – 120 days from receipt of the last validated data.

With this schedule, the remedial construction should be completed prior to the onset of winter weather. However, if there are delays in gaining access or performing the design investigation, the schedule may need to be adjusted, and the remedial construction phase may need to be postponed until the spring of 2014.

6.0 POST-CONSTRUCTION PLANS

This section provides an overview of the plans and permit requirements that will be in place after construction of the Corrective Measures. In accordance with requirements of the Part 373 Permit, the Site Management Plan and accompanying Groundwater Monitoring Plan will be submitted to NYSDEC for review and approval within 120 days of receiving the final validated data from CMI activities.

6.1 SITE MANAGEMENT PLAN

A Site Management Plan (SMP) will be necessary for the site to ensure continued containment of residual impacts in concrete, asphalt, and subsurface soil, and to establish procedures for management of residual impacted materials. The SMP will include descriptions and drawings of areas of the site with residual impacts, procedures for routine inspections and reporting, and procedures for repairs, maintenance, and potential future construction activities.

6.2 GROUNDWATER MONITORING PLAN

A Groundwater Monitoring Plan will be prepared as required by the Part 373 Permit. The groundwater monitoring program proposed in the NYSDEC-approved *Revised Final Corrective Measure Report* included the installation of two new deep groundwater monitoring wells on the east (downgradient) side of the site, and annual monitoring of the two new wells and existing monitoring well MW-5 for PCBs and VOCs for five years. The purpose of the groundwater monitoring program is to verify that groundwater underlying the site has continued to be un-impacted by site activities, as found during the RCRA Facility Investigation.

6.3 ADDITIONAL LONG-TERM REQUIREMENTS

Additional long-term requirements were incorporated into the March 2012 *Final Corrective Measures and Response to Comments on the Statement of Basis* and into the July 2012 Part 373 Permit. These requirements include an environmental easement on the property that:

- Restricts the facility to commercial use;
- Requires the facility owner to submit a RCRA Facility Investigation work plan that includes a Report on Current Conditions for the inaccessible Sub-slab Area of Concern (AOC) no later than 180 calendar days prior to the date when the AOC becomes accessible for such an investigation; and
- Requires compliance with an approved Site Management Plan.

The Part 373 Permit that was issued July 5, 2012 includes requirements for additional investigation and subsequent activities, as warranted, should additional areas of concern be identified or at such time as the facility building is planned for demolition.

TABLE

TABLE 1

CLEANUP OBJECTIVES FOR COMPOUNDS DETECTED IN SOIL, SEDIMENT AND GROUNDWATER

GE APPARATUS SERVICE CENTER
TONAWANDA, NEW YORK

Compound	Soil and Sediment					Groundwater				
	Number of Samples Analyzed[1]	Number of Detections	Maximum Concentration Detected (mg/kg)	Cleanup Objective[2] (mg/kg)	Number of Samples Above Cleanup Objective	Number of Samples Analyzed[1]	Number of Detections	Maximum Concentration Detected (µg/L)	Cleanup Objective[3] (µg/L)	Number of Samples Above Cleanup Objective
PCBs	**Surface Soil and Sediment/Subsurface Soil**									
Aroclor 1248	49/48	0/1	ND/0.21	1/10	0/0	7	2	21	0.09	2
Aroclor 1254	49/48	18/11	240/6.3	1/10	12/0	7	2	42	0.09	2
Aroclor 1260	49/48	45/21	160/110	1/10	26/3	7	4	100	0.09	4
Total PCBs (Lab)	49/48	45/23	240/116.3	1/10	30/3	7	4	142	0.1	4
VOCs	**Subsurface Soil**									
Benzene	19	0	ND	0.06	0	7	2	11	1	2
Chlorobenzene	19	2	34	1.7	1	7	2	540	5	2
Chloroform	19	0	ND	0.3	0	7	3	1.9	7	0
1,2-Dichlorobenzene	19	1	0.0027	7.9	0	7	1	3.5	3	1
1,3-Dichlorobenzene	19	3	6.7	1.6	1	7	4	50	3	4
1,4-Dichlorobenzene	19	4	1.1	8.5	0	7	4	48	3	4
1,1-Dichloroethane	19	1	0.0083	0.2	0	7	2	4.2	5	0
1,1-Dichloroethene	19	0	ND	0.4	0	7	2	6.4	5	1
cis-1,2-Dichloroethene[4]	19	0	ND	0.3	0	7	1	0.61	5	0
Ethylbenzene	19	0	ND	5.5	0	7	2	5.2	5	1
Methylene chloride	19	0	ND	0.1	0	7	1	0.56	5	0
Toluene	19	0	ND	1.5	0	7	1	1.2	5	0
1,1,1-Trichloroethane	19	0	ND	0.8	0	7	1	3.3	5	0
m-, p-Xylenes[5]	19	2	0.0012	1.2	0	7	2	25	5	2
o-Xylene[5]	19	0	ND	1.2	0	7	3	5	5	1
Total VOCs	19	6	34.78	10	1	7	5	626	NS	NS

Notes:
1. Laboratory analysis by EPA Methods 8082 (PCBs) and 8021 (VOCs)
2. Recommended Soil Cleanup Objectives (RSCOs) from NYSDEC TAGM HWR-94-4046
3. NYS Groundwater Standard (6 NYCRR Part 700), Division of Water TOGS, June 1998
4. Soil standards for trans-1,2-DCE
5. Standards for total xylenes
6. NA = Not Analyzed; ND = Not Detected; NS = No Standard

FIGURES

BASEMAP SOURCES:

REFERENCE

USGS 7.5-minute Series Topographic Maps:
- Buffalo Northwest Quadrangle 1965
- Buffalo Northeast Quadrangle 1965
- Tonawanda West Quadrangle 1980
- Tonawanda East Quadrangle 1980

Title: SITE LOCATION MAP

Location: 175 MILENS ROAD
TONAWANDA, NEW YORK

Client: GENERAL ELECTRIC INTERNATIONAL, INC.

URS Corporation
3 Corporate Drive, Suite 203
Clifton Park, New York 12065

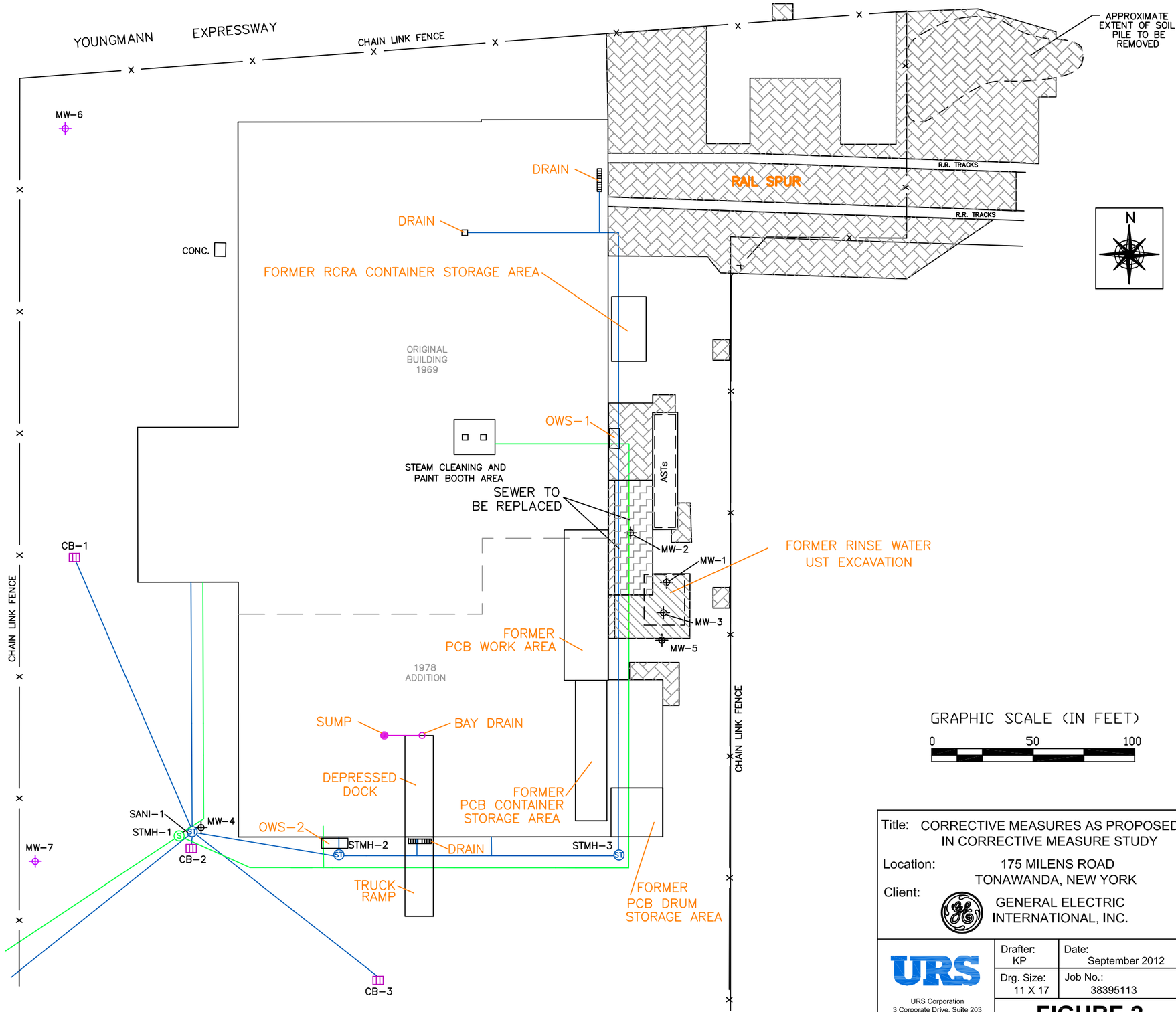
Drafter: KP	Date: September 2012
Drg. Size: 8.5 x 11	Job No.: 38395113

FIGURE 1

J:\38395113 GE Tonawanda CMIP and GC\CMI Plan\CMIP-figures\Figure 1 Site Location.dwg User:Karen_Peppin Oct 02, 2012 - 4:03pm

LEGEND

- ST – STORM MANHOLE
- S – SANITARY MANHOLE
- – CATCH BASIN
- – STORM SEWER
- – SANITARY SEWER
- – FLOOR DRAIN
- – TRENCH WITH FLOOR DRAIN
- – DEPRESSED DOCK SEWER
- – EXCAVATION TO 1 FOOT AND BACKFILL
- – EXCAVATION TO 4 FEET AND BACKFILL
- – EXCAVATION FROM 6 TO 12 FEET AND BACKFILL
- – EXCAVATION TO TOP OF FOOTINGS
- – 8 INCH STORM SEWER TO BE REPLACED
- – 4 INCH SANITARY SEWER TO BE REPLACED
- – EXISTING MONITORING WELL
- – NEW MONITORING WELL



GRAPHIC SCALE (IN FEET)

0 50 100

SOURCE: "MAP OF GENERAL ELECTRIC SERVICE CENTER PROPERTY, PART OF LOT 45, TOWNSHIP 12, RANGE 8, TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK" KRIEBEL ASSOCIATES, JULY 29, 1998.

Title: CORRECTIVE MEASURES AS PROPOSED IN CORRECTIVE MEASURE STUDY

Location: 175 MILENS ROAD TONAWANDA, NEW YORK

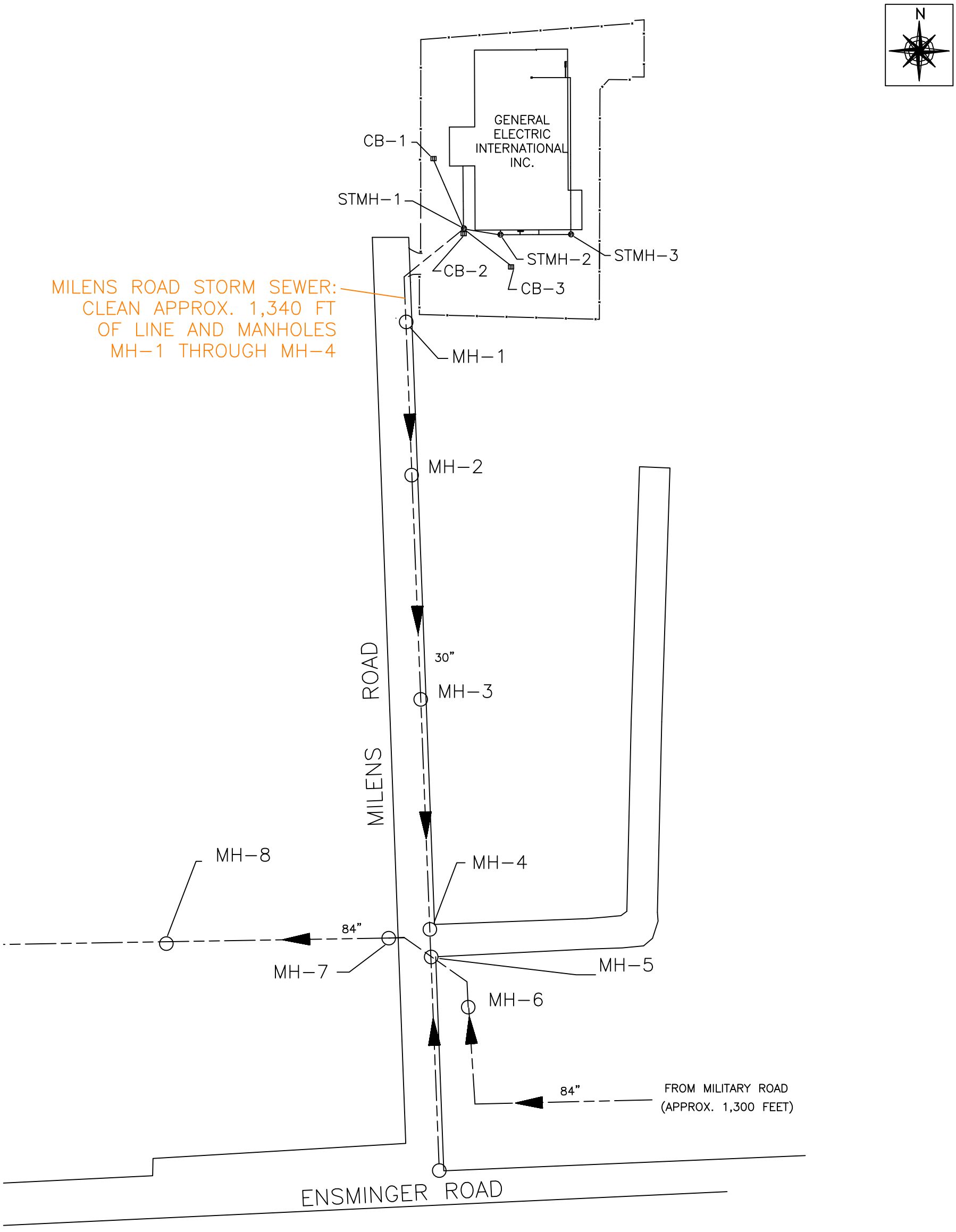
Client: GENERAL ELECTRIC INTERNATIONAL, INC.

URS Corporation
3 Corporate Drive, Suite 203
Clifton Park, New York 12065

Drafter: KP	Date: September 2012
Drg. Size: 11 X 17	Job No.: 38395113

FIGURE 2

J:\38395113 GE Tonawanda CMIP and GC\CMI Plan\CMIP-Figures\Fig 2 - CMS Alt 4 85030-31A.dwg User=Karen_Peppin Oct 02, 2012 - 4:16pm



0 200 400

APPROXIMATE GRAPHIC SCALE (IN FEET)

LEGEND

84" — SEWER PIPE DIAMETER

— APPROX. PIPE LOCATION

— FLOW DIRECTION

○ MH–3 — STORM MANHOLE

— STORM SEWER

CB–1 — CATCH BASIN

Title:	MILENS ROAD STORM SEWERS
Location:	175 MILENS ROAD TONAWANDA, NEW YORK
Client:	GENERAL ELECTRIC INTERNATIONAL, INC.

URS Corporation
3 Corporate Drive, Suite 203
Clifton Park, New York 12065

Drawn By: KP	Date: September 2012
Drg. Size: 11 x 17	Job No.: 38395113

FIGURE 3

J:\38395113 GE Tonawanda CMIP and GC\CMI Plan\CMIP-figures\Fig 3 - Milens Rd storm.dwg User:Karen_Peppin Oct 02, 2012 - 3:41pm

LEGEND

– DECOMMISSIONED PCB AREA

– FLOOR DRAIN

– TRENCH DRAIN

– STORM MANHOLE

– SANITARY MANHOLE

– CATCH BASIN

– STORM SEWER

– SANITARY SEWER

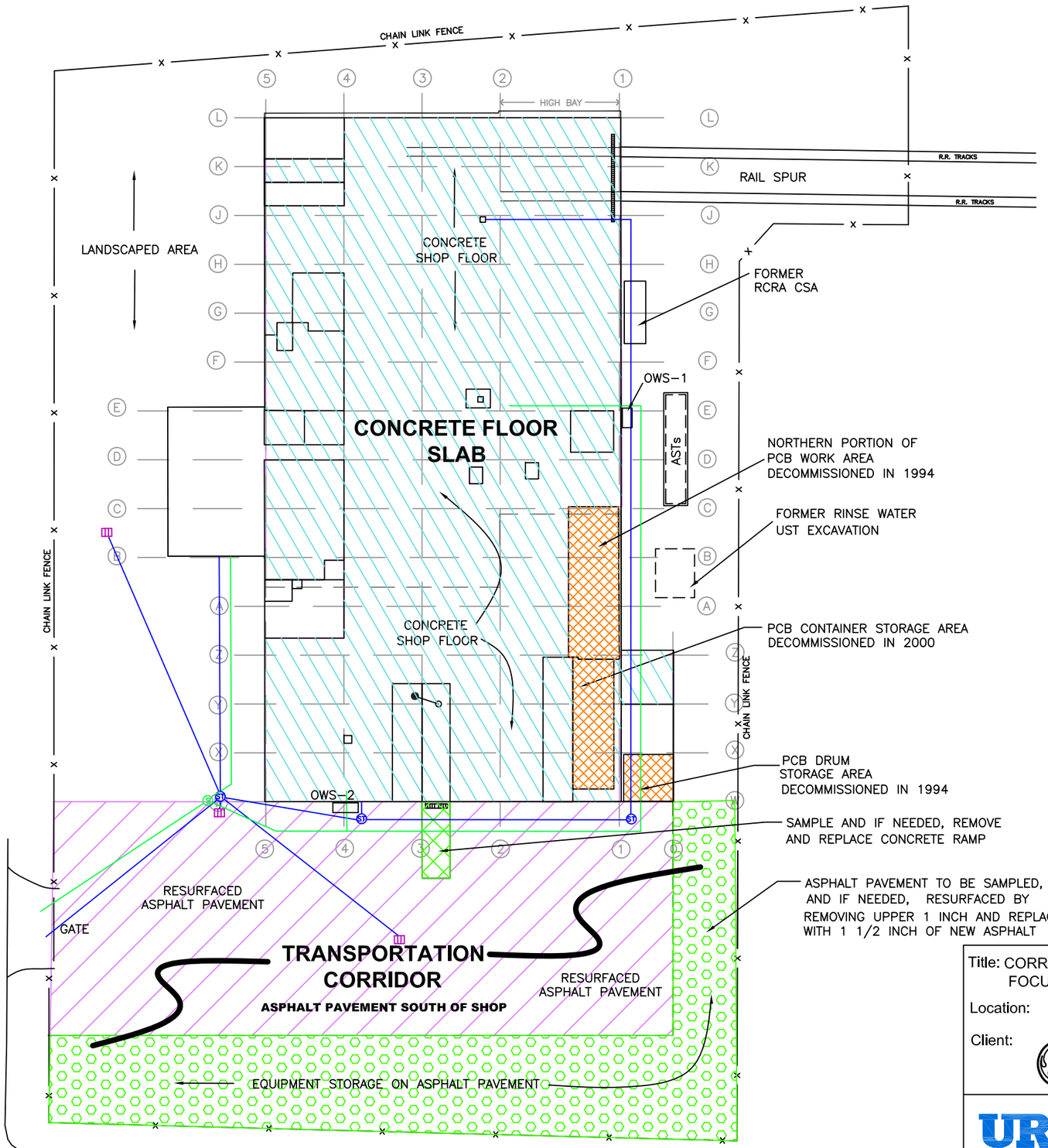
– COLUMN LINES

– CLEANED AND EPOXY COATED CONCRETE SURFACES (2003–2004)

– ASPHALT PAVEMENT – SURFACE REMOVED AND REPLACED (2004)

– CONCRETE RAMP TO BE SAMPLED, AND IF NECESSARY, REMOVED AND REPLACED

– ASPHALT PAVEMENT TO BE SAMPLED, WHEN ACCESSIBLE, AND (IF NECESSARY) SURFACE REMOVED AND REPLACED



NOTES:

1. THE LOCATIONS OF SITE FEATURES ARE APPROXIMATE.

2. IN DECEMBER 2004, THE TOP INCH OF ASPHALT PAVEMENT IN THE TRANSPORTATION CORRIDOR WAS REMOVED, DISPOSED OF OFF–SITE, AND REPLACED WITH NEW ASPHALT. THE ASPHALT BENEATH THE EQUIPMENT STORAGE WAS NOT ACCESSIBLE AND THEREFORE NOT REPLACED AT THAT TIME.

3. BETWEEN DECEMBER 2003 AND MAY 2004 THE FACILITY CONCRETE FLOOR WAS SUBJECTED TO A DOUBLE WASH AND DOUBLE RINSE AND EPOXY COATED WITH CONTRASTING COLORS AND LABELING.

4. SOURCES FOR THIS FIGURE WERE:
   A. "MAP OF GENERAL ELECTRIC SERVICE CENTER PROPERTY, PART OF LOT 45, TOWNSHIP 12, RANGE 8, TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK" KRIEBEL ASSOCIATES, JULY 29, 1998.
   B. "1/8" PART FLOOR PLAN AND DETAILS," CANNON DESIGN INC., AS–BUILT 4–19–78.

Title: CORRECTIVE MEASURES AS PROPOSED IN FOCUSED CORRECTIVE MEASURE STUDY

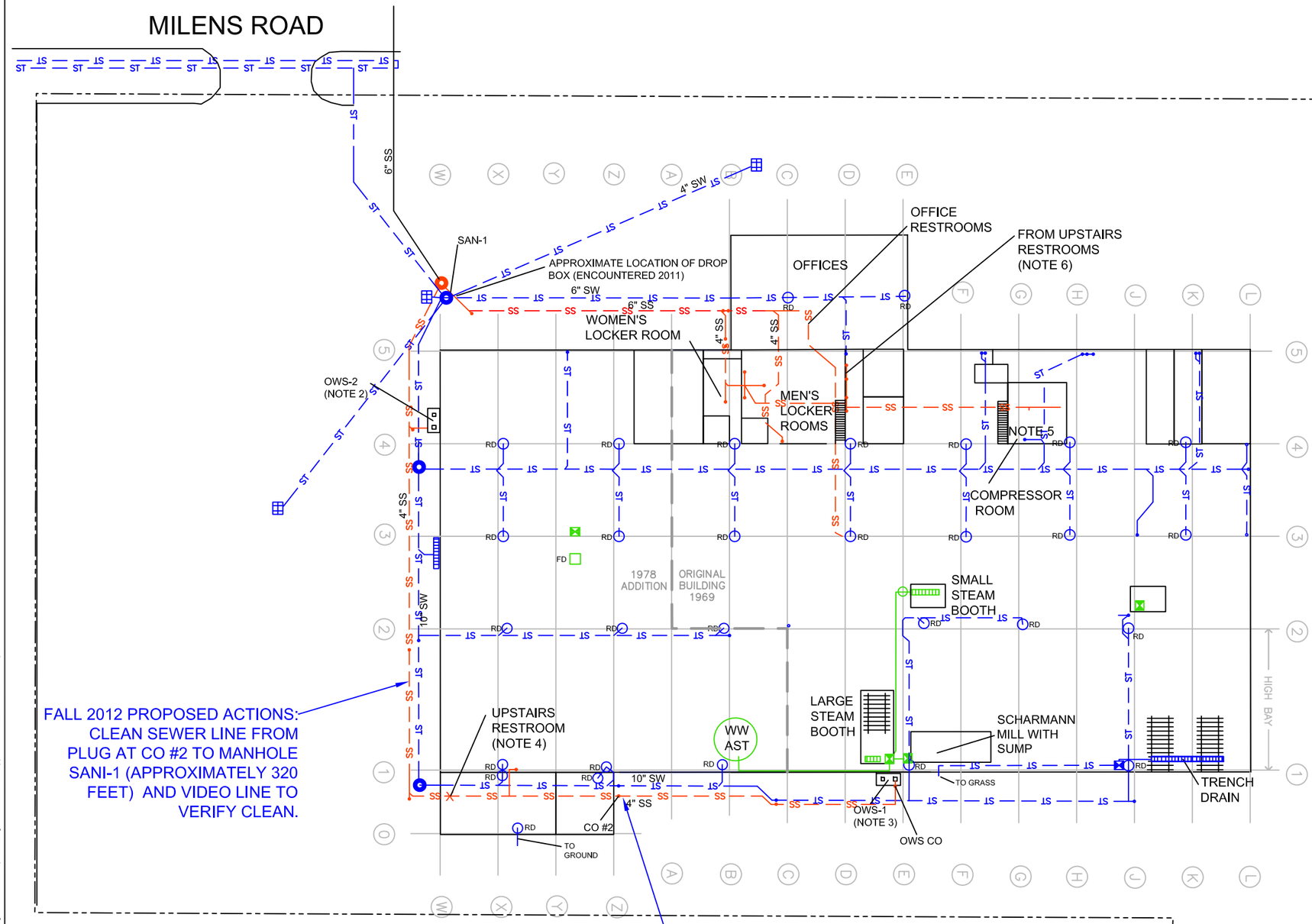
Location: 175 MILENS ROAD TONAWANDA, NEW YORK

Client: GENERAL ELECTRIC INTERNATIONAL, INC.

URS Corporation
3 Corporate Drive, Suite 203
Clifton Park, New York 12065

Drafter: KP	Date: September 2012
Drg. Size: 11 X 17	Job No.: 38395113

FIGURE 4



LEGEND

- PROPERTY LINE
- RAIL ROAD TRACKS
- SS — SANITARY SEWER PIPE - CLEANED 2011
- SANITARY MANHOLE
- SANITARY SEWER CLEAN OUT (CO)
- SANITARY SEWER TRAP (ST)
- OIL WATER SEPARATOR
- PROCESS WATER PIPE (NOTE 8)
- PROCESS WATER FLOOR DRAIN
- PROCESS WATER TRENCH DRAIN
- PROCESS WATER SUMP
- ST — STORM SEWER PIPE
- STORM SEWER MANHOLE
- STORM SEWER CATCH BASIN
- STORM SEWER TRENCH DRAIN
- STORM SEWER SUMP
- RD — ROOF DRAIN
- VENT OR HUB DRAIN
- STORM SEWER CLEAN OUT

ORIGINAL FIGURE IN COLOR

0 50 100

GRAPHIC SCALE (IN FEET)

DRAWING NOTES:

1. DRAWING BASED UPON HISTORICAL DRAWINGS OF FACILITY AND FIELD OBSERVATIONS. LOCATIONS ARE APPROXIMATE.
2. OWS-2 WAS ABANDONED IN FEBRUARY 1998. INFLUENT AND EFFLUENT LINES ARE PLUGGED (2011 CONFIRMATION).
3. OWS-1 REMOVED FROM SERVICE IN NOVEMBER 2010 AND INFLUENT REDIRECTED TO AST. INFLUENT AND EFFLUENT LINES ARE PLUGGED (2011 CONFIRMATION).
4. PIPE DETAIL FOR UPSTAIRS BATHROOM IN SOUTHEAST CORNER NOT SHOWN. JUNCTION WITH SANITARY SEWER MARKED WITH X.
5. COMPRESSOR (2) NON-CONTACT COOLING WATER DRAIN LINES ARE ½-INCH TO 1.5-INCH OVERHEAD AND TIE INTO SANITARY LINES FROM MEZZANINE RESTROOMS.
6. SANITARY PIPING FROM MEZZANINE RESTROOMS IS APPROXIMATE. DRESSING ROOM PIPING INFORMATION NOT SHOWN.
7. SIMPLIFIED DRAIN LAYOUT SHOWN FOR OFFICE RESTROOMS AND LOCKER ROOMS.
8. ALL PROCESS WATER IS CONTAINERIZED AND SENT FOR OFF-SITE DISPOSAL. THERE ARE NO REMAINING CONNECTIONS TO THE SANITARY SYSTEM.

Title: ON-SITE SEWERS CURRENT CONDITIONS

Location: 175 MILENS ROAD TONAWANDA, NEW YORK

Client: GENERAL ELECTRIC INTERNATIONAL, INC.

URS Corporation
3 Corporate Drive, Suite 203
Clifton Park, New York 12065

Drafter: KP	Date: October 2012
Drg. Size: 11 x 17	Job No.: 38395113

FIGURE 5

J:\38395113 GE Tonawanda CMP and GC\CMI Plan\CMP-figures\Fig 5 - Sewer Update.dwg User:Karen_Peppin Oct 02, 2012 - 4:12pm

FIGURE 6
CORRECTIVE MEASURE IMPLEMENTATION SCHEDULE

GENERAL ELECTRIC INTERNATIONAL, INC.
TONAWANDA, NEW YORK

Task Description	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14
Corrective Action Permit Issued 7/5/12																							
Develop Corrective Measure Implementation Plan																							
Prepare CMIP																							
Submit CMIP																							
NYSDEC Review of CMIP																							
Review & Address NYSDEC Comments																							
Submit Revised CMIP																							
NYSDEC Review of Revised CMIP																							
NYSDEC Approval of CMIP																							
Corrective Measure Implementation																							
Submit Monthly Progress Reports																							
Access																							
Initiate Contact and Negotiate Access																							
Permits																							
Evaluate If Needed																							
Obtain Permit(s), If Needed																							
Review Existing Data & Current Site Use																							
Pre-Design Investigation Work Plans																							
Prepare Investigation Work Plans																							
Submit Investigation Work Plans to NYSDEC																							
NYSDEC Review																							
NYSDEC Approves Investigation Work Plans																							
Conduct Design Investigations																							
Review Design Investigation Data																							
Design																							
Design (Remedial and Restoration)																							
Submit Remedial Design																							
NYSDEC Review of CMI Design																							
NYSDEC Approval of CMI Design																							
Contracting																							
Solicit Bid and Select Contractor																							
Remedial Construction																							
Submittals and Mobilization																							
Primary Remedial Field Work																							
Receipt of Validated Data																							
Restoration																							
Prepare Corrective Measure Completion Report																							
Prepare Corrective Measure Completion Report																							
Submit Corrective Measure Completion Report																							
Groundwater Monitoring - Annual for 5 Years																							
Prepare and Submit Groundwater Monitoring Plan																							
Implement Groundwater Monitoring Plan (5-year, annual)																							
Site Management																							
Prepare and Submit Site Management Plan																							
Implement Site Management Plan																							

HEALTH AND SAFETY PLAN
CORRECTIVE MEASURE IMPLEMENTATION

PARTS AND REPAIR SERVICE CENTER
GENERAL ELECTRIC INTERNATIONAL, INC.
TONAWANDA, NEW YORK

Job No.: 38395113
Prepared by: Don Porterfield
Preparation Date: September 25, 2012

HEALTH AND SAFETY PLAN
CORRECTIVE MEASURE IMPLEMENTATION

GE INSPECTION AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

		PHONE
Project Number:	38395113	
Project Manager:	Karen Peppin (Clifton Park, NY)	518-688-0015
Site Manager:	John Boyd	716-207-4093
Site Safety Officer:	John Boyd	716-207-4093
Plan Prepared By:	Don Porterfield (Clifton Park, NY)	518-688-0015
Preparation Date:	September 25, 2012	
Plan Updated:	n/a	

APPROVALS

Health and Safety Representative:

10/1/12

Sheldon Nozik **(DATE)**

Regional Manager, Health, Safety and Environment:

9/29/12

Ben Bertolotti CIH **(DATE)**

Project Manager:

9/25/12

Karen Peppin **(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 Manager, Health, Safety and Environment. A copy of this plan is to be maintained at the site at all times.

HEALTH AND SAFETY PLAN
TABLE OF CONTENTS

Section **Page**

Attachments

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
atm	atmosphere
C	ceiling
Carcinogen	a substance that can cause cancer
cc	cubic centimeter
CGI	combustible gas indicator
CNS	central nervous system
CSP	Certified Safety Professional
CRZ	contaminant reduction zone
DERA	Designated Emergency Response Authority
DOT	Department of Transportation
ESLI	End-of-Service-Life Indicator
eV	electron volts
EZ	Exclusion Zone
FID	flame ionization detector
HEPA	high-efficiency particular absolute
HSM	Health and Safety Manager
HSP	Health and Safety Plan
kg	kilogram
LEL	lower explosive limit
Lpm	liters per minute
m	meter
mg	milligram
mg/M^3	milligrams per cubic meter
ml	milliliter
mm	millimeter
MSDS	Material Safety Data Sheet
ND	not detected
NIOSH	National Institute for Occupational Safety and Health

GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS (Continued)

O_2	oxygen
OBZ	operator's breathing zone
OEL	occupational exposure limit
OHM	Oil and Hazardous Material
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
OVM	organic vapor monitor
PEL	permissible exposure limit
PID	photoionization detector
PM	project manager
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
REL	recommended exposure limit
RSO	Radiation Safety Officer
RMHSE	Regional Manager, Health, Safety, and Environment
SMS	Safety Management Standard
SSO	Site Safety Officer
SSR	Subcontractor's Safety Representative
STEL	short term exposure limit
TLV	threshold limit value
TWA	time-weighted average
UEL	upper explosive limit
URS	URS Corporation and subsidiaries
VOC	volatile organic compound

GE INSPECTION AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

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 (HSP) IS INTEGRAL TO THE SAFE CONDUCT OF SITE OPERATIONS AND MUST BE APPLIED IN ITS ENTIRETY.

EMERGENCY INFORMATION

Ambulance: **911**
Fire: **911** 716-875-8564 (Non-Emergency Number)
Police: **911** 716-874-8965 (Non-Emergency Number)
Hospital: 716-879-6100 (Kenmore Mercy Hospital at 2950 Elmwood Avenue, Buffalo, NY)
Occupational Clinic: 716-447-6474 (Health Works WNY, 2075 Sheridan Dr., Buffalo, NY)

Project Manager:	Karen Peppin	518-688-0015 (o) 518-409-0655 (m)
Health and Safety Representative:	Sheldon Nozik	716-923-1160 (o)
Regional Manager, Health, Safety, and Environment:	Ben Bertolotti	973-777-3003 (o) 973-572-3916 (m)
Alternates:	Sheldon Nozik	716-923-1160 (o) 716-998-7626 (m)
National Response Center:		800-424-8802

CLINIC DIRECTIONS:
To reach the occupational clinic from the service center, exit the site by turning left onto Milens Road (south); continue to end; turn left onto Ensminger Road (east); take the first right onto Military Road (south); turn left onto Sheridan Drive (Rt. 324) (east). The clinic is on the right side of the street.

HOSPITAL DIRECTIONS:
To reach the hospital from the service center, exit the site by turning left onto Milens Road; continue to end (south); turn left onto Ensminger Road (east); take the first right onto Military Road (south); turn left onto Sheridan Drive (Rt. 324) (east); make first right onto Elmwood Avenue (south). The hospital is on the right side of the street.

Note that persons without serious or life-threatening injuries should be escorted to an occupational health clinic or urgent care facility instead of a hospital. See Section 12.5

Additional information concerning emergency procedures is located in Section 12.0, and the hospital route map is located in Attachment A. A copy of the hospital route map must be readily available in each site vehicle that may be used to transport accident victims to the hospital.

CONSTITUENTS OF CONCERN

1. **Polychlorinated Biphenyls (PCBs)**
2. **Volatile Organic Compounds (VOCs), such as cholorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene**

Additional information regarding site history, constituents of concern, and scope of work activities is located in sections 2.0 and 5.0.

ACTION LEVELS

Analyzer Reading	Location	Duration	Action	Personal Protective Equipment
< 5 ppm	Operator's Breathing Zone (OBZ)	-----	Continue periodic monitoring.	Minimum Site Ensemble (See Page 4)
> 5 ppm	OBZ	>1 minute	Provide respiratory protection; establish decontamination area, and contact the PM.	Minimum site ensemble, plus coveralls, nitrile inner and outer gloves, and half-face air purifying respirators with organic vapor cartridges. Cartridges will be changed on a daily basis.
> 10 ppm	OBZ	>1 minute	Provide respiratory protection; establish decontamination area, and contact the PM.	Minimum site ensemble, plus coveralls, nitrile inner and outer gloves, and full-face air purifying respirators with organic vapor cartridges. Cartridges will be changed on a daily basis.
> 20 ppm Or > 75 ppm	OBZ	>1 minute Or Instantaneously	Stop work; move upwind while vapors dissipate. If elevated levels remain for more than 5 minutes, the source will be covered with clean soil, plastic sheeting, or foam, and the PM will be notified.	As specified by PM and RMHSE.

In the event of an emergency, workers must wear appropriate levels of protection for that activity. The appropriate level of protection would be determined by the SSM at the time of the emergency. Site work will be shut down during these activities.

PROJECT HAZARD ANALYSIS

Task	Chemical Hzds.	Heat/ Cold Stress	Noise	Slip/Trip/ Fall	Lifting Hzds.	Mechanical Hzds.	Electro-cution	Explosion	Exca-vation
1. Collection of soil, concrete, and asphalt samples	**Med**	**Med**	**Low**	**Med**	**Med**	**Med**	**Low**	**Low**	**N/A**
2. Gauging the thickness and collecting samples of water and sediment in sewer structures (may include confined space entry)	**Med**	**Med**	**Low**	**Med**	**High**	**High**	**Low**	**Low**	**N/A**
3. Oversight of removal of surface soil, asphalt, and concrete.	**Med**	**Med**	**Med**	**Med**	**Low**	**Med**	**Low**	**Low**	**Med**
4. Oversight of removal of subsurface soil.	**Med**	**Med**	**Med**	**Med**	**Low**	**Med**	**Low**	**Low**	**Med**
5. Oversight of sewer cleaning, replacement, and/or lining.	**Med**	**Med**	**Med**	**Med**	**Low**	**Med**	**Low**	**Low**	**Med**
6. Oversight of backfilling of excavations.	**Low**	**Med**	**Med**	**Med**	**Low**	**Med**	**Low**	**Low**	**Med**
7. Collection of waste characterization samples.	**Med**	**Med**	**Low**	**Med**	**Med**	**Low**	**Low**	**Low**	**N/A**
8. Collection of post-excavation samples.	**Med**	**Med**	**Med**	**Med**	**Med**	**Med**	**Low**	**Low**	**Med**
9. Oversight of restoration of asphalt and concrete.	**Low**	**Med**	**Med**	**Med**	**Low**	**Med**	**Low**	**Low**	**N/A**
10. Installation of groundwater monitoring wells.	**Med**	**Med**	**Med**	**Med**	**Med**	**Med**	**Low**	**Low**	**N/A**
11. Gauging water levels in monitoring wells and collecting groundwater samples.	**Med**	**Med**	**Low**	**Med**	**Med**	**Low**	**Low**	**Low**	**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.

Task	Minimum Protective Clothing/Equipment Requirements
1.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
2.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, leather gloves when removing manhole covers, traffic vest, barricades, and surgical nitrile gloves for handling samples. Coated tyvek, rubber boots, outer nitrile arm-length gloves and taped ankles and wrists if entering a sanitary sewer. All entrants must also wear full body harness.
3.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
4.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
5.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
6.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, surgical nitrile gloves for handling samples , traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
7.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
8.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
9.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.
10.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, surgical nitrile gloves for handling samples , traffic vest, if working near heavy equipment or drill rig and hearing protection near heavy equipment.
11.	Steel-toed boots, hard hat, safety glasses, nitrile gloves when handling potentially contaminated materials, traffic vest when working near heavy equipment or drill rig, and hearing protection near heavy equipment.

PROTECTIVE CLOTHING (FIRST ACTION LEVEL)

Chemical Protective Clothing

Outer Coveralls: **When splash hazard exists ***

Outer Gloves: **Nitrile or leather gloves (by task)**

Inner Gloves: **Surgical Nitriles**

Chemical protective steel-toed boots or chemical-resistant boot covers over steel-toed boots

*** Substitute poly-Coated Tyvek® if there is a potential for contact with liquids (sewer fluids, etc.)**

The HSP 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 2) and Sections 7.0 and 8.0.

ENGINEERING CONTROLS TO BE USED (AS APPLICABLE)

- **Allow manhole to vent after opening**
- **Natural wind forces to reduce exposure to airborne contaminants**

For more information, see Section 5.0.

INSTRUMENTATION TO BE USED

_x_ Organic Vapor Monitor (OVM), PID w/ 11.7 eV lamp OR EQUIVALENT PID
__ Photovac Microtip PID w/ __ eV lamp
__ MiniRAE PID w/ ___ eV lamp
Combustible Gas/O_2 Indicator
__ Foxboro Organic Vapor Analyzer (OVA) Flame Ionization Detector (FID)
__ Miniram Real-time Dust Monitor
_x_ Other __four-gas meter (O2/LEL/CO/H2S) for Confined Space entry_____

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 6.1.1
_X_ Is not anticipated

For more information on monitoring, see Section 6.0.

HAZ-COM MATERIALS INVENTORY

- **TSP or Alconox (decontamination)**
- **Isobutylene (calibration gas for PID)**
- **4-gas meter calibration gas**

HEALTH AND SAFETY EQUIPMENT LIST

Required	Not Required	
√		URS SMSs (relevant to project - see next page)
	√	Occupational Safety and Health Administration (OSHA) “Safety on the Job” Posters
√		Hardhats
√		Safety glasses
√		Ear plugs or muffs
	√	Cotton coveralls
√		Traffic safety vest (if working in high traffic areas)
	√	Tyvek® coveralls
√		Polycoated Tyvek® Q-23 coveralls
√		Steel-toed boots
√		Chemical-resistant steel-toed boots or chemical-resistant boot covers
√		Work gloves
√		Nitrile outer gloves
√		Surgical nitrile inner gloves
√		Plastic sheeting (visqueen)
√		55-gallon 17-H drums (for contaminated solids)
√		55-gallon 17-E drums (for liquids)
√		Drum liners
√		Barricade tape and barricades (for open manholes)
√		Wash tubs and scrub brushes
√		Decontamination solution (i.e., TSP)
	√	Folding chairs
	√	5- or 10-gallon portable eyewash
√		Respirator sanitizing equipment
√		First aid kit
√		Infection control kit
√		Drinking water
√		Gatorade or similar drink
√		Type ABC fire extinguishers
	√	Half-face respirators approved by National Institute for Occupational Safety and Health (NIOSH)
√		Full-face respirators (NIOSH-approved)
√		Respirator cartridges [organic vapor/P100 combo]
√		PID w/11.7 eV lamp and calibration kit
√		Combustible gas indicator (CGI) and calibration kit
	√	Garden sprayer
	√	Compressed gas horn
√		Duct tape
√		Paper towels and hand soap
	√	Spill sorbent
√		Plastic garbage bags
	√	Broom and/or shovel

SAFETY MANAGEMENT STANDARDS REFERENCED BY THIS HSP

SMS	TOPIC	HSP SECTION
046	Subcontractor Health and Safety Requirements	4.5
017	Hazardous Waste Operations	5.1.1
002	Worker Right to Know	5.1.2
010	Confined Space Entries	5.2.1
018	Heat Stress	5.2.2/7.1
059	Cold Stress	5.2.3
026	Noise and Hearing Conservation	5.2.4
021	Housekeeping	5.2.5
069	Manual Material Handling	5.2.6
013	Excavation Safety	5.2.7
019	Heavy Equipment Operations	5.2.7
056	Drilling Safety Guidelines	5.2.8
034	Utility Clearances	5.2.9
032	Traffic Control	5.2.10
047	Biological Hazards	5.3.1/5.3.2
051	Bloodborne Pathogens	5.3.1
043	Industrial Hygiene Monitoring	6.1.1
029	Personal Protective Equipment	7.0
042	Respiratory Protection	8.3/8.9
030	Sanitation	10.1
014	Fire Prevention	12.2
049	Incident Reporting	12.6/14.0

These SMSs are available on the URS Health and Safety Web site. Access the Web site from the SoURSe or through the Internet (www.urshse.com). User name, urshse; password, hardhat.

Copies of the SMSs referenced by this HSP are to be maintained on site. Project Managers (PMs) are responsible to see that other SMSs relevant to field activities, but not directly referenced by this HSP, also are available on site.

2.0 FACILITY BACKGROUND/WORK PLAN

2.1 SITE HISTORY

The General Electric International, Inc. (GE) Parts and Repair Service Center is at 175 Milens Road, Tonawanda, New York. GE has operated the service center since the late 1960s. The property comprises approximately 5.8 acres. The service center is an operating facility.

A RCRA Facility Assessment, a RCRA Facility Investigation, and several supplemental investigations have been performed at the site since 1988. These investigations documented the presence of PCBs and volatile organic compound contaminants in soil on the site. PCB impacts in soil are widespread along the eastern and southern sides of the shop building, and are within the concrete building slab. PCBS have been detected in soil at concentrations up to 240 mg/kg. VOC impacts are limited to the vicinity of the rinse tank excavation pit. The VOCs detected in soil are primarily chlorobenzenes at concentrations up to 34 mg/kg. The extent of impacts to site soil and groundwater has been limited by the clay underlying the site. PCBs have been detected in groundwater at concentrations up to 142 ug/L. The VOCs detected in groundwater are primarily chlorobenzenes at concentrations up to 540 ug/L. Impacts are generally shallow, except in locations of fill, such as pipe bedding material and the filled pit that formerly held a rinse tank. Sediment in the onsite storms sewers was found to contain concentrations of PCBs up 41,300 mg/kg, and was removed during interim corrective actions. Offsite storm sewers have also been impacted by PCBs at significantly lower concentrations. Sludge removed from the sanitary sewers in late 2011 contained PCBs at concentrations of 208 ppm. PCBs continue to be intermittently present in the sanitary sewer effluent after cleaning of the sewers in late 2011.

The facility recently received a permit from NYSDEC for Corrective Measure Implementation (CMI). The areas at and near the site where the permit requires corrective measures include:

- Former rinse water tank excavation
- Old oil/water separator
- Floor drains
- Sewers (storm and sanitary)
- Rail spur
- Truck bay
- Depressed dock
- Transportation corridor
- Two Mile Creek (work in this area is not included in the this plan)

The scope of the CMI program will include:

- Pre-design investigations of conditions at the site. These investigations will include collection of surface and subsurface soil samples. The investigations may also include groundwater sampling, collection of chip and core samples of asphalt and concrete, and collection of water and sediment samples from the sewer systems.
- Completion of design for the corrective measures at the site.
- Removal and off-site disposal of surface soil, asphalt, and concrete structures.
- Excavation and off-site disposal of subsurface soil.
- Collection of waste characterization samples and confirmatory samples from excavations.
- Dewatering and management (treatment or off-site disposal) of impacted perched groundwater.

- Replacement or cleaning and lining of subsurface sewer lines.
- Backfilling excavations.
- Restoring asphalt and concrete structures.
- Installation and sampling of groundwater monitoring wells.
- Long-term monitoring, maintenance, and repair of surface coverings.

2.2 PURPOSE AND SCOPE OF WORK

The elements of the scope of work covered by this Health and Safety Plan and the potential for URS or contractor personnel to handle materials containing PCBs or VOCs during each of the elements are:

Work Element	Potential to Handle PCB-Containing Materials	Potential to Handle VOC-Containing Materials
Collection of soil, concrete, and asphalt samples	High	Moderate
Gauging the thickness and collecting samples of water and sediment in sewer structures*	High	Low
Oversight of removal of surface soil, asphalt, and concrete by client's contractor	Moderate	Moderate
Oversight of excavation of subsurface soil by client's contractor	Moderate	High
Oversight of sewer replacement or cleaning and lining by client's contactor	Moderate	Moderate
Oversight of backfilling of excavations by client's contractor	Low	Low
Collection of waste characterization samples	High	Moderate
Collection of post-excavation samples	Moderate	Low
Oversight of restoration of asphalt and concrete by client's contractor	Low	Low
Installation of groundwater monitoring wells	Moderate	Low
Gauging water levels in monitoring wells and collecting groundwater samples from the wells	Moderate	Low

*Tasks conducted in or near the sanitary sewers pose a moderate risk of exposure to biological hazards that may be present in the sewage.

This Health and Safety Plan will be amended if additional work elements are needed to complete the Corrective Measure Implementation.

3.0 APPLICABILITY

The purpose of this HSP, which was developed specifically for operations at the **GE Tonawanda** site in **Tonawanda, New York** 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 HSP 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 HSP is to be used by URS personnel as a supplement to these rules, regulations, and guidance. This HSP is to be augmented by the URS Health and Safety Program and Management System; relevant standards from that program and system are required to be available on site during all activities.

The provisions of the HSP are mandatory for all onsite URS employees engaged in hazardous material management activities associated with this project, which may involve health and safety hazards.

Changing and/or unanticipated site conditions may require modification of this HSP to maintain a safe and healthful work environment. Any proposed changes to this plan will be reviewed with a URS health and safety professional prior to their implementation. If this is not feasible, the Site/Project Manager may modify the plan and record all changes in the field log book; under no circumstances will modifications to this plan conflict with federal, state, or other governmental health and safety regulations.

URS is providing a copy of this HSP 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 describes their plan for addressing applicable the health and safety requirements for activities that are unique to their scope of services (for example: drill rig operation, excavation safety, electrical safety, etc.).

4.0 RESPONSIBILITIES

URS will have site safety and health oversight and coordination responsibilities for URS 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.

URS will adhere strictly to the provisions of this HSP, along with applicable regulations issued by governmental entities. URS will coordinate work with facility personnel.

4.1 PROJECT MANAGER (URS)

The PM will direct URS onsite operations. The PM may delegate all or part of these duties to a properly qualified URS employee who is designated as the Site Manager. 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 URS employees.
- Establishing that URS personnel are aware of the provisions of this HSP, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies.
- Establishing that all URS 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 URS personnel are aware of the potential hazards associated with site operations.
- Monitoring the safety performance of all URS personnel to see that required work practices are employed.
- Correcting any URS work practices or conditions that may result in injury or exposure to hazardous substances.
- Preparing any accident/incident reports for URS activities (see Section 12.6).
- Seeing to the completion of Safety Plan Compliance Agreements by URS personnel (See Attachment B).
- Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Seeing that utility clearances are obtained prior to the commencement of work (see Section **5.2.7**).
- Seeing that the appropriate SMSs are appended to this HSP and are available on site (see "Plan-at-a-Glance").
- Reviewing and approving this project HSP.

4.2 SITE SAFETY OFFICER (URS)

The SSO's duties may be carried out by the PM or another qualified URS Site Manager. The SSO is responsible for the following.

- Implementing the project HSP and reporting any deviations from the anticipated conditions described in that plan to the PM and, if necessary, the RHSM.
- Determining that monitoring equipment is used properly by URS 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 health and safety representative to assure URS personnel have current medical clearance and training.
- Assuming any other duties as directed by the PM or RHSM.
- Coordinating with a URS health and safety professional to identify URS 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 13 of this HSP.
- 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.
- **Contacting the RHSM to perform personal industrial hygiene monitoring for aromatic hydrocarbons if the second action level is reached (>5 ppm in the OBZ), as described in the Action Level Table (page 4) and Section 6.1.1.**
- Seeing that decontamination procedures described in Section 10.0 are followed by URS personnel.
- Establishing monitoring of URS personnel and recording the results of exposure evaluations.
- Halting URS site operations, if necessary, in the event of an emergency or to correct unsafe work practices.
- Maintaining the visitor log.
- Posting OSHA "Safety of the Job" and other required posters at the site.

4.3 REGIONAL MANAGER, HEALTH, SAFETY, AND ENVIRONMENT (URS)

The RMHSEE is responsible for:

- Determining the need for periodic audits of the operation to evaluate compliance with this plan; and
- Providing health and safety support as requested by the SSO and PM.

4.4 PROJECT PERSONNEL (URS)

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 HSP and reporting any deviations from the procedures described in that HSP 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 URS personnel are aware of such problems; and
- Reviewing the project HSP and signing the Safety Plan Compliance Agreement.

4.5 SUBCONTRACTOR'S SAFETY REPRESENTATIVE

Subcontractors are requested to designate an on-site employee (preferably a manager) who will serve as the Safety Representative (SSR) for their company. In this capacity, the SSR is responsible for providing health and safety oversight of their personnel participating on the project team. In addition, the SSR will perform routine work area inspections, conduct safety meetings, provide safety orientations for new employees and investigate incidents involving their employees. The SSR will attend periodic safety meetings with the URS SSO. Additional information regarding Subcontractor health and safety requirements can be found in SMS 046 in Attachment D

5.0 JOB HAZARD ANALYSIS

In addition to the chemical, physical, and biological hazards described below, the service center is and active facility. Communication and coordination with the on-site GE Environmental Health and Safety coordinator will be necessary to minimize potential hazards stemming from a shared work site.

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 those that exist at the site and are the cause for conducting site activities. 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). Additional requirements for activities at sites where hazardous waste may be present can be found in SMS 017 in Attachment D.

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 HSP 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. 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. [NIOSH is deleted because it is merely recommended, and is based on a 10 hr workday]

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.

Summaries on the site constituents of concern follow.

Chemical Name	OSHA PEL	Routes of Exposure	Health Hazard/Target Organ	Symptoms of Overexposure
PCBs (42% Chlorine)	1 mg/m3 "skin"	Inhalation, skin absorption, ingestion, skin and/or eye contact	Skin, eyes, liver, reproductive system	Irritation of eyes, chloroacne, liver damage, potential carcinogen
PCBs (54% Chlorine)	0.5 mg/m3 "skin"	Inhalation, skin absorption, ingestion, skin and/or eye contact	Skin, eyes, liver, reproductive system	Irritation of eyes, chloroacne, liver damage, potential carcinogen
Chlorobenzene	75 ppm	Inhalation, skin and/or eye contact	CNS and eyes	Irritation of skin, eyes, and upper respiratory tract
1,4-Dichlorobenzene	75 ppm	Inhalation, ingestion, skin and/or eye contact	Eye and skin irritant, respiratory system, kidneys	Irritation of eyes, headache, nausea, weight loss, liver damage, and potential carcinogen

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). Inhalation of vapors or particulates during site activities will be minimized by the use of engineering controls. 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).

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. 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 C. The SSO will make copies of these MSDSs available to any URS subcontractors (i.e., drillers, excavators) on this project.

URS' written Hazard Communication Program is located in SMS 002, a copy of which is to be maintained on site.

5.2 PHYSICAL HAZARDS

Physical hazards at this work site include:

- Performing work at an operating facility;
- Confined spaces;
- Heat stress and cold stress;
- Noise from the operation of site equipment;

- Slip-trip-fall types of accidents;
- Back injuries resulting from improper lifting;
- Being caught in or struck by drilling or construction equipment; and
- Underground and aboveground utilities.

5.2.1 Confined Spaces

A Confined space, as defined in OSHA Standard 29 CFR 1910.146, is:

- Large enough for personnel entry;
- Has limited or restricted means for entry and exit; and
- Is not designed for continuous occupancy.

All confined spaces will be considered to be **permit-required spaces** until further investigation reveals the nature and extent of hazards. A permit-required confined space is a confined space that may present one of more potential hazards, such as hazardous atmospheres, fire/explosion, engulfment, entrapment, electrical, mechanical, or any other serious hazard.

Since some of the hazards described above may be encountered with an entry to the sewer manholes at the GE Tonawanda facility, therefore the manholes will be considered permit-required confined spaces.

Responsibilities

All URS confined space personnel will be trained to OSHA's level of Hazardous Materials Technician in accordance to 29 CFR 1910.120 – Hazardous Waste Operations. All URS personnel involved in the confined space work (attendants, entrants, and supervisors) shall be trained in confined space pursuant to OSHA 29 CFR 1910.146.

Entry Supervisor
The Entry Supervisor will be responsible for the acceptable entry conditions prior to entry and follow URS' Safety Management Standard 10 – Confine Space Entry. The Entry Supervisor will be responsible for ensuring that a Back-Up Rescuer is available at the time of entry.

Also, the Entry Supervisor has the authority to stop work and take corrective actions when conditions change.

Attendant
The Attendant's responsibility is to maintain contact with the Entrant at all times, which maybe through hand signals, radios, or verbal contact. The Attendant will also notify the Entry Supervisor of any conditions that may arise within the manhole, compromised equipment or that the Entrant expresses concern of the safety within. The Attendant will follow URS' Safety Management Standard 10 – Permit Required Confine Spaces.

Entrant
The Entrant's responsibility is performing tasks described above. The Entrant will be provided with the appropriate PPE ensemble to ensure his/her safety and also, have the authority to request extraction from the manhole if any safety issues arise. This Entrant will follow URS' Safety Management Standard 10 – Permit Required Confine Spaces.

Back-Up Rescuer
The Back-Up Rescuer's responsibility is to be trained to level acceptable to OSHA's Final Rule pertaining to Confine Spaces. He / She will be proficient at the following rescue positions; attendant, rescuer, rigger and air monitoring, and will have previously demonstrated confidence in all positions.

Site Control

The perimeter around the designated confined space will be marked with barrier tape and fluorescent orange pillars and cones. A sign will be visible stating "Danger Confine Space – Do Not Enter" or equivalent wording.

It is believed that traffic control will not be a concern on this project. However, upon arriving at the site, traffic concerns become an issue, measures will be implemented to reduce and control traffic, such as parking vehicle(s) to serve as an extra barrier.

Confined Space Preparation

As described in URS' SMS 010, the confined space will be prepared through space isolation, atmospheric testing, ventilation, and final authorization of the Permit.

Atmospheric testing will consist of oxygen levels, combustibles, carbon monoxide and hydrogen sulfide. Acceptable atmospheric levels for entry will consist of:

- Oxygen 19.5% – 23.3%
- Combustibles <10% LEL
- Carbon Monoxide < 35 ppm
- Hydrogen Sulfide < 2 ppm

To ensure acceptable atmospheric levels, in accordance to URS' SMS 010, ventilation will be continuous during entry. However, any atmospheric levels above or below the acceptable standards before or during entry will halt entry and applicable mechanical measures will be conducted to remove the limiting factor.

Personal Protective Equipment

The minimum required PPE ensemble for entry varies upon each duty being performed. The description of minimum PPE, for each position being performed, ensemble is as follows:

Entry Supervisor – Hard-hat, safety glasses, steel-toe boots (

Attendant – Tyvek suit, hard-hat, safety glasses, steel-toe boots, rubber over-boots, full-body harness, nitrile gloves and nitrile over-gloves.

Entrant – Tyvek suit, hard-hat, safety goggles, steel-toe boots, rubber over-boots, full-body harness, nitrile gloves and nitrile over-gloves.

Used PPE will be bagged at the entry site and then placed in a drum. The drum will be labeled in accordance to Federal and State regulations.

Decontamination

Decontamination of personnel and equipment will be in accordance to OSHA's Rule 29 CFR 1910.120 – Hazardous Waste Operations. Any applicable decon solution required on-site will also require a MSDS sheet filed in the project file.

Termination of Entry

Upon completion of work or a "Stop Work" order has been given the permit must obtain a signature from the Entry Supervisor. This should be accomplished after the space is resealed and signs and barricades removed.

Rescue Provisions

The manhole will be entered using a non-entry rescue technique, which will require the use of a tripod, winch, lanyard and full body harness. In the event that the primary system (tripod with winch) has failed, back-up rescue provisions will be utilized. For this project, the Back-Up Rescuer will be facility (GE) personnel, if trained personnel are available at the time of the work. Otherwise, local emergency personnel will be utilized.

A two-tier emergency level response will be determined by the type of emergency that is encountered during the project.

> Tier 1 – Depending on the emergency or unsafe conditions, it is the discrepancy of the Entry Supervisor to determine the need of additional resources (fire, police, and/or emergency medical services).
>
> Tier 2 – Emergency personnel will automatically be dispatched to the site.

A copy of emergency phone numbers will also be kept at the confine space location if unseen variables arise and further resources are needed.

5.2.2 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 (Attachment D), a copy of which is to be maintained on site.

5.2.3 Cold Stress Recognition and Control

Protection against cold stress will be initiated when temperatures drop below 45°F. Cold stress guidance is provided below and in SMS 059 (Attachment D).

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.

5.2.4 Noise Hazards

Previous surveys indicate that heavy equipment, such as ***drilling or construction*** equipment may produce continuous and impact noise at or above the action level of 85 dBA. All URS personnel within 25 feet of operating equipment or near an operation that creates noise levels high enough to impair conversation will wear hearing protective devices (either muffs or plugs). URS personnel who are in the Medical Surveillance Program are automatically enrolled in the URS Hearing Conservation Program and have had baseline and, where appropriate, annual audiograms. Personnel will wash their hands with soap and water prior to inserting earplugs to avoid initiating ear infections. Additional information regarding the URS Hearing Conservation Program is located in SMS 026, a copy of which is to be maintained on site.

5.2.5 Slip/Trip/Fall Hazards

Workers should 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. Workers should exercise caution around open manholes or excavations, such as test pits, and avoid getting closer than 2 feet to the edge of an unsloped excavation unless guardrails or fall protection is provided. If conditions become slippery, workers should take small steps with their feet pointed slightly outward to decrease the probability of slipping. Gravel or sand will be spread in muddy areas to reduce slipperiness. Workers should watch where they are walking and walk only in areas of good stability. URS SMS 021 (Attachment D) will be used to aid in the identification and elimination of slip/trip/fall hazards.

5.2.6 Lifting Hazards

The following guidelines will be followed whenever lifting equipment such as portable generators, coolers filled with samples, handling manhole covers, and any other objects that are of odd size or shape or that weigh over 50 pounds. Safe lifting procedures are described in SMS 069 (see attachment D), a copy of which is to be available on site. The procedures include the following.

- 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.

5.2.7 Heavy Equipment

Operation of heavy equipment during excavation and other site activities presents potential physical hazards to personnel. Issues associated with excavations and heavy equipment operations are addressed in SMS 013 and 019, respectively. Copies of these SMS shall be maintained on site.

The following precautions must be observed whenever heavy equipment is in use:

- Wear PPE, such as steel-toed shoes, safety glasses or goggles, and hard hats, whenever such equipment is present.
- At all times, be aware of the location and operation of heavy equipment, and take precautions to avoid getting in the way of its operation. Never assume that the equipment operator sees you. Make eye contact and use hand signals to inform the operator of your intent, particularly if you intend to work near or approach the equipment.
- Traffic safety vests **ARE REQUIRED** for URS personnel working near mobile heavy equipment, such as backhoes and other excavators.
- Never walk directly in back of or to the side of heavy equipment without the operator's acknowledgment.
- When an equipment operator must operate in tight quarters, the equipment subcontractor will provide a person to assist in guiding the operator's movements.
- Keep all non-essential personnel out of the work area.
- Any heavy equipment that is used in the exclusion zone (EZ) will remain in that zone until its task is completed. The equipment subcontractor will completely decontaminate such equipment in the designated equipment decontamination area as required prior to moving the equipment outside of the EZ/Contamination Reduction Zone (CRZ).

5.2.8 Drilling and Well Installation

The drill rig operator has superior knowledge regarding drill rig maintenance, operation, and safety. The following information provides general guidelines for safe practices onsite. See SMS 056, which is in Attachment D, for a summary of drilling safety guidelines.

Movement of Drill Rigs (Includes Geoprobe Equipment)

The following safety guidelines relate to off-road movement of drill rigs:

- Before moving a drill rig, first walk the route of travel, inspecting for depressions, slumps, gullies, ruts, and similar obstacles.

- Use a spotter or guide when moving a drill rig anywhere on site.

- Always lower the mast prior to drill rig movement.

- Always check the brakes of a drill rig carrier before traveling, particularly on rough, uneven, or hilly ground.

- Discharge all passengers before moving a drill rig on rough or hilly terrain.

- Engage the front axle of 4x4 or 6x6 vehicles or carriers when traveling off the highway on a hilly terrain.

- Use caution when traveling on a hillside. Conservatively evaluate the hillside capability of drill rigs, because the addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill.

- Attempt to cross obstacles such as small logs, small erosion channels or ditches squarely, not at an angle.

- When lateral or overhead clearance is close, use the assistance of someone on the ground as a guide.

Underground utilities are as dangerous as overhead lines. Be aware and always suspect the existence of underground utilities such as electrical power, gas, petroleum, telephone, sewer, and water. Ask for assistance:

- If a sign warning of underground utilities is located on a site boundary, do not assume that underground utilities are located on or near the boundary or property line under the sign; telephone the utility company and check it out. The underground utilities may be a considerable distance away from the warning sign.

- Always contact the owners of the utility lines or the nearest underground utility location service before drilling. The utility personnel should determine the location of underground lines and should mark and flag these locations. Determine, with the utility personnel, what specific precautions must be taken to assure safety.

Housekeeping On and Around the Drill Rig

To complete the first requirement for safe field operations, the safety supervisor of the drilling crew must understand and fulfill his responsibility for maintenance and "housekeeping" on and around the drill rig. Suitable storage locations should be provided for all tools, materials, and supplies. The locations should allow for the convenient handling of tools, materials or supplies without danger that these could fall on or hit a member of the drill crew or a visitor.

Avoid storing or transporting tools, materials, or supplies within or on the mast (derrick) of the drill rig. Pipe, drill rods, bits, casing, augers, and similar drilling tools should be stacked in an orderly manner on racks or sills to prevent spreading, rolling, or sliding.

Penetration hammers or other types of driving hammers should be placed at a safe location on the ground or secured to prevent movement when not in use. Work areas, platforms, walkways, scaffolding, and other access ways should be kept free of materials, obstructions, and substances such as ice, excess

grease, or oil that could cause a surface to become slick or otherwise hazardous. Keep all controls, control linkages, and warning and operation lights and lenses free of oil, grease, and/or ice.

Do not store gasoline in any portable container other than a non-sparking, red container with a flame arrestor in the fill spout. The word "gasoline" must be clearly visible on the container.

Use of Hand Tools

There are many kinds of hand tools that can be used on or around a drill rig. The most important rule is "use the tool for its intended purpose." The following are a few specific and general suggestions that apply to the safe use of several hand tools often used on and around drill rigs.

- When a tool becomes damaged, either repair it before using it again or discard it.
- When using a hammer for any purpose, wear safety glasses and require all others around you to do the same.
- When using a chisel for any purpose, wear safety glasses and require all others around you to do the same.
- Keep all tools cleaned and stored in an orderly manner when not in use.
- Replace hook and heel jaws when they become visibly worn.
- When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be caught between the wrench handle and the ground or the platform should the wrench slip or the joint suddenly let go.

Use of Augers

The following general procedures should be used when advancing a boring with continuous flight or hollow-stem augers:

- Prepare to start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at a low RPM.
- The operator and tool handler should establish a system of responsibility for the series of various activities required for auger drilling, such as connecting and disconnecting auger sections, and inserting and removing the auger fork. The operator must be sure that the tool handler is well away from the auger column and that the auger fork has been removed before starting rotation.
- Only use the manufacturer's recommended method of securing the auger to the power coupling. Do not touch the coupling or the auger with your hands, a wrench, or any other tool during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place your hands or fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.
- Never allow your feet to get under the auger section that is being hoisted.

- Stay clear of any rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.

- Never use your hands or feet to remove cuttings away from auger.

- Augers should be cleaned only when the drill rig is in neutral, and the augers have stopped rotating.

Start-Up Procedures

All drill rig personnel and visitors should be instructed to "stand clear" of the drill rig immediately prior to and during and starting of an engine. Before starting a drill rig engine, make sure that all of the gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers are in the correct non-actuating positions, and the cathead rope is not on the cathead.

Drill Rig Operation

Safety requires the attention and cooperation of every worker and site visitor. The following procedures are related to safety during drilling operations:

- Do not drive the drill rig from hole to hole with the mast in the raised position. Before raising the mast, look up to check for overhead obstructions.

- Before raising the mast, clear all drill rig personnel (with the exception of the operator) and visitors from the areas immediately to the rear and the sides of the mast. In addition, inform them that the mast is being raised.

- Before the mast of a drill rig is raised and drilling is commenced, the drill rig must first be leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig should be re-leveled if it settles after the initial set up. Lower the mast only when leveling jacks are down, and do not raise the leveling jack pads until the mast is completely lowered. Before starting drilling operations, secure and/or lock the mast, if required by the drill manufacturer's recommendations.

- The drill rig operator should operate a drill rig only from the position of the controls. The operator should shut down the drill engine before leaving the vicinity of the drill. "Horsing around" within the vicinity of the drill rig and tool and supply storage areas is strictly prohibited, even when the drill rig is shut down. Watch for slippery ground when mounting/dismounting the platform.

- Drilling operations should be terminated during an electrical storm.

- Consuming alcoholic beverages, depressants, stimulants, or any other chemical substance while on the job is strictly prohibited.

- All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors or animals from stepping or falling into the hole. All open boreholes will be covered, protected or backfilled adequately according to local or state regulations when the project is completed.

5.2.9 Underground and Aboveground Utilities

The Site Manager or SSO is responsible for locating underground utilities before the commencement of any subsurface (> 0.3 meter [1 ft.]) activities. Resources include site plans, utility companies, and

regional utility locating services. The proper utility company personnel will certify in writing to the Site Manager or SSO that underground utilities have been deactivated, and the certification will be retained in the project files.

Procedures for activities conducted proximate to utility locations are located in SMS 034, a copy of which is to be maintained on site.

Excavation, drilling, crane work, or similar operations adjacent to overhead lines will not be initiated until operations are coordinated with utility officials. Operations adjacent to overhead lines are prohibited unless one of the following conditions is satisfied.

Power has been shut off and positive means (e.g., lockout/tagout) have been taken to prevent lines from being energized. Wherever possible, the URS SSO will observe power shut off and place a lock and tag on the switch. In all cases, utility company personnel will certify in writing to the Site Manager or SSO that the overhead utilities have been deactivated, and the certification will be retained in the project files. The Site Manager or SSO must also attempt to verify power shut off by checking that power is no longer available to the affected building or equipment.

Equipment, or any part of the equipment, cannot come within the following minimum clearance from energized overhead lines:

Power Lines Nominal System (kv)	Minimum Required Clearance
0-50	**10 feet**
51- 200	**15 feet**
201-300	**20 feet**
301-500	**25 feet**
501-750	**35 feet**
751-1000	**45 feet**

5.2.10 Work Area Protection

Project operations may be undertaken in a roadway or parking lot, causing motor vehicles to pose a hazard. Guidance on properly coning and flagging the work area is provided in Attachment D (SMS 032). Consideration should be given to parking work vehicles within the coned area between the work area and oncoming traffic. Procedures for work zone traffic control are provided in SMS 032, a copy of which is to be maintained on site.

5.3 BIOLOGICAL HAZARDS

Possible biological hazards at this work site include:

- Sewage;
- Ticks;
- Poisonous Plants (i.e. Poison Ivy); and
- Mosquitoes.

5.3.1 Sewage

Sewage work does not typically involve exposure to bloodborne pathogens as covered under the OSHA standard, even though other biological hazards may be present. Water-borne pathogens that may be present in sewage include E. coli, and sewage should be treated as potentially infectious. To protect against water-borne biological hazards personnel must use protection such as impervious coveralls (poly coated tyvek), disposable gloves, boots, face shields, etc. 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. Work should be performed in a manner that prevents splashing. SMS 047 and 051 provide additional information regarding biological hazards and bloodborne pathogens.

5.3.2 Ticks

Tick bites can result in possible Lyme Disease, Rocky Mountain Spotted Fever, Babesiosis, and Ehrlichiosis. To protect against these illnesses, avoid areas that are likely infested with ticks especially in spring and summer; wear light colored clothing, long sleeves and pants and tuck pants into socks; and apply repellants. Always check your clothes and body for ticks at the end of the day and remove according to SMS 047 (Attachment D).

5.3.3 Poisonous Plants

Poison ivy, poison oak, and poison sumac are the most common cause of allergic contact dermatitis. Avoiding these plants is the best defense. Long sleeves and pants should also be worn if avoidance is not possible.

5.3.4 Mosquitoes

Mosquito borne diseases can be quite serious and all precautions should be taken to avoid getting bitten by a mosquito. Arboviral encephalitis is the most common disease found in mosquitos in the northeast. Insect repellent, long sleeves and pants, and mosquito netting should be used to avoid mosquito bites.

6.0 EXPOSURE MONITORING PLAN

Hazardous atmospheric conditions, heat stress, noise, and chemical exposures may be encountered during work at this site. Hazardous atmospheric conditions that potentially be encountered during confined space entry are addressed in Section 5.2.1. Heat stress monitoring and prevention is addressed in Section 5.2.2. Noise levels will not be monitored; URS personnel will wear hearing protection as described in Section 5.2.4.

6.1 CHEMICAL EXPOSURE MONITORING

The field instrumentation described in this HSP 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. **DO NOT SUBSTITUTE INSTRUMENTS WITHOUT THE CONSENT OF THE HSP PREPARER OR THE REGIONAL HEALTH AND SAFETY MANAGER.**

The monitoring equipment specified in Section 1.0 will be used on a regular basis to evaluate the potential for exposure to airborne contaminants, typically every five to ten minutes. 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 readings exceed the first action level (5 ppm > one minute), 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.

A reading in the OBZ above the second action level (5 ppm > one minute) will require the use of half-face respirators with appropriate cartridges. If we do not stock suitable half-face respirators, personnel will upgrade to full-face units. An OBZ reading above the third action level (10 ppm > one minute) will require the use of full-face respirators with appropriate cartridges. If the monitoring instrument reads more than the fourth action level (20 ppm > one minute or 75 ppm instantaneously), 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 Health and Safety Representative or PM will be contacted for further guidance.

6.2 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.

6.3 DATA LOGGING

All monitoring data, including background readings, will be logged in the field logbook. The results of daily instrument calibrations can be logged either on the form provided in Attachment E or in the 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, EXCAVATING) WILL CEASE UNTIL THE INSTRUMENT IS APPROPRIATELY REPAIRED OR REPLACED,** and the PM or RHSM will be contacted for further guidance.

6.4 DUST CONTROL

High winds and site operations can cause airborne dust hazards. If site operations generate sustained visible dust, a water mist will be applied to reduce dust generation. If the mist is not effective in reducing dust generation, personnel will don respirators (half-face or full-face, as appropriate for analyzer readings) with combination organic vapor/high efficiency particulate absolute (P100) cartridges (such as MSA's GMC-H cartridges).

Sand and Portland cement that may be used in groundwater monitoring well construction may contain free silica (quartz). Airborne exposure to silica dust may occur during the handling of these materials. Half- or full-face respirators with P100 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.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The minimum Personal Protective Equipment (PPE) for site personnel includes:

- Hardhat;
- Safety glasses with side shields (or impact-resistant goggles);
- Steel-toed boots or chemical-resistant steel-toed boots;
- Ear protection in the vicinity of noisy equipment;
- Work gloves and/or chemical-resistant gloves; and
- Traffic safety vest in the vicinity of heavy equipment.

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, a copy of which is to be maintained on site.

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 URS personnel.

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift.
- 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 uncoated Tyvek®). 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.]***

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.

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 HSP in determining respirator requirements for this project.

> *CAUTION: Full-face piece or half-face piece 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

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.

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, a copy of which is to 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. Chemical gas or vapor respirator cartridges will be ***changed out at least daily.***

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 headstraps, 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 nosecups, 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., Ziplock® 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, a copy of which is to be available on site.

9.0 SITE CONTROL

9.1 GENERAL

Barricade tape and/or barricades will be used to delineate a work zone for safety purposes around the work area. 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. The personnel decontamination station will be established at this point if formal decontamination procedures are required (see Section 10.0). 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 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 ***(with the assistance of the facility representative)*** will determine an upwind evacuation area prior to each shift, and all personnel will be notified of its location. 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.

The SSO will coordinate project work with the on-site GE Environmental Health and Safety coordinator.

The SSO will verify that all site visitors sign the visitors' log. In addition, all URS personnel and site visitors entering the work area must present evidence of their participation in a medical surveillance program and completion of health and safety training programs that fulfill the requirements of this HSP.

The SSO will provide site hazard and emergency action information to all site visitors before they enter the site. This can be done by providing a copy of this HSP to the visitor.

9.2 WORK ZONES

If monitoring instrument readings exceed the first action level (5 ppm > one minute), requiring the use of chemical protective equipment, work zones must be established as described below.

- EZ – A 25-foot circle (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 (visqueen) 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.
- CRZ – A corridor leading from the EZ will be defined; 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 HSP.

- 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).

10.0 DECONTAMINATION PROCEDURES

If the monitoring instrument readings indicate respirator use (the second action level [5 ppm > one minute]) in the OBZ, the following steps will be followed whenever personnel leave the EZ/work area.

- Remove all equipment, sample containers, and notes to the CRZ. Obtain decontamination solutions and decontaminate the tools (shovels, auger flights, etc.) by brushing them under a water rinse. A high-pressure steam cleaner also may be used for decontamination. All waste and spent decontamination solutions will be properly contained.
- Scrub boots with a stiff bristle brush and water. Washtubs and chairs will be provided.
- Remove outer gloves (and boot covers, if used).
- Remove Tyvek® coveralls; discard in provided container.
- Remove hardhat and eye protection.
- Remove respirator.
- Remove inner gloves.
- 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; see Sections 8.6 - 8.8). Cartridges will be changed in accordance with the procedures described in Section 8.4.

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

10.1 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.

Unless toilet facilities are available on site, or transportation is readily available (within five minutes) to transport personnel to nearby toilet facilities.

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 single-use towels will be available for personnel use. Employees will wash hands with soap and water after any exposure to sewage.

URS procedures for site sanitation are located in SMS 030, a copy of which is to be maintained on site.

10.2 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.

10.3 DECONTAMINATION OF TOOLS

When all work activities have been completed, contaminated tools used by URS personnel will be appropriately decontaminated or properly disposed of as hazardous waste.

Contact with PCB-contaminated media is not considered to be high. 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 disposed of as a PCB waste if it cannot be properly decontaminated.

Tools will be placed on a decontamination pad or into a bucket and thoroughly washed using a non-phosphate wash, tap water rinse, distilled water rinse, alconox rinse, air drying, and a second distilled water rinse. All visible particles are to be removed before the tool is considered clean.

11.0 SAFE WORK PRACTICES

11.1 GENERAL SITE RULES

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the contaminated or potentially contaminated area or where the possibility for the transfer of contamination exists.
- Alcohol consumption is prohibited during work hours. Excessive drinking is strongly discouraged at all times while the team is in the field. Use of prescription medications that impair judgment or affect motor skill and all illegal drugs are also prohibited. For additional information, please review the URS Substance Abuse Policy. Behavior that could endanger the health or safety of any individual of the field team will not be tolerated. Any individual violating these requirements will be subject to disciplinary action that may include termination.
- 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 10.0.
- 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.)
- All field crew members should remain alert to potentially dangerous situations in which they should not become involved (i.e., note the presence of strong, irritating, or nauseating odors, etc.).
- Only those vehicles and the equipment required to complete work tasks should be permitted within the EZ/work zone (drill rigs, excavators, and similar items). All non-essential vehicles should remain within the support zone.
- Containers, such as drums, will be moved only with the proper equipment and will be secured to prevent dropping or the loss of control during transport.
- Field survey instruments, such as PIDs, will be covered with plastic or similar coverings to minimize the potential for contamination.
- No matches or lighters are permitted in the work area/EZ or CRZ.
- 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.
- Spills should be prevented, to the extent possible. Should a spill occur, any liquid should be contained, if possible.
- Splashing of contaminated materials should be prevented.
- Field crew members should 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.

- The number of personnel and equipment in the EZ should be minimized, but only to the extent consistent with workforce requirements for safe site operations.
- 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 when sampling for hazardous material, when the first action level criterion has been exceeded, or when working in remote areas.
- Personnel are to immediately notify the SSO or Site Manager if any indications of potential explosions or unusual conditions are observed.

11.2 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 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.

11.3 SAMPLE SHIPMENT/HAZARDOUS MATERIALS SHIPMENT

If samples to be collected during the course of this project 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.

Shipping of samples that may contain PCBs cannot be shipped via FedEx air services unless strict packaging requirements are followed. Furthermore, the liability imposed by UPS for shipping samples that may contain PCBs also prohibits URS from using UPS. Samples that may contain PCBs may be shipped via FedEx ground services as long as holding times are not exceeded. It is recommended that a laboratory or qualified independent courier services is used to transport the samples to the laboratory for analysis.

12.0 EMERGENCY RESPONSE PLAN

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. These procedures are to be reviewed during the onsite safety briefings conducted by the SSO.

In the event of a fire or medical emergency, the emergency numbers identified in Section 1.0 (page 1) can be called for assistance.

12.1 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 (typically, the URS field office, unless conditions dictate otherwise). The SSO ***(in cooperation with a facility representative)*** will designate a primary assembly area prior to the start of work each day. The assembly area may have to be re-designated by the SSO in the event that the area of influence of an emergency affects the primary assembly area. Once personnel are assembled, the SSO will do a head count. The SSO will evaluate the assembly area to determine whether it is outside of the influence of the situation; if it is not, the SSO will redirect the group to a new assembly area where a new head count will be taken.

During any site evacuation, all employees will be instructed to observe wind direction indicators. During evacuation, employees will be instructed to travel upwind or crosswind of the area of influence. The SSO will provide site personnel with specific evacuation instructions via the site emergency radio, if necessary, specifying the actual site conditions.

12.2 FIRE

Fire prevention procedures are described in SMS 014, a copy of which is to be maintained on site. To protect against fires, the following special precautions must be taken.

- Before any flame-producing devices (i.e., cutting torches or welding irons) are used in the EZ, the SSO must be contacted. In some cases, the client may require to be contacted as well, to determine whether a hot work permit is required. A detailed inspection of the work area will be conducted to determine whether potential fire sources exist; if they do, they must be removed to at least 35 feet away before work can commence.
- Two 2A10B:C fire extinguishers must be located at the work area when cutting or welding is being conducted, and a fire watch will be posted.
- Upon completion of the cutting/welding activities, the area will be inspected for hot metal, slag, etc. The fire watch will remain at its station for at least 15 minutes after the hot work is completed.

Type ABC fire extinguishers will be available on site to contain and extinguish small fires. The local or facility fire department will be summoned in the event of any fire on site.

12.3 COMMUNICATION

A communication network must be set up to alert site personnel of emergencies and to summon outside emergency assistance. Where voice communication is not feasible, an alarm system (i.e., sirens, horns, etc.) will be set up to alert employees of emergencies. Radio communication also may be used to communicate with personnel in the EZ. Where phone service is not readily available, radios or portable telephones will be used to communicate with outside agencies. Site personnel will be trained on the use of the site emergency communication network. Emergency phone numbers will be posted at the phone or radio used for outside communication. The SSO is responsible for establishing the communication network prior to the start of work and for explaining it to all site personnel during the site safety briefing.

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 backup support
Grip partner's wrist	Exit area immediately

12.4 EMERGENCY RESPONSE PROCEDURES

The emergency response team will consist of employees 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.

  In the event of an emergency, follow the procedures outlined in Figure 12-1. Notify site personnel of the situation, survey the scene to determine whether the situation is safe, to determine what happened, and to search for other victims. The Emergency Response Checklist provided on the next page can be used to help remember the things to do in an emergency.

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:		
Project Manager		
Fire Department		
Police Department		
Nearest Hospital or Medical Care Facility		
Start Documentation		
If spill or leak occurs:		
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		
A copy of the document submitted to the HSM		

12.5 MEDICAL EMERGENCY RESPONSE PLAN

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;
- Emergency telephone numbers list; and
- Portable radios for emergency communications in remote areas.

Drugs, inhalants, or medications will not be included in the first aid kit.

Supplies should be reordered as they are used. A monthly inventory must be done on the first aid kit and infection control kit contents, and supplies that have been used must be reordered.

12.6 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 Office Health and Safety Representative (*716-998-7626*) or the RHSM (*973-572-3916*). Work is to be stopped until the PM or SSO have determined the cause of the incident and have taken the appropriate action to prevent a recurrence. Any injury or illness, regardless of severity, is to be reported (see SMS 049). Site injuries and illnesses will also be reported to the on-site GE Environmental Health and Safety coordinator by the SSO.

12.7 OPERATION SHUTDOWN

In certain extremely hazardous situations, the SSO or SSR may request that site operations be temporarily suspended while the underlying hazard is corrected or controlled. During operations shutdowns, all personnel will be required to stand upwind to prevent exposure to fugitive emissions. The SSO, with concurrence from the RHSM, will have ultimate authority for operations shutdown and restart. The SSO will promptly notify the on-site GE Environmental Health and Safety coordinator of all situations that may impact GE personnel.

12.8 SPILL OR HAZARDOUS MATERIALS RELEASE

Small spills are immediately reported to the SSO 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 small spills for approved storage and disposal. The SSO will notify the on-site GE Environmental Health and Safety coordinator of spill or release of hazardous materials.

In the unlikely event of a larger release of hazardous materials as a result of site activities, site personnel will evacuate to the predestinated assembly area. The local Designated Emergency Response Authority (DERA) will be notified by the SSO immediately, and appropriate actions will be taken to protect public health and mitigate the contaminant release. The DERA can be reached through the local police or fire department. The Site Manager will make the following emergency contacts:

Regional Health and Safety Manager	**Ben Bertolotti 973-777-3003**
Health and Safety Representative	**SheldonNozik 716-923-1160**
Project Manager	**Karen Peppin 518-688-0015**
EPA Response Center (if reportable quantity is exceeded)	**(800) 424-8802**
NYSDEC Spill Response	**(800) 457-7362)**

13.0 TRAINING, MEDICAL SURVEILLANCE, SITE INSPECTIONS

13.1 TRAINING AND MEDICAL SURVEILLANCE

All URS site personnel 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 URS personnel performing confined space entry work (entrant supervisor, attendant, and entrant) will have met the training requirements of 29 CFR 1919.146.

All URS site 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 are maintained by the local office.

In addition, all URS site personnel will review this HSP and sign a copy of the Safety Plan Compliance Agreement provided in Attachment B. The PM will maintain these agreements at the site and place them in the project file at the conclusion of the operation.

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 HSP;
- 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.

13.2 SITE INSPECTIONS

The URS Site Manager or SSO is to conduct a daily site inspection prior to the start of each shift. It is the responsibility of the PM or Site Manager to resolve discrepancies immediately, contacting the RHSM 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.

14.0 RECORDKEEPING

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

All URS personnel will review the HSP and sign the Safety Plan Compliance Agreement in Attachment B; copies of these forms will be maintained in the project file as noted in Section 12.

The SSO will conduct a Site Safety Briefing in accordance with Section 13 and have all attendees sign the form in Attachment B; copies will be maintained in the project file.

All permit required confined space permit forms and monitoring data forms will be kept in the project folder.

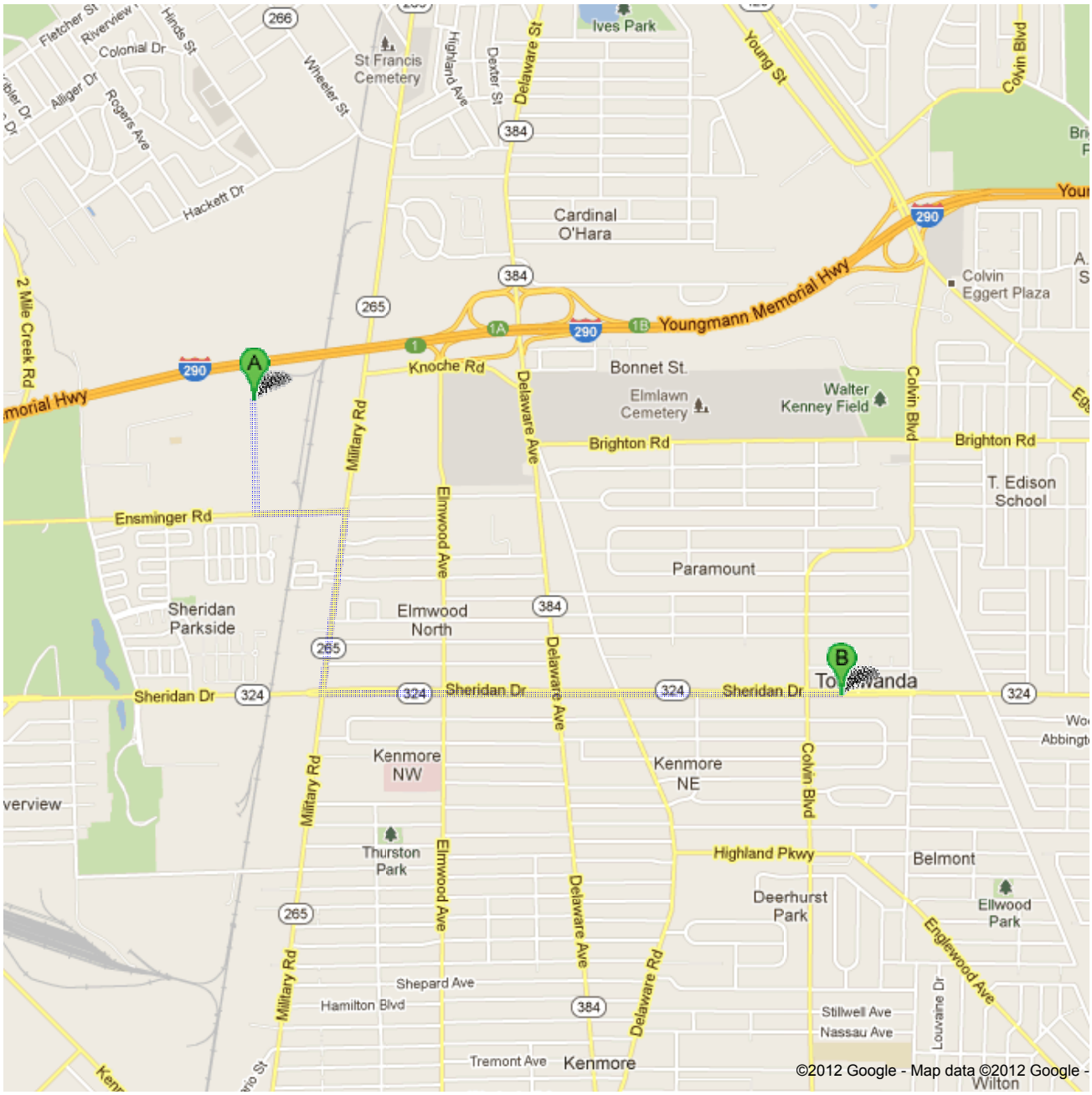
Any incident or exposure incident will be investigated and the Incident Report form (SMS 049) will be completed and forwarded to the Office Human Resources Representative and the RHSM. GE may require that incident report form also be filled out.

All instrument readings and calibrations, PPE use and changes, health and safety-related issues, and deviations from or problems with this HSP will be recorded in the field log.

ATTACHMENT A

HOSPITAL ROUTE MAP

Directions to 2075 Sheridan Dr, Buffalo, NY 14223
2.5 mi – about **7 mins**
Healthy Works WNY, LLC
Dr. Mark Costanza
(716) 447-6474



175 Milens Rd, Tonawanda, NY 14150

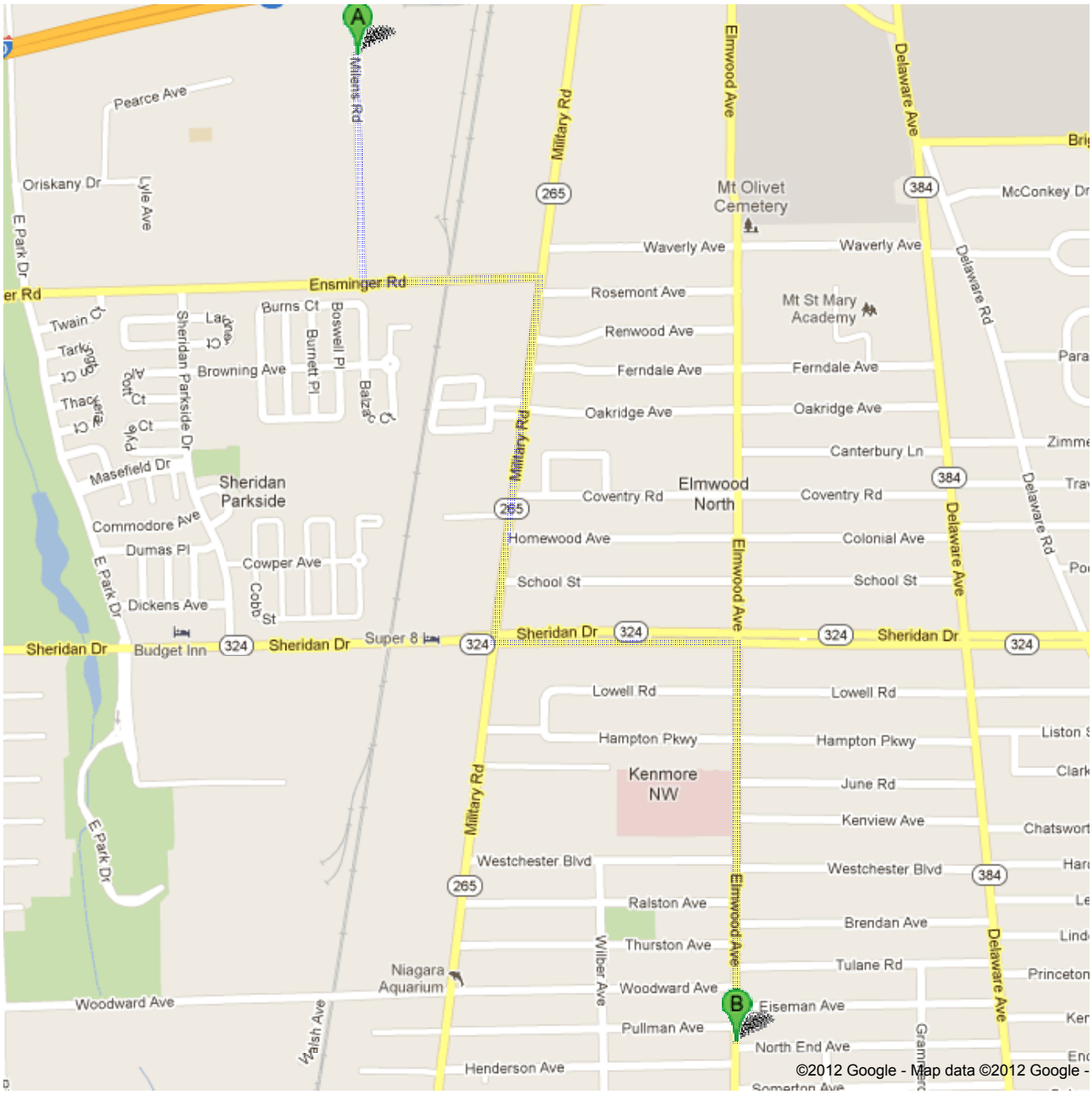
1.	Head **south** on **Milens Rd** toward **Ensminger Rd** About 46 secs	go 0.3 mi total 0.3 mi
2.	Turn left onto **Ensminger Rd** About 1 min	go 0.2 mi total 0.6 mi
3.	Turn right onto **Military Rd** About 1 min	go 0.5 mi total 1.1 mi
4.	Turn left onto **Sheridan Dr** Destination will be on the right About 4 mins	go 1.4 mi total 2.5 mi

2075 Sheridan Dr, Buffalo, NY 14223

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Directions to 2950 Elmwood Ave, Kenmore, NY 14217
2.0 mi – about **6 mins**
Kenmore Mercy Hospital
(716) 447-6100



175 Milens Rd, Tonawanda, NY 14150

	1. Head **south** on **Milens Rd** toward **Ensminger Rd** About 46 secs	go 0.3 mi total 0.3 mi
	2. Turn left onto **Ensminger Rd** About 1 min	go 0.2 mi total 0.6 mi
	3. Turn right onto **Military Rd** About 1 min	go 0.5 mi total 1.1 mi
	4. Turn left onto **Sheridan Dr** About 1 min	go 0.3 mi total 1.4 mi
	5. Take the 1st right onto **Elmwood Ave** Destination will be on the right About 1 min	go 0.6 mi total 2.0 mi

2950 Elmwood Ave, Kenmore, NY 14217

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

ATTACHMENT B
SAFETY PLAN COMPLIANCE AGREEMENT AND
MEDICAL EMERGENCY CONTACT SHEET

I, _____, have received a copy of the Health and Safety Plan for this Project. I have reviewed the plan, 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.

SIGNED: _____ _____
Signature Date

Firm: URS Corp.

This brief Medical Emergency Contact Sheet will be kept in the Support Zone during site operations. It is in no way a substitute for the Medical Surveillance Program requirements of the URS Health and Safety Program. This data sheet will accompany injured personnel when medical assistance or transport to hospital facilities is necessary.

Emergency Contact: _____ Phone #: _____

Relationship: _____

Do you wear contact lenses? _____

ATTACHMENT C

MATERIAL SAFETY DATA SHEETS

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2009/04/20

D.O.T. Classification: Not regulated.

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 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

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 / CHEMICAL CHARACTERISTICS

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 AND EXPLOSION HAZARD 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.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

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 : HEALTH HAZARD DATA

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.

First Aid

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.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

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.

Section 8 : CONTROL 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 capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

AIR LIQUIDE

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
U.S. SUPPLIER/MANUFACTURER'S NAME:	CALGAZ
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
BUSINESS PHONE:	1-410-228-6400 (8 a.m. to 5 p.m. U.S. EST)
General MSDS Information:	1-713-868-0440
Fax on Demand:	1-800-231-1366
EMERGENCY PHONE:	
Chemtrec: United States/Canada/Puerto Rico:	1-800-424-9300 [24-hours]
Chemtrec International:	1-703-527-3887 [24-hours]

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH	OTHER
			TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	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	OBSERVED EFFECT
12-16% Oxygen:	Breathing and pulse rate increase, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea, vomiting, collapse, or loss of consciousness.
Below 6%:	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
FLAMMABILITY HAZARD	(RED)	0
PHYSICAL HAZARD	(YELLOW)	0

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.

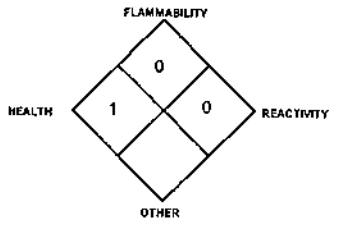
FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

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 fatal 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 lbs/ ft^3 (1.153 kg/m^3)
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 (ft^3/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/cu ft (1.326 kg/m^3)
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 at 32°F (0°C) and 1 atm: 0.04.91
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 (ft^3/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:
LC_{50} (inhalation, rat) = 620,000 mg/kg/4 hours
LC_{50} (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 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): 126
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 (outer package). Pertinent shipping information goes on the outside of the outer package. 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): 126
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(r) 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/NDSL 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 recommended recycling for scrap metal content. CALGAZ 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"

AIR LIQUIDE

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: NON-FLAMMABLE GAS MIXTURE

Containing One or More of the Following Components in a Nitrogen Balance Gas:Oxygen, 0.0015-23.5%;Methane, 0.0005-2.5%;Carbon Monoxide, 0.0005-1.0%; Hydrogen Sulfide, 0.001-0.025%

SYNONYMS: Not Applicable
CHEMICAL FAMILY NAME: Not Applicable
FORMULA: Not Applicable
Document Number: 50018

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
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-8400
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					
			ACGIH		OSHA		NIOSH	OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	ppm
Oxygen	7782-44-7	0.0015 - 23.5%	There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5%.					
Methane	74-82-8	0.0005 - 2.5%	There are no specific exposure limits for Methane. Methane is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Hydrogen Sulfide	7783-06-4	0.001- 0.025 %	10 (NIC = 5)	15	10 (Vacated 1989 PEL)	20 (ceiling); 50 (ceiling, 10 min. peak once per 8-hour shift 15 (vacated 1989 PEL)	100	NIOSH REL: STEL = 10 (ceiling) 10 minutes DFG-MAKs: TWA = 10 PEAK = 2•MAK, 10 min., momentary value
Carbon Monoxide	630-08-0	0.0005 - 1.0%	25	NE	50 35 (Vacated 1989 PEL)	200 [ceiling] (Vacated 1989 PEL)	1200	NIOSH RELS: TWA = 35 STEL = 200 (ceiling) DFG MAKs: TWA = 30 PEAK = 2•MAK, 15 min., average value DFG MAK Pregnancy Risk Classification: B
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. NIC = Notice of Intended Change 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 gas mixture is a colorless gas which has a rotten-egg odor (due to the presence of Hydrogen Sulfide). The odor cannot be relied on as an adequate warning of the presence of this gas mixture, because olfactory fatigue occurs after over-exposure to Hydrogen Sulfide. Hydrogen Sulfide and Carbon Monoxide (another component of this gas mixture) are toxic to humans in relatively low concentrations. Over-exposure to this gas mixture can cause skin or eye irritation, nausea, dizziness, headaches, collapse, unconsciousness, coma, and death. Additionally, releases of this gas mixture may produce oxygen-deficient atmospheres (especially in small confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated.

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. A potential health hazard associated with this gas mixture is the potential of inhalation of Hydrogen Sulfide, a component of this gas mixture. Such over-exposures may occur if this gas mixture is used in a confined space or other poorly-ventilated area. Over-exposures to Hydrogen Sulfide can cause dizziness, headache, and nausea. Over-exposure to this gas could result in respiratory arrest, coma, or unconsciousness, due to the presence of Hydrogen Sulfide. Continuous inhalation of low concentrations of Hydrogen Sulfide may cause olfactory fatigue, so that the odor is no longer an effective warning of the presence of this gas. A summary of exposure concentrations and observed effects are as follows:

CONCENTRATION OF HYDROGEN SULFIDE	OBSERVED EFFECT
0.3-30 ppm	Odor is unpleasant.
50 ppm	Eye irritation. Dryness and irritation of nose, throat.
Slightly higher than 50 ppm	Irritation of the respiratory system.
100-150 ppm	Temporary loss of smell.
200-250 ppm	Headache, vomiting nausea. Prolonged exposure may lead to lung damage. Exposures of 4-8 hours can be fatal.
300-500	Swifter onset of symptoms. Death occurs in 1-4 hours.
500 ppm	Headache, excitement, staggering, and stomach ache after brief exposure. Death occurs within 0.5 - 1 hour of exposure.
> 600 ppm	Rapid onset of unconsciousness, coma, death.
> 1000 ppm	Immediate respiratory arrest.

NOTE: This gas mixture contains a maximum of 250 ppm Hydrogen Sulfide. The higher concentration values here are presented to delineate the complete health effects which have been observed for humans after exposure to Hydrogen Sulfide.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	3
FLAMMABILITY HAZARD	(RED)	0
PHYSICAL HAZARD	(YELLOW)	0

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
See Section 8			

For Routine Industrial Use and Handling Applications

3. HAZARD IDENTIFICATION (continued)

Inhalation over-exposures to atmospheres containing more than the Threshold Limit Value of Carbon Monoxide (25 ppm), another component of this gas mixture, can result in serious health consequences. Carbon Monoxide is classified as a chemical asphyxiant, producing a toxic action by combining with the hemoglobin of the blood and replacing the available oxygen. Through this replacement, the body is deprived of the required oxygen, and asphyxiation occurs. Since the affinity of Carbon Monoxide for hemoglobin is about 200-300 times that of oxygen, only a small amount of Carbon Monoxide will cause a toxic reaction to occur. Carbon Monoxide exposures in excess of 50 ppm will produce symptoms of poisoning if breathed for a sufficiently long time. If this gas mixture is released in a small, poorly ventilated area (i.e. an enclosed or confined space), symptoms which may develop include the following:

CONCENTRATION OF CARBON MONOXIDE	OBSERVED EFFECT
All exposure levels:	Over-exposure to Carbon Monoxide can be indicated by the lips and fingernails turning bright red.
200 ppm:	Slight symptoms (i.e. headache) after several hours of exposure.
400 ppm:	Headache and discomfort experienced within 2-3 hours of exposure.
1,000 -2000 ppm:	Within 30 minutes, slight palpitations of the heart occurs. Within 1.5 hours, there is a tendency to stagger.
200-2500 ppm:	Within 2 hours, there is mental confusion, headaches, and nausea. Unconsciousness within 30 minutes.
>2500 ppm:	Potential for collapse and death before warning symptoms.

Additionally, if mixtures of this gas mixture contain less than 19.5% Oxygen and are released in a small, poorly ventilated area (i.e. an enclosed or confined space), 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 following effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN	OBSERVED EFFECT
12-16% Oxygen:	Breathing and pulse rate increased, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea, vomiting, collapse, or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

SKIN and EYE CONTACT: Hydrogen Sulfide, a component of this gas mixture, may be irritating to the skin. Inflammation and irritation of the eyes can occur at very low airborne concentration of Hydrogen Sulfide (less than 10 ppm). Exposure over several hours may result in "gas eyes" or "sore eyes" with symptoms of scratchiness, irritation, tearing and burning. Above 50 ppm of Hydrogen Sulfide, there is an intense tearing, blurring of vision, and pain when looking at light. Over-exposed individuals may see rings around bright lights. Most symptoms disappear when exposure ceases. However, in serious cases, the eye can be permanently damaged.

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. However the Hydrogen Sulfide and Carbon Monoxide components of this gas mixture are toxic to humans. Over-exposure to this gas mixture can cause nausea, dizziness, headaches, collapse, unconsciousness, coma, and death. Due to the presence of Hydrogen Sulfide, over-exposures to this gas mixture can also irritate the skin and eyes; severe eye contamination can result in blindness.

CHRONIC: Severe over-exposures to the Hydrogen Sulfide component of this gas mixture, which do not result in death, may cause long-term symptoms such as memory loss, paralysis of facial muscles, or nerve tissue damage. In serious cases of over-exposure, the eyes can be permanently damaged. Skin disorders and respiratory conditions may be aggravated by repeated over-exposures to this gas product. Refer to Section 11 (Toxicology Information) for additional information on the components of this gas mixture. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, blood system, central nervous system effects, cardiovascular system, skin, eyes. CHRONIC: Neurological system, reproductive system, eyes.

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. 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).

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.

SKIN EXPOSURE: If irritation of the skin develops after exposure to this gas mixture, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.

EYE EXPOSURE: If irritation of the eye develops after exposure to this gas mixture, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Seek medical assistance immediately, preferably an ophthalmologist.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing respiratory conditions may be aggravated by over-exposure to this gas mixture. Carbon Monoxide, a component of this gas mixture, can aggravate some diseases of the cardiovascular system, such as coronary artery disease and angina pectoris. Because of the presence of Hydrogen Sulfide, eye disorders or skin problems may be aggravated by over-exposure to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate over-exposure. Hyperbaric oxygen is the most efficient antidote to Carbon Monoxide poisoning, the optimum range being 2-2.5 atm. A special mask, or, preferably, a compression chamber to utilize oxygen at these pressures is required. Avoid administering stimulant drugs. Be observant for initial signs of pulmonary edema in the event of severe inhalation over-exposures.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

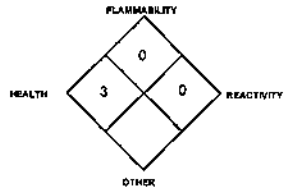
AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

NFPA RATING



FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture contains toxic gases, Hydrogen Sulfide and Carbon Monoxide, and presents an health hazard to firefighters. 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.

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 over-exposure to Hydrogen Sulfide and Carbon Monoxide, the toxic components of this gas mixture, and other safety hazards related to the remaining components of this gas mixture, 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. For emergency disposal,

6. ACCIDENTAL RELEASE MEASURES (continued)

secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors. Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for Hydrogen Sulfide, Carbon Monoxide, and Oxygen. Hydrogen Sulfide and Carbon Monoxide level must be below exposure level listed in Section 2 (Composition and Information on Ingredients) and 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, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify cylinders containing a gas mixture with Hydrogen Sulfide or Carbon Monoxide. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Eye wash stations/safety showers should be near areas where this gas mixture is used or stored. All work operations should be monitored in such a way that emergency personnel can be immediately contacted in the event of a release. All work practices should minimize releases of Hydrogen Sulfide and Carbon Monoxide-containing gas mixtures.

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 Oxygen, Hydrogen Sulfide, and Carbon Monoxide.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if the levels of components exceeds exposure limits presented in Section 2 (Composition and Information of Ingredients) and Oxygen levels are below 19.5%, or unknown, during emergency response to a release of this gas mixture. 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 19.16.33% 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). The following NIOSH respiratory protection recommendations for Hydrogen Sulfide and Carbon Monoxide are provided for further information.

NIOSH/OSHA RECOMMENDATIONS FOR HYDROGEN SULFIDE CONCENTRATIONS IN AIR:

Up to 100 ppm:	Powered air-purifying respirator with cartridge(s) to protect against hydrogen sulfide; gas mask with canister to protect against hydrogen sulfide; or SAR; or full-facepiece SCBA.
Emergency or Planned Entry into Unknown Concentration or IDLH Conditions:	Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
Escape:	Gas mask with canister to protect against hydrogen sulfide; or escape-type SCBA
NOTE:	The IDLH concentration for Hydrogen Sulfide is 100 ppm.

NIOSH/OSHA RECOMMENDATIONS FOR CARBON MONOXIDE CONCENTRATIONS IN AIR:

Up to 350 ppm	Supplied Air Respirator (SAR)
Up to 875 ppm	Supplied Air Respirator (SAR) operated in a continuous flow mode.
Up to 1200 ppm	Gas mask with canister to protect against carbon monoxide; or full-facepiece SCBA; or full-facepiece Supplied Air Respirator (SAR).
Emergency or Planned Entry into Unknown Concentration or IDLH Conditions:	Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece Supplied Air Respirator (SAR) with an auxiliary positive pressure SCBA.
Escape:	Gas mask with canister to protect against carbon monoxide; or escape-type SCBA. NOTE: End of Service Life Indicator (ESLI) required for gas masks.
NOTE:	The IDLH concentration for Carbon Monoxide is 1200 ppm.

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, the main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: .072 lbs/ ft^3 (1.153 kg/m^3)
FREEZING/MELTING POINT @ 10 psig: -345.8°F (-210°C)
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.
VAPOR PRESSURE @ 70°F (21.1°C) (psig): Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.
BOILING POINT: -320.4°F (-195.8°C)
pH: Not applicable.
MOLECULAR WEIGHT: 28.01
EXPANSION RATIO: Not applicable.
SPECIFIC VOLUME (ft^3/lb): 13.8

The following information is for this gas mixture.

ODOR THRESHOLD: 0.13 ppm (Hydrogen Sulfide)
APPEARANCE AND COLOR: This gas mixture is a colorless gas which has an rotten egg-like odor, due to the presence of Hydrogen Sulfide.
HOW TO DETECT THIS SUBSTANCE (warning properties): Continuous inhalation of low concentrations of this gas mixture may cause olfactory fatigue, due to the presence of Hydrogen Sulfide, so the odor is not a good warning property of 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. Wet lead acetate paper can be used for leak detection. The paper turns black in the presence of Hydrogen Sulfide. Cadmium chloride solutions can also be used. Cadmium solutions will turn yellow upon contact with Hydrogen Sulfide.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.

DECOMPOSITION PRODUCTS: The thermal decomposition products of Methane include carbon oxides. The decomposition products of Hydrogen Sulfide include water and sulfur 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 Nitrogen (the main component of this gas mixture). Lithium reacts slowly with Nitrogen at ambient temperatures. Components of this gas mixture (Hydrogen Sulfide, Methane) are also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride). Carbon Monoxide is mildly corrosive to nickel and iron (especially at high temperatures and pressures). Hydrogen Sulfide is corrosive to most metals, because it reacts with these substances to form metal sulfides.

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:

NITROGEN:

There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

METHANE:

There are no specific toxicology data for Methane. Methane is a simple asphyxiant, which acts to displace oxygen in the environment.

CARBON MONOXIDE:

LC_{50} (Inhalation-Rat) 1807 ppm/4 hours

LC_{50} (Inhalation-Mouse) 2444 ppm/4 hours

LC_{50} (Inhalation-Guinea Pig) 5718 ppm/4 hours

LC_{50} (Inhalation-wild bird species) 1334 ppm

LCLo (Inhalation-Human) 4 mg/m^3/12 hours: Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Blood: methemoglobinemia-carboxyhemoglobin

LCLo (Inhalation-Man) 4000 ppm/30 minutes

LCLo (Inhalation-Human) 5000 ppm/5 minutes

LCLo (Inhalation-Dog) 4000 ppm/46 minutes

LCLo (Inhalation-Rabbit) 4000 ppm

LCLo (Inhalation-Mammal-species unspecified) 5000 ppm/5 minutes

TCLo (Inhalation-Human) 600 mg/m^3/10 minutes: Behavioral: headache

TCLo (Inhalation-Man) 650 ppm/45 minutes: Blood: methemoglobinemia-carboxyhemoglobin; Behavioral: changes in psychophysiological tests

TCLo (Inhalation-Rat) 1800 ppm/1 hour/14 days-intermittent: Cardiac: other changes

TCLo (Inhalation-Rat) 30 mg/m^3/8 hours/10 weeks-intermittent: Brain and Coverings: other degenerative changes; Behavioral: muscle contraction or spasticity

TCLo (Inhalation-Rat) 96 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes

TCLo (Inhalation-Rat) 250 ppm/5 hours/20 days-intermittent: Blood :pigmented or nucleated red blood cells, changes in other cell count (unspecified), changes in erythrocyte (RBC) count

TDLo (Subcutaneous-Rat) 5983 mg/kg/18 weeks-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol)

TCLo (Inhalation-Monkey) 200 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes

TCLo (Inhalation-Rabbit) 200 mg/m^3/3 hours/13 weeks-intermittent: Brain and Coverings: other degenerative changes; Cardiac: other changes; Blood: hemorrhage

TCLo (Inhalation-Guinea Pig) 200 mg/m^3/5 hours/30 weeks-continuous: Cardiac: arrhythmias (including changes in conduction), EKG changes not diagnostic of specified effects, pulse rate increase, without fall in BP

CARBON MONOXIDE (continued):

TCLo (Inhalation-Mouse) 50 ppm/30 days-intermittent: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi

TCLo (Inhalation-Guinea Pig) 200 mg/m^3/5 hours/4 weeks-intermittent: Endocrine: hyperglycemia

TCLo (Inhalation-Guinea Pig) 200 ppm/24 hours/90 days-continuous: Blood: pigmented or nucleated red blood cells, other changes

TCLo (Inhalation-Rat) 75 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Maternal Effects: other effects; Effects on Newborn: behavioral

TCLo (Inhalation-Rat) 150 ppm/24 hours: female 1-22 day(s) after conception: Reproductive: Specific Developmental Abnormalities: cardiovascular (circulatory) system

TCLo (Inhalation-Rat) 150 ppm/24 hours: female 1-22 day(s) after conception: Reproductive: Effects on Newborn: growth statistics (e.g.%, reduced weight gain), behavioral

TCLo (Inhalation-Rat) 1 mg/m^3/24 hours: female 72 day(s) pre-mating: Reproductive: Maternal Effects: menstrual cycle changes or disorders, parturition; Fertility: female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated)

TCLo (Inhalation-Rat) 150 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Effects on Newborn: behavioral

TCLo (Inhalation-Rat) 75 ppm/24 hours: female 0-20 day(s) after conception: Reproductive: Specific Developmental Abnormalities: immune and reticuloendothelial system

TCLo (Inhalation-Mouse) 65 ppm/24 hours: female 7-18 day(s) after conception: Reproductive: Effects on Newborn: behavioral

TCLo (Inhalation-Mouse) 250 ppm/7 hours: female 6-15 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Specific Developmental Abnormalities: musculoskeletal system

TCLo (Inhalation-Mouse) 125 ppm/24 hours: female 7-18 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus)

TCLo (Inhalation-Mouse) 8 pph/1 hour: female 8 day(s) after conception: Reproductive: Fertility: litter size (e.g. # feluses per litter; measured before birth); Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), fetal death

CARBON MONOXIDE (continued):

TCLo (Inhalation-Rabbit) 50 ppm/24 hours/8 weeks-continuous: Blood: changes in platelet count

TCLo (Inhalation-Mouse) 8 pph/1 hour: female 8 day(s) after conception: Reproductive: Specific Developmental Abnormalities: Central Nervous System

TCLo (Inhalation-Rabbit) 180 ppm/24 hours: female 1-30 day(s) after conception: Reproductive: Effects on Newborn: stillbirth, viability index (e.g., # alive at day 4 per # born alive)

Micronucleus Test (Inhalation-Mouse)1500 ppm/10 minutes

Sister Chromatid Exchange (Inhalation-Mouse) 2500 ppm/10 minutes

HYDROGEN SULFIDE:

LC_{50} (Inhalation-Rat) 444 ppm: Lungs, Thorax, or Respiration: other changes; Gastrointestinal: hypermotility, diarrhea; Kidney, Ureter, Bladder: urine volume increased

LC_{50} (Inhalation-Mouse) 634 ppm/1 hour

LCLo (Inhalation-Human) 600 ppm/30 minutes

LCLo (Inhalation-Man) 5700 µg/kg: Behavioral: coma; Lungs, Thorax, or Respiration: chronic pulmonary edema

LCLo (Inhalation-Human) 800 ppm/5 minutes

LCLo (Inhalation-Mammal-species unspecified) 800 ppm/5 minutes

TCLo (Inhalation-Rat) 30 ppm/6 hours/10 weeks-intermittent: Sense Organs and Special Senses (Olfaction): olfactory nerve change, effect, not otherwise specified

TCLo (Inhalation-Rat) 1200 mg/m^3/2 hours/5 days-intermittent: Brain and Coverings: other degenerative changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase

TCLo (Inhalation-Rat) 100 ppm/8 hours/5 weeks-intermittent: Brain and Coverings: other degenerative changes; Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: cytochrome oxidases (including oxidative phosphorylation)

TCLo (Inhalation-Rat) 80 ppm/6 hours/90 days-intermittent: Brain and Coverings: changes in brain weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain

TCLo (Inhalation-Rat) 20 ppm: female 6-22 day(s) after conception lactating female 21 day(s) post-birth: Reproductive: Effects on Newborn: physical

TCLo (Inhalation-Mouse) 80 ppm/6 hours/90 days-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain; Related to Chronic Data: death

TCLo (Inhalation-Rabbit) 40 mg/m^3/5 hours/30 weeks-intermittent: Sense Organs and Special Senses (Eye): conjunctive irritation

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: This gas mixture is irritating to the eyes, and may be irritating to the skin.

SENSITIZATION OF PRODUCT: The components of this gas mixture are not known to be skin or respiratory sensitizers.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture on the human reproductive system.

Mutagenicity: The components of this gas mixture are not reported to cause mutagenic effects in humans.

REPRODUCTIVE TOXICITY INFORMATION (continued):

Embryotoxicity: This gas mixture contains components that may cause embryotoxic effects in humans; however, due to the small total amount of the components, embryotoxic effects are not expected to occur.

Teratogenicity: This gas mixture is not expected to cause teratogenic effects in humans due to the small cylinder size and small total amount of all components. The Carbon Monoxide component of this gas mixture which exists up to 1%, can cause teratogenic effects in humans. Severe exposure to Carbon Monoxide during pregnancy has caused adverse effects and the death of the fetus. In general, maternal symptoms are an indicator of the potential risk to the fetus since Carbon Monoxide is toxic to the mother before it is toxic to the fetus.

Reproductive Toxicity: The components of this gas mixture are not reported to cause adverse reproductive effects in humans.

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): Biological Exposure Indices (BEIs) have been determined for components of this gas mixture, as follows:

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
CARBON MONOXIDE • Carboxyhemoglobin in blood • Carbon monoxide in end-exhaled air	 • End of shift • End of shift	 • 3.5% of hemoglobin • 20 ppm

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.

CARBON MONOXIDE:

Atmospheric Fate: A photochemical model was used to quantify the sensitivity of the tropospheric oxidants ozone (O_3) and OH to changes in methane (CH_4), Carbon Monoxide (CO), and NO emissions and to perturbations in climate and stratospheric chemistry. In most cases, increased CH_4 and CO emissions will suppress OH (negative coefficients) in increased O_3 (positive coefficients) except in areas where NO and O_3 influenced by pollution are sufficient to increased OH. In most regions, NO, CO, and CH_4 emission increased will suppress OH and increased O_3, but these trends may be opposed by stratospheric O3 depletion and climate change.

HYDROGEN SULFIDE:

Water Solubility = 1 g/242 mL at 20°C.

Plant toxicity: Continuous fumigation of plants with 300 or 3000 ppb Hydrogen Sulfide caused leaf lesions, defoliation, and reduced growth with severity of injury correlated to dose. At higher (3.25 and 5.03 ppm) Hydrogen Sulfide, significant reductions in leaf CO2 and water vapor exchanges occurred, and stomatal openings were depressed. When Hydrogen Sulfide gas was applied to 29 species of green plants for 5 hours, young, rapidly elongating tissues were more sensitive to injury than older tissues. Symptoms included scorching of young shoots and

12. ECOLOGICAL INFORMATION(continued)

leaves, basal and marginal scorching of older leaves. Mature leaves were unaffected. Seeds exposed to Hydrogen Sulfide gas showed delay in germination.

Persistence: Converts to elemental sulfur upon standing in water.

Major Species Threatened: Aquatic and animal life plants may be injured if exposed to 5 ppm in air over 24 hours.

Biodegradation: Microorganisms in soil and water are involved in oxidation-reduction reactions that oxidize hydrogen sulfide to elemental sulfur. Members of the genera Beggiatoa, Thioploca, and Thiotrix function in transition zones between aerobic and anaerobic conditions where both molecular oxygen and hydrogen sulfide are found. Also, some photosynthetic bacteria oxidize hydrogen sulfide to elemental sulfur. Members of the families Chlorobiaceae and Chromatiaceae (purple sulfur bacteria) are obligate aerobes and are phototropic, and are found in waters with high H_2S concentrations. The interactions of these organisms form part of the global sulfur cycle.

Bioconcentration: Does not have bioaccumulation or food chain contamination potential.

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 this gas mixture's effects on plant and animal life. Hydrogen Sulfide and Carbon Monoxide, components of this gas mixture, can be deadly to exposed animal life, producing symptoms similar to those experienced by humans. This gas mixture may also be harmful to plant life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this gas mixture's effects on aquatic life. The presence of more than a trace of the Carbon Monoxide component of this gas mixture is a hazard to fish. The following aquatic toxicity data are available for the Hydrogen Sulfide component of this gas mixture:

HYDROGEN SULFIDE:

LC_{50} (*Asellus* arthropods) 96 hours = 0.111 mg/L

LC_{50} (*Crangon* arthropods) 96 hours = 1.07 mg/L

LC_{50} (*Gammarus* arthropods) 96 hours = 0.84 mg/L

LC_{50} (Ephemera) 96 hours = 0.316 mg/L

LC_{50} (Inhalation-Flies) > 960 minutes = 380 mg/m^3

LC_{50} (Inhalation-Flies) 7 minutes = 1,500 mg/m^3

LC_{50},F (bluegill, eggs) 72 hours = 0.0190 mg/L

HYDROGEN SULFIDE (continued):

LC_{50},F (bluegill, 35-day-old fry) 96 hours = 0.0131 mg/L

LC_{50},F (bluegill, juveniles) 96 hours = 0.0478 mg/L

LC_{50},F (bluegill, adults) 96 hours = 0.0448 mg/L

LC_{50},F (fathead minnows) 96 hours = 0.0071-0.55 mg/L

LC_{50},F (bluegill) 96 hours = 0.0090-0.0140 mg/L

LC_{50},F (brook trout) 96 hours = 0.0216-0.0308 mg/L

Toxic (goldfish) = 100 mg/L

HYDROGEN SULFIDE (continued):

Lethal (goldfish) 96 hours = 10 mg/L

Toxic (carp) 24 hours = 3.3 mg/L

Toxic (goldfish) 24 hours = 4.3 mg/L

Toxic (sunfish) 1 hour = 4.9 to 5.3 mg/L

Toxic (goldfish) 200 hours = 5 mg/L

Toxic (minnows) 24 hours = 5-6 mg/L

Toxic (carp) 24 hours = 6-26 mg/L

Toxic (trout) 15 minutes = 10 mg/L

Toxic (goldfish) 24 hours = 25 mg/L

Toxic (tench) 3 hours = 100 mg/L

MATC,F (fathead minnows) 0.0037 mg/L

MATC,F (bluegill) 0.0004 mg/L

MATC,F (brook trout) 0.055 mg/L

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL 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: Non-Flammable Gas

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

U.S. DEPARTMENT OF TRANSPORTATION INFORMATION (continued):

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 mixture 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: 3000

PASSENGER CARRYING SHIP INDEX: Forbidden

PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: Forbidden

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

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: This gas mixture is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Hydrogen Sulfide	YES	YES	YES

U.S. SARA THRESHOLD PLANNING QUANTITY: Hydrogen Sulfide = 500 lb (227 kg)

U.S. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Hydrogen Sulfide = 100 lb (45 kg)

OTHER U.S. FEDERAL REGULATIONS:

- Hydrogen Sulfide and Carbon Monoxide are subject to the reporting requirements of CFR 29 1910.1000.
- Hydrogen Sulfide and Methane are subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for each of these gases is 10,000 pounds and so this mixture will not be affected by the regulation.
- Depending on specific operations involving the use of this gas mixture, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Hydrogen Sulfide is listed in Appendix A of this regulation. The Threshold Quantity for Hydrogen Sulfide under this regulation is 1500 lbs (and so one cylinder of this gas mixture will not be affected by this regulation).
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Nitrogen and Oxygen are not listed Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Hydrogen Sulfide is listed under this regulation in Table 1 as a Regulated Substance (Toxic Substance), in quantities of 10,000 lbs (4,553 kg) or greater.

15. REGULATORY INFORMATION(continued)

Carbon Monoxide and Methane are listed under this regulation in Table 3, as Regulated Substances (Flammable), in quantities of 10,000 lbs (4,553 kg) or greater, and so this mixture will not be affected by the regulation.

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: Carbon Monoxide, Hydrogen Sulfide, Methane.

California - Permissible Exposure Limits for Chemical Contaminants: Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.

Florida - Substance List: Oxygen, Carbon Monoxide, Hydrogen Sulfide

Illinois - Toxic Substance List: Carbon Monoxide, Methane, Hydrogen Sulfide.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List: Oxygen, Carbon Monoxide, Hydrogen Sulfide, Methane.

Michigan - Critical Materials Register: No.

Minnesota - List of Hazardous Substances: Carbon Monoxide, Hydrogen Sulfide, Methane.

Missouri - Employer Information/Toxic Substance List I: Hydrogen Sulfide, Methane.

New Jersey - Right to Know Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Methane.

North Dakota - List of Hazardous Chemicals, Reportable Quantities: Hydrogen Sulfide.

Pennsylvania - Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.

Rhode Island - Hazardous Substance List: Oxygen, Carbon Monoxide, Nitrogen, Hydrogen Sulfide, Methane.

Texas - Hazardous Substance List: Hydrogen Sulfide.

West Virginia - Hazardous Substance List: Hydrogen Sulfide.

Wisconsin - Toxic and Hazardous Substances: Hydrogen Sulfide

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The Carbon Monoxide component of this gas mixture is on the California Proposition 65 lists. WARNING! This gas mixture contains a compound known to the State of California to cause birth defects or other reproductive harm.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL 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 CLASSIFICATION: This gas mixture is categorized as a Controlled Product, Hazard Classes A and D2A, 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 recommended recycling for scrap metal content. CALGAZ 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

AIR LIQUIDE

ATTACHMENT D

SAFETY MANAGEMENT STANDARDS

(Field Copy Only)

ATTACHMENT E

FORMS

URS	Health, Safety and Environment **CONFINED SPACE ENTRY PERMIT**	Attachment 010-1 NA Issue Date: October 2000 Revision 7: December 2009

Space to be Entered: _____ Permit No. _____

Location/Description: _____ Purpose of Entry: _____

Authorized Duration of Permit: Date: _____ to: _____

Time: _____ to: _____

PERMIT SPACE HAZARDS (Indicate specific hazards with initials.)

_____ Oxygen deficiency (less than 19.5%)

_____ Oxygen enriched (greater than 23.5%)

_____ Flammable gases or vapors (greater than 10% of LEL)

_____ Airborne combustible dust (meets or exceeds LEL)

_____ Toxic gases or vapors (greater than PEL or TLV)

_____ Mechanical Hazards

_____ Electrical Hazards

_____ Chemical Hazards

_____ Engulfment

_____ Other: _____

EQUIPMENT REQUIRED FOR ENTRY AND WORK
Specify as required:

Personal Protective Equipment: _____

Respiratory Protection: _____

Atmospheric Testing/Monitoring: _____

Communication: _____

Permits: _____

Rescue: _____

Hand/Power Tools: _____

Blocking/Blanking: _____

Other: _____

_____

PREPARATION FOR ENTRY (Check after steps have been taken.)

☐ Notify affected groups of service interruption.

☐ Isolation Methods ☐ Lockout/Tagout ☐ Blank/Blind

☐ Purge/Clean ☐ Inert ☐ Ventilate

☐ Atmospheric Test ☐ Barriers ☐ Other:

☐ Personnel Awareness:

☐ Pre-entry briefing on specific hazards and control methods

☐ Notify contractors of permit and hazard conditions

☐ Other:

☐ Additional Notifications required:

AUTHORIZED ENTRANTS (List by name or attach roster):

RESCUE PERSONNEL / SERVICE RESCUE EQUIPMENT:

Phone Number: _____

Contact Method: _____

Phone Number: _____

Contact Method: _____

AUTHORIZED ATTENDANTS (List by name or attach roster):

ATMOSPHERIC TESTING FREQUENCY: _____

Name of Atmosphere Tester: _____

PERMIT CANCELLED BY (if required):

Date: _____ Time: _____

Reason for Cancellation: _____

_____

Testing	Result	Result	Result	Result	Result	Result	Result
Time (Indicate am/pm)							
Oxygen (%)							
Flammability (%)							
H_2S (ppm)							
Toxic-(Specify)							
Cl_2(ppm)							
CO (ppm)							
SO_2 (ppm)							
Temperature °F/°C							
Other							
Tester Initials							

AUTHORIZATION BY ENTRY SUPERVISORS

I verify review of this permit and verify that all necessary precautions have been taken to provide for a safe entry into and work in this confined space.

Printed Name _____ Signature _____ Date _____ Time _____

Printed Name _____ Signature _____ Date _____ Time _____

Printed Name _____ Signature _____ Date _____ Time _____

Printed Name _____ Signature _____ Date _____ Time _____

THIS PERMIT MUST BE POSTED AT THE CONFINED SPACE.

THIS PERMIT EXPIRES AT THE END OF THE SHIFT ON WHICH IT WAS ISSUED.

A NEW PERMIT MUST BE ISSUED FOR WORK THAT CONTINUES INTO THE NEXT SHIFT.

URS	Health, Safety and Environment **NON-PERMIT REQUIRED CONFINED SPACE WORK FORM**	Attachment 010-2 NA Issue Date: October 2000 Revision 7: December 2009

Space to be entered: _____ Location/Description: _____

Purpose of entry: _____ Permit Valid for (Date): _____

Supervisor Authorizing Work: _____ _____
Print Name Signature

Individuals Authorized To Perform Work (Signatures):

_____ _____ _____

_____ _____ _____

I have evaluated the hazards of the above confined space and have determined that there are no hazards present. I have also made the required safety equipment available and instructed the authorized individuals accordingly.

Hazard Evaluator: Date of Evaluation:

ATMOSPHERIC TESTING

Oxygen Deficiency/Enrichment	☐ Yes ☐ No	Results _____	%
H_2S Vapors	☐ Yes ☐ No	Results _____	ppm
Hazardous Vapors/Gases	☐ Yes ☐ No	Results _____	ppm
CO Level Within Limits	☐ Yes ☐ No	Results _____	ppm
Explosive Atmosphere	☐ Yes ☐ No	Results _____	%

The proposed work requires the following:

Safety belt, lanyard and separate lifeline: ☐ Yes ☐ No

Lockout/tagout of mechanical equipment: ☐ Yes ☐ No

Other personal protective equipment: ☐ Yes ☐ No

If Yes, list

_____

_____

Fire protection (if hot work conducted): ☐ Yes ☐ No

Attendant: ☐ Yes ☐ No

Other requirements:

_____

_____

URS	Health, Safety and Environment **ALTERNATE ENTRY CONFINED SPACE WORK FORM**	Attachment 010-3 NA Issue Date: October 2000 Revision 7: December 2009

Space to be entered: _____ Location/Description: _____

Purpose of entry: _____ Permit Valid for (Date): _____

Supervisor Authorizing Work: _____ _____
Print Name Signature

Individuals Authorized To Perform Work (Signatures):

_____ _____ _____

_____ _____ _____

I have evaluated the hazards of the above confined space and have determined that the only hazards present are atmospheric hazards that can be controlled by the ventilation method given below.

Hazard Evaluator: _____ Date of Evaluation: _____

Ventilation Required to Control Atmospheric Hazard:

ATMOSPHERIC TESTING

Oxygen Deficiency/Enrichment	☐ Yes ☐ No	Results _____	%
H_2S Vapors	☐ Yes ☐ No	Results _____	ppm
Hazardous Vapors/Gases	☐ Yes ☐ No	Results _____	ppm
CO Level Within Limits	☐ Yes ☐ No	Results _____	ppm
Explosive Atmosphere	☐ Yes ☐ No	Results _____	%

Comments:

_____

_____

_____

URS	Health, Safety and Environment **EXCAVATION / TRENCHING PERMIT**	Attachment 013-1 NA Issue Date: July 2000 Revision 6: March 2012

Authorization No.: _____ Date and Time Permit Valid: _____

Competent Person: _____ Date and Time Permit Expires: _____

Project Name: _____ Excavation/Trench Location: _____

Description or Job Special Procedures:

_____

_____

_____

ESTIMATED DIMENSIONS:
DEPTH = _____
TOP = W _____ L _____
BOTTOM = W _____ L _____

SOIL ANALYSIS METHOD(S) USED:
☐ Visual ☐ Manual ☐ Tabulated Data

SOIL CHARACTERISTICS:
☐ Cemented ☐ Cohesive ☐ Layered
☐ Fissured ☐ Granular ☐ Plastic
☐ Dry ☐ Moist ☐ Saturated ☐ Submerged

PROTECTIVE SYSTEMS:
Protective systems for excavations/trenches deeper than 20 feet (6.1 meters) must be designed and approved by a registered professional engineer.

SLOPING/BENCHING:
☐ **Vertical (90°)** ☐ **3/4 :1 (53°)** ☐ **1:1 (45°)**
☐ **1 ½:1 (34°)** ☐ **2:1 (26°)** ☐ **Other**

SHORING:
☐ Timber
☐ Aluminum Hydraulic
☐ Trench Shield/Trench Box

SOIL TYPE:
☐ Stable Rock ☐ Type A
☐ Type B ☐ Type C
☐ Avg. Compression Strength _____ tsf
☐ Compressed Strength Data _____

MANUAL TEST USED:
☐ Plasticity ☐ Dry Strength ☐ Ribbon
☐ Thumb Penetration ☐ Pocket Penetrometer
☐ Dry Testing ☐ Other

UTILITIES:
☐ One Call Service Notified
☐ Utilities Marked by Public Utilities
☐ Property Owner Contacted
☐ Utility Drawings Reviewed
☐ Private Utility Locater Utilized

LIST OF KNOWN OBSTRUCTIONS:
☐ Electrical ☐ Telephone ☐ Water
☐ Sewer ☐ Steam ☐ Alarm
☐ Drain ☐ Process ☐ Footings ☐ Pilings
☐ Concrete Encasement
☐ Other

OTHER:
☐ Means of Egress Required ☐
☐ Confined Space Permit Required ☐

SPECIAL INSTRUCTIONS and WORK INSTRUCTIONS

All unsafe conditions must be corrected prior to excavation entry. If any hazardous conditions are observed, the excavation must be evacuated immediately, and no one is allowed to re-enter until corrective action has been taken.

Signature and Dates

	Print Name	Signature	Date
Excavation Competent Person			
Client Representative (if applicable)			
Site Supervisor			
HSE Representative			
Registered Professional Engineer (if applicable)			
Project Manager			
Subcontractor Rep			
Equipment Superintendent			
Field Engineer			
Other			

URS	Health, Safety and Environment HEAT STRESS MONITORING RECORD	Attachment 018-2 NA Issue Date: May 2001 Revision 7: September 2011

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	

URS	Health, Safety and Environment **DAILY HEAVY EQUIPMENT SAFETY INSPECTION CHECKLIST**	Attachment 019-1 NA Issue Date: June 1999 Revision 7: September 2011

Equipment ID No: _____ Inspector's Name: _____

Equipment Name: _____ Employee No.: _____

Beg. Hours: _____ End Hours: _____ Date: _____

INSTRUCTIONS: Each shift must inspect all applicable items indicated. If an unsatisfactory condition is observed, suspend operation of the equipment and report the unsatisfactory condition to the site supervisor immediately.

ITEM INSPECTED	CHECK IF SATISFACTORY	COMMENTS	CORRECTED BY	DATE
Equipment Operating Manuals Available	☐			
Falling Object Protective Structure (FOP)	☐			
Roll-Over Protection Structure (ROP)	☐			
Seat Belts	☐			
Operator Seat Bar(s)	☐			
Side Shields, Screens, or Cab	☐			
Lift-Arm Device	☐			
Grab Handles	☐			
Back-up Alarm – Working	☐			
Lights	☐			
Guards	☐			
Horn	☐			
Windshield Wipers	☐			
Glass, Mirrors	☐			
Anti-Skid Tread Clear of Mud	☐			
Safety Signs (i.e., counterbalance swing area)	☐			
Fire Extinguisher	☐			
General Condition	☐			
Fuel Connection	☐			
Oil (fuel and no leaks)	☐			
Clear of Extra Materials	☐			
Controls Function Properly	☐			
Hydraulic System (full and no leaks)	☐			
Parking Brake	☐			
Lift Arm and Bucket	☐			
Tires/Tracks	☐			
Steering	☐			
Breathing Air System	☐			
Blast Shields	☐			
Flammable Atmosphere Protective Equipment	☐			
Quantity of Fuel Added	☐			
Quantity of Oil Added	☐			

Operator Signature _____

URS	Health, Safety and Environment HOUSEKEEPING INSPECTION SHEET	Attachment 021-1 NA Issue Date: June 1999 Revision 7: September 2012

Building or Location: _____

Inspection Conducted by: _____ **Date:** _____

Check Yes, No, or NA for Not Applicable.

General Site Housekeeping

1.	Do not block exits or emergency equipment.	☐ Yes	☐ No	☐ NA
2.	Do not leave equipment or materials lying on the ground.	☐ Yes	☐ No	☐ NA
3.	Keep storage areas free from the accumulation of materials that constitute trip hazards.	☐ Yes	☐ No	☐ NA
4.	Remove scrap materials and other debris from work area.	☐ Yes	☐ No	☐ NA
5.	Remove combustible scrap and debris by safe means at regular intervals.	☐ Yes	☐ No	☐ NA
6.	Store oily rags in metal cans with tight fitting lids. Remove oily rags at the end of the day.	☐ Yes	☐ No	☐ NA

Visibility

7.	Ensure that halls, stairways and walkways are well lit.	☐ Yes	☐ No	☐ NA
8.	Ensure that well designed light switches are present in areas where walkways are not always lighted.	☐ Yes	☐ No	☐ NA
9.	Ensure that dust, smoke or steam does not create poor visibility.	☐ Yes	☐ No	☐ NA
10.	Ensure that glare from floodlights or windows does not create poor visibility in work areas.	☐ Yes	☐ No	☐ NA

Stairs

11.	Ensure that handrails are tight and at the proper level.	☐ Yes	☐ No	☐ NA
12.	Ensure that handrails extend past the top and bottom step.	☐ Yes	☐ No	☐ NA
13.	Ensure that white or yellow strips are painted on the first and last step for better visibility. (Not an OSHA requirement – recommendation only).	☐ Yes	☐ No	☐ NA
14.	Ensure that steps are not rough or defective.	☐ Yes	☐ No	☐ NA
15.	Ensure that stair treads are wide enough and risers consistently spaced.	☐ Yes	☐ No	☐ NA
16.	Ensure that stairs are free of obstructions.	☐ Yes	☐ No	☐ NA

Floor Conditions

17.	Ensure that floors of every workroom are clean, and so far as possible, in a dry condition.	☐ Yes	☐ No	☐ NA
18.	Ensure that floors are not oily, overly waxed, or polished.	☐ Yes	☐ No	☐ NA
19.	Where wet floors or processes are present, provide proper drainage and false floors, mats, or other dry standing places.	☐ Yes	☐ No	☐ NA
20.	Finish floor surfaces with non-slip coatings where spills are likely.	☐ Yes	☐ No	☐ NA
21.	Ensure that floors and passageways are free from protruding nails, splinters, holes, or loose boards.	☐ Yes	☐ No	☐ NA
22.	Ensure that floors are free of holes and depressions.	☐ Yes	☐ No	☐ NA
23.	Ensure that aisles or pathways are wide enough for easy passage and for carrying objects (48 inches is recommended).	☐ Yes	☐ No	☐ NA

24.	Ensure that ramps are covered with non-slip surfaces or matting.	☐ Yes	☐ No	☐ NA
25.	Keep carpets or rugs free from loose or frayed edges that may catch boots or shoes.	☐ Yes	☐ No	☐ NA
26.	Keep walkways free from extension cords, air hoses and cables.	☐ Yes	☐ No	☐ NA
27.	Keep pathways free from boxes, containers, machine parts, or other tripping hazards.	☐ Yes	☐ No	☐ NA

Ground Conditions

28.	Ensure that trip hazards are not present.	☐ Yes	☐ No	☐ NA
29.	Ensure that fall hazards are not present.	☐ Yes	☐ No	☐ NA
30.	Ensure that holes or changes in ground elevation are either filled or guarded.	☐ Yes	☐ No	☐ NA
31.	Ensure that muddy walkways are filled with gravel to reduce slipping.	☐ Yes	☐ No	☐ NA
32.	Ensure that all employees who work in wet or greasy conditions wear slip resistant footwear.	☐ Yes	☐ No	☐ NA

Equipment

33.	Ensure that vehicle steps are of adequate size, surface placement for safe dismounting.	☐ Yes	☐ No	☐ NA
34.	Ensure that hand grips or ladders are adequate for getting into and out of equipment.	☐ Yes	☐ No	☐ NA
35.	Ensure that ladders have been checked for damage and removed from service if found unsafe.	☐ Yes	☐ No	☐ NA

Chemicals

36.	Ensure that chemicals are properly stored to minimize a potential spill.	☐ Yes	☐ No	☐ NA
37.	Ensure that spill cleanup materials are available and appropriate for the type of potential spill.	☐ Yes	☐ No	☐ NA

Identify areas that need attention and describe the corrective actions to be implemented:

_____

_____

_____

_____

_____

I certify that the above inspection was performed to the best of my knowledge and ability, based on the conditions present.

_____ _____

Signature Date

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	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	
				☐	☐	

Drawing of Equipment or Work Layout

Reference Numbers refer to the Test Numbers on Page 1

URS	Health, Safety and Environment **NOISE DOSIMETRY FIELD SHEET**	Attachment 026-2 NA Issue Date: July 2000 Revision 7: March 2012

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	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	☐ Yes	☐ No	Hard hat, ANSI Z89, Class G, E or C
2.	Flying objects that could strike head	☐ Yes	☐ No	Hard hat, ANSI Z89, Class G, E or C
3.	Energized wires or equipment that could strike head	☐ Yes	☐ No	Hard hat, ANZI Z89, Class G or E (dependent on potential voltage)
4.	Sharp objects or corners at head level	☐ Yes	☐ No	Hard hat, ANSI Z89, Class G, E or C

Eye Hazards

5.	Chemical splashes or irritating mists	☐ Yes	☐ No	See Supplemental Information A for additional information
6.	Excessive dust	☐ Yes	☐ No	Safety glasses or goggles
7.	Smoke and/or fumes	☐ Yes	☐ No	Safety goggles
8.	Welding operations	☐ Yes	☐ No	Welding goggles; See Supplemental Information A and B for additional information
9.	Lasers/optical radiation	☐ Yes	☐ No	Have URS HSE Representative assist you in proper selection
10.	Projectiles	☐ Yes	☐ No	Safety goggles plus face shield
11.	Sawing, cutting, chipping, and/or grinding	☐ Yes	☐ No	Safety goggles plus face shield; See Supplemental Information A for additional information

Face Hazards

12.	Chemical splashes or irritating mists	☐ Yes	☐ No	Safety goggles; See Supplemental Information A for more information; add face shield if irritating or corrosive
13.	Welding operations	☐ Yes	☐ No	Welding goggles or welding helmet; see Supplemental Information A and B for additional information
14.	Projectiles	☐ Yes	☐ No	Safety goggles plus face shield

Hand Hazards

15.	Chemical exposure	☐ Yes	☐ No	Use chemical-resistant gloves specific to hazard; consult MSDS, chemical hazard guide, or HSE Representative
16.	Sharp edges, splinters, etc.	☐ Yes	☐ No	Leather or Kevlar gloves
17.	Temperature extremes – heat	☐ Yes	☐ No	Leather gloves, welder's gloves, hot mill gloves

If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.

18.	Temperature extremes – cold	☐ Yes	☐ No	Insulated gloves
19.	Blood, fungus, biological agents	☐ Yes	☐ No	Nitrile gloves
20.	Exposure to live electrical currents	☐ Yes	☐ No	Electrical gloves; consult HSE representative
21.	Sharp tools, machine parts, etc.	☐ Yes	☐ No	Leather or Kevlar gloves
22.	Material handling	☐ Yes	☐ No	Leather gloves

Foot Hazards

23.	Heavy materials (greater than 50 pounds) handled by employees	☐ Yes	☐ No	Safety shoes or boots
24.	Potential to crush whole foot	☐ Yes	☐ No	Safety shoes or boots with metatarsal guard
25.	Sharp edges or points (puncture risk)	☐ Yes	☐ No	Safety shoes or boots
26.	Exposure to electrical hazards	☐ Yes	☐ 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 heals.
27.	Slippery conditions	☐ Yes	☐ No	Rubber-soled boots or grips
28.	Chemical contamination	☐ Yes	☐ No	Rubber, PVC, or polyurethane boots or boot covers with puncture and protective toe if task required
29.	Wet conditions	☐ Yes	☐ No	Rubber boots or boot covers
30.	Construction/demolition	☐ Yes	☐ 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	☐ Yes	☐ No	ANSI A-10.14 Type 1 full-body harness
32.	Suspended scaffolds, boatswain's chairs, float scaffolds, or suspended staging	☐ Yes	☐ No	ANSI A-10.14 Type 1 full-body harness
33.	Working in trees	☐ Yes	☐ No	ANSI A-10.14 Type 1 full-body harness
34.	Working in vehicle-mounted elevating work platforms (e.g., bucket trucks, aerial lifts)	☐ Yes	☐ No	ANSI A-10.14 Type 1 full-body harness

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 _____

URS	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.	☐ Yes ☐ No
2.	Suspension system in hard hat does not show signs of deterioration, including cracking, tearing, or fraying.	☐ Yes ☐ No
3.	The brim or shell is not cracked, perforated, or deformed.	☐ Yes ☐ No
4.	Employees use hard hats in marked areas.	☐ Yes ☐ No
5.	Areas requiring hard hat usage are marked.	☐ Yes ☐ No
	Safety Shoes	
6.	Safety shoes used by employees do not show signs of excessive wear.	☐ Yes ☐ No
7.	Areas requiring safety shoes are marked.	☐ Yes ☐ No
	Work Gloves	
8.	Gloves are available and worn when needed.	☐ Yes ☐ No
9.	Gloves are appropriate for the task.	☐ Yes ☐ 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.	☐ Yes ☐ No
	Protective Clothing	
11.	Protective clothing (including traffic control apparel) is worn by employees when required.	☐ Yes ☐ No
	Hearing Protection	
12.	Noise hazard areas are posted.	☐ Yes ☐ No
13.	Employees are using earplugs or muffs when using noise producing equipment or working in posted noise hazard areas.	☐ Yes ☐ No
	Safety Glasses/Goggles	
14.	Eye hazard areas are marked or posted.	☐ Yes ☐ No
15.	Employees use safety glasses/goggles when working in eye hazard areas or working with equipment that produces an eye hazard.	☐ Yes ☐ No
16.	Face shields are used when required and worn over safety goggles.	☐ Yes ☐ No

REMARKS ***(All "No" answers indicate a hazard which needs to be fixed.)***

URS	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? 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	☐ Yes	☐ No	☐ NA
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	Health, Safety, and Environment **TRAFFIC CONTROL DEVICE INSPECTION CHECKLIST**	Attachment 032-1 NA Issue Date: June 1999 Revision 3: December 2009

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	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.	☐ Yes ☐ No ☐ 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.	☐ Yes ☐ No ☐ 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?		☐ Yes ☐ No Comment:	
Building Utility Service Line Connections Identified:	☐ Yes ☐ No ☐ N/A	Cleared:	☐ Yes ☐ No ☐ 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?	☐ Yes ☐ No**
Apparent saw cuts or patches in concrete/pavement?	☐ Yes** ☐ No
Piping along building exterior? Identify purposed and layout.	☐ Yes** ☐ No ☐ N/A
Manholes, vault covers, drains, pipes present?	☐ Yes** ☐ No
Piping inside of manholes correlate to utility markings?	☐ Yes ☐ No** ☐ N/A
Clear line-of-sight (equipment/vehicles/snow not blocking view or potential utilities)?	☐ Yes ☐ No**
Work between potential utilities or manholes?	☐ Yes** ☐ No
Work areas clear of overhead utilities?	☐ Yes ☐ No**
All known utilities located on plot/site map for personnel to review?	☐ Yes ☐ 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:		

URS	Health, Safety and Environment **UTILITY CLEARANCE CHECKLIST**	Attachment 034-1 NA Issue Date: June 1999 Revision 6: September 2011

OneCall Utilities			Field Observation
Utility	**Notified by**	**Comments**	**Marked** (mains and services)
Electric [redacted]	☐ OneCall ☐ Other		☐ Yes ☐ No ☐ Above
Gas/Petroleum Pipeline (Yellow)	☐ OneCall ☐ Other		☐ Yes ☐ No
Sewer/Drainage (Green)	☐ OneCall ☐ Other		☐ Yes ☐ No
Water (Blue)	☐ OneCall ☐ Other		☐ Yes ☐ No
Communications (Orange)	☐ OneCall ☐ Other		☐ Yes ☐ No ☐ Above
Other	☐ OneCall ☐ Other		☐ Yes ☐ No ☐ 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.		☐Yes ☐No	☐ Yes ☐ No ☐ Above
Electricity: [redacted] Mains / Supplies / Interior / Exterior (signs, fuel pumps, low voltage security perimeters, gates, property light posts, equipment, substations, etc.)		☐Yes ☐No	☐ Yes ☐ No ☐ Above
Gas: (Yellow) Mains / Supplies / Equipment / Pipelines (Natural, Process, Oil, Crude, Refined (Gas, Diesel, Jet), etc.)		☐Yes ☐No	☐ Yes ☐ No ☐ Above
Steam (Yellow)		☐Yes ☐No	☐ Yes ☐ No ☐ Above
Structures: Possible horizontally installed facilities, vaults, basements, tunnels, sub-grade structures, foundations, overhead obstructions, etc.		☐Yes ☐No	☐ Yes ☐ No ☐ Above
UST Systems (Tanks / piping / electric)		☐Yes ☐No	☐ Yes ☐ No
Sewer: (Green) Sanitary, storm, combined, septic, drainage (parking, buildings, fields), irrigation		☐Yes ☐No	☐ Yes ☐ No
Water: (Blue) Process, Plant, potable, well, cooling, return/makeup, fire, sprinkler, landscape irrigation, reclaim (Purple) other		☐Yes ☐No	☐ Yes ☐ No ☐ Above
Other: Abandoned Lines, invisible dog fences, shopping cart perimeter monitoring, traffic lights		☐Yes ☐No	☐ Yes ☐ No ☐ 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.	☐ Yes ☐ No ☐ N/A
Precautions have been taken to prevent contact with overhead or underground utilities.	☐ Yes ☐ No ☐ N/A

Printed Name of Person Completing Checklist:	Signature:

URS	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			
• Abrasive blasting (with any type of grit or material) will be performed	☐ Yes	☐ No	_____
• Employee will fill abrasive blasting pots or perform clean-up activities	☐ Yes	☐ No	_____
• Employee will be in a contained area where abrasive blasting is taking place	☐ Yes	☐ No	_____
Acids			
• Liquid or powder acids will be used in a situation where acid vapors, mists, or dust may be breathed	☐ Yes	☐ No	_____
Adhesives			
• Aerosols-propelled adhesives are to be used in areas where there is insufficient or no local exhaust ventilation	☐ Yes	☐ No	_____
• Two-part adhesives (mix part one with two, let set, then use) are to be used in areas where there is limited ventilation	☐ Yes	☐ No	_____
Alkalis/Bases/Caustics			
• Powdered alkalis will be used in a situation where an airborne dust may be breathed	☐ Yes	☐ No	_____
Asbestos Abatement			
• Asbestos will be removed, repaired, or sampled	☐ Yes	☐ No	_____
• Employees will be inspecting or overseeing areas where asbestos will be removed or disturbed	☐ Yes	☐ No	_____
Cleaning Compounds			
• Degreasers or carbon removers will be used in areas where local exhaust ventilation is not provided	☐ Yes	☐ No	_____
• Aerosol-propelled cleaning compounds will be used in areas where there is no local exhaust ventilation	☐ Yes	☐ 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	☐ Yes	☐ No	_____
• Degreasers or carbon removers will be used in voids, tanks, or other confined spaces	☐ Yes	☐ No	_____
Corrosion-Preventive Compounds			
• Corrosion-prevention compounds, including chemical conversion compounds and corrosion inhibitors, will be used in areas where there is no local exhaust ventilation	☐ Yes	☐ No	_____
Detergents/Soaps			
• Ammonia-based detergents will be used in large quantities (more than 5 gallons) in areas where local exhaust ventilation cannot be provided	☐ Yes	☐ No	_____

Material Used or Process to be Performed		Notes
• Large quantities (5- or 55-gallon containers) of high pH powder detergent/soap will be used in a situation where dust may be breathed	☐ Yes ☐ No	
Fuels (including regular or unleaded gasoline, kerosene, diesel fuel, JP-5)		
• Employees will be inside unventilated fuel cells or other confined spaces containing fuels	☐ Yes ☐ No	
Grinding, Cutting, Sanding		
• Cutting, grinding, or sanding surfaces that have coatings containing beryllium, cadmium, chromium, lead, or zinc	☐ Yes ☐ No	
• Cutting, grinding, or sanding surfaces that are concrete or glass without use of ventilation or water	☐ Yes ☐ No	
Hazardous Waste Sites		
• 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)	☐ Yes ☐ No	
• Employees will be performing site assessments on potential hazardous waste sites	☐ Yes ☐ No	
Hydraulic Fluids (including petroleum-based fluids, synthetic fire-resistant fluids, and water-based fire-resistant fluids)		
• Hydraulic fluids and the vapors generated will not be exhausted using local exhaust ventilation	☐ Yes ☐ No	
• 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	☐ Yes ☐ No	
Inspection Penetrants (including Flouro-finder, water-indicating pastes, and penetrant removers)		
• 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	☐ Yes ☐ No	
Lead Abatement Activities		
• Lead-containing materials will be disturbed, removed, or sampled	☐ Yes ☐ No	
• Employees will be inspecting or overseeing areas where lead will be removed or disturbed	☐ Yes ☐ No	
Lubricants/Oils		
• Aerosol lubricants or oils will be sprayed with no immediate exhaust ventilation	☐ Yes ☐ No	
Oxidizers (materials that give off oxygen, including chlorine laundry bleach, calcium hypochlorite, calcium oxide, oxygen candles, lithium hydroxide, hydrogen peroxide, and sodium dichromate)		
• Oxidizers containing organic chlorine will be used in a situation where the dusts or vapors may be breathed	☐ Yes ☐ No	
• Powdered oxidizers will be used in a situation where airborne dust may be breathed	☐ Yes ☐ No	
Paint Materials (including paints, primers, thinners, enamels, lacquers, strippers, coatings, and varnishes)		
• Paint materials will be spray-applied in areas where there is no local exhaust ventilation	☐ Yes ☐ No	
• Two-part (mix part a with part b, let set, then apply) polyurethane or epoxy polyamide paints will be brush- or spray-applied	☐ Yes ☐ No	
• Paints containing beryllium, cadmium, chromium, lead, or zinc (refer to the MSDS)	☐ Yes ☐ No	

Material Used or Process to be Performed			Notes
• Paint materials will be applied in confined spaces	☐ Yes	☐ No	_____
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)			
• Local exhaust ventilation will not be provided and work will involve breathing solvent vapors	☐ Yes	☐ No	_____
• Solvents will be used within confined spaces	☐ Yes	☐ No	_____
• Solvents will be applied using aerosols	☐ Yes	☐ No	_____
Thermal Insulation (including asbestos and non-asbestos materials like pipe lagging, fiberglass insulation, boiler insulation, packing materials, and floor or ceiling tiles)			
• Insulation will be disturbed, removed, or sampled	☐ Yes	☐ No	_____
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)			
• Morpholine, EDTA, or harness buffer/titrating solution is to be used in poorly ventilated spaces	☐ Yes	☐ No	_____
• Powdered water-treatment chemicals will be used in a situation where chemical dusts may be breathed	☐ Yes	☐ No	_____
Welding/Brazing/Cutting			
• Welding will be performed in confined spaces	☐ Yes	☐ No	_____
• Welding galvanized metal or stainless steel	☐ Yes	☐ No	_____
• Brazing with cadmium or lead	☐ Yes	☐ No	_____
• Torch-cutting on coated/painted materials	☐ Yes	☐ No	_____
For Any of the Above-Listed Activities			
• An employee will be in the immediate area – within 10 feet of the job or operation; or	☐ Yes	☐ No	_____
• Employee will be inside confined space where activities are taking place; or	☐ Yes	☐ No	_____
• Employee will be inside a "controlled area" such as found in asbestos abatement, lead abatement, radiation control area, or a hazardous waste site	☐ Yes	☐ No	_____
Other			
• 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	☐ Yes	☐ No	_____
• Mine operations require issuance of an emergency escape respirator	☐ Yes	☐ No	_____
• Emergency response plan requires issuance of respirators to first responders	☐ Yes	☐ No	_____
• Radiological controls require use of a respirator	☐ Yes	☐ No	_____
• Laboratory Chemical Hygiene plan requires issuance of respirators	☐ Yes	☐ No	_____
• Exposure to airborne mold	☐ Yes	☐ No	_____

URS	Health, Safety and Environment VOLUNTARY USE OF RESPIRATORS	Attachment 042-2 NA Issue Date: July 2000 Revision 6: March 2012

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:

URS	Health, Safety and Environment **FIT TEST RECORD**	Attachment 042-3 NA Issue Date: July 2000 Revision 6: March 2012

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**

URS	Health, Safety and Environment **RESPIRATOR STANDARD OPERATING PROCEDURE**	Attachment 042-4 NA Issue Date: July 2000 Revision 6: March 2012

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.

URS	Health, Safety and Environment GENERAL INDUSTRIAL HYGIENE SURVEY FORM	Attachment 043-1 NA Issue Date: June 1999 Revision 5: January 2011

Location: _____ Prepared By: _____ Date Prepared: _____ Page _____ of _____

Job Description	No. of Hours Per Day Worked On This Job	Dust, Fume, or Mists	Control Methods	Gases	Vapors	Other	Control Methods	Noise	Control Methods	Radiation, UV Vibration, IR, etc.	Control Methods	Comments

URS	Health, Safety and Environment **INDUSTRIAL HYGIENE SAMPLE FIELD SHEET**	Attachment 043-2 NA Issue Date: June 1999 Revision 5: January 2011

Sample ID Date: _____

Material of Interest (MOI) in Dust: _____

Site: _____ Sample I.D. No. _____

Person Sampled or Area: _____ Employee No. _____

Job/Area: _____

Sample Type

Personal: ☐ Area: ☐ Resp. Dust: ☐ Total Dust: ☐ Other: _____

Pump Type:		Pump No		Time On:		Time Off:	
Total Time (min):		Cassette No:		Initial Flow:		Final Flow:	
Average Flow:		Volume:		Calibrator Model:		Calibrator Serial No:	

Workplace Conditions

Operations: Normal ☐ Abnormal ☐ Explain _____

Respirator Use: Type _____ % of Time Worn _____

Ventilation: Type _____

Normal ☐ Abnormal ☐ Explain _____

Weather Conditions

Approximate Temperature: ____ °F ____ °C

Sky: Precipitation ☐ Cloudy ☐ Partly Cloudy ☐ Clear ☐

Wind: Calm ☐ Light ☐ Medium ☐ High ☐

Work Description/Comments: Scheduled Hours per Shift: ____

_____

_____

_____

Sampled By: _____

URS	Health, Safety and Environment **TOTAL DUST INDUSTRIAL HYGIENE SAMPLE SUMMARY**	Attachment 043-3 NA Issue Date: June 1999 Revision 5: January 2011

MATERIAL OF INTEREST (MOI) IN DUST: _____ **Page** _____ **of** _____

IDENTIFICATION **SAMPLE TYPE** **Exposure Limit:** **OSHA PEL:** **DUST** _____ mg/m^3 **MOI** _____

Prepared By: _____ **Personal:** _____ **ACGIH TLV:** **DUST** _____ mg/m^3 **MOI** _____

Date Prepared: _____ **Area:** _____ **Location:** _____ **Scheduled Hours Per Shift:** _____

Date / Sample No.	Name or Area / Employee No.	Job Class / Equipment	Resp Type / % Use	Pump Type / ID No.	Time On	Time Off	Sam Time (min)	Flow (lpm)	Vol (m^3)	Filter Wt. Dust mg	Filter Wt. MOI mg	MOI %	Concentration Dust mg/m^3	Concentration MOI mg/m^3	Shift TWA Dust mg/m^3	Shift TWA MOI mg/m^3	% PEL or % TLV Dust mg/m^3	% PEL or % TLV MOI mg/m^3

RESPIRABLE DUST INDUSTRIAL HYGIENE SAMPLE SUMMARY

MATERIAL OF INTEREST (MOI) IN DUST: ____________________ Page ______ of ______

IDENTIFICATION | SAMPLE TYPE | Exposure Limit: OSHA PEL: DUST ______ mg/m³ MOI ______

Prepared By: ____________ Personal: ____________ ACGIH TLV: DUST ______ mg/m³ MOI ______

Date Prepared: ____________ Area: ____________ Location: ____________ Scheduled Hours Per Shift: ______

Date	Name or Area	Job Class	Resp Type	Pump Type	Time		Sam Time (min)	Flow (lpm)	Vol (m^3)	Filter Wt.		MOI %	Concentration		Shift TWA		% PEL or % TLV	
Sample No.	Employee No.	Equipment	% Use	ID No.	On	Off				Dust mg	MOI mg		Dust mg/m^3	MOI mg/m^3	Dust mg/m^3	MOI mg/m^3	Dust mg/m^3	MOI mg/m^3

URS	Health, Safety and Environment DETECTOR TUBE INDUSTRIAL HYGIENE SAMPLE SUMMARY	Attachment 043-5 NA Issue Date: June 1999 Revision 5: January 2011

GAS/VAPOR: _____ Page _____ of _____

IDENTIFICATION

Prepared By: _____ Date: _____

DETECTOR TUBE

Brand: _____ Type: _____

Batch No.: _____ Exp. Date: _____

Pump Type: _____ Serial No.: _____

EXPOSURE LIMIT

Basis: ACGIH TLV _____ OSHA PEL _____

Location: _____

Scheduled Hours Per Shift: _____

SAMPLE TYPE

Area _____

Personal _____

Survey _____

Sequential _____

Leak Test Yes ☐ No ☐

Time	Name or Area	Job Class	Resp Type	Sampling Conditions			Pump Strokes	Air Concentration			Comments
Sample No.	Employee No.	Location	% Use	Temperature	R.H.	Atm. Pres.		Tube ( )	Corrected ( )	%PEL or %TLV	

GAS / VAPOR / FUME / MIST INDUSTRIAL HYGIENE SAMPLE SUMMARY

SAMPLE DEVICE Page ______ of ______

Brand: ____________ **Type:** ____________ **Batch No.:** ____________ **Exp. Date:** ____________

IDENTIFICATION **SAMPLE TYPE**

Prepared By: ____________ **Personal:** ____________ **Location:** ____________

Date Prepared: ____________ **Area:** ____________ **Scheduled Hours Per Shift:** ____________

Date	Name or Area	Job Class	Resp Type	Pump Type	Time		Sample Time (min)	Flow (lpm)	Vol (m^3)	Lab Results	Air Concentration	Shift TWA	Exposure Limit PEL/TLV	%PEL or %TLV	MOI
Sample No.	Employee No.	Location	% Use	ID No.	On	Off									

URS	Health, Safety and Environment **COMBUSTIBLE GAS MONITOR** **INDUSTRIAL HYGIENE SAMPLE SUMMARY**	Attachment 043-7 NA Issue Date: June 1999 Revision 5: January 2011

PERMISSIBLE EXPOSURE LIMITS

Carbon Monoxide (CO)

Shift TWA: _____

Ceiling: _____

STEL: _____

Hydrogen Sulfide (H_2S)

Shift TWA: _____

Ceiling: _____

STEL: _____

Basis:

ACGIH ☐ **OSHA** ☐ **ACGIH** ☐ **OSHA** ☐

WORKPLACE CONDITIONS

Site: _____

Operations: **Normal** ☐ **Not Normal** ☐ **Explain** _____

Ventilation Type: _____

Normal ☐ **Not Normal** ☐ **Explain** _____

Instrument Type: _____ **Serial No.:** _____

Date / Sampled By	Location / Conditions	Resp Type / % Use	Weather	Carbon Monoxide			Oxygen %	Hydrogen Sulfide			LEL %	Time (Hr)	Comments
				Real Time	Shift TWA %TLV/%PEL	STEL %TLV/%PEL		Real Time	Shift TWA %TLV/%PEL	STEL %TLV/%PEL			

URS	Health, Safety and Environment PID / FID MONITORING REPORT	Attachment 043-8 NA Issue Date: June 1999 Revision 5: January 2011

Location: _____ Page _____ of _____

Prepared By: _____ Calibration: _____

Model: _____ Span Gas: _____ Lamp Voltage: _____

Serial No.: _____ Zero Gas: _____

Date	Location and Conditions	Event No.	Sample Time hour: min	Min (ppm)	AVG (ppm)	Max (ppm)	Alarm		Comments
							Level (ppm)	Status	

URS	Health, Safety and Environment **SUBCONTRACTOR SAFETY EVALUATION FORM**	Attachment 046-1 NA Issue Date: July 1999 Revision 8: September 2011

It is the policy of URS to provide a safe and healthful environment for all of its employees through the prevention of occupational injuries and illnesses. 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.

Year	EMR Interstate (or international equivalent)
_____	_____
_____	_____
_____	_____

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 $\frac{\text{(E above) x 200,000}}{\text{Employee Hours Worked (Given Year)}}$			
H. Lost Workday Case Incident Rate $\frac{\text{(C above) x 200,000}}{\text{Employee Hours Worked (Given Year)}}$			

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.

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

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 a copy for evaluation.* ☐ Yes ☐ No

Are records kept? ☐ Yes ☐ No

If "Yes," who conducts the orientation? (Job Title) _____

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

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 safety 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.

_____

_____

_____

_____

_____

_____

_____

_____

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 _____

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*
- ☐ 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 Safety Inspection conducted within the past year

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 Corporate, Regional, or Strategic Business Unit (SBU) HSE Manager for evaluation.

Project or Site Manager Name: _____

Signature: _____

Date: _____

URS	Health, Safety and Environment **SUBCONTRACTOR VARIANCE FORM**	Attachment 046-3 NA Issue Date: July 1999 Revision 8: September 2011

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?

_____

_____

_____

_____

_____

_____

_____

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	Health, Safety and Environment INFRASTRUCTURE & ENVIRONMENT INCIDENT REPORT FORM	Attachment 049-1 NA IE Issue Date: May 2001 Revision 11: March 2012

ADMINISTRATIVE INFORMATION

Database Office ID:

Group: ☐ East ☐ West ☐ International

Region:

Client Sector:

NOTIFICATION / LOCATION DATA

Site or Office:		Customer/Client Name:
Date of Event:	Time of Event:	Time Employee Started Work:
Date Supervisor Notified:	Time Supervisor Notified:	Name of Employee Submitting Report:
Client Notification Completed (if required)? ☐ Yes ☐ No		Project/Order Number:

TYPE OF EVENT (Check all applicable items)

Illness (Check one)
- ☐ Employee
- ☐ Subcontractor
- ☐ Other

Injury (Check one)
- ☐ Employee
- ☐ Subcontractor
- ☐ Other

NAME of Injured/Ill Employee:

_____

Property Damage (Check one)
- ☐ Company (owned, leased, rented)
- ☐ Client/Customer
- ☐ Other

Vehicular Accident (Check one)
- ☐ Company (owned, leased, rented)
- ☐ Client/Customer
- ☐ Other

- ☐ Fire
- ☐ Explosion
- ☐ Flash

☐ Other (describe): _____

EVENT SUMMARY

Briefly state the facts contributing to the event. Attach additional pages and supporting information, as necessary. Avoid use of employees' names. *If this is an injury or illness, supply additional information as required on Page 2.*

ROOT CAUSE DETERMINATION

Root Cause (State the root or primary cause, then select the most appropriate cause category from Page 4):

CONTRIBUTING FACTORS

Contributing Causes (Describe any contributing causes, then select the applicable cause categories from Page 4):

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.

FOR INJURIES/ILLNESS ONLY

Employee Information

What was the employee's location when the injury/illness occurred (include city and state)?

What was the employee doing when the injury/illness occurred? Describe the activity as well as the tools, equipment, or material you were using.

What happened? Describe how the injury/illness occurred.

What was the injury or illness? Describe the part of the body that was affected and how it was affected. Use the Incident Pick List on Page 4 to aid in your description.

What level of medical treatment was received? ☐ First Aid ☐ Clinic/Physician ☐ Emergency Room ☐ Refused/None

List witnesses and/or other employees involved. Attach statements where applicable.

Do you feel URS provided you with the proper safety instructions (including PPE usage) for the task you were performing at the time of the incident? ☐ Yes ☐ No (Explain below)

How do you think this type of incident could be prevented or avoided in the future?

Mark all PPE being used when the incident occurred:

☐ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Safety Shoes
☐ Half-face Respirator	☐ Full-face Respirator	☐ Protective Gloves	☐ Chemical Gloves
☐ Hard Hat	☐ Hearing Protection	☐ Other (describe):	

Injured/Ill Employee Signature: _____ Date: _____

Name of Injured/Ill Employee (Please print clearly): _____

Employee Number: _____ Contact Phone Number: _____

Additional Sheets Attached? ☐ Yes ☐ No (Include photos, maps, and/or diagrams when possible.)

Supervisor Information

Describe any additional/different details other than those provided on the previous page. Avoid use of employees' names, where possible. Attach additional sheets, drawings, or photos, as needed.

Were the required tools available at the time of the injury? ☐ Yes ☐ No (Explain below)

At the time of the injury, was the employee using the correct tools for the task? ☐ Yes ☐ No (Explain below)

Was the employee sent for substance screening? ☐ Yes ☐ No (Explain below)

How do you think this type of incident could be prevented or avoided in the future?

Supervisor Signature: _____ Date: _____

Supervisor Name (Please print clearly):

Project Manager Comments

Signature: _____ Date: _____

Project Manager Name (Please print clearly):

HSE Representative Comments

Signature: _____ Date: _____

HSE Representative Name (Please print clearly):

Site/Office Manager Comments

Signature: _____ Date: _____

Site/Office Manager Name (Please print clearly):

ROOT CAUSE CATEGORIES

Check all cause categories that apply to the incident, then choose the root cause (or causes) category from the boxes checked. Enter where indicated on Page 1.

PHYSICAL/ENVIRONMENT

- ☐ Extreme cold/ice
- ☐ Extreme heat
- ☐ Working/walking surface unfavorable
- ☐ Inadequate lighting
- ☐ Excessive noise
- ☐ Chemical exposure
- ☐ Biological hazards (animal/plant)
- ☐ Other weather
- ☐ Other

SYSTEMS

- ☐ Inadequate training/instruction
- ☐ Inadequate management system
- ☐ Missing or incorrect procedures or planning
- ☐ Inadequate management emphasis on safety
- ☐ Corporate/operations procedures not communicated
- ☐ Other

PHYSICAL/EQUIPMENT, TOOLS, and PPE

- ☐ Failure due to improper maintenance
- ☐ Failure due to improper design
- ☐ Other

HUMAN

- ☐ Failure to adequately recognize hazards
- ☐ Failure to follow procedures
- ☐ Failure to recognize condition change
- ☐ Impaired state (drug, alcohol, other)
- ☐ Physical/psychological limitation for task
- ☐ Inadequate communications (i.e., supervisor/employee)
- ☐ Carelessness by affected person(s)
- ☐ Carelessness by other person(s)
- ☐ Improper selection of equipment/tool/PPE
- ☐ Improper use of equipment/tool/PPE
- ☐ Other

INCIDENT PICK LIST

NATURE OF INJURY/ILLNESS

- ☐ Amputation
- ☐ Burn
- ☐ Concussion
- ☐ Contusion/Abrasion
- ☐ Corneal Abrasion
- ☐ Dental
- ☐ Dermatitis
- ☐ Fatality
- ☐ Fracture
- ☐ Hearing Loss
- ☐ Heat-Related Illness
- ☐ Hernia
- ☐ Insect Bite
- ☐ Laceration/Puncture
- ☐ Other
- ☐ Respiratory Disorder
- ☐ Sprain/Strain

BODY PART

- ☐ Ankle/Foot
- ☐ Arm/Elbow
- ☐ Back
- ☐ Eyes
- ☐ Head
- ☐ Hip/Groin
- ☐ Internal Organs/Blood
- ☐ Leg/Knee
- ☐ Multiple Body Parts
- ☐ Neck/Cervical
- ☐ Respiratory
- ☐ Shoulder
- ☐ Trunk
- ☐ Wrist/Hand

DIRECT CAUSE

- ☐ Animal/Insect Contact
- ☐ Biological Agent
- ☐ Caught Between
- ☐ Ergonomics/Repetitive Trauma
- ☐ Exposure To
- ☐ Miscellaneous
- ☐ Motor Vehicle Wreck
- ☐ Overexertion
- ☐ Poisonous Plant
- ☐ Slips/Trips/Falls
- ☐ Struck Against
- ☐ Struck By

DISTRIBUTION

NOTE: *The preferred method of distribution of this report is by e-mail attachment either in Word, or scanned to PDF. Forward URS incident reports to the OHM at incidentreport@urs.com. Alternatively, reports may be faxed to 512.419.6413. Initial reports must be submitted to the OHM within 24 hours of incident. More detailed follow-up reports may be submitted later.*

Additional Distribution: ☐ Program/Client Sector Manager ☐ Regional HSE Manager ☐ Office HSE Representative

Name of Injured Employee:		Name of Individual Providing Statement:	
Date of Injury:		Approximate Time of Injury:	
Body Part(s) Injured:		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:		Printed Name of Individual Providing Statement:	
Date:		Contact Phone Number:	

DISTRIBUTION

E-mail to ***incidentreport@urs.com*** *or fax to 512.419.6413.*

Job Safety Analysis

For those major tasks identified in the Scope of Work, complete the Job Safety Analysis below. Use additional sheets, as necessary.

Site: _____ **Date:** _____

Prepared By: _____ **Approved By:** _____

Work Activity:

Key Hazard (s)	Training Requirements	Protective Equipment Use
Equipment Required	**Other Hazard Control Measures**	

Work Activity:

Key Hazard (s)	Training Requirements	Protective Equipment Use
Equipment Required	**Other Hazard Control Measures**	

Work Activity:		
Key Hazard (s)	**Training Requirements**	**Protective Equipment Use**
Equipment Required	**Other Hazard Control Measures**	

Work Activity:		
Key Hazard (s)	**Training Requirements**	**Protective Equipment Use**
Equipment Required	**Other Hazard Control Measures**	

URS	Health, Safety and Environment **Daily Tailgate Meeting Form #2**	SMS 086 NA Supplemental Information I Issue Date: January 2011

Date:	Time:	Job number:
Client:		
Site location:		
Task:		

SAFETY TOPICS PRESENTED

Safety observations / lessons learned from previous day:
Physical hazards and controls:
Chemical hazards and controls:
Biological hazards and controls:
Job safety analysis review:
Other topics:
Emergency procedures review:
Remember that all employees have the responsibility to stop work if safety risks are identified. Report all safety observations and near miss events. Practice 4sight (What am I about to do; What can go wrong; What can be done to make is safer; and What have I done to communicate the hazard(s) to others?).

ATTENDEES

Printed Name	Signature	Company/Office

Meeting Conducted By:
Signature:

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN
FOR
CORRECTIVE MEASURES IMPLEMENTATION PROGRAM
PARTS AND REPAIR SERVICE CENTER
GENERAL ELECTRIC INTERNATIONAL, INC.
TONAWANDA, NEW YORK

PREPARED FOR:

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OCTOBER 2012

TABLE OF CONTENTS

QUALITY ASSURANCE PROJECT PLAN

FIGURES
(after text)

TABLES
(following text)

ATTACHMENTS
(following text)

ACRONYMS AND ABBREVIATIONS

ASP	Analytical Services Protocol
°C	degree centigrade
CLP	Contract Laboratory Program
CMI	Corrective Measure Implementation
COC	chain of custody
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EDD	electronic data deliverable
ELAP	Environmental Laboratory Approval Program
FSP	Field Sampling Plan
FD	field duplicate
IDL	instrument detection limit
ITR	independent technical review
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MD	matrix duplicate
MDL	method detection limit
mg/L	milligrams per liter
mg/kg	milligrams per kilograms
MS	matrix spike
MSB	matrix spike blank
MSD	matrix spike duplicate
NEIC	National Enforcement Investigations Center
NIST	National Institute of Standards and Technology
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCB	polychlorinated biphenyl
ppm	parts per million
PMWP	Project Management Work Plan
PQO	Project Quality Objective
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation Recovery Act
RPD	relative percent difference
SVOC	semivolatile Organic Compounds
TA	TestAmerica Laboratories, Inc.
TCLP	toxicity characteristic leaching procedure
µg/kg	micrograms per kilograms
µg/L	micrograms per liter
URS	URS Corporation New York
USEPA	United States Environmental Protection Agency
VOC	volatile organic compounds
VTSR	validated time of sample receipt

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared by URS Corporation New York (URS) for the General Electric International, Inc. (GE) Parts and Repair Service Center located at 175 Milens Road, Tonawanda, New York.

This QAPP provides an overview of quality assurance/quality control (QA/QC) procedures to be implemented during field and laboratory activities in support of the Corrective Measure Implementation (CMI) program that focuses on the excavation and removal of contaminated surface and subsurface soil, asphalt, and concrete. Site-specific sampling plans have not yet been prepared, so this QAPP has been prepared to incorporate the range of analyses and media types that may be sampled during the CMI program.

2.0 PROJECT/SITE DESCRIPTION

The GE Parts and Repair Service Center is at 175 Milens Road, Tonawanda, New York. GE has operated the service center since the late 1960s (see Figure 1 – Site Plan). The property comprises approximately 5.8 acres.

A Resource Conservation Recovery Act (RCRA) Facility Assessment, a RCRA Facility Investigation, and several supplemental investigations have been performed at the site since 1988. These investigations documented the presence of polychlorinated biphenyls (PCBs) and volatile organic compound (VOCs) contaminants in soil on the site. PCB impacts in soil are widespread along the eastern and southern sides of the shop building, and are within the concrete building slab. VOC impacts are limited to the vicinity of the former rinse tank excavation pit. The extent of impacts to site soil and groundwater has been limited by the clay underlying the site. Impacts are generally shallow, except in locations of fill, such as pipe bedding material and the filled pit that formerly held a rinse tank. Portions of the onsite storm and sanitary sewer systems have been impacted by PCBs. Offsite storm sewers have also been impacted by PCBs at significantly lower concentrations.

The facility recently received a permit from NYSDEC for CMI. The areas at and near the site where the permit requires corrective measures include:

- Former rinse water tank excavation
- Old oil/water separator
- Floor drains
- Sewers (storm and sanitary)
- Rail spur
- Truck bay
- Depressed dock
- Transportation corridor
- Two Mile Creek (work in this area is not included in the this QAPP)

The scope of the CMI program will include:

- Pre-design investigations of conditions at the site. These investigations will include collection of surface and subsurface soil samples. The investigations

may also include groundwater sampling, collection of chip and core samples of asphalt and concrete, and collection of water and sediment samples from the sewer systems.

- Completion of design for the corrective measures at the site.
- Removal and off-site disposal of surface soil, asphalt, and concrete structures.
- Excavation and off-site disposal of subsurface soil.
- Collection of waste characterization samples and confirmatory samples from excavations.
- Dewatering and management (treatment or off-site disposal) of impacted perched groundwater.

- Replacement or cleaning and lining of subsurface sewer lines.
- Backfilling excavations.
- Restoring asphalt and concrete structures.
- Installation and sampling of groundwater monitoring wells.
- Long-term monitoring, maintenance, and repair of surface coverings.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The following describes key URS personnel and their responsibilities for this CMI (see Figure 2 – Organizational Chart). Resumes of key individuals identified are included in Attachment A – Resumes of Key Personnel.

3.1 Project Manager

The URS Project Manager for this program will be responsible for technical and financial management of the project, and for overall coordination and review of component work activities. The URS Project Manager will serve as the initial and primary contact with NYSDEC throughout the project, and will be responsible for successful implementation of the project's QA/QC activities. The URS Project Manager may delegate a portion of the tasks required for successful implementation of the project to a qualified individual, the Site Manager, who will be on site during field activities (i.e., investigations, remedial action, O&M activities, etc.). The Site Manager will work under the direction of the URS Project Manager, and will be responsible for implementing applicable QC procedures in the field and verifying that all other URS field personnel adhere to these procedures and perform all activities as described in the project work plans.

3.2 Project Chemist

The URS Project Chemist is responsible for verifying that the analytical laboratory adhere to the QA/QC requirements specified in this QAPP. URS Project Chemist will be the point of contact for the Laboratory's Project Manager, and will personally communicate with the Laboratory's Project Manager to verify that all sample analyses are being performed such that the resulting data will be of sufficient quality for its intended purpose.

The laboratory providing analytical testing services to URS in support of this CMI program is TestAmerica Laboratories, Inc. (TA) located in Amherst, New York, which is New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified for all analyses to be performed. Copies of the applicable ELAP certifications for to be used during this

CMI program are provided in Attachment B – Copies of Laboratory NYSDOH ELAP Certifications. TA maintains its own QA/QC program and employs the required staff to implement this program. The QA Officer for TA is responsible for verifying that all sample analyses are performed in accordance the analytical methods, laboratory QA/QC procedures, and QAPP.

3.3 Independent Technical Reviewer

All work of a substantive nature or identified as a deliverable will undergo an independent technical review (ITR) by experienced and qualified personnel. The Project Manager is responsible for identifying and selecting reviewers that are independent from the actual work or decision making on the tasks or activities being reviewed and who possess technical qualifications sufficient for conducting an in depth review. A written record of the review and resolution of the review findings will be maintained in the project files.

The ITR is used as a management tool to assess:

- Compliance with referenced standards;
- The potential for erroneous assumptions, data, calculations, methods, or conclusions;
- Compliance with the standard of professional practice;
- The basis of and compliance with input and design requirements, design criteria, and design calculations;
- That the appropriate detail/or and calculation checks (i.e., QC) and internal project team reviews have been performed;
- The soundness of the technical approach and results; and,
- That the work was completed in compliance with the requirements of the Work Assignment.

4.0 PROJECT QUALITY OBJECTIVES

4.1 Background

Project quality objectives (PQOs), such as those described in the *Uniform Federal Policy for Quality Assurance Project Plans* (USEPA, 2005), define the type, quantity, and quality of data that are needed to answer specific environmental questions and support proper environmental decisions. More specifically, the PQOs:

- Define the environmental problem;
- Identify target analytes/contaminants of concern and concentration levels;
- Establish the analytical techniques to be used (field-screening, on-site, and/or off-site);
- Establish the appropriate sampling techniques to be used;
- Establish project sampling/analytical measurement performance criteria (where applicable) for precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity; and
- Determine the number of samples needed for each analytical group/matrix/concentration level.

PQOs for this CMI program are divided into four phases. A project-specific sampling plans has not yet been prepared, therefore this QAPP includes the range of sample types and analyses that may or may not be undertaken. The CMI program may include:

Phase I – Design Investigation and Planning:

- Collection of surface and subsurface soil samples to determine the extent of PCB contamination;
- Collection of perched groundwater to characterize the water to determine how it will be managed during remediation;
- Collect concrete chip and core samples from depressed loading dock ramp to determine if impacted by PCB contamination;
- Collection of samples from railroad structures (ties, aggregate, wipes from rails) to determine if impacted by PCBs and waste management during remediation; and
- Gauging the thickness and collecting samples of wastewater and sediment in storm, sanitary, or other water collection structures (drains).

Phase II – Remediation:

- Collection of soil, sludge, wastewater, decontamination water, asphalt, concrete, and/or other debris samples for waste characterization;
- Collection of post-excavation samples to confirm sufficient soil removed;
- Collection of treated wastewater samples for discharge, if applicable; and
- Adequate removal of soil where boundaries have been defined.

Phase III – Restoration:

- Collection of clean backfill samples for unrestricted use in accordance with NYSDEC Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10);
- Replacement, cleaning, and/or lining of subsurface sewer lines;
- Backfilling excavations; and
- Restoring asphalt and concrete structures.

Phase IV – Long-Term Groundwater Monitoring (5 Years)

- Installation and sampling of groundwater monitoring wells.

A summary of the samples that may be collected and the analytical parameters for each phase is presented in Table 1. The proposed media to be sampled and analyses will be presented in project-specific work plans.

4.2 Project Quality Objectives For Chemical Data Measurement

The data quality indicators of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) will be measured (when applicable) from data collected from chemical analyses of samples collected during this CMI program.

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 matrix spike/matrix spike duplicate/matrix duplicate (MS/MSD/MD) and

field duplicate (FD) samples. These provide a measure not only of sampling and analytical precision, but also of analytical precision based on 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 CMI program is presemted in Tables 2a and 2b.

4.2.2 Accuracy

Accuracy measures the analytical bias of a measurement system. Sources of measurement error may include the sampling process, field contamination, sample preservation and handling, sample matrix, and sample preparation and analysis techniques. Sampling accuracy may be assessed by evaluating the results of equipment rinsate blanks 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. Accuracy can be estimated based on the recovery of spiked analytes in the MS/MSD and laboratory control samples (LCS) [or matrix spike blanks (MSB)]. MS/MSD analyses, which will give an indication of matrix effects that may be affecting target compound identification and quantitation, are also a good gauge of method efficiency. Accuracy criteria for all analyses being performed as part of this CMI program is presented in Tables 2a and 2b.

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 that 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 investigation objectives. The sampling procedures, which will be described in either the project Field Sampling Plan (FSP) or project work plans, will be 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, completeness, and sensitivity) 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 were 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. The completeness goal for data collected as part of this CMI program is 90%. If this goal is not met, then NYSDEC and URS project personnel will determine what, if any, further actions 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. Instrument detection limits (IDLs) are similar to MDLs although the analytical procedures used for IDL determinations do not include the preparation/extraction procedures that are used for MDL determinations and environmental sample analyses. Therefore, IDLs provide a measure of sensitivity under ideal conditions, and do not take

into account effects of sample matrix and/or other factors that may affect sensitivity. MDLs (and/or IDLs) for the parameters to be analyzed as part of the work assignment are presented in Tables 2a and 2b.

5.0 SAMPLING LOCATIONS AND PROCEDURES

Proposed sampling locations and sampling procedures will be provided in either project work plans or a site-specific Field Sampling Plan.

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 (COC) 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 this work assignment will follow the COC guidelines of National Enforcement Investigations Center (NEIC) Policies and Procedures, prepared by the NEIC of the USEPA Office of Enforcement.

6.1 Custody Definitions

- Chain-of-Custody Officer - The employee responsible for oversight of all COC activities is the Site Manager (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 placed it under lock, or
  - It is in a designated secure area.

6.2 Responsibilities

The Site Manager will be responsible for monitoring all COC activities and for collecting legally admissible COC documentation for the permanent project file, and will perform to following tasks:

- Review sample labels or tags, closure tapes, and COC records.

- Train all field sampling personnel in the methodologies for carrying out COC activities and the proper use of all COC and record documents.
- Monitor the implementation of COC procedures.
- Submit copies of the completed COC records to the Project Chemist.

6.3 Chain-of-Custody

Chain-of-custody is initiated in the laboratory when the empty sample containers are shipped for use in the field. When the empty containers are received from the laboratory, they will be checked for any breach of custody including, but not limited to, incomplete COC records, broken COC seals, or any evidence of tampering. Filled sample containers will be returned to the laboratory using appropriate COC procedures. Upon receipt of the samples, the laboratory sample custodian will check for any breach of custody. The Laboratory Project Manager shall notify the URS Project Chemist immediately if there are any problems with the COC documentation. Examples of COC records are provided in Attachment C.

6.4 Sample Containers and Holding Times

Sample container and preservation requirements and analytical holding times for the analytical methods being used for this CMI program presented in Table 3. All holding times begin with the validated time of sample receipt (VTSR) at the laboratory.

7.0 ANALYTICAL PROCEDURES

The specific analytical methods to be used for the analysis of samples collected during this CMI program, and the quality control criteria to be followed by the laboratory when performing the analyses, are presented in Tables 1, 2a, and 2b. The analytical methods and procedures to be used on samples are provided in the NYSDEC Analytical Services Protocol (ASP), July 2005 (or must current) document.

8.0 CALIBRATION PROCEDURES AND FREQUENCY

In order to obtain a high level of precision and accuracy during sample processing and analysis procedures, laboratory and field 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 sources traceable to National Institute of Standards and Technology, or other reliable commercial sources to ensure the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished as per the referenced methods referenced. 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 manufacture specifications. Calibration is conducted with two American Society of Testing Materials 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 (e.g., 4°C ± 2°C for refrigerators) shall be clearly posted on each unit in service.

Water Supply System – The laboratory performing water/solid/waste sample analyses must maintain a sufficient supply of analyte-free water for all project needs. The grade of the water must be of the highest quality in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for organic analyses, and ion-exchange treatment is recommended for inorganic tests. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis by the laboratory.

Sample Containers - All sample containers supplied by the laboratory shall meet the requirements of the analytical methods being used and/or the requirements specified in the NYSDEC ASP July 2005 (or most current), whichever is more stringent. Pre-cleaned sample containers may be purchased by the laboratory and provided for sample collection as long as the containers meet the requirements of each analytical method and/or the NYSDEC ASP (most current), whichever is more stringent. Documentation of sample container cleaning procedures and/or certifications provided by vendors shall be maintained by the laboratory.

8.2 Laboratory Instruments

Calibration of laboratory instruments is required to verify that the analytical system is operating properly and at the sensitivity necessary to meet the project-required quantitation limits for each analytical method. 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) and/or any additional requirements identified in this QAPP. Calibration of laboratory instruments will be performed according to the analytical methods required for this CMI program, as presented in Table 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 report case narrative, and submitted with the analytical results.

8.3 Field Instruments

Various types of portable instruments may be used in the field during this CMI program, which may include one or more of the following: multi-purpose meters capable of measuring pH, conductivity, dissolved oxygen, oxidation/reduction (redox) potential, and/or temperature; photoionization detectors and/or flame ionization detectors used to monitor organic vapors; dust monitors to measure concentrations of particulates; multi-gas meters and analyte-specific devices (e.g. Drager tubes/chips) for health and safety purposes; and helium detectors used for leak-checking during soil vapor sample collection. Other instruments may also be used as needed based on the requirements of the work assignment. The instruments expected to be used in the field during this CMI program will be identified in either the site-specific FSP or project work plans. All calibration and maintenance of field instrumentation shall be performed according the manufacturer's requirements or as otherwise indicated in the project plans, and shall be documented by the Site Manager.

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 that 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 analytical methods. Acceptable criteria and/or target ranges for these QC samples are also identified in Tables 2a and 2b.

QC results that vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers to the analytical data, 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 samples, will be analyzed as 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 or as required by the analytical methods. Concentrations of all analytes in the method blanks should be below the quantitation limits identified in Tables 2a and 2b. The Laboratory Project Manager shall contact the URS Project Chemist to determine the appropriate course of action if analyte concentrations in any blank are greater than the quantitation limit.

Laboratory Control Samples (or Matrix Spike Blanks) – An LCS (or MSB), is an aliquot of laboratory demonstrated analyte-free water or solid air spiked (fortified) with all, or a representative group, of the analytes being analyzed. The LCS (or MSB) recoveries and RPD are a measure of precision and accuracy that are used to verify that the analysis being performed is in control. LCS (or MSB) analyses shall be performed for each matrix as required by the methods. Acceptance criteria for LCS (or MSB) analyses are also specified in Tables 2a and 2b.

9.2 Matrix-Specific QC

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples – MS/MSD samples consist of an aliquot of a sample that is spiked (fortified) 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 (%R) for each analyte and the 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/MSD samples will be analyzed at a required frequency of 1 per 20 samples. MS/MSD samples are not required for waste characterization samples. Acceptance criteria for MS/MSD analyses are also specified in Tables 2a and 2b.

Matrix Duplicates (MD) - The MD is a second aliquot of a sample that is prepared and analyzed in a manner identical to that used for the parent sample. Collection of MD samples provides for the evaluation of precision both in the field and at the laboratory by comparing the analytical results of two samples taken from the same location. A MD may be performed instead of the MSD. Every effort will be made to obtain replicate samples; however, due to interferences, lack of homogeneity, and the nature of soil samples, the analytical results are not always reproducible.

9.3 Additional QC

Additional QC samples that may be collected as part of this CMI program are described in this section. The anticipated number and type of QC samples to be collected are identified in Table 1. In the event that the actual number of samples varies from the estimated quantity, the number of QC samples collected will be adjusted based on the frequency of collection specified in this QAPP.

Equipment/Rinsate Blanks – An equipment or rinsate blank is used to indicate potential contamination from sample instruments used to collect and transfer samples. When collecting solid or water samples, the equipment blank is a sample of laboratory demonstrated analyte-free water passed over and/or through cleaned sampling equipment. The water must originate from one common source within the laboratory and must be the same water used by the laboratory when performing the analyses (i.e., for method blanks). Equipment blanks should be collected, transported,

and analyzed in the same manner as the samples acquired that day. Equipment blanks typically are not required when using dedicated and/or disposable sampling equipment. Equipment blank samples will be collected at a frequency of one equipment blank per sampling event per type of equipment.

Trip Blanks - Trip blanks are only required when collecting aqueous samples for volatile organics. They are not required for waste characterization samples. Trip blanks are not required for non-aqueous matrices or for analysis of any other parameters. They consist of a set of sample bottles filled at the laboratory with laboratory demonstrated analyte-free water. Trip blanks accompany the empty sample containers that are shipped from the laboratory into the field, and then back to the laboratory along with the collected samples for analysis. Trip blank are required at the rate of one per each cooler containing aqueous volatile organic. These bottles are never opened in the field. Trip blanks must return to the laboratory with the same set of containers they accompanied to the field.

Field Duplicates – A field duplicate (FD) sample pair consists of two independent samples that are collected at approximately the same time and place, using the same collection methods. Field duplicate samples are not required for waste characterization samples. Both are containerized, handled, and analyzed in an identical manner. Field duplicates are useful in documenting the precision of the sampling process, and also provide a measure of analysis precision. Duplicate samples will be collected at a required frequency of 1 per 20 samples. Field duplicates are typically 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 or matrix duplicate, MS/MSD, and/or LCS/LCSD (MSB/MSBD) analyses. The RPD between the concentrations detected in the above-listed sample pairs is calculated using the following formula:

$$RPD = \left| \frac{(X_1 - X_2)}{[(X_1 + X_2)/2]} \right| x\ 100\%$$

where:

X_1 = *Measured value of sample, MS, or LCS (MSB)*

X_2 = *Measured value of field (or matrix) duplicate, MSD, or LCSD (MSBD)*

RPD criteria for this CMI program are specified in Tables 2a and 2b.

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 percent recovery (%R) of a compound or analyte 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, LCS (MSB) samples as well as from surrogate compounds that are added to samples prior to extraction and analysis (typically used for organic fractions only). Accuracy is calculated using the following formula:

$$\%R = \frac{(X_s - X_u)}{K} x\ 100\%$$

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*

Accuracy criteria for this CMI program are specified in Tables 2a and 2b.

10.3 Completeness

Completeness is calculated on a per matrix basis for the project and is calculated as follows:

$$\%\ Completeness = \frac{(N - X_n)}{N}\ x\ 100\%$$

where:

N - *Number of valid measurements expected to be obtained*

X_n - *Number of invalid measurements*

11.0 CORRECTIVE ACTIONS

The Site Manager will discuss with and receive approval from the URS Project Manager or NYSDEC prior to taking any corrective actions in the field that may need to be implemented in order to meet project objectives. The Site Manager will document any corrective actions taken in the Field Log Book.

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 case narrative. A discussion of the corrective actions to be taken is presented in the following sections.

11.1 Incoming Samples

The laboratory shall document problems noted during sample receipt. The Laboratory Project Manager will contact the URS Project Chemist as soon as possible if any problems are encountered. 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 Laboratory Project Manager will contact the URS Project Chemist immediately for problem resolution. All corrective actions shall be documented thoroughly. Holding times for each analytical method and matrix are presented on Table 3.

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

fail to meet the required criteria, recalibration must be performed and, if necessary, all samples going back to the previous acceptable continuing calibration standard must be reanalyzed.

11.4 Quantitation Limits

The laboratory must make every attempt to meet all quantitation limits identified in Tables 2a and 2b. It should be noted that these limits are based on undiluted samples analyses and are not adjusted for moisture content (soil/solid samples). Sample-specific quantitation limits may be affected by any dilution that is needed because of elevated analyte concentrations, moisture content (soil/solids), and/or matrix interferences. If difficulties arise in achieving the required quantitation limits due to a particular sample matrix, the Laboratory Project Manager will contact the URS Project Chemist for problem resolution. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory shall report results from both the initial analyses and secondary dilution analyses. Dilution should only be used to bring target analytes within the linear range of calibration. If samples are analyzed at a dilution with no target analytes detected, the Laboratory Project Manager shall contact the URS Project Chemist so that appropriate corrective actions can be initiated.

11.5 Method QC

All QC samples, including blanks, matrix spikes, matrix spike duplicates, matrix duplicates, surrogate recoveries, laboratory control samples, and other method-specified QC samples, shall meet the acceptance criteria specified in this QAPP. Failure to these criteria will result in the possible qualification of all affected data. When the criteria are not met, the affected sample(s) should be reanalyzed within the required holding times to verify the presence or absence of matrix effects. It should be noted that reanalysis is not always required. The Laboratory Project Manager shall contact the URS Project Chemist to discuss possible corrective actions should unusually difficult sample matrices be encountered. The laboratory shall follow the requirements of the analytical methods and any instructions provided by the URS Project Chemist when determining if samples require reanalysis. 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, or as otherwise identified for the work assignment.

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 requested to reissue the analytical data report with the corrective actions appropriately documented in the case narrative.

12.0 DATA REDUCTION, VALIDATION, AND USABILITY

NYSDEC ASP Category B deliverable requirements (or equivalent) will be required for documentation and reporting of all data, except waste characterization data. Where applicable, the standard NYSDEC Data Package Summary Forms should be completed by the analytical laboratories and included in the deliverable data packages. In addition, the sample results will also be reported in 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. Results for aqueous samples will be reported in concentration units of micrograms per liter (µg/L) or milligrams per liter (mg/L). Results for solid samples will be reported in concentration units of micrograms per kilogram (µg/Kg) or milligrams per kilogram (mg/Kg) and adjusted for moisture content.

Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or other reliable commercial sources. Data reduction will be performed by individuals experienced with a particular analysis and knowledgeable of requirements.

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 not be required for waste characterization samples.

Data validation will be performed by the URS Project Chemist and/or an environmental chemist under his/her supervision. All analytical samples collected will receive a limited data review. This review will include a review of completeness of all required deliverables, holding times, review

of QC results (blanks, instrument tunings, calibration standards, calibration verifications, surrogates recoveries, spike recoveries, replicate analyses, and laboratory controls) to determine if the data are 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 results provided in the data summary sheets, and a review of laboratory data qualifiers. The methods identified in Table 1, as well as the general guidelines presented in one or more of the following USEPA Region II documents (or most current update), will be used to aide the chemist during the data review. The specific USEPA Region II validation guidelines to be followed will vary based on the required analytical parameters for each work assignment, and will be documented in the Data Usability Summary Report (Section 12.3).

- Validating Volatile Organic Compounds by SW-846 Method 8260B, SOP HW-24, Revision 2, August 2008 (or most current);
- Validating Semivolatile Organic Compounds by SW-846 Method 8270D, SOP HW-22, Revision 4, August 2008 (or most current);
- Validating Pesticide Compounds, Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B, SOP HW-44, Revision 1, October 2006 (or most current);
- Validating PCB Compounds by SW-846 Method 8082A, SOP HW-45, Revision 1, October 2006 (or most current);
- Validating Chlorinated Herbicides by GC SW-846 Method 8151A, SOP HW-17, Revision 3, July 2008 (or most current);
- Contract Laboratory Program (CLP) Organics Data Review and Preliminary Review (CLP/SOW OLMO4.3), SOP HW-6, Revision 14, September 2006 (or most current);
- Validation of Metals Data for the CLP Program, based on SOW ILMO5.3, SOP HW-2, Revision 13, September 2006 (or most current); and

12.3 Data Usability

A Data Usability Summary Report (DUSR) (NYSDEC *DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 2B*, Final, May 2010) will be submitted to NYSDEC, and will describe the samples and the analytical parameters. Data deficiencies, analytical protocol deviations, and quality control problems will be identified and their effect on the data will be discussed. The DUSR will also include recommendations on resampling/reanalysis. A copy of the NYSDEC DUSR requirements is provided in Attachment D. Waste characterization data will not be included in the DUSR.

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.

Maintenance of field instrumentation will be performed as needed by the vendor and/or URS personnel according to the manufacturer’s requirements.

14.0 PERFORMANCE AND SYSTEMS AUDITS

Audits are evaluations of laboratory QA/QC procedures, and are performed before or shortly after systems are operational, and on an ongoing basis thereafter. Problems detected during these audits shall be reviewed by the Laboratory QA Manager and other laboratory management personnel, and corrective action shall be instituted as necessary.

14.1 Performance Audits

Performance audits are conducted by introducing control samples into the data measurement, reduction, and reporting processes. These control samples may include performance evaluation samples, or field samples spiked with known amounts of analytes. In addition to conducting internal reviews and performance audits as part of its established quality assurance program, the laboratory is required to take part in regularly-scheduled performance audits/evaluations from state and federal agencies. They are typically conducted as part of the certification process and to evaluate laboratory performance 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, and to take appropriate corrective actions as needed.

14.2 Systems Audits

Systems audits are thorough, on-site qualitative audits of facilities, equipment/instrumentation, personnel, training procedures, record keeping, data review/management, and reporting aspects of a system. They provide a qualitative measure of the data produced by one section of, or the entire, measurement process. The audits are performed against a set of requirements, which may include laboratory standard operating procedures, a quality assurance project plan or work plan, a standard method, and/or a project statement of work. The primary objective of the systems audits is to verify that all procedures are being performed according to the requirements specified above. Systems audits are performed internally by the Laboratory QA Manager, and also by external parties such as state and federal regulatory agencies and private-sector

clients. Typically, state and federal agencies perform systems audits in conjunction with performance audits/evaluations during the laboratory certification process. As part of its QA program, the Laboratory QA Manager shall also conduct periodic checks and audits of the analytical, data reduction, and reporting systems. The purpose of these is to verify that the systems are operating properly, and that personnel are adhering to established procedures and documenting the required information. These checks and audits assist in determining or detecting where problems are occurring.

REFERENCES

New York State Department of Environmental Conservation (NYSDEC), 2005. *Analytical Services Protocol;* July.

NYSDEC, 2010. *DER-10, Technical Guidance for Site Investigation and Remediation*; Final. May.

United States Environmental Protection Agency (USEPA). 1983. *National Enforcement Investigations Center (NEIC) Office of Enforcement, NEIC Policies and Procedures EPA 330/9-78-001-R;*Denver CO, May.

USEPA. 2005. *Uniform Federal Policy for Quality Assurance Project Plans; Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs, Final, Version 1; EPA-505-B-04-900A*, March.

USEPA. 2006a. *CLP Organics Data Review and Preliminary Review (CLP/SOW OLMO4.3), HW-6, Revision 14;* Region II, September.

USEPA. 2006b. *Validation of Metals Data for the CLP Program, based on SOW ILMO5.3*, *SOP HW-2, Revision 13;* Region II, September.

USEPA. 2006d. *Validating PCB Compounds by SW-846 Method 8082A, SOP HW-45, Revision 1;* Region II, October.

USEPA. 2006e. *Validating Pesticide Compounds, Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B, SOP HW-44, Revision 1*, Region II, October.

USEPA. 2008a. *Validating Chlorinated Herbicides by Gas Chromatography* SW-846 Method 8151A*, HW-17, Revision 3;* Region II, July.

USEPA. 2008b. *Validating Semivolatile Organic Compounds by SW-846 Method 8270D, SOP HW-22, Revision 4;* Region II, August.

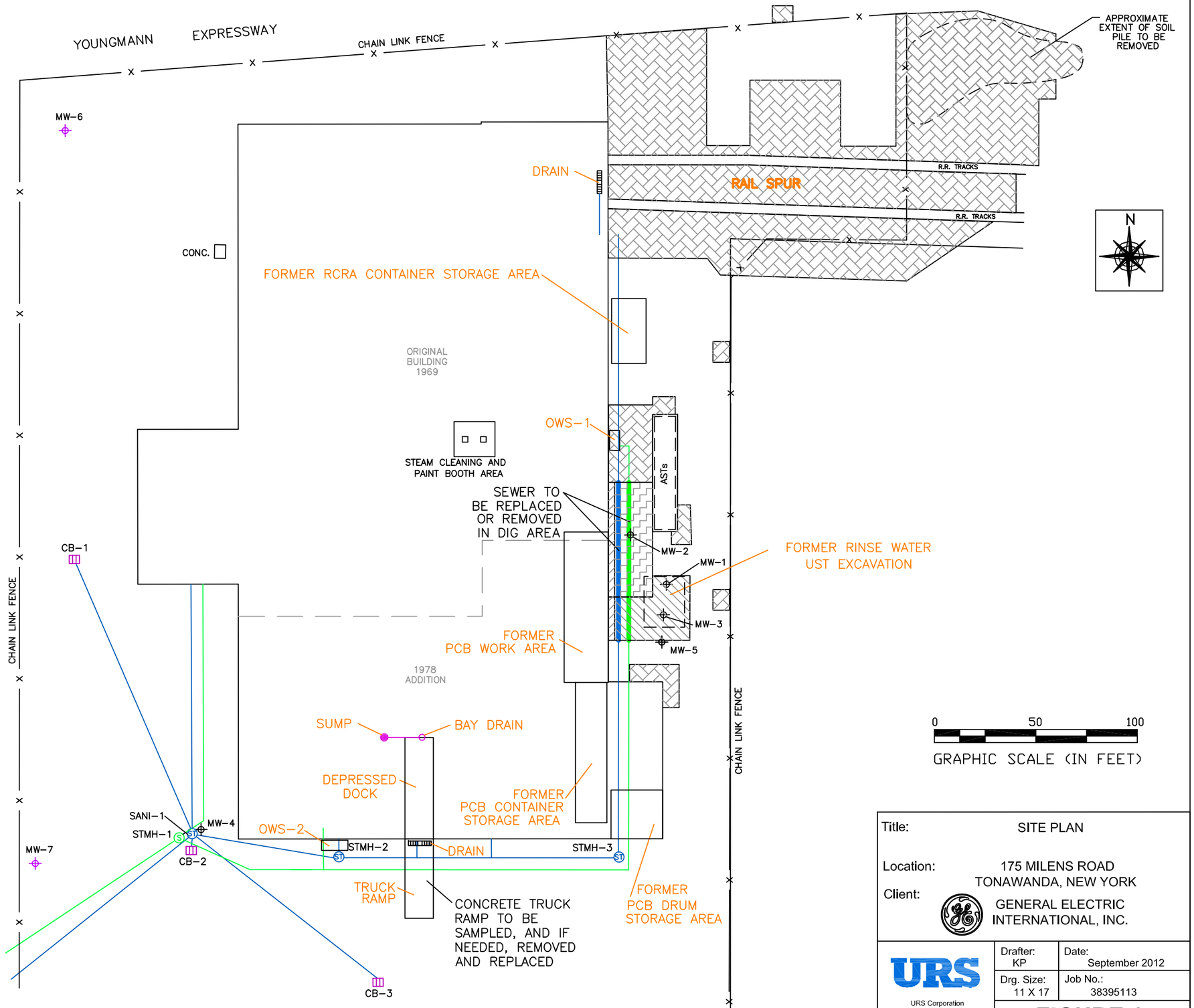
USEPA. 2008c. *Validating Volatile Organic Compounds by SW-846 Method 8260B, HW-24, Revision 2, Region II;* August.

FIGURES

LEGEND

- ST – STORM MANHOLE
- S – SANITARY MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- FLOOR DRAIN
- TRENCH WITH FLOOR DRAIN
- DEPRESSED DOCK SEWER
- EXCAVATION TO 1 FOOT AND BACKFILL
- EXCAVATION TO 4 FEET AND BACKFILL
- EXCAVATION FROM 6 TO 12 FEET AND BACKFILL
- EXCAVATION TO TOP OF FOOTINGS
- 8 INCH STORM SEWER APPROX. 80 FT TO BE REPLACED
- 4 INCH SANITARY SEWER – APPROX. 80 FT OF OUT-OF-SERVICE SECTION TO BE REMOVED
- EXISTING MONITORING WELL
- PROPOSED NEW MONITORING WELL

SOURCE: "MAP OF GENERAL ELECTRIC SERVICE CENTER PROPERTY, PART OF LOT 45, TOWNSHIP 12, RANGE 8, TOWN OF TONAWANDA, ERIE COUNTY, NEW YORK" KRIEBEL ASSOCIATES, JULY 29, 1998.



Title:	SITE PLAN
Location:	175 MILENS ROAD TONAWANDA, NEW YORK
Client:	GENERAL ELECTRIC INTERNATIONAL, INC.

URS Corporation
3 Corporate Drive, Suite 203
Clifton Park, New York 12065

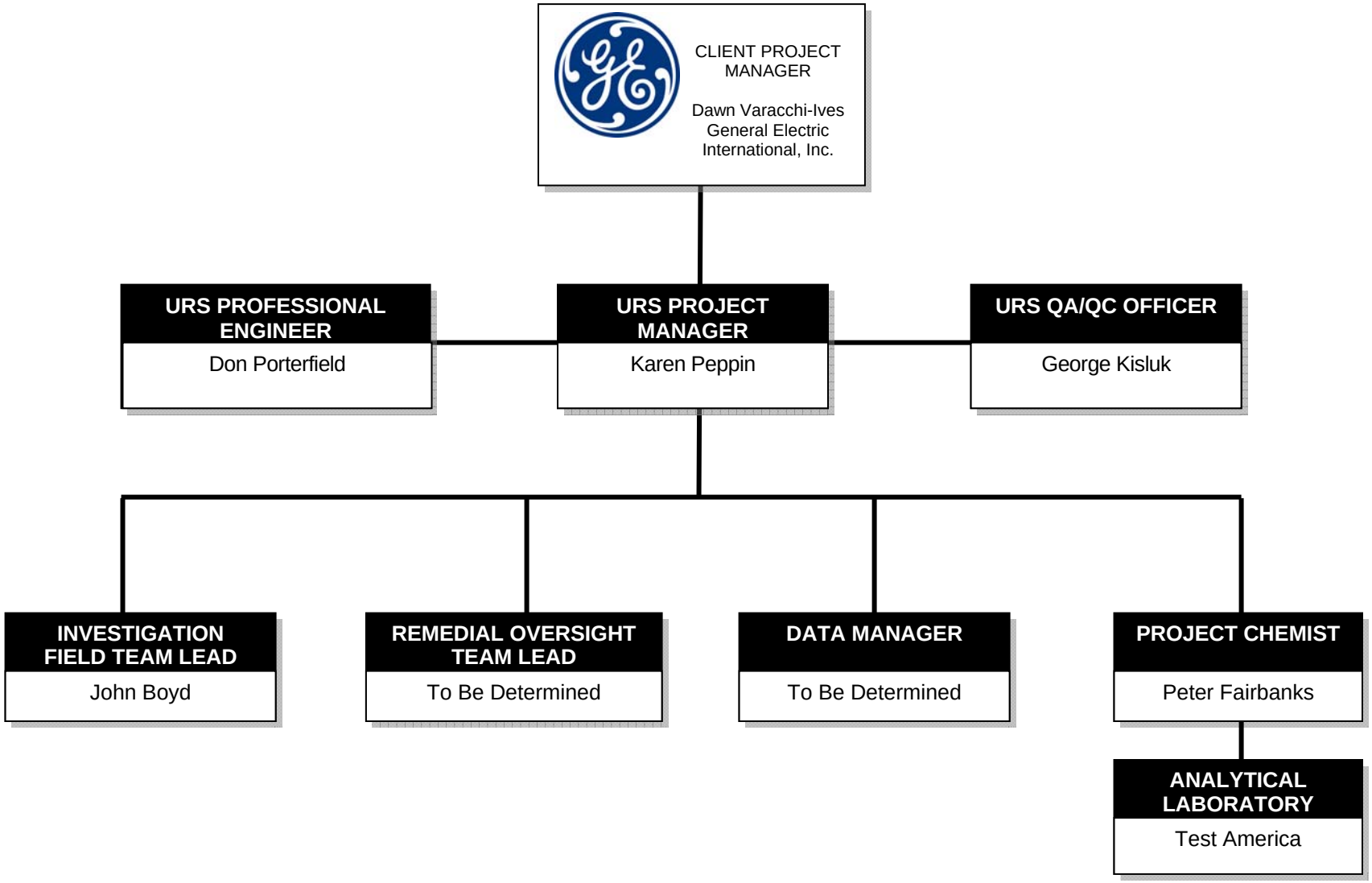
Drafter: KP	Date: September 2012
Drg. Size: 11 X 17	Job No.: 38395113

FIGURE 1

J:\38395113 GE Tonawanda CMIP and GC\CMI Plan\QAPP\Fig1 - Site Plan.dwg User-Karen_Peppin Oct 02, 2012 - 3:15pm

FIGURE 2
ORGANIZATIONAL CHART

CORRECTIVE MEASURE IMPLEMENTATION
PARTS AND REPAIR SERVICE CENTER
GENERAL ELECTRIC INTERNATIONAL, INC.
TONAWANDA, NEW YORK



TABLES

TABLE 1

SUMMARY OF ANTICIPATED SAMPLES TO BE COLLECTED AND ANALYTICAL PARAMETERS

GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER

TONAWANDA, NEW YORK

Parameter	Analytical Method[1]	Matrix	Estimated Number of Samples	Estimated Field QC Samples[2]				Estimated Total No. of Samples
				Field Duplicates	MS/MSD/MD	Rinsate Blanks	Trip Blanks	
Phase I - Design Investigation and Planning								
Polychlorinated Biphenyls (PCBs)	EPA 8082	Soil	40	2	2	2	0	48
PCBs	EPA 8082	Groundwater	1	0	0	0	0	1
Volatile Organic Compounds (VOCs)	EPA 80260B	Groundwater	1	0	0	0	1	2
RCRA Metals (8)	EPA 6010B/7470A	Groundwater	1	0	0	0	0	1
PCBs	EPA 8082	Concrete	8	1	1	0	0	11
PCBs	EPA 8082	Asphalt	5	1	1	0	0	8
PCBs	EPA 8082	Wipes	4	1	1	0	0	7
PCBs	EPA 8082	RR Tie Chips	4	1	1	0	0	7
Toxicity Characterization Leaching Procedure (TCLP) VOCs	EPA 1311/8260B	Sediment	2	0	0	0	0	2
TCLP Semivolatile Organic Compounds (SVOCs)	EPA 1311/8270C	Sediment	2	0	0	0	0	2
TCLP Pesticides	EPA 1311/8081A	Sediment	2	0	0	0	0	2
TCLP Herbicides	EPA 1311/8151A	Sediment	2	0	0	0	0	2
TCLP Metals	EPA 1311/6010B/7470A	Sediment	2	0	0	0	0	2
Corrosivity (as pH)	EPA 9045C	Sediment	2	0	0	0	0	2
Ignitability	EPA 1030	Sediment	2	0	0	0	0	2
Reactive Cyanide	EPA SW-846 Sec 7.3	Sediment	2	0	0	0	0	2
Reactive Sulfide	EPA SW-846 Sec 7.3	Sediment	2	0	0	0	0	2
PCBs	EPA 8082	Sediment	2	0	0	0	0	2
TCLP VOCs	EPA 1311/8260B	Wastewater	2	0	0	0	0	2
TCLP SVOCs	EPA 1311/8270C	Wastewater	2	0	0	0	0	2
TCLP Pesticides	EPA 1311/8081A	Wastewater	2	0	0	0	0	2
TCLP Herbicides	EPA 1311/8151A	Wastewater	2	0	0	0	0	2
TCLP Metals	EPA 1311/6010B/7470A	Wastewater	2	0	0	0	0	2
Corrosivity (as pH)	EPA 9040B	Wastewater	2	0	0	0	0	2
Ignitability	EPA 1010	Wastewater	2	0	0	0	0	2
Reactive Cyanide	EPA SW-846 Sec 7.3	Wastewater	2	0	0	0	0	2
Reactive Sulfide	EPA SW-846 Sec 7.3	Wastewater	2	0	0	0	0	2
PCBs	EPA 8082	Wastewater	2	0	0	0	0	2

TABLE 1

SUMMARY OF ANTICIPATED SAMPLES TO BE COLLECTED AND ANALYTICAL PARAMETERS

GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER

TONAWANDA, NEW YORK

Parameter	Analytical Method[1]	Matrix	Estimated Number of Samples	Estimated Field QC Samples[2]				Estimated Total No. of Samples
				Field Duplicates	MS/MSD/MD	Rinsate Blanks	Trip Blanks	
Phase II - Remediation								
Toxicity Characterization Leaching Procedure (TCLP) VOCs	EPA 1311/8260B	Solid/Aqueous Waste	10	0	0	0	0	10
TCLP Semivolatile Organic Compounds (SVOCs)	EPA 1311/8270C	Solid/Aqueous Waste	10	0	0	0	0	10
TCLP Pesticides	EPA 1311/8081A	Solid/Aqueous Waste	10	0	0	0	0	10
TCLP Herbicides	EPA 1311/8151A	Solid/Aqueous Waste	10	0	0	0	0	10
TCLP Metals	EPA 1311/6010B/7470A	Solid/Aqueous Waste	10	0	0	0	0	10
Corrosivity (as pH)	EPA 9040B/9045C	Solid/Aqueous Waste	10	0	0	0	0	10
Ignitability	EPA 1010/1030	Solid/Aqueous Waste	10	0	0	0	0	10
Reactive Cyanide	EPA SW-846 Sec 7.3	Solid/Aqueous Waste	10	0	0	0	0	10
Reactive Sulfide	EPA SW-846 Sec 7.3	Solid/Aqueous Waste	10	0	0	0	0	10
PCBs	EPA 8082	Solid/Aqueous Waste	10	0	0	0	0	10
PCBs	EPA 8082	Post-Excavation Soil	43	2	2	4	0	53
VOCs	EPA 80260B	Post-Excavation Soil	7	1	1	1	0	11
TBD[3]	TBD	Treated Wastewater	0	0	0	0	0	0
Phase III - Restoration (Parameters per 6 NYCCR Part 375-6.8)								
VOCs	EPA 8260B	Backfill	8	0	0	0	0	8
SVOCs	EPA 8270C	Backfill	8	0	0	0	0	8
Pesticides	EPA 8081A	Backfill	8	0	0	0	0	8
PCBs	EPA 8082	Backfill	8	0	0	0	0	8
Herbicides	EPA 8151A	Backfill	8	0	0	0	0	8
Metals	EPA 6010B/7471A	Backfill	8	0	0	0	0	8
Hexavalent Chromium	EPA 7196A	Backfill	8	0	0	0	0	8
Total Cyanide	EPA 9010B/9012	Backfill	8	0	0	0	0	8
IV. Long-Term Groundwater Monitoring (3 samples per year x 5 years = 15 samples)								
PCBs	EPA 8082	Groundwater	15	5	5	5	0	30
VOCs	EPA 8260B	Groundwater	15	5	5	5	5	35

Notes:

1. NYSDEC Analytical Services Protocol (ASP), July 2005 Edition.
   For waste characterization samples, the parameters and anaytical methods will be determined based on the requirements of the disposal facility(ies).
2. Field duplicate sample frequency: 1 per 20 samples.
   MS/MSD/MD sample frequency: 1 per 20 samples.
   Rinsate Blank sample frequency: 1 per sampling event per type of non-dedicated, non-disposable equipment.
   Trip blank frequency: 1 per cooler.
3. TBD: If CMI program includes treating remedial wastewater and discharging treated water under the terms of a permit, the terms of the permit will specify the paramters analyzed and the required analytical methods.

MS/MSD/MD - Matrix spike/matrix spike duplicate/matrix duplicate

RR - Railroad

TABLE 2a
ANALYTICAL LABORATORY QUANTITATION AND DETECTION LIMITS
AND PRECISION AND ACCURACY CRITERIA
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Laboratory:	TestAmerica Laboratories, Inc - Amherst, NY				**Matrix:**	Soil, Sediment, Concrete, Asphalt, RR Tie Chips, Solid Waste,and Backfill				
Analytical Method	**Parameter**	**Units**	**QL**	**MDL**	**LCS Accuracy Criteria (%R)**		**LCS Precision Criteria (RPD)**	**MS Accuracy Criteria (%R)**		**MS/MSD Precision Criteria (RPD)**
					Lower Limit	**Upper Limit**		**Lower Limit**	**Upper Limit**	
8082 - PCBs	PCB-1016	ug/Kg	16.7	3.26	51	185	50	42	159	50
	PCB-1221	ug/Kg	16.7	3.26	NA	NA	NA	NA	NA	NA
	PCB-1232	ug/Kg	16.7	3.26	NA	NA	NA	NA	NA	NA
	PCB-1242	ug/Kg	16.7	3.26	NA	NA	NA	NA	NA	NA
	PCB-1248	ug/Kg	16.7	3.26	NA	NA	NA	NA	NA	NA
	PCB-1254	ug/Kg	16.7	7.82	NA	NA	NA	NA	NA	NA
	PCB-1260	ug/Kg	16.7	7.82	61	185	50	47	153	50
	DCB Decachlorobiphenyl (Surr)	NA	NA	NA	36	182	NA	NA	NA	NA
	Tetrachloro-m-xylene (Surr)	NA	NA	NA	24	172	NA	NA	NA	NA
8260B - VOCs	1,1,1-Trichloroethane	ug/Kg	5	0.363	77	121	20	77	121	30
	1,1,2,2-Tetrachloroethane	ug/Kg	5	0.811	80	120	20	80	120	30
	1,1,2-Trichloroethane	ug/Kg	5	0.65	78	122	20	78	122	30
	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/Kg	5	1.14	60	140	20	60	140	30
	1,1-Dichloroethane	ug/Kg	5	0.61	73	126	20	73	126	30
	1,1-Dichloroethene	ug/Kg	5	0.612	59	125	20	59	125	30
	1,2,4-Trichlorobenzene	ug/Kg	5	0.304	64	120	20	64	120	30
	1,2-Dibromo-3-Chloropropane	ug/Kg	5	2.5	63	124	20	63	124	30
	1,2-Dibromoethane	ug/Kg	5	0.642	78	120	20	78	120	30
	1,2-Dichlorobenzene	ug/Kg	5	0.391	75	120	20	75	120	30
	1,2-Dichloroethane	ug/Kg	5	0.251	77	122	20	77	122	30
	1,2-Dichloropropane	ug/Kg	5	2.5	75	124	20	75	124	30
	1,3-Dichlorobenzene	ug/Kg	5	0.257	74	120	20	74	120	30
	1,4-Dichlorobenzene	ug/Kg	5	0.7	73	120	20	73	120	30
	2-Hexanone	ug/Kg	25	2.5	59	130	20	59	130	30
	2-Butanone (MEK)	ug/Kg	25	1.83	70	134	20	70	134	30
	4-Methyl-2-pentanone (MIBK)	ug/Kg	25	1.64	65	133	20	65	133	30
	Acetone	ug/Kg	25	4.21	61	137	20	61	137	30
	Benzene	ug/Kg	5	0.245	79	127	20	79	127	30
	Bromodichloromethane	ug/Kg	5	0.67	80	122	20	80	122	30
	Bromoform	ug/Kg	5	2.5	68	126	20	68	126	30
	Bromomethane	ug/Kg	5	0.45	37	149	20	37	149	30
	Carbon disulfide	ug/Kg	5	2.5	64	131	20	64	131	30
	Carbon tetrachloride	ug/Kg	5	0.484	75	135	20	75	135	30
	Chlorobenzene	ug/Kg	5	0.66	76	124	20	76	124	30
	Dibromochloromethane	ug/Kg	5	0.64	76	125	20	76	125	30
	Chloroethane	ug/Kg	5	1.13	69	135	20	69	135	30
	Chloroform	ug/Kg	5	0.309	80	118	20	80	118	30
	Chloromethane	ug/Kg	5	0.302	63	127	20	63	127	30
	cis-1,2-Dichloroethene	ug/Kg	5	0.64	81	117	20	81	117	30
	cis-1,3-Dichloropropene	ug/Kg	5	0.72	82	120	20	82	120	30
	Cyclohexane	ug/Kg	5	0.7	70	130	20	70	130	30
	Dichlorodifluoromethane	ug/Kg	5	0.413	57	142	20	57	142	30
	Ethylbenzene	ug/Kg	5	0.345	80	120	20	80	120	30
	Isopropylbenzene	ug/Kg	5	0.754	72	120	20	72	120	30
	Methyl acetate	ug/Kg	5	0.93	60	140	20	60	140	30
	Methyl tert-butyl ether	ug/Kg	5	0.491	63	125	20	63	125	30
	Methylcyclohexane	ug/Kg	5	0.76	60	140	20	60	140	30
	Methylene Chloride	ug/Kg	5	2.3	61	127	20	61	127	30
	Styrene	ug/Kg	5	0.25	80	120	20	80	120	30
	Tetrachloroethene	ug/Kg	5	0.671	74	122	20	74	122	30
	Toluene	ug/Kg	5	0.378	74	128	20	74	128	30
	trans-1,2-Dichloroethene	ug/Kg	5	0.516	78	126	20	78	126	30
	trans-1,3-Dichloropropene	ug/Kg	5	2.2	73	123	20	73	123	30
	Trichloroethene	ug/Kg	5	1.1	77	129	20	77	129	30
	Trichlorofluoromethane	ug/Kg	5	0.473	65	146	20	65	146	30
	Vinyl chloride	ug/Kg	5	0.61	61	133	20	61	133	30
	Xylenes, Total	ug/Kg	10	0.84	70	130	20	80	120	30
	1,2-Dichloroethane-d4 (Surr)	NA	NA	NA	64	126	NA	NA	NA	NA
	Toluene-d8 (Surr)	NA	NA	NA	71	125	NA	NA	NA	NA
	4-Bromofluorobenzene (Surr)	NA	NA	NA	72	126	NA	NA	NA	NA

TABLE 2a
ANALYTICAL LABORATORY QUANTITATION AND DETECTION LIMITS
AND PRECISION AND ACCURACY CRITERIA
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Laboratory:	TestAmerica Laboratories, Inc - Amherst, NY				**Matrix:**	Soil, Sediment, Concrete, Asphalt, RR Tie Chips, Solid Waste,and Backfill				
Analytical Method	**Parameter**	**Units**	**QL**	**MDL**	**LCS Accuracy Criteria (%R)**		**LCS Precision Criteria (RPD)**	**MS Accuracy Criteria (%R)**		**MS/MSD Precision Criteria (RPD)**
					Lower Limit	**Upper Limit**		**Lower Limit**	**Upper Limit**	
8270C - SVOCs	Biphenyl	ug/Kg	170	10.51428	30	130	60	30	130	60
	bis (2-chloroisopropyl) ether	ug/Kg	170	17.64	34	130	44	34	130	44
	2,4,5-Trichlorophenol	ug/Kg	170	36.8149	33	130	45	33	130	45
	2,4,6-Trichlorophenol	ug/Kg	170	11.13659	39	130	53	39	130	53
	2,4-Dichlorophenol	ug/Kg	170	8.84975	22	130	52	22	130	52
	2,4-Dimethylphenol	ug/Kg	170	45.59644	10	130	60	10	130	60
	2,4-Dinitrophenol	ug/Kg	330	59.06137	40	130	32	40	130	32
	2,4-Dinitrotoluene	ug/Kg	170	26.13436	36	130	43	36	130	43
	2,6-Dinitrotoluene	ug/Kg	170	41.30373	46	130	30	46	130	30
	2-Chloronaphthalene	ug/Kg	170	11.32611	39	130	38	39	130	38
	2-Chlorophenol	ug/Kg	170	8.59328	43	130	35	43	130	35
	2-Methylnaphthalene	ug/Kg	170	2.04484	43	130	60	43	130	60
	2-Methylphenol	ug/Kg	170	5.19098	42	130	34	42	130	34
	2-Nitroaniline	ug/Kg	330	54.14509	34	130	48	34	130	48
	2-Nitrophenol	ug/Kg	170	7.71638	10	130	60	10	130	60
	3,3'-Dichlorobenzidine	ug/Kg	170	148	11	130	40	11	130	40
	3-Nitroaniline	ug/Kg	330	38.81322	13	130	60	13	130	60
	4,6-Dinitro-2-methylphenol	ug/Kg	330	58.29008	43	130	37	43	130	37
	4-Bromophenyl phenyl ether	ug/Kg	170	53.70538	38	130	30	38	130	30
	4-Chloro-3-methylphenol	ug/Kg	170	6.94446	10	130	48	10	130	48
	4-Chloroaniline	ug/Kg	170	49.54531	45	130	32	45	130	32
	4-Chlorophenyl phenyl ether	ug/Kg	170	3.59842	42	130	53	42	130	53
	4-Methylphenol	ug/Kg	330	9.4	23	130	37	23	130	37
	4-Nitroaniline	ug/Kg	330	18.8558	10	144	30	10	144	30
	4-Nitrophenol	ug/Kg	330	40.91715	43	130	30	43	130	30
	Acenaphthene	ug/Kg	170	1.98418	46	130	30	46	130	30
	Acenaphthylene	ug/Kg	170	1.38072	30	130	60	30	130	60
	Acetophenone	ug/Kg	170	8.66305	37	130	30	37	130	30
	Anthracene	ug/Kg	170	4.32194	30	130	60	30	130	60
	Atrazine	ug/Kg	170	7.51146	30	130	60	30	130	60
	Benzaldehyde	ug/Kg	170	18.51196	40	130	30	40	130	30
	Benzo(a)anthracene	ug/Kg	170	2.91388	44	130	30	44	130	30
	Benzo(a)pyrene	ug/Kg	170	4.06861	29	154	32	29	154	32
	Benzo(b)fluoranthene	ug/Kg	170	3.27501	10	130	30	10	130	30
	Benzo(g,h,i)perylene	ug/Kg	170	2.02566	35	143	30	35	143	30
	Benzo(k)fluoranthene	ug/Kg	170	1.85814	43	130	40	43	130	40
	Bis(2-chloroethoxy)methane	ug/Kg	170	9.18259	41	130	30	41	130	30
	Bis(2-chloroethyl)ether	ug/Kg	170	14.57441	34	130	30	34	130	30
	Bis(2-ethylhexyl) phthalate	ug/Kg	170	54.38616	42	154	36	42	154	36
	Butyl benzyl phthalate	ug/Kg	170	45.32835	34	160	37	34	160	37
	Caprolactam	ug/Kg	170	73.02415	30	130	60	30	130	60
	Carbazole	ug/Kg	170	1.95306	42	130	36	42	130	36
	Chrysene	ug/Kg	170	1.68779	43	130	30	43	130	30
	Di-n-butyl phthalate	ug/Kg	170	58.34917	50	133	39	50	133	39
	Di-n-octyl phthalate	ug/Kg	170	3.94792	48	146	31	48	146	31
	Dibenz(a,h)anthracene	ug/Kg	170	1.98543	16	135	30	16	135	30
	Dibenzofuran	ug/Kg	170	1.75662	45	130	30	45	130	30
	Diethyl phthalate	ug/Kg	170	5.09952	48	130	30	48	130	30
	Dimethyl phthalate	ug/Kg	170	4.40366	46	130	39	46	130	39
	Fluoranthene	ug/Kg	170	2.44588	45	130	30	45	130	30
	Fluorene	ug/Kg	170	3.88915	45	130	30	45	130	30
	Hexachlorobenzene	ug/Kg	170	8.38584	50	130	31	50	130	31
	Hexachlorobutadiene	ug/Kg	170	8.63759	37	130	41	37	130	41
	Hexachlorocyclopentadiene	ug/Kg	170	51.03698	10	130	58	10	130	58
	Hexachloroethane	ug/Kg	170	13.06357	23	130	37	23	130	37
	Indeno(1,2,3-cd)pyrene	ug/Kg	170	4.66924	10	134	30	10	134	30
	Isophorone	ug/Kg	170	8.43613	43	130	40	43	130	40
	N-Nitrosodi-n-propylamine	ug/Kg	170	13.36969	35	130	30	35	130	30
	N-Nitrosodiphenylamine	ug/Kg	170	9.22816	44	130	52	44	130	52
	Naphthalene	ug/Kg	170	2.80953	40	130	33	40	130	33
	Nitrobenzene	ug/Kg	170	7.48254	45	130	51	45	130	51
	Pentachlorophenol	ug/Kg	330	57.89626	10	130	53	10	130	53
	Phenanthrene	ug/Kg	170	3.54216	45	130	30	45	130	30
	Phenol	ug/Kg	170	17.76801	33	130	34	33	130	34
	Pyrene	ug/Kg	170	1.09282	18	164	30	18	164	30
	2,4,6-Tribromophenol (Surr)	NA	NA	NA	20	143	NA	20	143	NA
	2-Fluorobiphenyl (Surr)	NA	NA	NA	46	130	NA	46	130	NA
	2-Fluorophenol (Surr)	NA	NA	NA	22	130	NA	22	130	NA
	Nitrobenzene-d5 (Surr)	NA	NA	NA	39	130	NA	39	130	NA
	p-Terphenyl-d14 (Surr)	NA	NA	NA	33	130	NA	33	130	NA
	Phenol-d5 (Surr)	NA	NA	NA	36	146	NA	36	146	NA

TABLE 2a
ANALYTICAL LABORATORY QUANTITATION AND DETECTION LIMITS
AND PRECISION AND ACCURACY CRITERIA
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Laboratory:	TestAmerica Laboratories, Inc - Amherst, NY				**Matrix:**	Soil, Sediment, Concrete, Asphalt, RR Tie Chips, Solid Waste,and Backfill				
Analytical Method	**Parameter**	**Units**	**QL**	**MDL**	**LCS Accuracy Criteria (%R)**		**LCS Precision Criteria (RPD)**	**MS Accuracy Criteria (%R)**		**MS/MSD Precision Criteria (RPD)**
					Lower Limit	**Upper Limit**		**Lower Limit**	**Upper Limit**	
8081A - Pesticides	4,4'-DDD	ug/Kg	1.67	0.324	45	129	18	53	124	21
	4,4'-DDE	ug/Kg	1.67	0.25	49	120	16	44	123	18
	4,4'-DDT	ug/Kg	1.67	0.17	47	145	17	36	132	25
	Aldrin	ug/Kg	1.67	0.41	35	120	24	35	120	12
	alpha-BHC	ug/Kg	1.67	0.3	49	120	19	35	114	15
	alpha-Chlordane	ug/Kg	1.67	0.83	44	127	13	47	121	23
	beta-BHC	ug/Kg	1.67	0.18	58	123	17	50	121	19
	delta-BHC	ug/Kg	1.67	0.22	45	123	14	45	123	14
	Dieldrin	ug/Kg	1.67	0.4	53	128	13	47	120	12
	Endosulfan I	ug/Kg	1.67	0.21	29	125	16	29	125	18
	Endosulfan II	ug/Kg	1.67	0.3	56	127	17	21	137	26
	Endosulfan sulfate	ug/Kg	1.67	0.311	53	135	14	34	136	35
	Endrin	ug/Kg	1.67	0.23	58	129	19	53	120	20
	Endrin aldehyde	ug/Kg	1.67	0.426	39	133	23	33	120	47
	Endrin ketone	ug/Kg	1.67	0.41	61	133	14	49	131	37
	gamma-BHC (Lindane)	ug/Kg	1.67	1.206	50	120	20	50	120	12
	gamma-Chlordane	ug/Kg	1.67	0.53	54	124	14	51	120	15
	Heptachlor	ug/Kg	1.67	0.261	49	122	16	47	120	22
	Heptachlor epoxide	ug/Kg	1.67	0.43	47	128	17	44	122	15
	Methoxychlor	ug/Kg	1.67	0.23	61	146	14	53	143	24
	Toxaphene	ug/Kg	16.7	9.7	NA	NA	NA	NA	NA	NA
	DCB Decachlorobiphenyl (Surr)	NA	NA	NA	62	137	NA	NA	NA	NA
	Tetrachloro-m-xylene (Surr)	NA	NA	NA	30	124	NA	NA	NA	NA
8051A - Herbicides	2,4,5-T	ug/Kg	16.7	5.33	55	120	50	55	120	50
	2,4-D	ug/Kg	16.7	10.5	55	122	50	55	122	50
	Dinoseb	ug/Kg	16.7	5.29	10	130	50	10	130	50
	Silvex (2,4,5-TP)	ug/Kg	16.7	6	54	121	50	54	121	50
	2,4-Dichlorophenylacetic acid (Surr)	NA	NA	NA	39	120	NA	NA	NA	NA
6010B - Metals	Aluminum	mg/Kg	10	4.4	41	160	20	75	125	20
	Antimony	mg/Kg	15	0.54	25	272	20	75	125	20
	Arsenic	mg/Kg	2	0.4	69	131	20	75	125	20
	Barium	mg/Kg	0.5	0.11	72	127	20	75	125	20
	Beryllium	mg/Kg	0.2	0.028	73	127	20	75	125	20
	Cadmium	mg/Kg	0.2	0.03	73	127	20	75	125	20
	Calcium	mg/Kg	50	3.3	74	126	20	75	125	20
	Chromium	mg/Kg	0.5	0.2	68	132	20	75	125	20
	Cobalt	mg/Kg	0.5	0.05	75	125	20	75	125	20
	Copper	mg/Kg	1	0.21	74	126	20	75	125	20
	Iron	mg/Kg	10	1.1	31	169	20	75	125	20
	Lead	mg/Kg	1	0.24	70	130	20	75	125	20
	Magnesium	mg/Kg	20	0.927	64	136	20	75	125	20
	Manganese	mg/Kg	0.2	0.032	74	125	20	75	125	20
	Nickel	mg/Kg	5	0.23	70	130	20	75	125	20
	Potassium	mg/Kg	30	20	61	139	20	75	125	20
	Selenium	mg/Kg	4	0.57	64	137	20	75	125	20
	Silver	mg/Kg	0.5	0.2	66	135	20	75	125	20
	Sodium	mg/Kg	140	13	27	174	20	75	125	20
	Thallium	mg/Kg	6	0.3	67	132	20	75	125	20
	Vanadium	mg/Kg	0.5	0.11	54	146	20	75	125	20
	Zinc	mg/Kg	2	0.153	67	133	20	75	125	20
7471A - Mercury	Mercury	mg/Kg	0.02	0.0081	51	149	20	75	125	20
7196A - Cr^{+6}	Hexavalent Chromium (Cr^{+6})	mg/Kg	2	0.75	85	115	20	75	125	20
9012A - T-CN	Cyanide, Total (T-CN)	mg/Kg	1	0.483	29	122	15	85	115	15
1311/8260B - TCLP VOCs	Benzene	mg/L	0.001	0.00041	71	124	13	71	124	13
	Carbon tetrachloride	mg/L	0.001	0.00027	72	134	15	72	134	15
	Chlorobenzene	mg/L	0.001	0.00075	72	120	25	72	120	25
	Chloroform	mg/L	0.001	0.00034	73	127	20	73	127	20
	1,2-Dichloroethane	mg/L	0.001	0.00021	75	127	20	75	127	20
	1,1-Dichloroethene	mg/L	0.001	0.00029	58	121	16	58	121	16
	2-Butanone (MEK)	mg/L	0.005	0.00132	57	140	20	57	140	20
	Tetrachloroethene	mg/L	0.001	0.00036	74	122	20	74	122	20
	Trichloroethene	mg/L	0.001	0.00046	74	123	16	74	123	16
	Vinyl chloride	mg/L	0.001	0.0009	65	133	15	65	133	15
	1,2-Dichloroethane-d4 (Surr)	NA	NA	NA	66	137	NA	NA	NA	NA
	Toluene-d8 (Surr)	NA	NA	NA	71	126	NA	NA	NA	NA
	4-Bromofluorobenzene (Surr)	NA	NA	NA	73	120	NA	NA	NA	NA

TABLE 2a
ANALYTICAL LABORATORY QUANTITATION AND DETECTION LIMITS
AND PRECISION AND ACCURACY CRITERIA
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Laboratory: TestAmerica Laboratories, Inc - Amherst, NY **Matrix:** Soil, Sediment, Concrete, Asphalt, RR Tie Chips, Solid Waste,and Backfill

Analytical Method	Parameter	Units	QL	MDL	LCS Accuracy Criteria (%R)		LCS Precision Criteria (RPD)	MS Accuracy Criteria (%R)		MS/MSD Precision Criteria (RPD)
					Lower Limit	Upper Limit		Lower Limit	Upper Limit	
1311/8270C - TCLP SVOCs	1,4-Dichlorobenzene	mg/L	0.01	0.00046	32	120	36	32	120	36
	2,4-Dinitrotoluene	mg/L	0.005	0.000447	59	125	20	59	125	20
	Hexachlorobenzene	mg/L	0.005	0.00051	38	131	15	38	131	15
	Hexachlorobutadiene	mg/L	0.005	0.00068	30	120	44	30	120	44
	Hexachloroethane	mg/L	0.005	0.00059	25	120	46	25	120	46
	3-Methylphenol	mg/L	0.01	0.0004	39	120	30	39	120	30
	2-Methylphenol	mg/L	0.005	0.0004	39	120	27	39	120	27
	4-Methylphenol	mg/L	0.01	0.00036	39	120	24	36	120	24
	Nitrobenzene	mg/L	0.005	0.00029	52	120	24	52	120	24
	Pentachlorophenol	mg/L	0.01	0.0022	39	136	37	39	136	37
	Pyridine	mg/L	0.025	0.00041	10	120	49	10	120	49
	2,4,5-Trichlorophenol	mg/L	0.005	0.00048	65	126	18	65	126	18
	2,4,6-Trichlorophenol	mg/L	0.005	0.00061	64	120	19	64	120	19
	2,4,6-Tribromophenol (Surr)	mg/L	NA	NA	52	132	NA	NA	NA	NA
	2-Fluorobiphenyl (Surr)	mg/L	NA	NA	48	120	NA	NA	NA	NA
	2-Fluorophenol (Surr)	mg/L	NA	NA	20	120	NA	NA	NA	NA
	Nitrobenzene-d5 (Surr)	mg/L	NA	NA	46	120	NA	NA	NA	NA
	p-Terphenyl-d14 (Surr)	mg/L	NA	NA	67	150	NA	NA	NA	NA
	Phenol-d5 (Surr)	mg/L	NA	NA	16	120	NA	NA	NA	NA
1311/8081A - TCLP Pesticides	gamma-BHC (Lindane)	mg/L	0.0002	0.000006	57	128	24	53	120	15
	Chlordane (technical)	mg/L	0.002	0.000029	NA	NA	NA	NA	NA	NA
	Endrin	mg/L	0.0002	0.0000138	57	130	24	44	129	13
	Heptachlor	mg/L	0.0002	0.0000085	46	121	25	31	122	10
	Heptachlor epoxide	mg/L	0.0002	0.0000053	53	120	23	27	138	11
	Methoxychlor	mg/L	0.0002	0.0000141	48	165	26	31	160	10
	Toxaphene	mg/L	0.002	0.00012	NA	NA	NA	NA	NA	NA
	DCB Decachlorobiphenyl (Surr)	NA	NA	NA	16	120	NA	NA	NA	NA
	Tetrachloro-m-xylene (Surr)	NA	NA	NA	35	120	NA	NA	NA	NA
1311/8151A - TCLP Herbicides	Silvex (2,4,5-TP)	mg/L	0.002	0.00036	44	147	50	44	147	50
	2,4-D	mg/L	0.002	0.0004	45	149	50	45	149	50
	2,4-Dichlorophenylacetic acid	mg/L	NA	NA	32	132	NA	NA	NA	NA
1311/6010B - TCLP Metals	Arsenic	mg/L	0.01	0.00555	80	120	20	75	125	20
	Barium	mg/L	0.002	0.0007	80	120	20	75	125	20
	Cadmium	mg/L	0.001	0.0005	80	120	20	75	125	20
	Chromium	mg/L	0.004	0.001	80	120	20	75	125	20
	Lead	mg/L	0.005	0.003	80	120	20	75	125	20
	Selenium	mg/L	0.015	0.0087	80	120	20	75	125	20
	Silver	mg/L	0.003	0.0017	80	120	20	75	125	20
1311/7470A - TCLP Mercury	Mercury	mg/L	0.0002	0.00012	80	120	20	75	125	20
9045C - pH	Corrosivity (as pH)	S.U.	0.1	NA	99	101	NA	NA	NA	NA
1030	Ignitability	mm/sec	50	NA	97.5	102.5	NA	NA	NA	NA
SW-846, Sec. 7.3	Reactive Cyanide	mg/Kg	10	0.003	10	100	20	NA	NA	NA
SW-846, Sec. 7.3	Reactive Sulfide	mg/Kg	10	0.57	10	100	20	NA	NA	NA

TABLE 2a
ANALYTICAL LABORATORY QUANTITATION AND DETECTION LIMITS
AND PRECISION AND ACCURACY CRITERIA
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Laboratory:	TestAmerica Laboratories, Inc - Amherst, NY				**Matrix:**	Soil, Sediment, Concrete, Asphalt, RR Tie Chips, Solid Waste,and Backfill				
Analytical Method	**Parameter**	**Units**	**QL**	**MDL**	**LCS Accuracy Criteria (%R)**		**LCS Precision Criteria (RPD)**	**MS Accuracy Criteria (%R)**		**MS/MSD Precision Criteria (RPD)**
					Lower Limit	**Upper Limit**		**Lower Limit**	**Upper Limit**	
8082 - PCBs	PCB-1016	ug/wipe	1	1	46	191	50	46	191	50
	PCB-1221	ug/wipe	1	1	NA	NA	NA	NA	NA	NA
	PCB-1232	ug/wipe	1	1	NA	NA	NA	NA	NA	NA
	PCB-1242	ug/wipe	1	1	NA	NA	NA	NA	NA	NA
	PCB-1248	ug/wipe	1	1	NA	NA	NA	NA	NA	NA
	PCB-1254	ug/wipe	1	1	NA	NA	NA	NA	NA	NA
	PCB-1260	ug/wipe	1	1	57	174	50	57	174	50
	DCB Decachlorobiphenyl (Surr)	NA	NA	NA	55	168	NA	NA	NA	NA
	Tetrachloro-m-xylene (Surr)	NA	NA	NA	41	172	NA	NA	NA	NA

1 - Analytical Services Protocol (ASP), NYSDEC, July 2005.

VOCs - Volatile organic compounds
SVOCs - Semivolatile organic compounds
QL - Quantitation limit
LCS - Laboratory control sample
MDL - Method detection limit
mg/Kg - Milligram per kilogram
mg/L - Milligram per liter
mm/sec - Millimeter per second
MS/MSD - Matrix spike/matrix spike duplicate
ug/Kg - Microgram per kilogram
%R - Percent recovery
RPD - Relative percent difference
Surr - Surrogate
S.U. - Standard Units
NA - Not applicable

TABLE 2b
ANALYTICAL LABORATORY QUANTITATION AND DETECTION LIMITS
AND PRECISION AND ACCURACY CRITERIA
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Laboratory:	TestAmerica Laboratories, Inc - Amherst, NY			**Matrix:**	Groundwater, Wastewater, and Aqueous Waste					
Analytical Method	**Parameter**	**Units**	**QL**	**MDL**	**LCS Accuracy Criteria (%R)**		**LCS Precision Criteria (RPD)**	**MS Accuracy Criteria (%R)**		**MS/MSD Precision Criteria (RPD)**
					Lower Limit	**Upper Limit**		**Lower Limit**	**Upper Limit**	
8082 - PCBs	PCB-1016	ug/L	0.5	0.176	61	137	50	52	134	50
	PCB-1221	ug/L	0.5	0.176	NA	NA	NA	NA	NA	NA
	PCB-1232	ug/L	0.5	0.176	NA	NA	NA	NA	NA	NA
	PCB-1242	ug/L	0.5	0.176	NA	NA	NA	NA	NA	NA
	PCB-1248	ug/L	0.5	0.176	NA	NA	NA	NA	NA	NA
	PCB-1254	ug/L	0.5	0.25	NA	NA	NA	NA	NA	NA
	PCB-1260	ug/L	0.5	0.25	45	139	50	19	136	50
	DCB Decachlorobiphenyl (Surr)	NA	NA	NA	19	126	NA	NA	NA	NA
	Tetrachloro-m-xylene (Surr)	NA	NA	NA	23	127	NA	NA	NA	NA
8260B - VOCs	1,1,1-Trichloroethane	ug/L	1	0.82	73	126	15	73	126	15
	1,1,2,2-Tetrachloroethane	ug/L	1	0.21	70	126	15	70	126	15
	1,1,2-Trichloroethane	ug/L	1	0.23	76	122	15	76	122	15
	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	1	0.31	60	140	20	60	140	20
	1,1-Dichloroethane	ug/L	1	0.38	71	129	20	71	129	20
	1,1-Dichloroethene	ug/L	1	0.29	58	121	16	58	121	16
	1,2,4-Trichlorobenzene	ug/L	1	0.41	70	122	20	70	122	20
	1,2-Dibromo-3-Chloropropane	ug/L	1	0.39	56	134	15	56	134	15
	1,2-Dibromoethane	ug/L	1	0.73	77	120	15	77	120	15
	1,2-Dichlorobenzene	ug/L	1	0.79	80	124	20	80	124	20
	1,2-Dichloroethane	ug/L	1	0.21	75	127	20	75	127	20
	1,2-Dichloropropane	ug/L	1	0.72	76	120	20	76	120	20
	1,3-Dichlorobenzene	ug/L	1	0.78	77	120	20	77	120	20
	1,4-Dichlorobenzene	ug/L	1	0.84	75	120	20	75	120	20
	2-Hexanone	ug/L	5	1.24	65	127	15	65	127	15
	2-Butanone (MEK)	ug/L	10	1.32	57	140	20	57	140	20
	4-Methyl-2-pentanone (MIBK)	ug/L	5	2.1	71	125	35	71	125	35
	Acetone	ug/L	10	3	56	142	15	56	142	15
	Benzene	ug/L	1	0.41	71	124	13	71	124	13
	Bromodichloromethane	ug/L	1	0.39	80	122	15	80	122	15
	Bromoform	ug/L	1	0.26	66	128	15	66	128	15
	Bromomethane	ug/L	1	0.69	55	144	15	55	144	15
	Carbon disulfide	ug/L	1	0.19	59	134	15	59	134	15
	Carbon tetrachloride	ug/L	1	0.27	72	134	15	72	134	15
	Chlorobenzene	ug/L	1	0.75	72	120	25	72	120	25
	Dibromochloromethane	ug/L	1	0.32	75	125	15	75	125	15
	Chloroethane	ug/L	1	0.32	69	136	15	69	136	15
	Chloroform	ug/L	1	0.34	73	127	20	73	127	20
	Chloromethane	ug/L	1	0.35	68	124	15	68	124	15
	cis-1,2-Dichloroethene	ug/L	1	0.81	74	124	15	74	124	15
	cis-1,3-Dichloropropene	ug/L	1	0.36	74	124	15	74	124	15
	Cyclohexane	ug/L	1	0.18	65	126	20	65	126	20
	Dichlorodifluoromethane	ug/L	1	0.68	59	135	20	59	135	20
	Ethylbenzene	ug/L	1	0.74	77	123	15	77	123	15
	Isopropylbenzene	ug/L	1	0.79	77	122	20	77	122	20
	Methyl acetate	ug/L	1	0.5	60	140	20	60	140	20
	Methyl tert-butyl ether	ug/L	1	0.16	64	127	37	64	127	37
	Methylcyclohexane	ug/L	1	0.16	60	140	20	60	140	20
	Methylene Chloride	ug/L	1	0.44	57	132	15	57	132	15
	Styrene	ug/L	1	0.73	70	130	20	70	130	20
	Tetrachloroethene	ug/L	1	0.36	74	122	20	74	122	20
	Toluene	ug/L	1	0.51	80	122	15	80	122	15
	trans-1,2-Dichloroethene	ug/L	1	0.9	73	127	20	73	127	20
	trans-1,3-Dichloropropene	ug/L	1	0.37	72	123	15	72	123	15
	Trichloroethene	ug/L	1	0.46	74	123	16	74	123	16
	Trichlorofluoromethane	ug/L	1	0.88	62	152	20	62	152	20
	Vinyl chloride	ug/L	1	0.9	65	133	15	65	133	15
	Xylenes, Total	ug/L	2	0.66	76	122	16	76	122	16
	1,2-Dichloroethane-d4 (Surr)	NA	NA	NA	66	137	NA	NA	NA	NA
	Toluene-d8 (Surr)	NA	NA	NA	71	126	NA	NA	NA	NA
	4-Bromofluorobenzene (Surr)	NA	NA	NA	73	120	NA	NA	NA	NA

TABLE 2b
ANALYTICAL LABORATORY QUANTITATION AND DETECTION LIMITS
AND PRECISION AND ACCURACY CRITERIA
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Laboratory:	TestAmerica Laboratories, Inc - Amherst, NY				**Matrix:**	Groundwater, Wastewater, and Aqueous Waste				
Analytical Method	**Parameter**	**Units**	**QL**	**MDL**	**LCS Accuracy Criteria (%R)**		**LCS Precision Criteria (RPD)**	**MS Accuracy Criteria (%R)**		**MS/MSD Precision Criteria (RPD)**
					Lower Limit	**Upper Limit**		**Lower Limit**	**Upper Limit**	
6010B - RCRA Metals	Arsenic	mg/L	0.01	0.00555	80	120	20	75	125	20
	Barium	mg/L	0.002	0.0007	80	120	20	75	125	20
	Cadmium	mg/L	0.001	0.0005	80	120	20	75	125	20
	Chromium	mg/L	0.004	0.001	80	120	20	75	125	20
	Lead	mg/L	0.005	0.003	80	120	20	75	125	20
	Selenium	mg/L	0.015	0.0087	80	120	20	75	125	20
	Silver	mg/L	0.003	0.0017	80	120	20	75	125	20
7471A - Mercury	Mercury	mg/L	0.0002	0.00012	80	120	20	75	125	20
1311/8260B - TCLP VOCs	Benzene	mg/L	0.001	0.00041	71	124	13	71	124	13
	Carbon tetrachloride	mg/L	0.001	0.00027	72	134	15	72	134	15
	Chlorobenzene	mg/L	0.001	0.00075	72	120	25	72	120	25
	Chloroform	mg/L	0.001	0.00034	73	127	20	73	127	20
	1,2-Dichloroethane	mg/L	0.001	0.00021	75	127	20	75	127	20
	1,1-Dichloroethene	mg/L	0.001	0.00029	58	121	16	58	121	16
	2-Butanone (MEK)	mg/L	0.005	0.00132	57	140	20	57	140	20
	Tetrachloroethene	mg/L	0.001	0.00036	74	122	20	74	122	20
	Trichloroethene	mg/L	0.001	0.00046	74	123	16	74	123	16
	Vinyl chloride	mg/L	0.001	0.0009	65	133	15	65	133	15
	1,2-Dichloroethane-d4 (Surr)	NA	NA	NA	66	137	NA	NA	NA	NA
	Toluene-d8 (Surr)	NA	NA	NA	71	126	NA	NA	NA	NA
	4-Bromofluorobenzene (Surr)	NA	NA	NA	73	120	NA	NA	NA	NA
1311/8270C - TCLP SVOCs	1,4-Dichlorobenzene	mg/L	0.01	0.00046	32	120	36	32	120	36
	2,4-Dinitrotoluene	mg/L	0.005	0.000447	59	125	20	59	125	20
	Hexachlorobenzene	mg/L	0.005	0.00051	38	131	15	38	131	15
	Hexachlorobutadiene	mg/L	0.005	0.00068	30	120	44	30	120	44
	Hexachloroethane	mg/L	0.005	0.00059	25	120	46	25	120	46
	3-Methylphenol	mg/L	0.01	0.0004	39	120	30	39	120	30
	2-Methylphenol	mg/L	0.005	0.0004	39	120	27	39	120	27
	4-Methylphenol	mg/L	0.01	0.00036	39	120	24	36	120	24
	Nitrobenzene	mg/L	0.005	0.00029	52	120	24	52	120	24
	Pentachlorophenol	mg/L	0.01	0.0022	39	136	37	39	136	37
	Pyridine	mg/L	0.025	0.00041	10	120	49	10	120	49
	2,4,5-Trichlorophenol	mg/L	0.005	0.00048	65	126	18	65	126	18
	2,4,6-Trichlorophenol	mg/L	0.005	0.00061	64	120	19	64	120	19
	2,4,6-Tribromophenol (Surr)	mg/L	NA	NA	52	132	NA	NA	NA	NA
	2-Fluorobiphenyl (Surr)	mg/L	NA	NA	48	120	NA	NA	NA	NA
	2-Fluorophenol (Surr)	mg/L	NA	NA	20	120	NA	NA	NA	NA
	Nitrobenzene-d5 (Surr)	mg/L	NA	NA	46	120	NA	NA	NA	NA
	p-Terphenyl-d14 (Surr)	mg/L	NA	NA	67	150	NA	NA	NA	NA
	Phenol-d5 (Surr)	mg/L	NA	NA	16	120	NA	NA	NA	NA
1311/8081A - TCLP Pesticides	gamma-BHC (Lindane)	mg/L	0.0002	0.000006	57	128	24	53	120	15
	Chlordane (technical)	mg/L	0.002	0.000029	NA	NA	NA	NA	NA	NA
	Endrin	mg/L	0.0002	0.0000138	57	130	24	44	129	13
	Heptachlor	mg/L	0.0002	0.0000085	46	121	25	31	122	10
	Heptachlor epoxide	mg/L	0.0002	0.0000053	53	120	23	27	138	11
	Methoxychlor	mg/L	0.0002	0.0000141	48	165	26	31	160	10
	Toxaphene	mg/L	0.002	0.00012	NA	NA	NA	NA	NA	NA
	DCB Decachlorobiphenyl (Surr)	NA	NA	NA	16	120	NA	NA	NA	NA
	Tetrachloro-m-xylene (Surr)	NA	NA	NA	35	120	NA	NA	NA	NA
1311/8151A - TCLP Herbicides	Silvex (2,4,5-TP)	mg/L	0.002	0.00036	44	147	50	44	147	50
	2,4-D	mg/L	0.002	0.0004	45	149	50	45	149	50
	2,4-Dichlorophenylacetic acid	mg/L	NA	NA	32	132	NA	NA	NA	NA

TABLE 2b
ANALYTICAL LABORATORY QUANTITATION AND DETECTION LIMITS
AND PRECISION AND ACCURACY CRITERIA
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Laboratory:	TestAmerica Laboratories, Inc - Amherst, NY				**Matrix:**	Groundwater, Wastewater, and Aqueous Waste				
Analytical Method	**Parameter**	**Units**	**QL**	**MDL**	**LCS Accuracy Criteria (%R)**		**LCS Precision Criteria (RPD)**	**MS Accuracy Criteria (%R)**		**MS/MSD Precision Criteria (RPD)**
					Lower Limit	**Upper Limit**		**Lower Limit**	**Upper Limit**	
1311/6010B - TCLP Metals	Arsenic	mg/L	0.01	0.00555	80	120	20	75	125	20
	Barium	mg/L	0.002	0.0007	80	120	20	75	125	20
	Cadmium	mg/L	0.001	0.0005	80	120	20	75	125	20
	Chromium	mg/L	0.004	0.001	80	120	20	75	125	20
	Lead	mg/L	0.005	0.003	80	120	20	75	125	20
	Selenium	mg/L	0.015	0.0087	80	120	20	75	125	20
	Silver	mg/L	0.003	0.0017	80	120	20	75	125	20
1311/7470A - TCLP Mercury	Mercury	mg/L	0.0002	0.00012	80	120	20	75	125	20
9040B - pH	Corrosivity (as pH)	S.U.	0.1	NA	99	101	NA	NA	NA	NA
1010	Ignitability	°F	50	NA	97.5	102.5	NA	NA	NA	NA
SW-846, Sec. 7.3	Reactive Cyanide	mg/L	10	0.003	10	100	20	NA	NA	NA
SW-846, Sec. 7.3	Reactive Sulfide	mg/L	10	0.57	10	100	20	NA	NA	NA

1 - Analytical Services Protocol (ASP), NYSDEC, July 2005.

VOCs - Volatile organic compounds
SVOCs - Semivolatile organic compounds
QL - Quantitation limit
°F - Degrees Fahrenheit
LCS - Laboratory control sample
MDL - Method detection limit
mg/L - Milligram per liter
MS/MSD - Matrix spike/matrix spike duplicate
ug/L - Micrograms per liter
%R - Percent recovery
RPD - Relative percent difference
Surr - Surrogate
S.U. - Standard Units
NA - Not applicable

TABLE 3
SAMPLE CONTAINER, PRESERVATION, AND HOLDING TIME REQUIREMENTS
GENERAL ELECTRIC PARTS AND REPAIR SERVICE CENTER
TONAWANDA, NEW YORK

Analytical Method/Parameter	Container Size/Type*	Number of Containers to Be Collected	Preservation	Maximum Holding Time (from VTSR)
Aqueous Samples (Groundwater, Wastewater, and/or Aqueous Waste)				
Volatile Organic Compounds (VOCs)	40 mL glass VOC vial	3	HCl to pH<2, 4 ^{o}C	Analysis: 12 days (5 days if not preserved to pH<2)
Polychlorinated Biphenyls (PCBs)	1L amber glass	2	4 ^{o}C	Extraction: 5 days; Analysis: 40 days
RCRA Metals	1L plastic	1	HNO_3 to pH < 2	Analysis: 180 days
Toxicity Characterization Leaching Procedure (TCLP) VOCs	40 mL glass VOC vial	3	4 ^{o}C	TCLP Extaction: 7 days; Analysis: 7 days
TCLP Semivolatile Organic Compounds (SVOCs)	1L amber glass	3		TCLP Extaction: 5 days; Prep Extraction: 7 days; Analysis: 40 days
TCLP Pesticides				TCLP Extaction: 5 days; Prep Extraction: 7 days; Analysis: 40 days
TCLP Herbicides				TCLP Extaction: 5 days; Prep Extraction: 7 days; Analysis: 40 days
TCLP Metals				TCLP Extaction: 180 days/28 days (Hg); Analysis: 180 days/28 days (Hg)
Corrosivity (as pH)	100 mL plastic	1		Analyze immediately
Ignitability	250 mL plastic	1		Analysis: 14 days
Reactive Cyanide	250 mL plastic	1		Analysis: 14 days
Reactive Sulfide	250 mL plastic	1		Analysis: 14 days
Solid Samples (Soil, Concrete, Asphalt, RR Tie Chips, Sediment, Solid Waste, and/or Backfill)				
PCBs	4 oz. glass jar	1	4 ^{o}C	Extraction: 5 days; Analysis: 40 days
TCLP VOCs	4 oz. glass jar with Teflon septa	2		TCLP Extaction: 7 days; Analysis: 7 days
TCLP SVOCs	8 oz. amber glass jar	2		TCLP Extaction: 5 days; Prep Extraction: 7 days; Analysis: 40 days
TCLP Pesticides				TCLP Extaction: 5 days; Prep Extraction: 7 days; Analysis: 40 days
TCLP Herbicides				TCLP Extaction: 5 days; Prep Extraction: 7 days; Analysis: 40 days
TCLP Metals				TCLP Extaction: 180 days/28 days (Hg); Analysis: 180 days/28 days (Hg)
Corrosivity (as pH)	8 oz. glass jar	1		Analysis: 14 days
Ignitability				Analysis: 14 days
Reactive Cyanide				Analysis: 14 days
Reactive Sulfide				Analysis: 14 days
VOCs	2 oz. glass jars with Teflon septa	3	4 ^{o}C	Analysis: 12 days
SVOCs	8 oz. amber glass jar	1	4 ^{o}C	Extraction: 5 days; Analysis: 40 days
Pesticides	8 oz. amber glass jar	1	4 ^{o}C	Extraction: 5 days; Analysis: 40 days
PCBs	8 oz. amber glass jar	1	4 ^{o}C	Extraction: 5 days; Analysis: 40 days
Herbicides	8 oz. amber glass jar	1	4 ^{o}C	Extraction: 5 days; Analysis: 40 days
Metals	4 oz. glass jar	1	4 ^{o}C	Analysis: 180 days
Hexavalent Chromium	4 oz. glass jar	1	4 ^{o}C	Analysis: 24 hours
Total Cyanide	4 oz. glass jar	1	4 ^{o}C	Analysis: 12 days
Wipe Samples				
PCBs	16 oz. glass; filter soaked in hexane	1	4 ^{o}C	Extraction: 5 days Analysis: 40 days

* Number and size of containers may vary based on laboratory sample volume requirements.

VTSR - Validated time of sample receipt

ATTACHMENT A

RESUMES OF KEY PERSONNEL

George Kisluk

Senior Environmental Chemist

Areas of Expertise

Environmental Chemistry

Years of Experience

With URS: 17 Years
With Other Firms: 13 Years

Education

MBA/ Organizational Management/ Syracuse University/ 1991

BS/ Biology/ Alliance College Minor, Polish/ 1980

Registration/Certification

40 Hr. OSHA Site Worker Protection Training

Overview

Mr. Kisluk is a Senior Environmental Chemist with broad experience in environmental chemistry ranging from the analytical laboratory to onsite hazardous waste remediation projects. Responsibilities have included remedial investigation coordination, preparations of work plans, budgets, implementation of sampling and analytical procedures, onsite supervision of technical activities, qualitative health risk assessments, data validation and data usability for remedial investigations and activities. Mr. Kisluk has also performed quality assurance (QA) reviews for technical issues relating to chemistry on reports, plans, and correspondence and has also performed on-site laboratory audits. In addition to chemistry related activities, Mr. Kisluk has also performed construction inspection services at several landfill remediation and closure projects.

He has experience in the operation, maintenance, and troubleshooting of analytical instrumentation including Hewlett Packard, Perkin Elmer, Tracor, and SRI Gas Chromatographs, Perkin Elmer Atomic Absorption Spectrometers, and Hewlett Packard and Finnegan Gas Chromatographs/Mass Spectrometers. He has experience with portable analytical equipment including the Photovac Voyager and the Photovac PetroPro. He is also computer literate and knowledgeable in the use of word processing, spreadsheet and database programs including Word, WordPerfect, Excel, QuatroPro, FoxPro, and Access software.

Project Specific Experience

New York State Department of Environmental Conservation Projects: Remedial Investigation (RI) Coordinator for 12 year/$20 million Standby Contract and 7 year $7 million Standby Contract which includes Meeker Avenue Plume Trackdown Site; Site Characterization, Kink Cosmo Cleaners Site RI/Feasibility Study (FS), Former Spic and Span Cleaners and Dyers Site RI/FS, College Point 2 and 3 Site Characterizations and RI, Camp Summit Remedial Design (RD), Camp Georgetown RD, Camp Pharsalia RD, 93 Main Street RI, American Cleaners RI/FS, Busy Bee Disposal Site, Kliegman Brothers Operable Unit (OU) 1 and OU2 RI/FS, Chatham Woods Immediate Investigation Work Assignment (IIWA), North of Brush Avenue IIWA, South of Home Depot IIWA, Home Depot OU 2 IIWA, White Sun Cleaners IIWA, 1st Ave. and East 90th St. IIWA and Site Characterization, North of 720 Melrose Ave. IIWA and Site Characterization, Bronxchester Urban Renewal Agency Site Characterization, College Point 2 Plume Trackdown IIWA, Polymer Applications Operations & Maintenance (O&M), and Hillcrest Site Investigation. His duties and responsibilities on these projects included the review of project specific scopes of work and the subsequent development of work plans and budget estimates. As RI coordinator, he is responsible for the coordination of field investigation activities such as drilling, geoprobe boring, heavy equipment, mobile laboratories, and surveying subcontractors, as well as data interpretation

and preparation of RI, Site Characterization and IIWA reports. He also has duties and the project chemist, performing data validation and preparing Data Usability Summary Reports (DUSR) on multiple work assignments.

New York State Department of Transportation Projects: Project Chemist for the NYSDOT HMARD Contracts which includes but is not limited to the following sites: Southtowns Connector, Vulcan Street Reconstruction Buffalo, Rt 104 JRD Property, Route 286 Penfield Pembroke, Rt 63&262 Oakland, Rt 5 at Beach Road Evans, I-690 over CSX Syracuse, Rt 63 Peoria Curve, I-81, Butternut Syracuse, Rt 104 Scriba, Rt 695 at Rt 5 Camillus, Rt 16 Ishua, Rt 78&31 Lockport, I-81 Drainage Syracuse, Rt 20A East Aurora, Rt 174 Marcellus, Rt 96 Spencer, Watkins Glenn Residency, Fredonia Sub-Residency, Rt 240 Colden UST removal, Rt 62 Niagara Falls, Campbell Blvd Bridge, I-81 Destiny Drum Removal, Rt 5&20 Avon, Rt 62 Hamburg Former Sunoco Environmental Investigation, Rt 39 Arcade RR Crossing, Limestone Plaza, Rt 5 Outer Harbor Buffalo, North Syracuse Residency Waste Paint removal, Rt 250 Fairport Crossing, Rt 281 Cortland, Erie Blvd over West Street Syracuse, Rt 15A Rochester Farm DSI, Rt 5&20 Seneca Falls, Oak Street Maintenance Facility. His duties and responsibilities on these types of projects include the review of project specific scopes of work and the subsequent development of analytical programs and analytical budget estimates. As Senior Chemist, he is responsible for the coordination of analytical laboratory services as well as analytical data management and data review. He assists with fieldwork as needed. Mr. Kisluk contributes to the preparation of reports to the NYSDOT.

New York State Electric & Gas (NYSEG) Former MGP Sites: Senior Chemist during remediation phase at multiple NYSEG Former MGP sites in Plattsburgh, Lockport, Ithaca, Geneva and Rochester, New York. Acting as liaison between URS and the laboratories to coordinate field sampling events and ensure all program requirements are met, coordinating and performing data validation for compliance with method and project guidelines, and preparing data for inclusion into remediation reports. He also was responsible coordinating between site personnel and the appropriate agencies in the submission of analytical data for wastewater discharge/monitoring. Performed on-site analysis of air samples using PhotoVac Voyager for community air monitoring.

Meeker Avenue Plume Trackdown: Technical Coordinator responsible for all facets of the site characterization work including budget estimates, work plans, health and safety plans, subcontractor procurement, project planning and tracking, coordination with subcontractors and report writing. This $1.6 million project for the identification of sources of trichloroethene (TCE) and tetrachloroethene (PCE) contamination in groundwater and soil included monitoring well installations and sampling, direct push soil boring, membrane interface probe (MIP) borings, soil gas conduit installation and sampling, screen point groundwater sampling, dense non-aqueous phase liquid (DNAPL) sampling and analysis,

compound specific isotope analysis (CSIA) analysis and interpretation, and soil vapor intrusion (SVI) sampling of residential properties. The SVI program consisted of community outreach, scheduling with building owners, coordination with the NYSDEC and NYS Department of Health and report preparation. Mr. Kisluk also served a translator for the Polish speaking residents of the neighborhood. The NYSDEC subsequently awarded URS a $7 million Single Source Standby Contract for the Meeker Avenue Area Plume Trackdown to perform additional Site Characterizations and RI/FS'.

College Point Site: Technical Coordinator responsible for all facets of the site multi-phase investigation which includes site characterization, interim remedial measures and remedial investigation work including budget estimates, work plans, health and safety plans, subcontractor procurement, project planning and tracking, coordination with subcontractors and report writing. This project for the identification of sources of polychlorinated biphenyl (PCB) and petroleum product contamination in soil included monitoring well installations and sampling, direct push soil boring, soil gas conduit installation and sampling, light non-aqueous phase liquid (LNAPL) sampling and analysis.

Consolidated Edison – Various Sites: Senior Chemist responsible for coordinating between the field and laboratory for field sampling events and to ensure all program requirements are met, coordinating and performing data validation for compliance with method and project guidelines, and preparing data for inclusion into remediation reports.

1st Avenue & East 90th Street and North of 720 Melrose Avenue Site Characterizations: Technical Coordinator responsible for all facets of the site characterization work including budget estimates, work plans, health and safety plans, subcontractor procurement, project planning and tracking, coordination with subcontractors and report writing. The two similar projects have a combined budget of over $1.1 million and included monitoring well installations and sampling using low flow and passive diffusion bag (PDB) sampling procedures, direct push soil borings soil gas conduit installation and sampling, screen point groundwater sampling, slug testing and rock coring for the identification of source(s) of PCE contamination in groundwater.

Polymer Applications: Senior Chemist as part of the team for the investigation and remediation of a former chemical processing facility in Tonawanda, NY. Duties included monthly O&M monitoring of effluent discharge from the onsite water treatment system and vapor recovery system. Mr. Kisluk was also responsible for the analytical program during the Interim Remedial Measures (IRM) phase of work at the site.

Hamburg Former Sunoco Environmental Investigation: Senior Chemist Responsible for the on site inspection and sampling of potentially hazardous waste remaining at this former automobile service station site prior to NYSDOT acquisition of the property.

Fredonia Sub-Residency: Senior chemist responsible for the analytical aspect of the site work for this in-situ bioremediation treatability study at this sub residency. The site is approximately two acres in size and is used by the NYSDOT for offices and storage of their truck fleet and equipment. The Fredonia Sub-Residency has a history of petroleum contamination. Groundwater is monitored quarterly for the presence of petroleum products and bacterial viability.

East Ferry Street: Senior Chemist responsible for the onsite testing for carcinogenic polynuclear aromatic hydrocarbons (PAHs) using immunoassay testing procedures with confirmation analysis by an offsite laboratory.

93 Main Street: Senior Chemist responsible for the onsite testing for pesticides and polychlorinated biphenyls (PCBs) using immunoassay testing procedures with confirmation analysis by an offsite laboratory.

Brownfield Redevelopment: Senior Chemist for several brownfield redevelopment projects located in the cities of Buffalo and Niagara Falls, New York for public and private sector clients. Duties and responsibilities on these projects included the review of project specific scopes of work and assisting with the development of work plans and budget estimates. Additionally, performed immunoassay testing for PCBs and PAHs for quick turnaround of results to identify areas of contamination with confirmation analysis by an offsite laboratory. As senior chemist, he was responsible for data validation and preparation of Data Usability Summary Reports.

Plattsburgh AFB, NY: Senior Environmental Chemist responsible for implementing current AFCEE QAPP requirements into the existing sampling and analysis plans for an RCRA facility closure plan and groundwater impact study. Performed onsite testing for several parameters using immunoassay with confirmation analysis by an offsite laboratory and Hach titration-based test kits for quick turnaround to identify areas of contamination.

New York Power Authority: Senior Chemist responsible for the preparation of the Sampling and Analysis Plan for the Niagara Power Project relicensing. Assisted with groundwater and surface water sampling, data validation, and data validation reports.

US Army Corps of Engineers Projects: Omaha District and Baltimore District projects including Pope Air Force Base and Roebling Steel Superfund Site. Senior Chemist responsible for preparation of Sampling and Analysis Plans, data validation, Quality Control Summary Reports (QCSR), Analytical Data Packages (ADP), and Quality Assurance Summary Data (QASD). Also responsible for preparation of chemical quality assurance reports (CQAR) comparing primary and split sample data.

153 Fillmore Avenue Voluntary Cleanup: Senior Chemist as part of the team for the investigation and remediation of former paint/roofing materials manufacturing facility in the City of Tonawanda. Following cessation of manufacturing operations the site was utilized for solvent recycling and subsequently abandoned. Included removal and disposal of underground storage tanks and 2,000 tons of solvent-contaminated soils, investigation of the remaining portions of site, asbestos survey and development of remedial alternatives to allow site redevelopment.

Former Dowell Facility Voluntary Cleanup: Senior Chemist as part of the team for the investigation and remediation of a former oil-field services facility in Cheektowaga, NY. This industrial facility prepared and supplied various types of cements and drilling fluids/muds to the oil drilling industry in western New York.

Union Ship Canal Voluntary Cleanup: Senior Chemist as part of the team for the investigation of Subparcel 3 associated with the former Hanna Furnace and Union Ship Canal site in Lackawanna, NY. This "High-Profile" Brownfields project is being performed under the NYSDEC Voluntary Cleanup Program and involves City, County, State and Federal agencies as well as local attorneys and developers. Responsibilities included laboratory procurement, coordination, data validation, and preparation of the Data Usability Summary Report.

Pope AFB, NC: Senior Chemist responsible for ensuring all historical analytical data previously generated from long-term operation and maintenance, and long-term monitoring is entered into and compliant with the IRPIMS data base requirements. Also responsible for the data validation of accuracy of chemical data in the site-wide database maintained in the ERPIMS format.

Bethlehem Steel Corporation, Lackawanna, NY: Senior Chemist responsible for laboratory procurement, coordination with laboratory, data validation, analytical quality control reports and accuracy of chemical data in electronic database of site-wide remedial investigation activities. Also assisted with the preparation of solid waste management unit (SWMU) reports.

Reich Farm Superfund Site: Senior Chemist responsible for data validation and data validation reports for operation, maintenance, and monitoring samples from the site located in Dover Township, NJ.

Hampton Roads Transit: Senior Chemist responsible for data validation and data validation report in accordance with USEPA Region III requirements for samples collected for the Norfolk Light Rail Transit project in the city of Norfolk VA.

Aberdeen Proving Grounds: Senior Chemist as part of the third party data validation team. Responsibilities included data validation, preparation and QA/QC review of data validation reports.

New York City Department of Design and Construction (NYCDDC) UST Project: Assist project manager with the preparation of a monthly financial report for 65 tank and remediation sites. Responsible for compiling and summarizing labor, construction management, subcontractor, and construction cost on a site by site basis in a monthly report to the NYCDDC. Also responsible for the quality control/quality assurance review of analytical data and the maintenance of the project-wide analytical database.

F.E. Warren AFB, WY: Senior Chemist responsible for updating, reviewing and correcting all base-wide historical chemical data in the electronic database for accuracy and compliance with IRPIMS requirements.

Lake RI, Data Validation: Senior Chemist performing QA review of data validation and validation reports.

Wegmans, Buffalo, NY: Senior Chemist responsible for reviewing groundwater monitoring data and preparing the quarterly monitoring reports for this former brownfield restored for use as a supermarket.

Searsport Pipeline, ME: Senior Chemist responsible for sampling activities in the field during the site assessment, which utilized methanol preservation techniques for volatile organic analyses. Also participated in data validation and preparation of quality control reports.

Roebling Steel, NJ: Senior Chemist responsible for updating the chemical data acquisition plan (CDAP) as part of the wharf restoration project. Also responsible for procuring the analytical laboratories, coordination of laboratory bottle shipment with the field in order to comply with the State of New Jersey's sample container 48 hour holding time requirements, data validation, preparation on the QCSR, QASD, and ADP.

Salem Acres, Salem, MA: Senior Environmental Chemist responsible for performing on-site ignitability screening test. Assisted in preparing the preconstruction survey report. Provided inspection services during semi-annual monitoring of groundwater and sediments along with data validation and preparing the preconstruction monitoring report. Also provided inspection services assisting the resident engineer during the remediation phase of the project.

Dublin Road Project, Medina, NY: PRP Inspector responsible for observing and reviewing construction activities as a representative for NYSDEC during the final phase of remediation activities at this landfill remediation and wetlands restoration project.

BFGSI, Cheektowaga, NY: Site Inspector during the installation of a gas vent and leachate collection trench system, as part of the landfill closure plan.

LiPari Landfill, NJ: Senior Environmental Chemist responsible for reviewing historical data and assisted in updating the electronic database using FoxPro to include all available historical analytical data for the site as part of litigation activities.

McGuire AFB, NJ: Senior Environmental Chemist responsible for the preparation of the quality assurance project plan, preparing cost proposals for analytical services and subcontract specifications. Summarized data usability of previous analytical work. Also responsible for performing data validation services and preparing data validation reports for samples collected at the base.

Greenbrook Flood Control Project, NJ: Senior Environmental Chemist responsible to the USACE - New York District for coordination of laboratory and field activities during the field investigation phase. Responsibilities also include data validation and preparing the quality control summary report (QCSR). Data validation parameters included radiation, wet chemistry and dioxin analyses.

Fort Edward Landfill, NY: Senior Environmental Chemist responsible for coordination of laboratory and field activities data validation using Region II validation guidelines and NYSDEC ASP methodologies. Also prepared a data usability report for initial two rounds of sampling as part of the remedial design and construction project as a part of a NYSDEC State Superfund Work Assignment.

Gentile AFB, OH: Environmental Chemist assisting the Senior Chemist during the data validation phase of the project.

PAS Oswego, NY: Senior Environmental Chemist responsible for coordination of laboratory and field activities during the semi-annual monitoring event. Also responsible for data validation and preparation of the environmental monitoring report.

Fort Eustis, VA: Senior Environmental Chemist for USACE Baltimore District. Member of data validation team responsible for auditing non-conventional methods such as radiological and wet chemistry parameters in addition to conventional organic and inorganic analyses.

Bailey Creek, Ft. Eustis, VA: Senior Environmental Chemist for USACE Baltimore District. Responsible for data validation and determining data usability in accordance with USEPA Region III data validation guidelines and USEPA methodologies. Parameters audited included wet chemistry analyses.

Loring AFB, ME: Senior Environmental Chemist responsible for coordination of laboratory and field activities during for the Test Pit Program. Also responsible for the data audit and data usability report in compliance with the AFCEE Handbook.

North Franklin Street Site, NY: Senior Environmental Chemist responsible for a quality assurance review of a quality assurance project plan for the remediation activities at the site.

Nike Battery PH 58: Senior Environmental Chemist responsible for the preparation of the chemical data acquisition plan (CDAP).

Nike Battery PH 41/43 NY 78: Senior Environmental Chemist responsible for the coordination of laboratory and field activities during the field investigation phase of the project.

Hyatt Clark Industries Facility, NJ: Assisted in updating the electronic database to include all historical analytical data for the site as part of the remedial investigation of the site.

Baird & McGuire Site, MA: Project Chemist on a Superfund site utilizing a mobile incinerator for the cleanup of over 400,000 tons of contaminated soil. Responsible for USACE certification and operation of an onsite analytical laboratory for quick turnaround analysis of soil and water for organic and inorganic parameters. Prepared analytical reports for onsite samples, performed data validation on offsite analytical data. Reviewed and revised sampling and analytical work plans. Member of team coordinating sampling activities of soil and air matrices for the trial burn.

EPA Region I ERCS Site, NH: Project Chemist responsible for the sampling and haz-cat analytical of over 750 drums and containers at chemical facility abandoned after a fire.

York Oil Site, NY: Project Chemist/Team Member at an EPA-NPL site involving a remedial investigation, as part of a rapid site assessment for the delineation of waste oils containing PCBs. Responsible for the analytical group utilizing an onsite laboratory.

EPA Region II ERCS Site, Lockport, NY: Project Chemist responsible for the sampling and haz-cat analysis of over 1,500 drums at an abandoned site. Coordinated offsite analytical work for disposal analysis.

EPA Region II ERCS Site, Tuckahoe, NY: Project Chemist responsible for the identification and segregation of potentially unstable chemicals stored at a vitamin manufacturing facility. Also responsible for the sampling and haz-cat analysis of over 500 drums and containers. Assisted the T&D coordinator in inventory and lab-packing of small chemical containers.

Pfohl Brothers Landfill, NY: Project Chemist responsible for preparing work plan for onsite sampling and analytical activities for this NYSDEC project. Responsible for the sampling and haz-cat analysis teams. Coordinated offsite analytical work with laboratories. Prepared waste profiles, manifest, and coordinated disposal of wastewater generated from on-site activities. Member of the post remediation sampling team as part of the O&M activities at this site.

Conrail, Jamestown Rail Yard, NY: Project Chemist responsible for coordinating activities in the cleanup of diesel contaminated soils. Acted as client representative for meetings with NYSDEC officials. Also responsible for coordinating the disposal of over 500 cu. yd. of soil and several waste drums.

Conrail Rail Yard, Geneva, NY: Project Chemist responsible for coordinating activities for the disposal of over 300 cu. yd. of diesel contaminated soil. Prepared and implemented work plan in the determination whether previous clean-up activities performed by Conrail were sufficient in achieving state mandated clean up levels for diesel fuel releases. Prepared final report for NYSDEC and Conrail.

Conrail Rail Yard, Lyons, NY: Project Chemist responsible for the sampling, analysis, and coordinating disposal of 20 drums at this site.

Fike Chemical, WV: Lead Chemist at a Region III ERCS site. Responsible for the onsite sample analysis and data interpretation. Participated in T&D management, including waste profiles and manifest documentation. Responsible for maintaining accurate database information. The project utilized a mobile laboratory for the analysis and ultimate disposal in excess of 5,500 drums and 250 storage tanks.

Bettendorf, IA: Chemist as member of an on-site analysis team utilizing a mobile laboratory for PCB contamination in the cleanup of a major manufacturing facility involved in a real estate transaction.

Lancaster, PA: Chemist as member of a team performing an investigative site evaluation for the presence of contamination from industrial activity at a facility involved in a real estate transaction.

Sun Pipeline Co., OH: Chemist as a member of a team responsible for the analysis of water for toluene contamination utilizing a mobile laboratory to determine its suitability for municipal use after a major spill resulting from pipeline damage. Also assisted the engineer responsible for designing the air stripping mechanism made specifically for the project. Duties included monitoring the performance of the unit.

Ashland Petroleum, PA: Chemist as a member of a team responsible for the analysis of water for diesel fuel contamination utilizing a mobile laboratory to determine its suitability for municipal use after a major spill

resulting from a holding tank collapse. His suggestion on improving the analytical method for determining contamination levels from the original proposal proved valuable in reducing analysis and turnaround time.

Ciba Geigy, NJ: Lead Chemist responsible for all onsite analytical data and instrumentation. Responsible for method development, participated in waste characterization and report preparation in a landfill remediation project utilizing three mobile laboratories in the analysis and ultimate disposal in excess of 15,000 drums.

Swartz Creek, MI: Senior Chemist responsible for all onsite data and instrumentation. Responsible for method development and report writing in the analysis of air and soil samples utilizing two mobile laboratories. Also responsible for site mobilization and demobilization of the analytical unit and a team of two chemists in the removal of 75,000 tons of waste and contaminated soil.

Lehigh Electric Site, PA: Chemist responsible for data generated on air, soil, oil, and water samples for PCB analysis at this early Superfund project in 1983. Responsible for the collection and distribution of samples for analysis. Responsible for the mobilization and demobilization of company's first mobile laboratory, utilized in the decommissioning and removal of electrical transformers containing PCB fluid.

Organic Preparations Supervisor responsible for day-to-day operations of the Organic Preparations Department. Duties included assigning proper EPA-approved methods to the appropriate organic analysis, including quality control requirements, scheduling to meet holding times, training personnel, equipment, inventory, and maintenance.

Karen Peppin

Project Engineer

Overview

Ms. Peppin has over fourteen years experience in conducting feasibility studies, conducting design level investigations, preparing bid documents, performing oversight of remedial activities, and preparing remedial work plans and reports documenting remedial activities. Prior to joining URS (Dames & Moore) in 1998, Ms. Peppin served as Assistant Manager Construction Materials Testing, Maxim Technologies of New York (Empire Soils).

Years of Experience

With URS: 14 Years
With Other Firms: 3 Years

Education

B.S./Civil Engineering, with concentration in Environmental Engineering/Rensselaer Polytechnic Institute, Troy, New York/1995

A.S./Engineering Science, Adirondack Community College/ Queensbury, New York/1993

Registration/Certification

40-hr OSHA HAZWOER
OSHA Supervisor
Confined Space

Expired - NICET II: Construction Materials Testing (Soils)

Expired - NICET I: Construction Materials Testing (Concrete)

Expired - Troxler

Project Specific Experience

Parts and Repair Service Center, Tonawanda, New York. Project Manager for an apparatus service shop in Tonawanda, New York through the Corrective Measure process, including revision of the Corrective Measurers Study (CMS) final report and preparation of monthly progress reports. Prepared work plans, coordinated implementation, evaluated data, and prepared summary reports for additional investigation of soil along the building foundation and evaluation of storm sewer and creek sediments.

New Bedford Superfund Site, New Bedford, Massachusetts. Engineer for design level investigation, specification preparation, and contractor selection for a former capacitor manufacturing facility in New Bedford, Massachusetts. Supported oversight of accelerated schedule for hazardous material removal and building demolition by servings as Interim Site Safety Officer and providing sampling support for perimeter air monitoring and storm water discharge monitoring.

Containment Cell, Whitehall, New York. Resident Engineer for the construction of a containment cell comprised of a sheet pile wall and cap system. Reviewed contractor submittals, documented construction activities, and prepared Final Engineering Report.

MGP Site Remediation, Plattsburgh, New York. Project Coordinator for remediation of an 11-acre former manufactured gas plant. Responsibilities included providing remedial oversight, collecting waste characterization and wastewater treatment plant effluent samples, coordinating waste disposal, and coordinating remedial work with utility relocation activities. Prepared Final Report+-.

Feasibility Study, Schenectady, New York. Project Engineer for a Feasibility Study (FS) for a 628-acre active manufacturing facility in Schenectady, New York. The FS included evaluation of remedial alternatives for onsite landfills, VOC-impacted groundwater, the presence of free-product, and nearby drinking water supplies.

CMS Report and Corrective Measure Implementation Work Plan, Albuquerque, New Mexico. Project Engineer for the CMS Report and Corrective Measure Implementation Work Plan, and assisted with design

investigations and preparation of bid documents for a former apparatus service shop in Albuquerque, New Mexico.

RCRA Container Storage Area, Tonawanda, New York. Project Manager for closure of a RCRA container storage area at a facility in Tonawanda, New York. Tasks include evaluating the option of closing the storage unit, preparing a *Revised Closure Plan*, coordinating implementation, and preparing the *Closure Certification Report*.

Commercial PCB Storage Area, Tonawanda, New York. Project Manager for closure of an EPA-approved Commercial PCB Storage Area at a RCRA permitted facility in Tonawanda, New York. Tasks included evaluating the option of closing the storage unit, preparing a revised *Closure Plan*, and coordinating implementation. Project work included multi-phase investigation to delineate impacts adjacent to the storage area and resulted in epoxy coating of this active facility's concrete floor in accordance with the procedures specified under TSCA for continued use of PCB-impacted porous surfaces.

Remedial Design and Project Management, Medford, Massachusetts. Project Engineer for remedial engineering support for projects implemented under the Massachusetts Contingency Program at for a transformer repair facility in Medford, Massachusetts. Ms. Peppin prepared a Release Abatement Measure (RAM) Plan for upgrading a consumptive-use fuel oil tank, prepared a RAM Plan for removing PCB containing sediments from storm sewers, provided field oversight for a Utility-Related Abatement Measure (URAM), prepared a URAM Completion Report, prepared a Phase III Remedial Action Plan for evaluating remedial alternatives for PCB-impacted soil, PCB-impacted sediment in storm sewers, and an offsite surface water body, designed and conducted design level investigations for the storm sewers and surface water body, evaluated different excavation scenarios for surface water sediments, and incorporated the remedial design into a Phase IV Remedy Implementation Plan for submission to the Massachusetts Department of Environmental Protection. Ms. Peppin provided engineering support for obtaining the ten permits and agreements from seven federal, state, or local entities necessary to conduct the remedial work. Ms. Peppin served as Project Manager and Project Engineer through contracting, remedial action implementation, and preparing Response Action Outcome Statements (RAOs) phases of the project, as wells as the final stages of obtaining the permits. Contracting support included preparing the bid specifications and assisting in evaluating contractor bids. Remedial actions for the off-site storm sewers and surface water body were performed from 2006 to 2007 with full time oversight and Environmental Inspector Services performed by URS. Wetland restoration monitoring was successfully completed in 2009. Ms. Peppin prepared the Response Action Outcome Statements for the four portions of this site where permanent or temporary remedies have been achieved. Inspections of the cap at the facility, groundwater monitoring, and semi-annual reporting activities are ongoing.

Interim Remedial Measure, Schenectady, New York. Project Engineer for an Interim Remedial Measure (IRM) to address seepage from an inactive industrial landfill at a facility in Schenectady, New York. Ms. Peppin assisted with the IRM design, prepared a bid package and specifications for implementation of the IRM, and provided field oversight for implementation of the IRM.

Industrial Landfill, Schenectady, New York. Project Engineer for developing and evaluating alternatives to minimize the environmental impact of remediating an inactive 100-acre industrial landfill at a facility in Schenectady, New York. The efforts included evaluation of innovative technologies including a phytoremediation system for the passive treatment of seeping groundwater and a phytocover system to reduce infiltration into the landfill by maximizing evapotranspiration.

Multi-State UST Evaluation. Project manager for evaluating the presence of underground storage tanks at multiple active and inactive facilities. Coordinated efforts of local staff in six states to perform site visits and record reviews, developed recommendations, and prepared summary reports.

Release Abatement Measure, Fitchburg, Massachusetts. Project Engineer for a Release Abatement Measure (RAM) Plan to recover turbine oil from beneath a former turbine manufacturing plant in Fitchburg, Massachusetts. Ms. Peppin prepared the bid package and specifications for implementation of the RAM Plan. She also assisted in the preparation of a pilot program for recovery of light non-aqueous phase liquids (LNAPL) at the site.

Several Environmental Remediation Projects, Connecticut, Massachusetts, and New York. Project Engineer for conceptual engineering design and cost estimates for environmental remediation projects in Connecticut, Massachusetts, and New York.

Groundwater Recovery Systems, Hudson Falls, New York. Project Engineer for DNAPL and PCB, VOC, and B/N SVOC contaminated groundwater recovery systems at an inactive hazardous waste site at a former capacitor manufacturing facility in Hudson Falls, New York. Ms. Peppin oversaw two full-time environmental technicians who maintained 37 recovery systems consisting of 15 dual-phase recovery systems, nine groundwater recovery wells, three DNAPL recovery systems and ten sumps. Specified and ordered all groundwater and pneumatic pumps, and controllers, and appurtences. Maintained records on all systems. Informed client of operational status of recovery systems on a weekly basis and monthly basis.

Feasibility Study, Hudson Falls, New York. Project Engineer for evaluating the feasibility of thermal desorption wells for remediation of PCB containing soils at an inactive hazardous waste site at a former capacitor manufacturing facility in Hudson Falls, New York.

SPCC Plans, Several Sites, New York. Assisted in collecting site data for 52 electrical substations throughout New York for preparation of SPCC Plans.

Interim Remedial Measure Work Plan, Schenectady, New York. Assisted in preparing an Interim Remedial Measure (IRM) Work Plan and bid specifications for removing PCB and metal containing sediment from a storm water collection pond at a manufacturing facility in Schenectady, New York.

Work Plan for AST Closures, Missouri. Assisted in preparing a work plan and bid specifications for removal of four above ground storage tanks at a former apparatus service shop in Missouri.

Vapor Extraction System Operation and Maintenance, Michigan. Prepared monthly progress reports to update the Michigan Department of Environmental Quality on the status of two soil vapor extraction (SVE) systems at a site in northern Michigan with groundwater contamination. Prepared quarterly air and water discharge reports for the SVE systems.

Remedial Action Work Plan, South Carolina. Assisted in revising a Remedial Action Work Plan under the South Carolina Voluntary Cleanup Program to address PCB contamination at a former apparatus service center. Assisted with the preparation of monthly progress reports.

Corrective Measures Evaluation, Central New York. Assisted in the preparation of a report documenting the evaluation of corrective measures for exceedences of metals at three State Pollution Discharge Elimination System (SPDES) Outfalls from a manufacturing plant in Central New York.

UST Closure, Waterford, New York. Provided field oversight for the in-place closure of one underground storage tank (UST), and the removal of five USTs at an industrial facility in Waterford, New York. Prepared tank closure reports for these tanks as well as six other USTs for submission to the NYSDEC.

Air Sparging Pilot Test, Michigan. Evaluated results and prepared report for an Air Sparging Pilot Test at a site in northern Michigan with groundwater contamination.

Groundwater Treatment System, New York. Assisted in maintaining a float controlled groundwater treatment system in Rensselaer, New York. Duties included sampling groundwater and system effluent, air monitoring, electrical and plumbing up-grades, troubleshooting, pump maintenance, overseeing carbon change-outs, and managing waste disposal.

Professional Societies/Affiliates

Associate Member, American Society of Civil Engineers
Member, Chi Epsilon

ATTACHMENT B

COPIES OF LABORATORY NYSDOH ELAP CERTIFICATIONS

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 02, 2012
Revised June 19, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. CHRISTOPHER SPENCER
TESTAMERICA BUFFALO
10 HAZELWOOD DRIVE - SUITE 106
AMHERST, NY 14228

NY Lab Id No: 10026

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Dissolved Gases

Acetylene	RSK-175
Ethane	RSK-175
Ethene (Ethylene)	RSK-175
Methane	RSK-175
Propane	RSK-175

Drinking Water Metals I

Arsenic, Total	EPA 200.8 Rev. 5.4
Barium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Cadmium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Chromium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Copper, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Iron, Total	EPA 200.7 Rev. 4.4
Lead, Total	EPA 200.8 Rev. 5.4
Manganese, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Mercury, Total	EPA 245.1 Rev. 3.0
Selenium, Total	EPA 200.8 Rev. 5.4
Silver, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Zinc, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4

Drinking Water Metals II

Aluminum, Total	EPA 200.7 Rev. 4.4
Antimony, Total	EPA 200.8 Rev. 5.4
Beryllium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Molybdenum, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Nickel, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Thallium, Total	EPA 200.8 Rev. 5.4
Vanadium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4

Drinking Water Metals III

Boron, Total	EPA 200.7 Rev. 4.4
Calcium, Total	EPA 200.7 Rev. 4.4
Magnesium, Total	EPA 200.7 Rev. 4.4
Potassium, Total	EPA 200.7 Rev. 4.4
Sodium, Total	EPA 200.7 Rev. 4.4

Drinking Water Miscellaneous

Endothall	EPA 548.1
Organic Carbon, Dissolved	SM 18-21 5310D (00)
Organic Carbon, Total	SM 18-21 5310D (00)
Turbidity	EPA 180.1 Rev. 2.0

Drinking Water Non-Metals

Alkalinity	EPA 310.2

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Drinking Water Non-Metals

Alkalinity	SM 18-21 2320B (97)
Calcium Hardness	EPA 200.7 Rev. 4.4
	SM 18-21 2340B (97)
Chloride	EPA 300.0 Rev. 2.1
	SM 18-21 4110B (00)
	SM 18-21 4500-Cl- E (97)
Color	SM 18-21 2120B (01)
Cyanide	EPA 335.4 Rev. 1.0
	SM 18-21 4500-CN E (99)
Fluoride, Total	EPA 300.0 Rev. 2.1
	SM 18-21 4110B (00)
Nitrate (as N)	EPA 353.2 Rev. 2.0
Nitrite (as N)	EPA 353.2 Rev. 2.0
Orthophosphate (as P)	SM 18-21 4500-P E
Solids, Total Dissolved	SM 18-21 2540C (97)
Specific Conductance	EPA 120.1 Rev. 1982
Sulfate (as SO4)	ASTM D516-90 02 & 07
	EPA 300.0 Rev. 2.1
	SM 18-21 4110B (00)

Drinking Water Trihalomethanes

Bromodichloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2
Total Trihalomethanes	EPA 524.2

Fuel Additives

Methyl tert-butyl ether	EPA 524.2

Microextractibles

1,2-Dibromo-3-chloropropane	EPA 504.1
1,2-Dibromoethane	EPA 504.1

Volatile Aromatics

1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2
Chlorobenzene	EPA 524.2
Ethyl benzene	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2

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Volatile Aromatics	
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2
Total Xylenes	EPA 524.2
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2
1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2

Volatile Halocarbons	
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

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All approved analytes are listed below:

Acrylates	
Acrolein (Propenal)	EPA 624
	EPA 8260B
Acrylonitrile	EPA 624
	EPA 8260B
Ethyl methacrylate	EPA 8260B
Methyl acrylonitrile	EPA 8260B
Methyl methacrylate	EPA 8260B
Amines	
1,4-Phenylenediamine	EPA 8270C
	EPA 8270D
1-Naphthylamine	EPA 8270C
	EPA 8270D
2-Naphthylamine	EPA 8270C
	EPA 8270D
2-Nitroaniline	EPA 8270C
	EPA 8270D
3-Nitroaniline	EPA 8270C
	EPA 8270D
4-Chloroaniline	EPA 8270C
	EPA 8270D
4-Nitroaniline	EPA 8270C
	EPA 8270D
5-Nitro-o-toluidine	EPA 8270C
	EPA 8270D
Aniline	EPA 8270C

Amines	
Aniline	EPA 8270D
Carbazole	EPA 8270C
	EPA 8270D
Diphenylamine	EPA 8270C
	EPA 8270D
Methapyrilene	EPA 8270C
	EPA 8270D
Pronamide	EPA 8270C
	EPA 8270D
Propionitrile	EPA 8260B
Pyridine	EPA 625
	EPA 8270C
	EPA 8270D
Benzidines	
3,3'-Dichlorobenzidine	EPA 625
	EPA 8270C
	EPA 8270D
3,3'-Dimethylbenzidine	EPA 8270C
	EPA 8270D
Benzidine	EPA 625
	EPA 8270C
	EPA 8270D
Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 608
	EPA 8081A

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WADSWORTH CENTER

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Issued April 02, 2012
Revised June 08, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. CHRISTOPHER SPENCER
TESTAMERICA BUFFALO
10 HAZELWOOD DRIVE - SUITE 106
AMHERST, NY 14228

NY Lab Id No: 10026

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 8081B
4,4'-DDE	EPA 608
	EPA 8081A
	EPA 8081B
4,4'-DDT	EPA 608
	EPA 8081A
	EPA 8081B
Aldrin	EPA 608
	EPA 8081A
	EPA 8081B
alpha-BHC	EPA 608
	EPA 8081A
	EPA 8081B
alpha-Chlordane	EPA 8081A
	EPA 8081B
beta-BHC	EPA 608
	EPA 8081A
	EPA 8081B
Chlordane Total	EPA 608
	EPA 8081A
	EPA 8081B
Chlorobenzilate	EPA 8270C
	EPA 8270D
delta-BHC	EPA 608
	EPA 8081A

Chlorinated Hydrocarbon Pesticides	
delta-BHC	EPA 8081B
Diallate	EPA 8270C
	EPA 8270D
Dieldrin	EPA 608
	EPA 8081A
	EPA 8081B
Endosulfan I	EPA 608
	EPA 8081A
	EPA 8081B
Endosulfan II	EPA 608
	EPA 8081A
	EPA 8081B
Endosulfan sulfate	EPA 608
	EPA 8081A
	EPA 8081B
Endrin	EPA 608
	EPA 8081A
	EPA 8081B
Endrin aldehyde	EPA 608
	EPA 8081A
	EPA 8081B
Endrin Ketone	EPA 8081A
	EPA 8081B
gamma-Chlordane	EPA 8081A
	EPA 8081B

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Chlorinated Hydrocarbon Pesticides	
Heptachlor	EPA 608
	EPA 8081A
	EPA 8081B
Heptachlor epoxide	EPA 608
	EPA 8081A
	EPA 8081B
Isodrin	EPA 8270C
	EPA 8270D
Kepone	EPA 8270C
	EPA 8270D
Lindane	EPA 608
	EPA 8081A
	EPA 8081B
Methoxychlor	EPA 608
	EPA 8081A
	EPA 8081B
Mirex	EPA 8081A
	EPA 8081B
	SM 18-20 6630C
PCNB	EPA 8270C
	EPA 8270D
Toxaphene	EPA 608
	EPA 8081A
	EPA 8081B

Chlorinated Hydrocarbons	
1,2,3-Trichlorobenzene	EPA 8260B
1,2,4,5-Tetrachlorobenzene	EPA 8270C
	EPA 8270D
1,2,4-Trichlorobenzene	EPA 625
	EPA 8270C
	EPA 8270D
2-Chloronaphthalene	EPA 625
	EPA 8270C
	EPA 8270D
Hexachlorobenzene	EPA 625
	EPA 8270C
	EPA 8270D
Hexachlorobutadiene	EPA 625
	EPA 8270C
	EPA 8270D
Hexachlorocyclopentadiene	EPA 625
	EPA 8270C
	EPA 8270D
Hexachloroethane	EPA 625
	EPA 8270C
	EPA 8270D
Hexachloropropene	EPA 8270C
	EPA 8270D
Pentachlorobenzene	EPA 8270C
	EPA 8270D

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Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
Dalapon	EPA 8151A
Dichloroprop	EPA 8151A
Dinoseb	EPA 8151A
Demand	
Biochemical Oxygen Demand	SM 18-21 5210B (01)
Carbonaceous BOD	SM 18-21 5210B (01)
Chemical Oxygen Demand	EPA 410.4 Rev. 2.0
	HACH 8000
Dissolved Gases	
Acetylene	RSK-175
Ethane	RSK-175
Ethene (Ethylene)	RSK-175
Methane	RSK-175
Propane	RSK-175
Fuel Oxygenates	
Di-isopropyl ether	EPA 8260B
Ethanol	EPA 8015 B
Methyl tert-butyl ether	EPA 8021B
	EPA 8260B
tert-amyl methyl ether (TAME)	EPA 8260B
tert-butyl alcohol	EPA 8015 B
Fuel Oxygenates	
tert-butyl alcohol	EPA 8260B
tert-butyl ethyl ether (ETBE)	EPA 8260B
Haloethers	
4-Bromophenylphenyl ether	EPA 625
	EPA 8270C
	EPA 8270D
4-Chlorophenylphenyl ether	EPA 625
	EPA 8270C
	EPA 8270D
Bis (2-chloroisopropyl) ether	EPA 625
	EPA 8270C
	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 625
	EPA 8270C
	EPA 8270D
Bis(2-chloroethyl)ether	EPA 625
	EPA 8270C
	EPA 8270D
Mineral	
Alkalinity	EPA 310.2
	SM 18-21 2320B (97)
Chloride	EPA 300.0 Rev. 2.1
	EPA 9056A
	SM 18-21 4110B (00)
	SM 18-21 4500-Cl- E (97)

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Mineral	
Fluoride, Total	EPA 300.0 Rev. 2.1
	EPA 9056A
	SM 18-21 4110B (00)
	SM 18-21 4500-F C (97)
Hardness, Total	SM 18-21 2340B (97)
	SM 18-21 2340C (97)
Sulfate (as SO4)	ASTM D516-90 02 & 07
	EPA 300.0 Rev. 2.1
	EPA 9056A
	SM 18-21 4110B (00)
Nitroaromatics and Isophorone	
1,3,5-Trinitrobenzene	EPA 8270C
	EPA 8270D
1,3-Dinitrobenzene	EPA 8270C
	EPA 8270D
1,4-Naphthoquinone	EPA 8270C
	EPA 8270D
2,4-Dinitrotoluene	EPA 625
	EPA 8270C
	EPA 8270D
2,6-Dinitrotoluene	EPA 625
	EPA 8270C
	EPA 8270D
Isophorone	EPA 625
	EPA 8270C
Nitroaromatics and Isophorone	
Isophorone	EPA 8270D
Nitrobenzene	EPA 625
	EPA 8270C
	EPA 8270D
Nitrosoamines	
N-Nitrosodiethylamine	EPA 8270C
	EPA 8270D
N-Nitrosodimethylamine	EPA 625
	EPA 8270C
	EPA 8270D
N-Nitrosodi-n-butylamine	EPA 8270C
	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 625
	EPA 8270C
	EPA 8270D
N-Nitrosodiphenylamine	EPA 625
	EPA 8270C
	EPA 8270D
N-nitrosopiperidine	EPA 8270C
	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270C
	EPA 8270D
Nutrient	
Ammonia (as N)	EPA 350.1 Rev. 2.0
Kjeldahl Nitrogen, Total	EPA 351.2 Rev. 2.0

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Nutrient	
Nitrate (as N)	EPA 353.2 Rev. 2.0
	SM 18-21 4500-NO3 F (00)
Nitrite (as N)	EPA 353.2 Rev. 2.0
	SM 18-21 4500-NO3 F (00)
Orthophosphate (as P)	SM 18-21 4500-P E
Phosphorus, Total	SM 18-21 4500-P E
Organophosphate Pesticides	
Atrazine	EPA 8270C
	EPA 8270D
Dimethoate	EPA 8270C
	EPA 8270D
Disulfoton	EPA 8270C
	EPA 8270D
Famphur	EPA 8270C
	EPA 8270D
Parathion ethyl	EPA 8270C
	EPA 8270D
Parathion methyl	EPA 8270C
	EPA 8270D
Phorate	EPA 8270C
	EPA 8270D
Simazine	EPA 8270C
	EPA 8270D
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015 B
Petroleum Hydrocarbons	
Gasoline Range Organics	EPA 8015 B
Phthalate Esters	
Benzyl butyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Diethyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Dimethyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Di-n-butyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Di-n-octyl phthalate	EPA 625
	EPA 8270C
	EPA 8270D
Polychlorinated Biphenyls	
PCB-1016	EPA 608
	EPA 8082
	EPA 8082A
PCB-1221	EPA 608

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Polychlorinated Biphenyls

PCB-1221	EPA 8082
	EPA 8082A
PCB-1232	EPA 608
	EPA 8082
	EPA 8082A
PCB-1242	EPA 608
	EPA 8082
	EPA 8082A
PCB-1248	EPA 608
	EPA 8082
	EPA 8082A
PCB-1254	EPA 608
	EPA 8082
	EPA 8082A
PCB-1260	EPA 608
	EPA 8082
	EPA 8082A
PCB-1262	EPA 8082
	EPA 8082A
PCB-1268	EPA 8082
	EPA 8082A

Polynuclear Aromatics

3-Methylcholanthrene	EPA 8270C
	EPA 8270D
7,12-Dimethylbenzyl (a) anthracene	EPA 8270C

Polynuclear Aromatics

7,12-Dimethylbenzyl (a) anthracene	EPA 8270D
Acenaphthene	EPA 625
	EPA 8270C
	EPA 8270D
Acenaphthylene	EPA 625
	EPA 8270C
	EPA 8270D
Anthracene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(a)anthracene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(a)pyrene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(b)fluoranthene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(ghi)perylene	EPA 625
	EPA 8270C
	EPA 8270D
Benzo(k)fluoranthene	EPA 625
	EPA 8270C
	EPA 8270D

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Polynuclear Aromatics	
Chrysene	EPA 625
	EPA 8270C
	EPA 8270D
Dibenzo(a,h)anthracene	EPA 625
	EPA 8270C
	EPA 8270D
Fluoranthene	EPA 625
	EPA 8270C
	EPA 8270D
Fluorene	EPA 625
	EPA 8270C
	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 625
	EPA 8270C
	EPA 8270D
Naphthalene	EPA 625
	EPA 8270C
	EPA 8270D
Phenanthrene	EPA 625
	EPA 8270C
	EPA 8270D
Pyrene	EPA 625
	EPA 8270C
	EPA 8270D

Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270C
	EPA 8270D
2,4,5-Trichlorophenol	EPA 625
	EPA 8270C
	EPA 8270D
2,4,6-Trichlorophenol	EPA 625
	EPA 8270C
	EPA 8270D
2,4-Dichlorophenol	EPA 625
	EPA 8270C
	EPA 8270D
2,4-Dimethylphenol	EPA 625
	EPA 8270C
	EPA 8270D
2,4-Dinitrophenol	EPA 625
	EPA 8270C
	EPA 8270D
2,6-Dichlorophenol	EPA 8270C
	EPA 8270D
2-Chlorophenol	EPA 625
	EPA 8270C
	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 625
	EPA 8270C
	EPA 8270D

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Priority Pollutant Phenols	
2-Methylphenol	EPA 8270C
	EPA 8270D
2-Nitrophenol	EPA 625
	EPA 8270C
	EPA 8270D
3-Methylphenol	EPA 8270C
	EPA 8270D
4-Chloro-3-methylphenol	EPA 625
	EPA 8270C
	EPA 8270D
4-Methylphenol	EPA 8270C
	EPA 8270D
4-Nitrophenol	EPA 625
	EPA 8270C
	EPA 8270D
Cresols, Total	EPA 625
	EPA 8270C
	EPA 8270D
Pentachlorophenol	EPA 625
	EPA 8151A
	EPA 8270C
	EPA 8270D
Phenol	EPA 625
	EPA 8270C
	EPA 8270D

Residue	
Settleable Solids	SM 18-21 2540 F (97)
Solids, Total	SM 18-21 2540B (97)
Solids, Total Dissolved	SM 18-21 2540C (97)
Solids, Total Suspended	SM 18-21 2540D (97)
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270C
	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
2-Methylnaphthalene	EPA 8270C
	EPA 8270D
4-Amino biphenyl	EPA 8270C
	EPA 8270D
Acetophenone	EPA 8270C
	EPA 8270D
Benzaldehyde	EPA 8270C
	EPA 8270D
Benzoic Acid	EPA 8270C
	EPA 8270D
Benzyl alcohol	EPA 8270C
	EPA 8270D

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Semi-Volatile Organics

Caprolactam	EPA 8270C
	EPA 8270D
Dibenzofuran	EPA 8270C
	EPA 8270D
Ethyl methanesulfonate	EPA 8270C
	EPA 8270D
Isosafrole	EPA 8270C
	EPA 8270D
Methyl methanesulfonate	EPA 8270C
	EPA 8270D
O,O,O-Triethyl phosphorothioate	EPA 8270C
	EPA 8270D
p-Dimethylaminoazobenzene	EPA 8270C
	EPA 8270D
Phenacetin	EPA 8270C
	EPA 8270D
Safrole	EPA 8270C
	EPA 8270D

Volatile Aromatics

1,2,4-Trichlorobenzene, Volatile	EPA 8260B
1,2,4-Trimethylbenzene	EPA 8021B
	EPA 8260B
1,2-Dichlorobenzene	EPA 624
	EPA 8260B
1,3,5-Trimethylbenzene	EPA 8021B

Volatile Aromatics

1,3,5-Trimethylbenzene	EPA 8260B
1,3-Dichlorobenzene	EPA 624
	EPA 8260B
1,4-Dichlorobenzene	EPA 624
	EPA 8260B
Benzene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
Chlorobenzene	EPA 624
	EPA 8260B
Ethyl benzene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
Isopropylbenzene	EPA 8021B
	EPA 8260B
Naphthalene, Volatile	EPA 8260B
n-Butylbenzene	EPA 8021B
	EPA 8260B
n-Propylbenzene	EPA 8021B
	EPA 8260B
p-Isopropyltoluene (P-Cymene)	EPA 8021B
	EPA 8260B
sec-Butylbenzene	EPA 8021B

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Volatile Aromatics	
sec-Butylbenzene	EPA 8260B
Styrene	EPA 624
	EPA 8260B
tert-Butylbenzene	EPA 8260B
Toluene	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
Total Xylenes	EPA 602
	EPA 624
	EPA 8021B
	EPA 8260B
Volatile Chlorinated Organics	
Epichlorohydrin	EPA 8260B
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260B
1,1,1-Trichloroethane	EPA 624
	EPA 8260B
1,1,2,2-Tetrachloroethane	EPA 624
	EPA 8260B
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260B
1,1,2-Trichloroethane	EPA 624
	EPA 8260B
1,1-Dichloroethane	EPA 624
	EPA 8260B

Volatile Halocarbons	
1,1-Dichloroethene	EPA 624
	EPA 8260B
1,1-Dichloropropene	EPA 8260B
1,2,3-Trichloropropane	EPA 8260B
1,2-Dibromo-3-chloropropane	EPA 8011
	EPA 8260B
1,2-Dibromoethane	EPA 8011
	EPA 8260B
1,2-Dichloroethane	EPA 624
	EPA 8260B
1,2-Dichloropropane	EPA 624
	EPA 8260B
1,3-Dichloropropane	EPA 8260B
2,2-Dichloropropane	EPA 8260B
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260B
2-Chloroethylvinyl ether	EPA 624
	EPA 8260B
3-Chloropropene (Allyl chloride)	EPA 8260B
Bromochloromethane	EPA 8260B
Bromodichloromethane	EPA 624
	EPA 8260B
Bromoform	EPA 624
	EPA 8260B
Bromomethane	EPA 624
	EPA 8260B

Serial No.: 47113

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 02, 2012
Revised June 08, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. CHRISTOPHER SPENCER
TESTAMERICA BUFFALO
10 HAZELWOOD DRIVE - SUITE 106
AMHERST, NY 14228

NY Lab Id No: 10026

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Volatile Halocarbons	
Carbon tetrachloride	EPA 624
	EPA 8260B
Chloroethane	EPA 624
	EPA 8260B
Chloroform	EPA 624
	EPA 8260B
Chloromethane	EPA 624
	EPA 8260B
cis-1,2-Dichloroethene	EPA 8260B
cis-1,3-Dichloropropene	EPA 624
	EPA 8260B
cis-1,4-Dichloro-2-butene	EPA 8260B
Dibromochloromethane	EPA 624
	EPA 8260B
Dibromomethane	EPA 8260B
Dichlorodifluoromethane	EPA 624
	EPA 8260B
Hexachlorobutadiene, Volatile	EPA 8260B
Methyl iodide	EPA 8260B
Methylene chloride	EPA 624
	EPA 8260B
Tetrachloroethene	EPA 624
	EPA 8260B
trans-1,2-Dichloroethene	EPA 624
	EPA 8260B

Volatile Halocarbons	
trans-1,3-Dichloropropene	EPA 624
	EPA 8260B
trans-1,4-Dichloro-2-butene	EPA 8260B
Trichloroethene	EPA 624
	EPA 8260B
Trichlorofluoromethane	EPA 624
	EPA 8260B
Vinyl chloride	EPA 624
	EPA 8260B
Volatiles Organics	
1,4-Dioxane	EPA 8260B
2-Butanone (Methylethyl ketone)	EPA 8260B
2-Hexanone	EPA 8260B
4-Methyl-2-Pentanone	EPA 8260B
Acetone	EPA 8260B
Acetonitrile	EPA 8260B
Carbon Disulfide	EPA 8260B
Cyclohexane	EPA 8260B
Isobutyl alcohol	EPA 8015 B
	EPA 8015C
	EPA 8260B
Methyl acetate	EPA 8260B
Methyl cyclohexane	EPA 8260B
o-Toluidine	EPA 8270C
Vinyl acetate	EPA 8260B

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Wastewater Metals I		**Wastewater Metals I**	
Barium, Total	EPA 200.7 Rev. 4.4	Copper, Total	EPA 6020
	EPA 200.8 Rev. 5.4		EPA 6020A
	EPA 6010B	Iron, Total	EPA 200.7 Rev. 4.4
	EPA 6010C		EPA 6010B
	EPA 6020		EPA 6010C
	EPA 6020A	Lead, Total	EPA 200.7 Rev. 4.4
Cadmium, Total	EPA 200.7 Rev. 4.4		EPA 200.8 Rev. 5.4
	EPA 200.8 Rev. 5.4		EPA 6010B
	EPA 6010B		EPA 6010C
	EPA 6010C		EPA 6020
	EPA 6020		EPA 6020A
	EPA 6020A	Magnesium, Total	EPA 200.7 Rev. 4.4
Calcium, Total	EPA 200.7 Rev. 4.4		EPA 6010B
	EPA 6010B		EPA 6010C
	EPA 6010C	Manganese, Total	EPA 200.7 Rev. 4.4
Chromium, Total	EPA 200.7 Rev. 4.4		EPA 200.8 Rev. 5.4
	EPA 200.8 Rev. 5.4		EPA 6010B
	EPA 6010B		EPA 6010C
	EPA 6010C		EPA 6020
	EPA 6020		EPA 6020A
	EPA 6020A	Nickel, Total	EPA 200.7 Rev. 4.4
Copper, Total	EPA 200.7 Rev. 4.4		EPA 200.8 Rev. 5.4
	EPA 200.8 Rev. 5.4		EPA 6010B
	EPA 6010B		EPA 6010C
	EPA 6010C		EPA 6020

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Wastewater Metals I

Nickel, Total	EPA 6020A
Potassium, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Silver, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Sodium, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Strontium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6020
	EPA 6020A

Wastewater Metals II

Aluminum, Total	EPA 200.7 Rev. 4.4
	EPA 6010B
	EPA 6010C
Antimony, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B

Wastewater Metals II

Antimony, Total	EPA 6010C
	EPA 6020
	EPA 6020A
Arsenic, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Beryllium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Chromium VI	EPA 7196A
	SM 18-19 3500-Cr D
	SM 20-21 3500-Cr B (01)
Mercury, Total	EPA 245.1 Rev. 3.0
	EPA 7470A
Selenium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
	EPA 6010B
	EPA 6010C
	EPA 6020

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Wastewater Metals II		**Wastewater Metals III**	
Selenium, Total	EPA 6020A	Molybdenum, Total	EPA 6020A
Vanadium, Total	EPA 200.7 Rev. 4.4	Thallium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4		EPA 200.8 Rev. 5.4
	EPA 6010B		EPA 6010B
	EPA 6010C		EPA 6010C
	EPA 6020		EPA 6020
	EPA 6020A		EPA 6020A
Zinc, Total	EPA 200.7 Rev. 4.4	Tin, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4		EPA 6010B
	EPA 6010B		EPA 6010C
	EPA 6010C	Titanium, Total	EPA 200.7 Rev. 4.4
	EPA 6020		EPA 6010B
	EPA 6020A		EPA 6010C
Wastewater Metals III		**Wastewater Miscellaneous**	
Cobalt, Total	EPA 200.7 Rev. 4.4	Boron, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4		EPA 6010B
	EPA 6010B		EPA 6010C
	EPA 6010C	Bromide	EPA 300.0 Rev. 2.1
	EPA 6020		EPA 9056A
	EPA 6020A		SM 18-21 4110B (00)
Molybdenum, Total	EPA 200.7 Rev. 4.4	Color	SM 18-21 2120B (01)
	EPA 200.8 Rev. 5.4	Cyanide, Total	EPA 335.4 Rev. 1.0
	EPA 6010B		EPA 9012A
	EPA 6010C		LACHAT 10-204-00-1-X
	EPA 6020		SM 18-21 4500-CN E (99)

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Wastewater Miscellaneous

Cyanide, Total	SM 18-21 4500-CN G (99)
Oil & Grease Total Recoverable (HEM)	EPA 1664A
	EPA 9070 (Solvent:Hexane)
Organic Carbon, Total	EPA 9060
	SM 18-21 5310D (00)
Phenols	EPA 420.4 Rev. 1.0
	EPA 9065
	EPA 9066
Specific Conductance	EPA 120.1 Rev. 1982
	EPA 9050
	SM 18-21 2510B (97)
Sulfide (as S)	SM 18-21 4500-S D (00)
	SM 19-21 4500-S F (00)
Surfactant (MBAS)	SM 18-21 5540C (00)
Total Organic Halides	EPA 9020
Total Petroleum Hydrocarbons	EPA 1664A
Turbidity	EPA 180.1 Rev. 2.0

Sample Preparation Methods

	EPA 200.2
	EPA 3005A
	EPA 3010A
	EPA 3020A
	EPA 3510C
	EPA 3520C
	EPA 5030B

Sample Preparation Methods

	EPA 9010B
	SM 18-20 4500-P b.5

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All approved analytes are listed below:

Acrylates	
Acrolein (Propenal)	EPA 8260B
Acrylonitrile	EPA 8260B
Ethyl methacrylate	EPA 8260B
Methyl acrylonitrile	EPA 8260B
Methyl methacrylate	EPA 8260B
Amines	
1,2-Diphenylhydrazine	EPA 8270C
	EPA 8270D
1,4-Phenylenediamine	EPA 8270C
	EPA 8270D
1-Naphthylamine	EPA 8270C
	EPA 8270D
2-Naphthylamine	EPA 8270C
	EPA 8270D
2-Nitroaniline	EPA 8270C
	EPA 8270D
3-Nitroaniline	EPA 8270C
	EPA 8270D
4-Chloroaniline	EPA 8270C
	EPA 8270D
4-Nitroaniline	EPA 8270C
	EPA 8270D
5-Nitro-o-toluidine	EPA 8270C
	EPA 8270D
Aniline	EPA 8270C

Amines	
Aniline	EPA 8270D
Carbazole	EPA 8270C
	EPA 8270D
Diphenylamine	EPA 8270C
	EPA 8270D
Methapyrilene	EPA 8270C
	EPA 8270D
Pronamide	EPA 8270C
	EPA 8270D
Benzidines	
3,3'-Dichlorobenzidine	EPA 8270C
	EPA 8270D
3,3'-Dimethylbenzidine	EPA 8270C
	EPA 8270D
Benzidine	EPA 8270C
	EPA 8270D
Characteristic Testing	
Corrosivity	EPA 9040B
	EPA 9045C
Free Liquids	EPA 9095A
Ignitability	EPA 1010
Reactivity	SW-846 Ch7 Sec. 7.3
Chlorinated Hydrocarbon Pesticides	
2,4'-DDD (Mitotane)	EPA 8081A

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Chlorinated Hydrocarbon Pesticides	
2,4'-DDD (Mitotane)	EPA 8081B
4,4'-DDD	EPA 8081A
	EPA 8081B
4,4'-DDE	EPA 8081A
	EPA 8081B
4,4'-DDT	EPA 8081A
	EPA 8081B
Aldrin	EPA 8081A
	EPA 8081B
alpha-BHC	EPA 8081A
	EPA 8081B
alpha-Chlordane	EPA 8081A
	EPA 8081B
Atrazine	EPA 8270C
	EPA 8270D
beta-BHC	EPA 8081A
	EPA 8081B
Chlordane Total	EPA 8081A
	EPA 8081B
Chlorobenzilate	EPA 8270C
	EPA 8270D
delta-BHC	EPA 8081A
	EPA 8081B
Diallate	EPA 8270C
	EPA 8270D

Chlorinated Hydrocarbon Pesticides	
Dieldrin	EPA 8081A
	EPA 8081B
Endosulfan I	EPA 8081A
	EPA 8081B
Endosulfan II	EPA 8081A
	EPA 8081B
Endosulfan sulfate	EPA 8081A
	EPA 8081B
Endrin	EPA 8081A
	EPA 8081B
Endrin aldehyde	EPA 8081A
	EPA 8081B
Endrin Ketone	EPA 8081A
	EPA 8081B
gamma-Chlordane	EPA 8081A
	EPA 8081B
Heptachlor	EPA 8081A
	EPA 8081B
Heptachlor epoxide	EPA 8081A
	EPA 8081B
Kepone	EPA 8270C
	EPA 8270D
Lindane	EPA 8081A
	EPA 8081B
Methoxychlor	EPA 8081A

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Chlorinated Hydrocarbon Pesticides	
Methoxychlor	EPA 8081B
Pentachloronitrobenzene	EPA 8270C
	EPA 8270D
Toxaphene	EPA 8081A
	EPA 8081B
Chlorinated Hydrocarbons	
1,2,4,5-Tetrachlorobenzene	EPA 8270C
	EPA 8270D
1,2,4-Trichlorobenzene	EPA 8270C
	EPA 8270D
2-Chloronaphthalene	EPA 8270C
	EPA 8270D
Hexachlorobenzene	EPA 8270C
	EPA 8270D
Hexachlorobutadiene	EPA 8270C
	EPA 8270D
Hexachlorocyclopentadiene	EPA 8270C
	EPA 8270D
Hexachloroethane	EPA 8270C
	EPA 8270D
Hexachlorophene	EPA 8270C
	EPA 8270D
Hexachloropropene	EPA 8270C
	EPA 8270D
Pentachlorobenzene	EPA 8270C

Chlorinated Hydrocarbons	
Pentachlorobenzene	EPA 8270D
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
Dalapon	EPA 8151A
Dichloroprop	EPA 8151A
Dinoseb	EPA 8151A
Pentachlorophenol	EPA 8151A
Haloethers	
4-Bromophenylphenyl ether	EPA 8270C
	EPA 8270D
4-Chlorophenylphenyl ether	EPA 8270C
	EPA 8270D
Bis (2-chloroisopropyl) ether	EPA 8270C
	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 8270C
	EPA 8270D
Bis(2-chloroethyl)ether	EPA 8270C
	EPA 8270D
Metals I	
Barium, Total	EPA 6010B
	EPA 6010C
	EPA 6020

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Metals I		**Metals I**	
Barium, Total	EPA 6020A	Manganese, Total	EPA 6020
Cadmium, Total	EPA 6010B		EPA 6020A
	EPA 6010C	Nickel, Total	EPA 6010B
	EPA 6020		EPA 6010C
	EPA 6020A		EPA 6020
Calcium, Total	EPA 6010B		EPA 6020A
	EPA 6010C	Potassium, Total	EPA 6010B
Chromium, Total	EPA 6010B		EPA 6010C
	EPA 6010C	Silver, Total	EPA 6010B
	EPA 6020		EPA 6010C
	EPA 6020A		EPA 6020
Copper, Total	EPA 6010B		EPA 6020A
	EPA 6010C	Sodium, Total	EPA 6010B
	EPA 6020		EPA 6010C
	EPA 6020A	Strontium, Total	EPA 6010B
Iron, Total	EPA 6010B	**Metals II**	
	EPA 6010C	Aluminum, Total	EPA 6010B
Lead, Total	EPA 6010B		EPA 6010C
	EPA 6010C	Antimony, Total	EPA 6010B
	EPA 6020		EPA 6010C
	EPA 6020A		EPA 6020
Magnesium, Total	EPA 6010B		EPA 6020A
	EPA 6010C	Arsenic, Total	EPA 6010B
Manganese, Total	EPA 6010B		EPA 6010C
	EPA 6010C		EPA 6020

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Metals II

Arsenic, Total	EPA 6020A
Beryllium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Lithium, Total	EPA 6010B
	EPA 6010C
Mercury, Total	EPA 7471A
	EPA 7471B
Selenium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Vanadium, Total	EPA 6010B
	EPA 6010C
Zinc, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A

Metals III

Cobalt, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Molybdenum, Total	EPA 6010B

Metals III

Molybdenum, Total	EPA 6010C
	EPA 6020
	EPA 6020A
Thallium, Total	EPA 6010B
	EPA 6010C
	EPA 6020
	EPA 6020A
Tin, Total	EPA 6010B
	EPA 6010C
Titanium, Total	EPA 6010B
	EPA 6010C

Minerals

Bromide	EPA 9056A
Chloride	EPA 9056A
	EPA 9251
Fluoride, Total	EPA 9056A
Sulfate (as SO4)	EPA 9038
	EPA 9056A

Miscellaneous

Boron, Total	EPA 6010B
	EPA 6010C
Cyanide, Total	EPA 9012A
Phenols	EPA 9066
Specific Conductance	EPA 9050
Total Organic Halides	EPA 9020

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All approved analytes are listed below:

Nitroaromatics and Isophorone	
1,3,5-Trinitrobenzene	EPA 8270C
	EPA 8270D
1,4-Dinitrobenzene	EPA 8270C
	EPA 8270D
1,4-Naphthoquinone	EPA 8270C
	EPA 8270D
2,4-Dinitrotoluene	EPA 8270C
	EPA 8270D
2,6-Dinitrotoluene	EPA 8270C
	EPA 8270D
4-Dimethylaminoazobenzene	EPA 8270C
	EPA 8270D
Hydroquinone	EPA 8270C
	EPA 8270D
Isophorone	EPA 8270C
	EPA 8270D
Nitrobenzene	EPA 8270C
	EPA 8270D
Pyridine	EPA 8270C
	EPA 8270D
Nitrosoamines	
N-Nitrosodiethylamine	EPA 8270C
	EPA 8270D
N-Nitrosodimethylamine	EPA 8270C
	EPA 8270D
Nitrosoamines	
N-Nitrosodi-n-butylamine	EPA 8270C
	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 8270C
	EPA 8270D
N-Nitrosodiphenylamine	EPA 8270C
	EPA 8270D
N-nitrosomethylethylamine	EPA 8270C
	EPA 8270D
N-nitrosomorpholine	EPA 8270C
	EPA 8270D
N-nitrosopiperidine	EPA 8270C
	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270C
	EPA 8270D
Nutrients	
Nitrate (as N)	EPA 9056A
Organophosphate Pesticides	
Dimethoate	EPA 8270C
	EPA 8270D
Disulfoton	EPA 8270C
	EPA 8270D
Famphur	EPA 8270C
	EPA 8270D
Parathion ethyl	EPA 8270C
	EPA 8270D

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WADSWORTH CENTER

Expires 12:01 AM April 01, 2013
Issued April 02, 2012
Revised June 12, 2012

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. CHRISTOPHER SPENCER
TESTAMERICA BUFFALO
10 HAZELWOOD DRIVE - SUITE 106
AMHERST, NY 14228

NY Lab Id No: 10026

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Organophosphate Pesticides		**Polychlorinated Biphenyls**	
Parathion methyl	EPA 8270C	PCB-1016	EPA 8082
	EPA 8270D		EPA 8082A
Phorate	EPA 8270C	PCB-1221	EPA 8082
	EPA 8270D		EPA 8082A
Sulfotepp	EPA 8270C	PCB-1232	EPA 8082
	EPA 8270D		EPA 8082A
Petroleum Hydrocarbons		PCB-1242	EPA 8082
Diesel Range Organics	EPA 8015 B		EPA 8082A
	EPA 8015C	PCB-1248	EPA 8082
Gasoline Range Organics	EPA 8015 B		EPA 8082A
	EPA 8015C	PCB-1254	EPA 8082
Phthalate Esters			EPA 8082A
Benzyl butyl phthalate	EPA 8270C	PCB-1260	EPA 8082
	EPA 8270D		EPA 8082A
Bis(2-ethylhexyl) phthalate	EPA 8270C	PCB-1262	EPA 8082
	EPA 8270D	PCB-1268	EPA 8082
Diethyl phthalate	EPA 8270C	**Polynuclear Aromatic Hydrocarbons**	
	EPA 8270D	3-Methylcholanthrene	EPA 8270C
Dimethyl phthalate	EPA 8270C		EPA 8270D
	EPA 8270D	7,12-Dimethylbenzyl (a) anthracene	EPA 8270C
Di-n-butyl phthalate	EPA 8270C		EPA 8270D
	EPA 8270D	Acenaphthene	EPA 8270C
Di-n-octyl phthalate	EPA 8270C		EPA 8270D
	EPA 8270D	Acenaphthylene	EPA 8270C
			EPA 8270D

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Polynuclear Aromatic Hydrocarbons	
Anthracene	EPA 8270C
	EPA 8270D
Benzo(a)anthracene	EPA 8270C
	EPA 8270D
Benzo(a)pyrene	EPA 8270C
	EPA 8270D
Benzo(b)fluoranthene	EPA 8270C
	EPA 8270D
Benzo(ghi)perylene	EPA 8270C
	EPA 8270D
Benzo(k)fluoranthene	EPA 8270C
	EPA 8270D
Chrysene	EPA 8270C
	EPA 8270D
Dibenzo(a,e)pyrene	EPA 8270C
	EPA 8270D
Dibenzo(a,h)anthracene	EPA 8270C
	EPA 8270D
Fluoranthene	EPA 8270C
	EPA 8270D
Fluorene	EPA 8270C
	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 8270C
	EPA 8270D
Phenanthrene	EPA 8270C
Phenanthrene	EPA 8270D
Pyrene	EPA 8270C
	EPA 8270D

Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270C
	EPA 8270D
2,4,5-Trichlorophenol	EPA 8270C
	EPA 8270D
2,4,6-Trichlorophenol	EPA 8270C
	EPA 8270D
2,4-Dichlorophenol	EPA 8270C
	EPA 8270D
2,4-Dimethylphenol	EPA 8270C
	EPA 8270D
2,4-Dinitrophenol	EPA 8270C
	EPA 8270D
2,6-Dichlorophenol	EPA 8270C
	EPA 8270D
2-Chlorophenol	EPA 8270C
	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 8270C
	EPA 8270D
2-Methylphenol	EPA 8270C
	EPA 8270D
2-Nitrophenol	EPA 8270C

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Priority Pollutant Phenols

2-Nitrophenol	EPA 8270D
3-Methylphenol	EPA 8270C
	EPA 8270D
4-Chloro-3-methylphenol	EPA 8270C
	EPA 8270D
4-Methylphenol	EPA 8270C
	EPA 8270D
4-Nitrophenol	EPA 8270C
	EPA 8270D
Pentachlorophenol	EPA 8270C
	EPA 8270D
Phenol	EPA 8270C
	EPA 8270D

Semi-Volatile Organics

1,1'-Biphenyl	EPA 8270C
	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270C
	EPA 8270D
2-Methylnaphthalene	EPA 8270C
	EPA 8270D
4-Amino biphenyl	EPA 8270C
	EPA 8270D
Acetophenone	EPA 8270C

Semi-Volatile Organics

Acetophenone	EPA 8270D
Benzaldehyde	EPA 8270C
	EPA 8270D
Benzoic Acid	EPA 8270C
	EPA 8270D
Benzyl alcohol	EPA 8270C
	EPA 8270D
Caprolactam	EPA 8270C
	EPA 8270D
Dibenzofuran	EPA 8270C
	EPA 8270D
Ethyl methanesulfonate	EPA 8270C
	EPA 8270D
Isosafrole	EPA 8270C
	EPA 8270D
Methyl methanesulfonate	EPA 8270C
	EPA 8270D
O,O,O-Triethyl phosphorothioate	EPA 8270C
	EPA 8270D
Phenacetin	EPA 8270C
	EPA 8270D
Safrole	EPA 8270C
	EPA 8270D

Volatile Aromatics

1,2,4-Trimethylbenzene	EPA 8021B

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Volatile Aromatics	
1,2,4-Trimethylbenzene	EPA 8260B
1,2-Dichlorobenzene	EPA 8260B
1,3,5-Trimethylbenzene	EPA 8021B
	EPA 8260B
1,3-Dichlorobenzene	EPA 8260B
1,4-Dichlorobenzene	EPA 8260B
2-Chlorotoluene	EPA 8021B
	EPA 8260B
4-Chlorotoluene	EPA 8021B
	EPA 8260B
Benzene	EPA 8021B
	EPA 8260B
Bromobenzene	EPA 8021B
	EPA 8260B
Chlorobenzene	EPA 8260B
Ethyl benzene	EPA 8021B
	EPA 8260B
Isopropylbenzene	EPA 8021B
	EPA 8260B
n-Butylbenzene	EPA 8021B
	EPA 8260B
n-Propylbenzene	EPA 8021B
	EPA 8260B
p-Isopropyltoluene (P-Cymene)	EPA 8021B
	EPA 8260B
sec-Butylbenzene	EPA 8021B
	EPA 8260B
Styrene	EPA 8260B
tert-Butylbenzene	EPA 8021B
	EPA 8260B
Toluene	EPA 8021B
	EPA 8260B
Total Xylenes	EPA 8021B
	EPA 8260B
Volatile Chlorinated Organics	
Epichlorohydrin	EPA 8260B
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260B
1,1,1-Trichloroethane	EPA 8260B
1,1,2,2-Tetrachloroethane	EPA 8260B
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260B
1,1,2-Trichloroethane	EPA 8260B
1,1-Dichloroethane	EPA 8260B
1,1-Dichloroethene	EPA 8260B
1,1-Dichloropropene	EPA 8260B
1,2,3-Trichloropropane	EPA 8260B
1,2-Dibromo-3-chloropropane	EPA 8260B
1,2-Dibromoethane	EPA 8260B
1,2-Dichloroethane	EPA 8260B
1,2-Dichloropropane	EPA 8260B

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All approved analytes are listed below:

Volatile Halocarbons	
1,3-Dichloropropane	EPA 8260B
2,2-Dichloropropane	EPA 8260B
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260B
2-Chloroethylvinyl ether	EPA 8260B
3-Chloropropene (Allyl chloride)	EPA 8260B
Bromochloromethane	EPA 8260B
Bromodichloromethane	EPA 8260B
Bromoform	EPA 8260B
Bromomethane	EPA 8260B
Carbon tetrachloride	EPA 8260B
Chloroethane	EPA 8260B
Chloroform	EPA 8260B
Chloromethane	EPA 8260B
cis-1,2-Dichloroethene	EPA 8260B
cis-1,3-Dichloropropene	EPA 8260B
cis-1,4-Dichloro-2-butene	EPA 8260B
Dibromochloromethane	EPA 8260B
Dibromomethane	EPA 8021B
	EPA 8260B
Dichlorodifluoromethane	EPA 8260B
Hexachlorobutadiene, Volatile	EPA 8260B
Methylene chloride	EPA 8260B
Tetrachloroethene	EPA 8260B
trans-1,2-Dichloroethene	EPA 8260B
trans-1,3-Dichloropropene	EPA 8260B

Volatile Halocarbons	
trans-1,4-Dichloro-2-butene	EPA 8260B
Trichloroethene	EPA 8260B
Trichlorofluoromethane	EPA 8260B
Vinyl chloride	EPA 8260B
Volatile Organics	
1,4-Dioxane	EPA 8260B
2-Butanone (Methylethyl ketone)	EPA 8260B
2-Hexanone	EPA 8260B
4-Methyl-2-Pentanone	EPA 8260B
Acetone	EPA 8260B
Acetonitrile	EPA 8260B
Carbon Disulfide	EPA 8260B
Cyclohexane	EPA 8260B
Ethyl Acetate	EPA 8260B
Ethylene Glycol	EPA 8015 B
	EPA 8015C
Isobutyl alcohol	EPA 8015 B
	EPA 8015C
	EPA 8260B
Methyl acetate	EPA 8260B
Methyl cyclohexane	EPA 8260B
Methyl tert-butyl ether	EPA 8260B
o-Toluidine	EPA 8260B
Propionitrile	EPA 8260B
tert-butyl alcohol	EPA 8015 B

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All approved analytes are listed below:

Volatile Organics

tert-butyl alcohol	EPA 8015C
Vinyl acetate	EPA 8260B

Sample Preparation Methods

EPA 1311
EPA 1312
EPA 3005A
EPA 3010A
EPA 3020A
EPA 3050B
EPA 3060A
EPA 3550B
EPA 3550C
EPA 3580
EPA 5030B
EPA 5035
EPA 5035A-H
EPA 5035A-L
EPA 9010B

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Lead in Paint	EPA 6010B

Sample Preparation Methods

EPA 3050B

Serial No.: 45934

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All approved analytes are listed below:

Polynuclear Aromatics	
Benzo(a)pyrene	NIOSH 5515
Naphthalene	NIOSH 5515
Purgeable Aromatics	
Benzene	NIOSH 1501
Ethyl benzene	NIOSH 1501
m/p-Xylenes	NIOSH 1501
o-Xylene	NIOSH 1501
Toluene	NIOSH 1501
Total Xylenes	NIOSH 1501

Serial No.: 45935

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ATTACHMENT C

EXAMPLE CHAIN-OF-CUSTODY RECORDS

CHAIN OF CUSTODY RECORD

TESTS

URS

PROJECT NO. | SITE NAME

LAB _____

SAMPLERS (PRINT/SIGNATURE)

COOLER _____ of _____

BOTTLE TYPE AND PRESERVATIVE

PAGE _____ of _____

DELIVERY SERVICE: _____ AIRBILL NO.: _____

LOCATION IDENTIFIER	DATE	TIME	COMP/ GRAB	SAMPLE ID	MATRIX	TOTAL NO.# OF CONTAINERS								REMARKS	SAMPLE TYPE	BEGINNING DEPTH (IN FEET)	ENDING DEPTH (IN FEET)	FIELD LOT NO.# (LERTIMS)

MATRIX CODES

AA - AMBIENT AIR
SE - SEDIMENT
SH - HAZARDOUS SOLID WASTE
SL - SLUDGE
WP - DRINKING WATER
WW - WASTE WATER
WG - GROUND WATER
SO - SOIL
DC - DRILL CUTTINGS
WL - LEACHATE
GS - SOIL GAS
WC - DRILLING WATER
WO - OCEAN WATER
WS - SURFACE WATER
WQ - WATER FIELD QC
LH - HAZARDOUS LIQUID WASTE
LF - FLOATING/FREE PRODUCT ON GW TABLE

SAMPLE TYPE CODES

TB# - TRIP BLANK
SD# - MATRIX SPIKE DUPLICATE
RB# - RINSE BLANK
FR# - FIELD REPLICATE
N# - NORMAL ENVIRONMENTAL SAMPLE
MS# - MATRIX SPIKE
(# - SEQUENTIAL NUMBER (FROM 1 TO 9) TO ACCOMMODATE MULTIPLE SAMPLES IN A SINGLE DAY)

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	DATE	TIME	SPECIAL INSTRUCTIONS
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LAB BY (SIGNATURE)	DATE	TIME	

Distribution: Original accompanies shipment, copy to coordinator field files

URSF-075C/1 OF 1/CofCR/GCM

ATTACHMENT D

DATA USABILITY SUMMARY REPORT REQUIREMENTS

Appendix 2B
Guidance for Data Deliverables and the Development of
Data Usability Summary Reports

1.0 Data Deliverables

(a) DEC Analytical Services Protocol Category A Data Deliverables:

1. A Category A Data Deliverable as described in the most current DEC Analytical Services Protocol (ASP) includes:

i. a Sample Delivery Group Narrative;

ii. contract Lab Sample Information sheets;

iii. DEC Data Package Summary Forms;

iv. chain-of-custody forms; and,

v. test analyses results (including tentatively identified compounds for analysis of volatile and semi-volatile organic compounds)

2. For a DEC Category A Data Deliverable, a data applicability report may be requested, in which case it will be prepared, to the extent possible, in accordance with the DUSR guidance detailed below.

(b) DEC Analytical Services Protocol Category B Data Deliverables

1. A Category B Data Deliverable is includes the information provided for the Category A Data Deliverable, identified in subdivision (a) above, plus related QA/QC information and documentation consisting of:

i. calibration standards;

ii. surrogate recoveries;

iii. blank results;

iv. spike recoveries;

v. duplicate results;

vi. confirmation (lab check/QC) samples;

vii. internal standard area and retention time summary;

viii. chromatograms;

ix. raw data files; and

x. other specific information as described in the most current DEC ASP.

2. A DEC Category B Data Deliverable is required for the development of a Data Usability Summary Report (DUSR).

2.0 Data Usability Summary Reports (DUSRs)

(a) Background. The Data Usability Summary Report (DUSR) provides a thorough evaluation of analytical data with the primary objective to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use.

1. The development of the DUSR must be carried out by an experienced environmental scientist, such as the project Quality Assurance Officer, who is fully capable of conducting a full data validation. The DUSR is developed from:

i. a DEC ASP Category B Data Deliverable; or

ii. the *USEPA Contract Laboratory Program National Functional Data Validation Standard Operating Procedures for Data Evaluation and Validation*.

2. The DUSR and the data deliverables package will be reviewed by DER staff. If full third party data validation is found to be necessary (e.g. pending litigation) this can be carried out at a later date on the same data package used for the development of the DUSR.

(b) Personnel Requirements. The person preparing the DUSR must be pre-approved by DER. The person must submit their qualifications to DER documenting experience in analysis and data validation. Data validator qualifications are available on DEC's website identified in the table of contents.

(c) Preparation of a DUSR. The DUSR is developed by reviewing and evaluating the analytical data package. In order for the DUSR to be acceptable, during the course of this review the following questions applicable to the analysis being reviewed must be answered in the affirmative.

1. Is the data package complete as defined under the requirements for the most current DEC ASP Category B or USEPA CLP data deliverables?

2. Have all holding times been met?

3. Do all the QC data; blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

4. Have all of the data been generated using established and agreed upon analytical protocols?

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

6. Have the correct data qualifiers been used and are they consistent with the most current DEC ASP?

7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?

(d) Documenting the validation process in the DUSR. Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples and the analytical parameters, including data deficiencies, analytical protocol deviations and quality control problems are identified and their effect on the data is discussed.