WALGREEN COMPANY

104 Wilmot Road MS#1630
Deerfield, Illinois 60015

WORKPLAN TO DELINEATE SOIL AND GROUNDWATER IMPACTS

WALGREEN COMPANY STORE 02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK

BCP Site No. C356032

May 2014

Prepared By:

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

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1.0 INTRODUCTION

URS Corporation-New York (URS), on behalf of the Walgreen Company (Walgreens), is submitting this Workplan to the New York State Department of Environmental Conservation (NYSDEC) to delineate soil and groundwater impacts at the Walgreens Store located at 10 East Chester Street in Kingston, New York. Walgreens received a letter from the NYSDEC on December 31, 2013 indicating that the Periodic Review Report (PRR) dated December 2013 and Institutional Control and Engineering Control (IC/EC) Certification were not approved. The NYSDEC requested that a Corrective Measures Workplan (CMWP) be submitted to address recalcitrant levels of tetrachloroethene (PCE) in MW-3. URS spoke with the NYSDEC on January 24, 2014 and suggested that additional delineation would need to be conducted at the site prior to submitting a CMWP. The NYSDEC agreed that additional delineation is warranted prior to developing a CMWP.

2.0 SITE HISTORY

The subject property (site) is located at 10 East Chester Street in Kingston, New York (see Figure 1). The site consists of approximately one-acre of land and is currently Walgreens Store No. 02077. The construction of the store was completed in 2010. The site is commercially zoned with surrounding properties that include a mix of commercial businesses and residential lots.

According to available information, portions of the site have historically been occupied by a dry cleaning facility, a vehicle fueling/service station, and a trolley barn that became a school bus maintenance garage. Based on the results of the Brownfield Cleanup Program Remedial Investigation Report/Remedial Action Plan prepared by S&W Redevelopment of North America, LLC, dated August 2005, the constituents of potential concern at the site include volatile organic compounds (VOCs) associated with solvents (i.e., trichloroethylene and tetrachloroethylene) and petroleum products. The previous owner of the site, 10 East Chester Street LLC, entered into the New York State Brownfield Program (BCP Site Number C356032) and completed remediation in accordance with the requirements of the BCP.

The site remedial activities included the removal of seven underground storage tanks (USTs) that contained petroleum products, the excavation of impacted soil, and performing in-situ chemical oxidation using potassium permanganate to remediate the groundwater. The remedial activities were conducted in accordance with the New York State Department of Environmental Conservation (NYSDEC) approved Remedial Action Plan prepared by S&W Redevelopment of North America, LLC, dated August 2005 and the Remedial Design In-Situ Chemical Oxidation prepared by Sterns and Wheeler, LLC, dated October 2005.

S&W Redevelopment of North America, LLC submitted a Final Engineering Report to the NYSDEC in November 2006. A Certificate of Completion was issued by the NYSDEC on December 14, 2006. This certificate stated "…that the remediation requirements set forth in ECL Article 27, Title 14, have been or will be achieved in accordance with the time frames, if any established in the remedial work plan." The certificate also noted that the site is restricted to a "commercial" use and that the site remediation is also predicated on the use of institutional or engineering controls. The use of groundwater underlying the site is prohibited without prior approval from the NYSDEC.

A Site Management Plan (SMP) was prepared by S&W Redevelopment of North America, LLC, on behalf of 10 East Chester Street LLC in December 2006. The SMP requires that all buildings constructed on site have a NYSDEC and New York State Department of Health (NYSDOH) approved active sub-slab

depressurization system, maintenance of six-inches of concrete or asphalt pavement across the site, and annual groundwater monitoring. Any future excavation of soils at the site must be done in accordance with the SMP. The SMP also requires an annual certification that the engineering and institutional controls employed at the site are unchanged from the previous certification and that nothing has occurred that would impair the ability of such controls to protect the public health and environment.

During redevelopment activities in May and June 2008, monitoring wells MW-1S, MW-2S, and MW-3S were abandoned with approval from the NYSDEC BCP. Replacement monitoring wells MW-1, MW-2 and MW-3 were installed by Bureau Veritas in February 2010. The locations of these wells are shown in Figure 2. Groundwater samples were collected in March and May 2010. The monitoring well installation and groundwater sampling results for 2010 are summarized in the Annual Groundwater Sampling Report prepared by Bureau Veritas, dated September 29, 2010.

URS submitted Annual Groundwater Sampling, Site Management Plan Review, and Institutional IC/EC Certifications to the NYSDEC in April 2011 and April 2012. URS collected a supplemental round of groundwater samples in August 2012 to verify recent data and to gather additional data to evaluate groundwater geochemistry. The recommendation was to continue annual groundwater sampling events using a low turbidity sampling methodology. The NYSDEC approved of this approach in January 2013. URS submitted an Annual Groundwater Sampling, Site Management Plan Review, and Institutional IC/EC Certification to the NYSDEC in December 2013. As discussed above, the NYSDEC did not approve the PRR dated December 2013 and IC/EC Certification and requested that a CMWP be submitted to address recalcitrant levels of tetrachloroethene (PCE) in MW-3.

URS conducted a review of previous investigative work conducted at the site and identified data gaps. URS is recommending that additional investigative work be conducted to delineate shallow soil impacts above the water table along the former sewer line that connected the floor drains within the former dry cleaning facility to the sanitary sewer located in Broadway and in the area of the former 550-gallon waste oil UST. In addition, URS is recommending that soil and groundwater impacts be delineated along the western property boundary (along East Chester Street) to verify that there is not an off-site source of PCE.

3.0 SCOPE OF WORK

In order to delineate the shallow soil and groundwater impacts, URS will conduct the following tasks:

- Task 1 – Conduct Utility Markout/Geophysical Survey;
- Task 2 – Advance Three Soil Borings Along East Chester Street and Collect Grab Groundwater Samples;
- Task 3 – Advance Soil Borings Along the Former Sewer Line and Collect Grab Groundwater Samples (Minimum of three soil borings, maximum of six soil borings);
- Task 4 – Advance One Soil Boring in the Former 550-gallon Waste Oil UST Area and Collect Grab Groundwater Sample; and
- Task 5 – Prepare Summary Report.

A description of the tasks is provided below.

The investigation activities will be conducted in accordance with the project-specific Health and Safety Plan (HASP) that is provided in Appendix A. The HASP was prepared in accordance with all applicable state and federal requirements. The personnel that will conduct the investigation activities at the site will

meet the appropriate training requirements as identified in 29CFR 1910.120. It is anticipated that the fieldwork will be performed with Level D personal protective equipment.

Real time air monitoring for VOCs and particulates will be conducted at the perimeter of the Exclusion Zone during the investigation activities in accordance with the Community Air Monitoring Plan (CAMP) provided in Appendix B.

3.1 TASK 1: CONDUCT UTILITY MARKOUT/GEOPHYSICAL SURVEY

Prior to commencing work, a utility markout and geophysical survey will be conducted to clear each proposed drilling location. Dig Safely New York will be notified in advance of the investigation activities. In addition, ground penetrating radar (GPR) and Precision Utility Location (PUL) will be utilized to locate subsurface utilities and structures in the area of proposed drilling. URS will request that Walgreens provide any as-built drawings that show subsurface structures and utilities. URS will maintain a safe distance from any subsurface utility or structure and modify proposed sampling locations in the field as needed.

3.2 TASK 2: ADVANCE THREE SOIL BORINGS ALONG EAST CHESTER STREET AND COLLECT GRAB GROUNDWATER SAMPLES

As shown in Figure 2, three soil borings will be advanced along East Chester Street. Based upon historical information, groundwater flow at the site is towards the southeast. The soil borings advanced along East Chester Street will represent upgradient conditions. Each soil boring will be advanced to the water table, which is anticipated to be encountered approximately eight to 10 feet below ground surface (bgs). URS will attempt to drill these three locations through the planter boxes along the property boundary.

Continuous soil samples will be collected using a Geoprobe with dual-tube sampling technology with a five-foot macrocore sampler for field screening and soil classification. Soil samples will be visually classified in the field according to lithology, sorting, grain size, and relative moisture content. The sampling equipment will be decontaminated prior to each sample interval using a Simple Green™ or Alconox™ solution followed by a deionized water rinse.

A representative portion of each soil sample collected will be placed into a re-sealable plastic bag. After allowing soil vapors to gather in the headspace of the plastic bag, the soil sample will be field screened for the presence of total volatile organic vapors using a photoionization detector (PID) equipped with a 10.6 eV lamp. The PID will be calibrated using ambient air and a 100 ppm isobutylene span gas prior to initiating site activities. In order to vertically delineate soil impacts, soil samples will be collected over two-foot intervals throughout the soil boring. It is anticipated that five soil samples will be collected from each soil boring.

Once the soil sampling is complete, the dual-tube sampling equipment will be advanced five-feet into the water table. A stainless steel screen will be placed into the hole through the dual tube casing. A grab groundwater sample will be collected from each soil boring location.

The 15 soil samples and three groundwater samples will be contained in laboratory-supplied glassware, labeled, placed on ice, and shipped to a New York State Department of Health certified laboratory under proper chain-of-custody documentation. Soil and groundwater samples will be submitted for analysis of target compound list (TCL) volatile organic compounds (VOCs) by EPA Method 8260C. In addition, one duplicate sample per media, one matrix-spike sample per media, and one matrix-spike duplicate sample

per media will also be collected for the analyses listed. A trip blank will be included at the frequency of one trip blank per sample cooler. The analytical data generated will be reported by the laboratory with ASP Category B QA/QC deliverables. In addition, the laboratory will provide an EDD for the data. A summary of the samples that will be collected is presented in the Quality Assurance Project Plan (QAPP) provided in Appendix C.

3.3 TASK 3: ADVANCE SOIL BORINGS ALONG THE FORMER SEWER LINE AND COLLECT GRAB GROUNDWATER SAMPLES

As shown in Figure 2, three soil borings will be advanced along the former sewer line that connected the floor drains within the former dry cleaning facility to the sanitary sewer located in Broadway. Each soil boring will be advanced to the water table, which is anticipated to be encountered approximately eight to 10 feet below ground surface (bgs). Based upon field observations (elevated PID readings, visual staining, etc), an additional three soil borings may be advanced east or west of the former sewer line to further delineate impacts. Since it is unknown at this time whether these additional soil borings will be warranted, they are not shown on Figure 2.

The soil samples will be collected following the same methodology described in Task 2. In order to vertically delineate soil impacts, soil samples will be collected over two-foot intervals throughout the soil boring. It is anticipated that five soil samples will be collected from each soil boring.

Once the soil sampling is complete, the dual-tube sampling equipment will be advanced five-feet into the water table. A stainless steel screen will be placed into the hole through the dual tube casing. A grab groundwater sample will be collected from each of the three soil borings along the former sewer line.

The 15 soil samples and three groundwater samples will be contained in laboratory-supplied glassware, labeled, placed on ice, and shipped to a New York State Department of Health certified laboratory under proper chain-of-custody documentation. Soil and groundwater samples will be submitted for analysis of TCL VOCs by EPA Method 8260C. In addition, one duplicate soil sample, one matrix-spike soil sample, and one matrix-spike duplicate soil sample will also be collected for the analyses listed. If additional soil borings are advanced, the additional soil samples will submitted for the same analyses. The analytical data generated will be reported by the laboratory with ASP Category B QA/QC deliverables. In addition, the laboratory will provide an EDD for the data. A summary of the samples that will be collected is presented in the QAPP provided in Appendix C.

3.4 TASK 4: ADVANCE ONE SOIL BORING IN THE FORMER 550-GALLON WASTE OIL UST AREA AND COLLECT GRAB GROUNDWATER SAMPLE

As shown in Figure 2, one soil boring will be advanced in the former 550-gallon waste oil UST area. The soil boring will be advanced to the water table, which is anticipated to be encountered approximately eight to 10 feet below ground surface (bgs). The soil samples will be collected following the same methodology described in Task 2. In order to vertically delineate soil impacts, soil samples will be collected over two-foot intervals throughout the soil boring. It is anticipated that five soil samples will be collected from the soil boring.

Once the soil sampling is complete, the dual-tube sampling equipment will be advanced five-feet into the water table. A stainless steel screen will be placed into the hole through the dual tube casing. A grab groundwater sample will be collected from the soil boring.

The five soil samples and one groundwater sample will be contained in laboratory-supplied glassware, labeled, placed on ice, and shipped to a New York State Department of Health certified laboratory under proper chain-of-custody documentation. Soil and groundwater samples will be submitted for analysis of TCL VOCs by EPA Method 8260C. The analytical data generated will be reported by the laboratory with ASP Category B QA/QC deliverables. In addition, the laboratory will provide an EDD for the data. A summary of the samples that will be collected is presented in the QAPP provided in Appendix C.

3.5 TASK 5: PREPARE SUMMARY REPORT

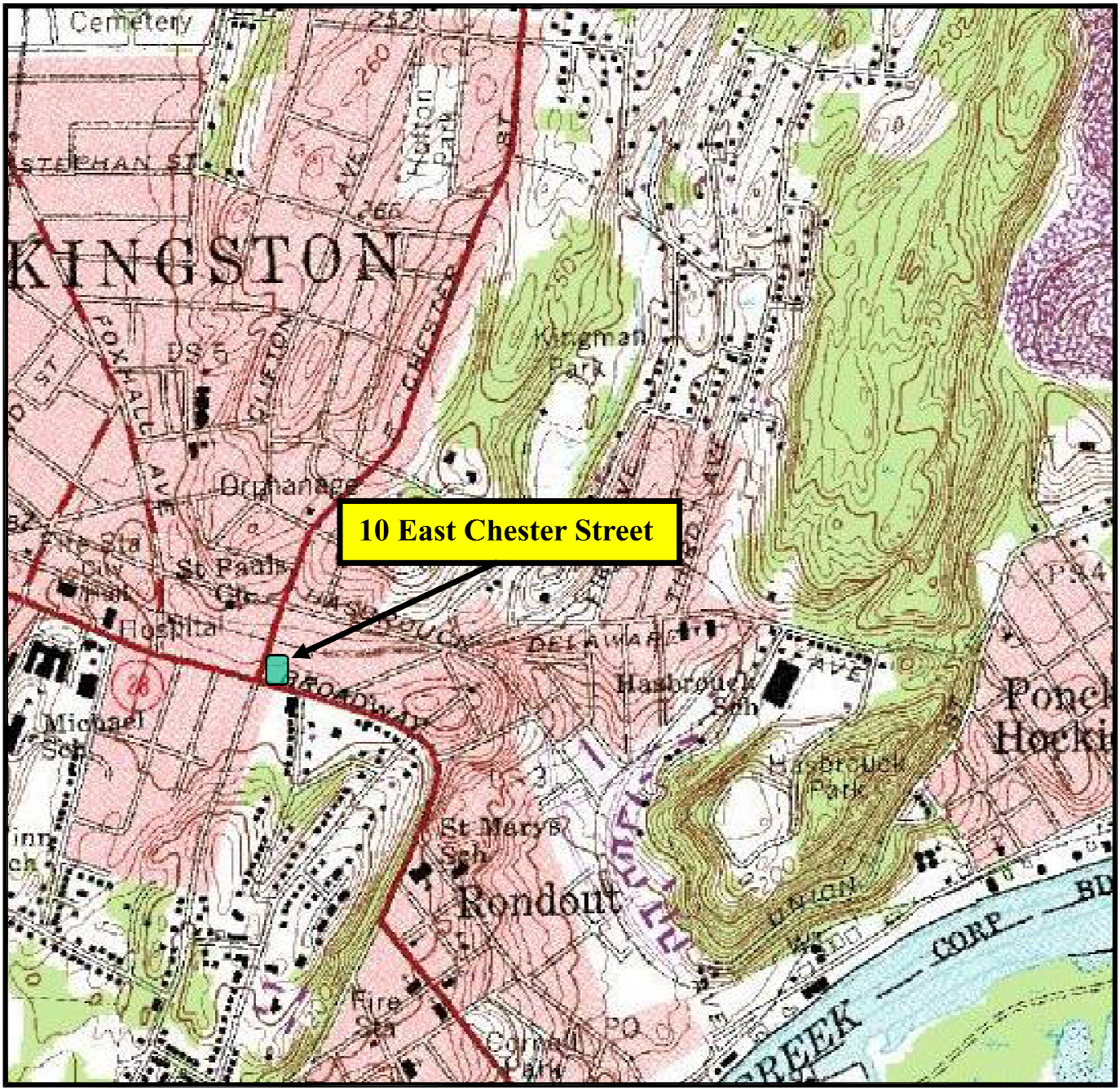
After completion of the investigation activities, the findings will be presented in a Summary Report. The Summary Report will include:

- A scale drawing showing the sampling locations;
- Boring logs; and
- Data tables with comparison to Part 375 Soil Cleanup Objectives for unrestricted use and Class GA groundwater standards.

4.0 SCHEDULE

It is anticipated that the site investigation activities will commence within 60 days of approval of this Workplan. URS will notify the NYSDEC prior to commencement of the investigation activities. It is anticipated that it will take two to three days to conduct the field work. The Summary Report will be prepared and submitted to NYSDEC within 30 days of completion of the field work and receipt of final analytical data.

FIGURES



SCALE: 1:12,000

1 0 1/4 1/2 MILE

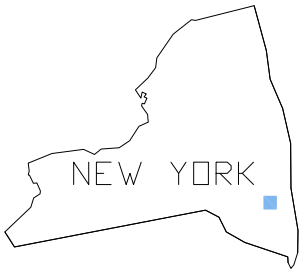
500 0 500 1000 1500 2000 2500 3000 3500 FEET

1 0 1/4 1/2 KILOMETER

NORTH

MAP REFERENCE:

PORTION OF U.S.G.S. QUADRANGLE MAP
7 ½ MINUTE SERIES (TOPOGRAPHIC)



QUADRANGLE LOCATION

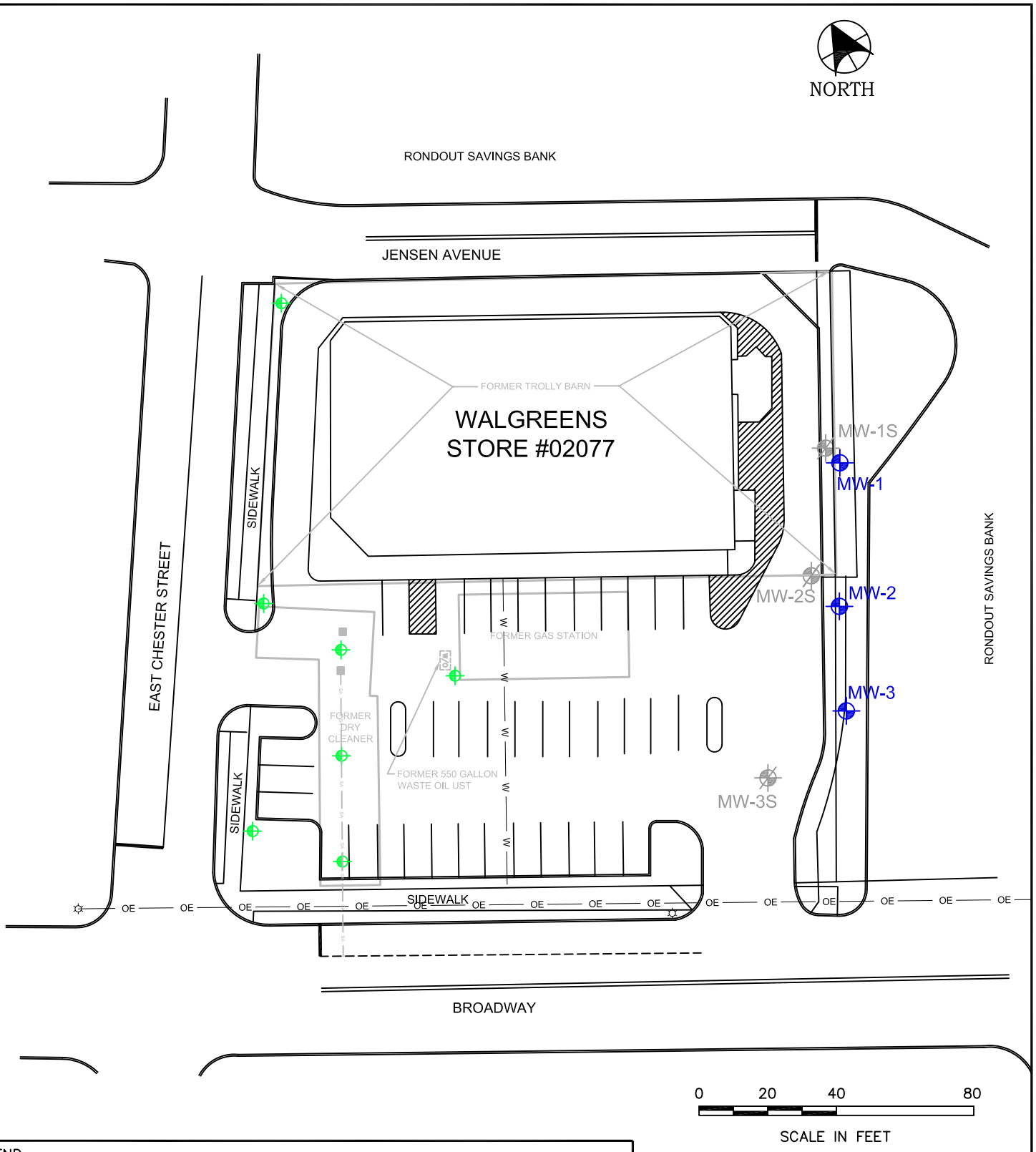
WALGREEN STORE #02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK 12401

FIGURE 1
SITE LOCATION MAP

DATE:	Mar 30, 2011
JOB NO.:	25368188
DRAWN BY:	JMM
CHK'D BY:	GG
SCALE:	AS SHOWN

URS
100 SOUTH WACKER DRIVE, SUITE 500
CHICAGO, ILLINOIS 60606
PHONE: (312) 939-1000
FAX: (312) 939-4198

PLOTTED: March 30, 2011 BY: Jeff Mcmahon CTB USED: ---- PAPER SPACE TAB: Figure 1 - Site Location Map
DWG PATH: C:\Users\Jeff Mcmahon\Documents\URS-Shell\Chicago-Office\walgreens\KINGSTON, NY\DWG\FIGURE 1 - SITE LOCATION MAP.dwg



LEGEND:

- CURB
- ABANDONED MONITORING WELL LOCATION
- MONITORING WELL LOCATION
- STREET LIGHT
- OE — OVERHEAD ELECTRIC
- W — WATER LINE
- SA — FORMER SEWER LINE
- FORMER FLOOR DRAIN
- PROPOSED SOIL BORING LOCATION
- W/O — FORMER 550 GALLON WASTE OIL UST

NOTE: LOCATIONS OF KNOWN UTILITIES ARE APPROXIMATE

WALGREENS STORE #02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK 12401

FIGURE 2
PROPOSED SAMPLING LOCATIONS

DATE:	Feb 04, 2014
JOB NO.:	25368188
DRAWN BY:	MAW
CHK'D BY:	JGG
SCALE:	AS SHOWN

URS
3 CORPORATE DRIVE, SUITE 203
CLIFTON PARK, NEW YORK 12065
PHONE: (518) 688-0015
FAX: (518) 688-0022

PLOTTED: February 4, 2014 BY: Wasson, Melissa CTB USED: 0-6 Black.ctb PAPER SPACE TAB: MW LOCATION MAP
DWG PATH: J:\25368188 Walgreens Kingston, NY\2014 Work\plan\KINGSTON - FIGURE2_rev 2014.dwg

APPENDIX A

HEALTH AND SAFETY PLAN

At URS, we believe that all injuries are preventable.

The most effective way to prevent injuries is to identify hazards before they become incidents.

4sight is a program that helps us do just that.

4sight reminds you to ask 4 simple questions before beginning a task:

- **What am I about to do?**
- **What could go wrong?**
- **What could be done to make it safer?**
- **What have I done to communicate the hazards?**

Taking a few minutes to stop and think about the task ahead is using 4sight.

Use 4sight at the beginning of every task and during your day.

Remember to stop, step back and use a bit of 4sight.

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HEALTH AND SAFETY PLAN

Prepared for:

Walgreens
The Pharmacy America Trusts

The Walgreen Company

10 East Chester Street
Kingston, NY

URS Project No.
25368188.00002

May 23, 2014

URS Corporation
3 Corporate Drive, Suite 203
Clifton Park, NY 12065
518-688-0015

10 East Chester Street
Kingston, NY
25368188.00002

HEALTH AND SAFETY PLAN

May 23, 2014

Prepared for:

The Walgreen Company

Prepared by:

URS Corporation
Clifton Park, New York

Approved: Jennifer Gillies — 5/23/14

Jennifer Gillies
URS Project Manager

Date

Approved: — 5/28/14

BEN BERTOLOTTI, CIH
Regional Health, Safety, and Environment
Manage

Date

This HASP is valid for up to one year from date of approval.

THIS HASP IS TO BE USED FOR THE SPECIFIC PROJECT DESCRIBED HEREIN. IT IS NOT TO BE USED FOR ANY OTHER PROJECT. THIS PLAN MUST BE REVISED AS APPROPRIATE TO ADDRESS CHANGING SITE CONDITIONS OR MODIFIED SCOPE OF WORK.

This HASP, and each of its provisions, is applicable only to, and for use only by, URS Corporation, its affiliates, and its subcontractors. Any use of this Plan by other parties, including, without limitation, third party contractors on projects where URS is providing engineering, construction management or similar services, without the express written permission of URS, will be at that party's sole risk, and URS Corporation shall have no responsibility therefore. The existence and use of this Plan by URS shall not be deemed an admission or evidence of any acceptance of any safety responsibility by URS for other parties unless such responsibility is expressly assumed in writing by URS in a specific project contract.

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Attachments

URS

Health and Safety Plan

1. Introduction

URS Corporation-New York (URS) is committed to providing a safe and healthful work environment. Our goal is zero incidents, meaning that we strive to complete every project without injury, illness, property damage, or environmental damage. Safety must always take precedence over expediency.

This Health and Safety Plan (HASP) summarizes health and safety hazard information for URS field activities associated with the site at 10 East Chester Street in Kingston, New York. The URS HASP delineates procedures that will allow personnel to work safely and respond quickly and appropriately to site emergencies. All site work will be conducted in accordance with requirements of the URS Health, Safety and Environment Program and Management System that is available on the SoURSe. All site work will be conducted in accordance with Occupational Safety and Health Administration (OSHA) regulations in the Code of Federal Regulations (CFR), Title 29, Parts 1904, 1910, and 1926 as well as occupational health rules of New York.

The URS Regional Health, Safety and Environment Manager (RHSEM) reviewed this HASP to verify compliance with applicable requirements. The RHSEM must approve any modifications to the procedures in this plan. The Project Manager is responsible for implementation of this plan.

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2. Scope of Work

Activities covered under this HASP include all field activities associated with soil boring advancement and groundwater sampling at 10 East Chester Street in Kingston, New York. This plan has been developed for URS personnel only.

This plan is valid from 5/23/14 to 5/23/15. The Project Manager and Site Safety Officer(s) are responsible for implementation of this plan.

Scope of work and major tasks	SCOPE OF WORK: Groundwater Gauging and Sampling Soil Boring Advancement and Soil Sampling MAJOR TASKS: • Gauge selected wells. • Purge wells with peristaltic pump • Collect Sample for designated parameters. • Advance Soil Borings • Collect soil samples • Collect groundwater samples from temporary wells
URS employees assigned	Michael Kuzia-Carmel, other staff as assigned
Subcontractors	• Zebra Environmental
Equipment needed	• Water Level Meter • Hand Tools (Ratchet, Rubber hammer, Crowbar, Vise grip) • PPE (Steel-toed boots, Safety vest and glasses, Hard hat, Nitrile gloves) • Leather Gloves • Decontamination Equipment • Low-flow sampling equipment (peristaltic pump, tubing, flow-thru cell) • Bottleware • PID
Dates of the work	• Annual Groundwater Sampling (November 2014) • Investigative work (Spring 2014)
What are the major hazards associated with each work activity?	See attached Job Safety Analysis (Attachment C).

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3. Key Personnel		
Position	**Name**	**Phone Numbers**
URS Project Manager	Sarah Rubin (Chicago) Jennifer Gillies (Clifton Park)	312-939-4198 (office) 518-688-0015 (office) 518-925-9543 (cell)
URS Field Supervisor	Mike Kuzia-Carmel	518-429-1630 (cell)
Walgreens Program Manager	Jeff Groncki	847-315-3571 (office)
Office HSE Representative	Eric Marcy	518-688-0015 (office) 518-275-8314 (cell)
Regional HSE Manager	Ben Bertolotti	973-777-3003 (office) 973-572-3916 (cell)
Occupational Health Manager	WorkCare	888-449-7787

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4. Task/ Operation Health and Safety Hazard Assessment	
Site Location and History	The site consists of approximately 1.0 acre of land located at the northeast corner of the intersection of Broadway and East Chester Street in Kingston, New York. The site is currently an operating Walgreens Store. Historical activities at the suite include a dry cleaning facility, a filling/service station, and a trolley barn/school bus maintenance garage. Previous investigation activities indicated the presence of volatile organic compounds (VOCs) associated with solvents (i.e.,trichloroethylene [TCE] and tetrachloroethene/perchloroethylene [PCE]) and petroleum compounds.
Chemical Hazards	Petroleum hydrocarbons associated with gasoline, diesel and oils. Benzene is generally the chemical of most concern due to its low Permissible Exposure Limit of 1.0 parts per million (ppm). Methyl benzene, toluene, and xylene are also of concern. Exposure to petroleum hydrocarbons can result in eye and throat irritation, headache, nausea, and blurred vision. Long-term exposure to high levels of benzene in the air can cause leukemia. TCE and PCE are also chemicals of concern at the site. TCE and PCE are eye and skin irritants. They cause headaches, dizziness, and nausea. Exposure to TCE and PCE can cause liver damage. During sampling activities, soil and groundwater samples may be introduced into sample containers that contain strong acids or bases which are used as sample preservatives. Alternatively these preservatives may introduced in to a sample after the samples has been placed into the sample container. These preservatives can act be harmful if they come into contact with the sampler etc. through direct contact from leaks, spills and splashing, or through inhalation of vapors. Appropriate PPE (see Section 7 of this HASP) and care should be taken when handling any containers holding these preservatives including, but not limited to nitrile gloves, safety glasses, and other appropriate protective clothing. See URS SMS 009 (Corrosive and Reactive Materials) for additional guidance.

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CHEMICAL EXPOSURE LIMITS

Chemical Name	OSHA PEL		ACGIH TLV		Chronic Health Hazards/ Target Organs
	TWA	STEL	TWA	STEL	
gasoline	None	None	300 ppm	500 ppm	Eye & Throat Irritant Chemical Pneumonia, Possible Liver and Kidney Damage, CNS
diesel	None	None	100 mg/m^3 (v)	----	Skin Irritant & Central Nervous System Depressant
TCE	100 ppm	C 200 ppm	50 ppm	100 ppm	Eye/skin irritant; head/vertigo; visual disturbance; fatigue; nausea, vomiting; liver injury; dermatitis; cardiac arrhythmia; potential occupational carcinogen
PCE	100 ppm	C 200 ppm	25 ppm	100 ppm	Eye, skin, nose, throat, and respiratory system irritant; nausea; flush face; vertigo/dizziness; incoherency; skin erythema (redness); liver damage; potential occupational carcinogen; headache.
benzene	1 ppm	5 ppm	0.5 ppm	2.5 ppm	Eye Irritant. Skin, Nose and Respiratory; Central Nervous System Depressant, Carcinogen
ethyl benzene	100 ppm	None	100 ppm	125 ppm	Eyes, Skin, Respiratory System and Central Nervous System

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Chemical Name	OSHA PEL		ACGIH TLV		Chronic Health Hazards/ Target Organs
toluene	200 ppm	C 300 ppm	50 ppm	----	Eye Irritant & Central Nervous System Depressant, Kidneys, Respiratory System
xylenes	100 ppm	None	100ppm	150ppm	Eye, Nose, Throat & Skin Irritant, Central Nervous System Depressant, Blood, Kidneys, Liver, GI Tract

PEL : Permissible Exposure Limits
TLV : Threshold Limit Values
ACGIH : American Conference of Governmental Industrial Hygiene
TWA : (Time-Weighted Average) the average concentration of a chemical to which it is permissible to be exposed for a conventional 8-hour workday and a 40-hour workweek. CNS: Central Nervous System.
STEL : Short Term Exposure Limit (15 minutes)
V : Vapor and aerosol
C : Ceiling Exposure Limit

Physical Hazards	Traffic, slips, trips, falls, fire/explosion, pinch points, ice, cold/heat stress.
Biological Hazards	Potential for poisonous snakes, plants and spiders, insects, mosquitoes, ticks, animal droppings, small biting animals and wildlife, and domestic pets.
Hazard Controls	Chemical, physical, and biological hazards will be minimized through engineering controls, employee training, administrative controls, and when necessary, personal protective equipment (PPE). Site specific controls are addressed in the Job Safety Analysis (JSA) contained in Attachment C.

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5. Employee Medical Qualifications and Training Requirements	
All personnel	All personnel will participate in documented daily health and safety tailgate meetings to discuss site conditions, hazards, hazard controls and JSAs. All personnel who are not required by project activities to have HAZWOPER training must have current field safety training.
Personnel entering the exclusion zone	40-hour HAZWOPER training with a current 8-hour refresher and medical qualification Refer to SMS 024 Medical Screening and Surveillance Refer to SMS 055 Health, Safety, and Environment Training
Field Supervisor and/or Site Safety Officer	8-hour HAZWOPER Supervisor Training First Aid Training for remote sites Refer to SMS 055 Health, Safety, and Environment Training

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6. Engineering and Administrative Controls

URS will implement engineering and administrative controls to reduce the spread of contamination, isolate contaminants, shield workers, prohibit access to hazardous areas, warn of physical hazards and/or otherwise minimize the likelihood of worker injury or exposure. Specific engineering and administrative controls for each URS activity are listed in the Job Safety Analysis (Attachment C).

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7. Personal Protective Equipment	
All site personnel – required at all times regardless of work activity (unless otherwise noted)	• Work clothes as appropriate • Gloves (nitrile surgical type inner and/or leather) as appropriate • Hard hat • Safety toe boots with good tread • Safety glasses - ANSI Z87 with side shields • Safety vest - ANSI Class 2 for work near roads or heavy equipment (Class 3 apparel is required for work at night or during periods of poor visibility) • Hearing protection – when voice communication becomes difficult due to noise (refer to URS SMS 026 – Noise and Hearing Conservation) • Refer to URS SMS 029 - Personal Protective Equipment
All personnel working in areas where action levels are exceeded – see Section 8	• Appropriate coveralls (Tyvek or equivalent) • Outer nitrile gloves • Full-face air purifying respirator with organic vapor cartridges. To use a respirator, employees must be trained, fit tested and medically qualified. • Refer to SMS 042 Respiratory Protection Program

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8. Air Monitoring

Air monitoring will be conducted with a photoionization detector (PID) with a 10.6 eV lamp calibrated to isobutylene to evaluate concentrations of volatile organic compounds (VOCs). The monitoring equipment must be calibrated in accordance with the manufacturer's instructions. In addition, the results of daily instrument calibrations must be recorded in the field notes or the form included in Attachment B. Continuous monitoring is required during intrusive work. Document readings in the field notes or the form included in Attachment B. Additional monitoring may be required to enter an excavation or confined space (see the applicable SMSs). The action levels below assume that no more than 4% of the VOCs present are benzene.

Air Monitoring Action Levels

Analyzer Reading	Location	Duration	Action	Personal Protective Equipment
< 10 ppm	OBZ	-----	No action required.	Minimum Site Ensemble (hardhat, steel-toed boots, eye protection, hearing protection)
> 10 ppm	OBZ	>1 minute	Monitor OBZ; don protective clothing; establish work zones	Minimum Site Ensemble, plus: coveralls, nitrile outer gloves, nitrile inner (surgical) gloves, and a full-face air purifying respirators with organic vapor cartridges. Cartridges will be changed in accordance with manufacturer's recommendations, or at a minimum, on a daily basis.
>100 ppm	OBZ	>1 minute	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind and notify RHSEM	As specified by RHSEM.

(OBZ - Operator's Breathing Zone)

Note: This action level table was established based-on the assumption that the equipment accounts for the response factor automatically and there is a 1:1 response factor. If the equipment does not account for response factor automatically, the user should reset the action level via the following formula:

Revised Action Level = Stated Action Level x Response Factor.

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9. Site Control and Decontamination	
Site Control	Work area barricades may be used to prevent access by unauthorized persons. Yellow caution tape, traffic cones and/or sawhorse-type barricades can be used for this purpose. Formal work zones (i.e., exclusion zone, contamination reduction zone, and support zone) will be implemented if the PID reading exceeds 10 ppm for more than one minute at the point of operations. No eating, drinking, or smoking is allowed in potentially contaminated areas. See URS SMS 032 Work Zone Traffic Control for additional information.
Coordination with Owners or Operators	URS must receive permission to access private property from land owners and site operators.
Personnel and PPE Decontamination	Personnel should wash hands and face after leaving the work zone and before eating. Formal decontamination procedures are required if the analyzer reading exceeds 10 ppm for more than 1 minute. Wash all reusable equipment with soap and water. Remove and containerize, and appropriately dispose of any disposable PPE in the contamination reduction zone.
Equipment Decontamination	Equipment decontamination will be performed as appropriate to limit the spread of contamination, limit worker exposure to contamination, and to meet Quality Assurance/Quality Control (QA/QC) requirements. Remove disposable PPE prior to leaving the work zone. Contain decontamination water as appropriate and comply with any applicable disposal requirements.

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10. Emergency Contingency Plan

Prior to beginning work at the site, the URS field personnel will identify a site evacuation route and place of refuge as well as the best means of communication from the site (e.g., are cell phones allowed, do they work, can responders find our location, etc.). In the event of an emergency at the site, first contact the appropriate emergency services, next secure the site, and then notify the URS Project Manager. The URS Project Manager and/or RHSEM will notify the client and other appropriate agencies.

All *incidents* are to be reported to the URS Project Manager and RHSEM immediately. All *injuries* are to be reported to the URS Project Manager, the URS Occupational Health Manager, and RHSEM immediately.

Medical Emergencies	URS personnel may administer first aid on a voluntary basis if they are trained to do so. Remember to follow "universal precautions" if blood or body fluids are present (i.e., assume all blood and bodily fluids are contaminated and avoid contact with these fluids). Use nitrile or latex gloves when performing first aid. Contact the RHSEM if you are exposed to another individual's blood or body fluids. For serious injuries or illnesses, transport the victim to the hospital via ambulance by calling 911. If exposure to hazardous substances is suspected, or if any symptoms of exposure are experienced, leave the contaminated area. If a dermal or ocular exposure is suspected, wash the affected area with plenty of water for a minimum of 15 minutes. If symptoms are serious in nature seek medical assistance immediately. In the event of any work-related injury or illness, contact the RHSEM or the URS Occupational Health Manager to report the incident in accordance with URS SMS 049 Injury/ Illness/ Incident Reporting and Notifications and URS SMS 065 Injury Management.

URS

<table>
<tr>
<td>Emergency Medical Services</td>
<td>
Minor injuries should be treated at an occupational health clinic when possible. Significant injuries should be treated at the nearest hospital.
<table>
<tr><td>Hospital Name & Address:
Benedictine Hospital
105 Marys Avenue
Kingston, NY 12401</td><td>Phone:
(845) 338-2500</td></tr>
</table>
<table>
<tr><td>Occupational Clinic Name & Address:
Healthquest
1530 Route 9
Wappingers Falls, NY 12590</td><td>Phone & Hours of Operation:
(845) 297-2511</td></tr>
</table>
Route maps and directions to the hospital and occupational clinic are provided in Attachment A.
</td>
</tr>
<tr>
<td>Emergency Equipment List</td>
<td>
Each URS work area will be equipped with the following equipment:

Cellular phone
First aid kit
Eye wash
Drinking water
Extra set of PPE

</td>
</tr>
</table>

10-1. Emergency Phone Numbers		
Organization	**Name**	**Phone numbers**
Police		911
Ambulance		911
Hospital	Benedictine Hospital	(845) 338-2500
Fire/HAZMAT		911
Poison Control Center		(800) 332-3073
URS Occupational Health Manager	WorkCare	888-449-7787
Walgreens Program Manager	Jeff Groncki	847-315-3571 (office)
URS Project Manager	Jennifer Gillies (Clifton Park)	518-925-9543
URS HSE Representative	Eric Marcy	518-688-0015 (office) 518-275-8314 (cell)
URS Regional HSE Manager	Ben Bertolotti	973-777-3003 (office) 973-572-3916 (cell)

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ATTACHMENT A

HOSPITAL ROUTE DIRECTIONS & MAP

OCCUPATIONAL CLINIC DIRECTIONS & MAP

Benedictine Hospital
105 Marys Avenue
Kingston, NY 12401
(845) 338-2500

1. **Start out going SOUTH on E CHESTER ST toward BROADWAY. 0.4 mi**
2. **Turn RIGHT onto MARYS AVE. 0.3 mi**
3. **105 MARYS AVE is on the LEFT**

URS

Benedictine Hospital
105 Marys Avenue
Kingston, NY 12401
(845) 338-2500

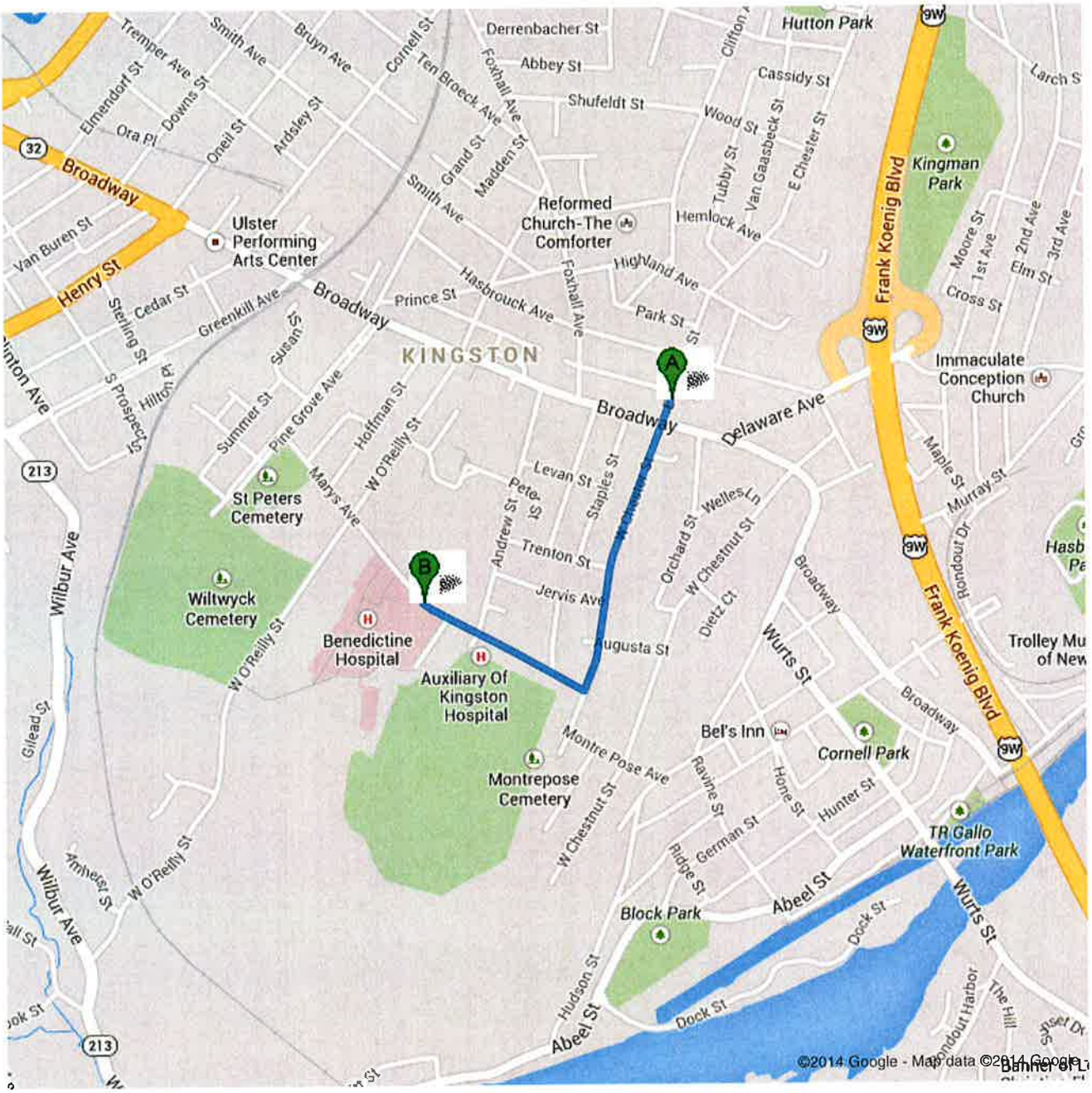
1. **Start out going SOUTH on E CHESTER ST toward BROADWAY. 0.4 mi**
2. **Turn RIGHT onto MARYS AVE. 0.3 mi**
3. **105 MARYS AVE is on the LEFT**

Google

Address **105 Marys Ave**
Kingston, NY 12401

Google

Directions to 105 Marys Ave, Kingston, NY 12401
0.7 mi – about **3 mins**



10 E Chester St, Kingston, NY 12401

1.	Head **south** on **E Chester St** toward **Broadway** About 2 mins	go 0.4 mi total 0.4 mi
2.	Turn right onto **Marys Ave** Destination will be on the left About 55 secs	go 0.3 mi total 0.7 mi

105 Marys Ave, Kingston, NY 12401

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.

Map data ©2014 Google

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

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Healthquest
1530 Route 9
Wappingers Falls, NY 12590
(845) 297-2511

1. **Start out going NORTH on E CHESTER ST toward JANSEN AVE. 0.1 mi**
2. **Turn RIGHT onto HASBROUCK AVE. 0.2 mi**
3. **HASBROUCK AVE becomes DELAWARE AVE. 0.0 mi**
4. **Merge onto US-9W S via the ramp on the LEFT. 15.6 mi**
5. **Merge onto US-44 E/RT-55 E toward MID HUDSON BRIDGE (Portions toll). 2.2 mi**
6. **Merge onto US-9 S toward WAPPINGERS FALLS/HYDE PARK. 7.1 mi**
7. **Make a U-TURN at LISS RD onto US-9 N. 0.1 mi**

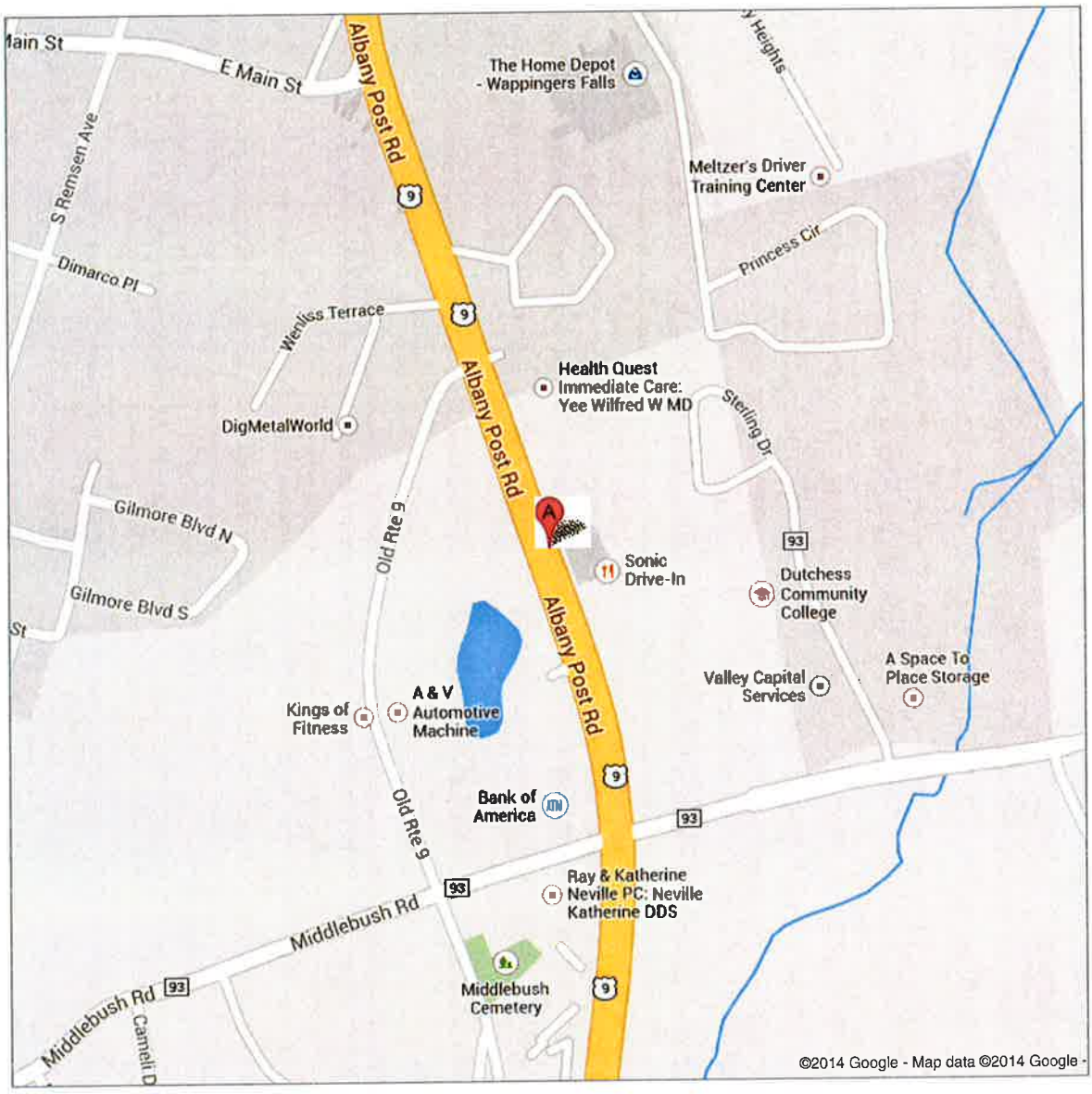
URS

Healthquest
1530 Route 9
Wappingers Falls, NY 12590
(845) 297-2511

1. Start out going NORTH on E CHESTER ST toward JANSEN AVE. 0.1 mi
2. Turn RIGHT onto HASBROUCK AVE. 0.2 mi
3. HASBROUCK AVE becomes DELAWARE AVE. 0.0 mi
4. Merge onto US-9W S via the ramp on the LEFT. 15.6 mi
5. Merge onto US-44 E/RT-55 E toward MID HUDSON BRIDGE (Portions toll). 2.2 mi
6. Merge onto US-9 S toward WAPPINGERS FALLS/HYDE PARK. 7.1 mi
7. Make a U-TURN at LISS RD onto US-9 N. 0.1 mi

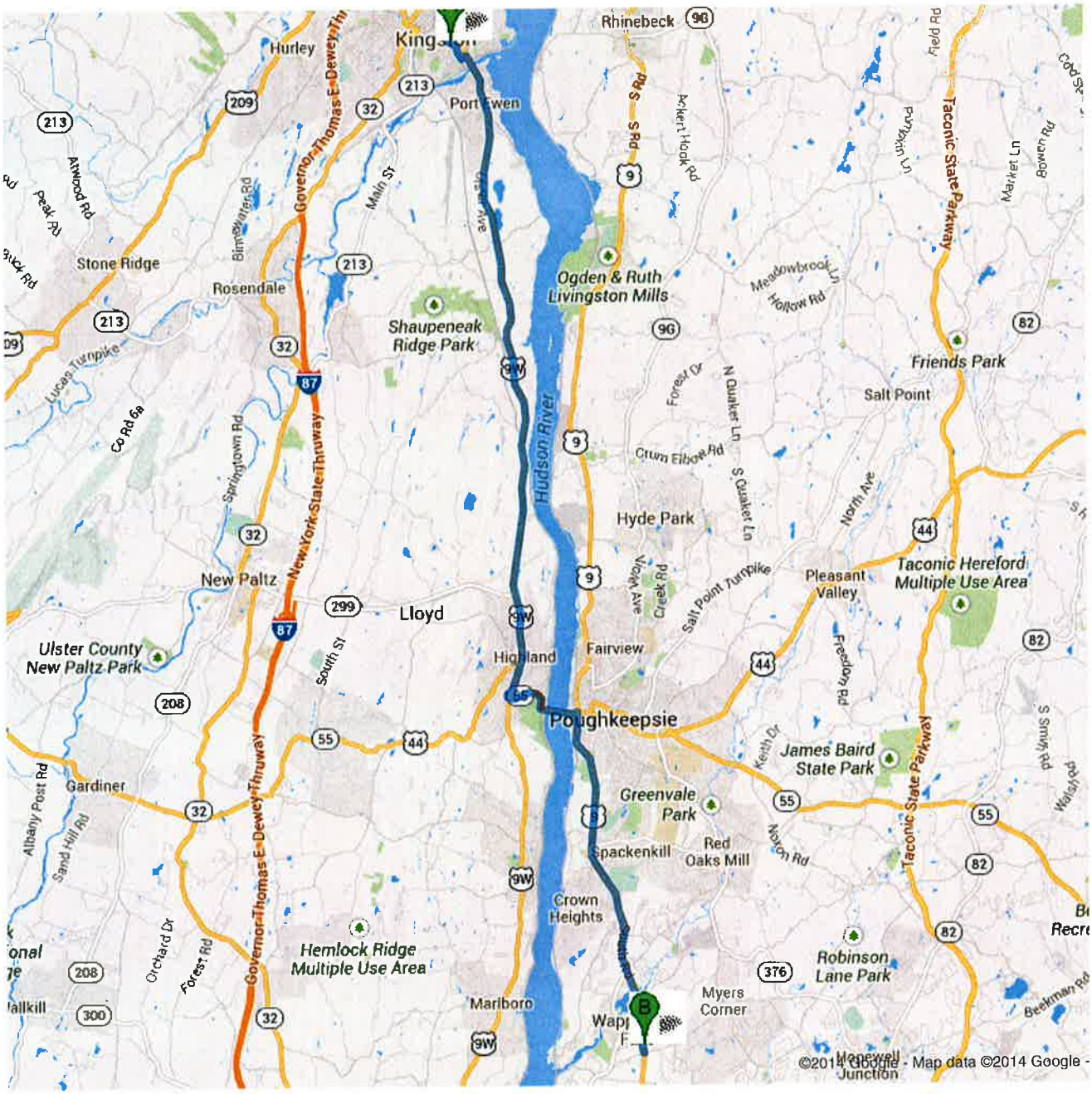
Google

Address **1530 U.S. 9**
Wappingers Falls, NY 12590



Google

Directions to 1530 U.S. 9, Wappingers Falls, NY 12590
26.5 mi – about **39 mins**



10 E Chester St, Kingston, NY 12401

	1. Head **south** on **E Chester St** toward **Broadway**	go 190 ft total 190 ft
	2. Take the 1st left onto **Broadway** About 56 secs	go 0.3 mi total 0.4 mi
	3. Turn left to stay on **Broadway**	go 0.2 mi total 0.6 mi
	4. Take the 1st left onto **Garraghan Dr/Spring St** Continue to follow Garraghan Dr	go 0.1 mi total 0.7 mi
9W	5. Take the 2nd right onto **US-9W S/Frank Koenig Blvd** Continue to follow US-9W S About 19 mins	go 15.1 mi total 15.8 mi
55	6. Take the ramp onto **NY-55 E/US-44 E** Partial toll road About 4 mins	go 2.2 mi total 17.9 mi
9	7. Turn right to merge onto **U.S. 9 S** toward **Wappingers Falls/Hyde Park** About 13 mins	go 8.3 mi total 26.3 mi
9	8. Make a U-turn at **County Rd 93/Myers Corners Rd** Destination will be on the right	go 0.2 mi total 26.5 mi

1530 U.S. 9, Wappingers Falls, NY 12590

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.

Map data ©2014 Google

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

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ATTACHMENT B

FORMS

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Air Monitoring Equipment Calibration Record			
Equipment Type	Calibration Gas (type & ppm)	Calibrated by / Date & Time	Remarks

Air Monitoring Record			
Equipment Type	Reading Location	Date & Time	Reading (ppm)

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ATTACHMENT C

JOB SAFETY ANALYSIS

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JOB SAFETY ANALYSIS

Develop separate JSAs for each separate work task as appropriate.
The JSA should be a working document that is used and revised as appropriate in the field.
The JSA should identify specific tasks, hazards and controls.

General Physical Hazards and Controls	
Potential Hazards	**Controls**
Use hazard recognition tools to identify hazards in the following categories: • **Motion** • **Environment (also see the biological hazards section below)** • **Chemical (see the chemical hazards section below)** • **Energized Systems**	
All hazards	4sight **What am I about to do?** ***Have I stepped through the task in my mind?*** ***Do I really understand the task?*** ***Have I done this task before?*** **What could go wrong?** ***What could move slip or fall?*** ***Does the equipment need to be checked?*** ***Could something spill, splash or leak?*** **What could be done to make it safer?** ***Should I get help with the task?*** ***Do I have the right tools or equipment?*** ***Do I need to review the JSA/Procedures?*** **What have I done to communicate the hazards?** ***Have I spoken to my team about the hazards?*** ***Have I informed others in the area?*** ***Does someone know where I am and what I am about to do?***
	• Manage projects so that adequate time is allowed to complete tasks • Manage projects so that proper equipment is available • Maintain and encourage a positive safety attitude/culture • **Look out for yourself and others at the site; provide feedback to each other on safety performance** • **Report near misses and safety observations** • Employees must review this Health and Safety Plan prior to work, and a copy must be available at the work site • Reevaluate the Job Safety Analysis daily; consider changes in weather conditions, work activities, and other site conditions • Conduct a daily safety briefing or tailgate meeting • Refer to SMS 072 Behavior Based Safety

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General Physical Hazards and Controls	
Potential Hazards	**Controls**
Heavy equipment	• Refer to SMS 046 Subcontractor Health and Safety Requirements • Discuss work activities and location of ground personnel with equipment operators prior to work • Wear high-visibility clothing • Stay away from equipment when possible • Make eye contact with the operator prior to approaching equipment • Have the operator de-energize equipment prior to approaching • Watch out for blind spots • Inspect equipment prior to work • Operators must maintain three points of contact when entering equipment • Refer to SMS 019 Heavy Equipment
Drill rig/soil probe	• Refer to SMS 046 Subcontractor Health and Safety Requirements • Stay clear of drilling operations, especially the rotating auger and cable winches • Know the location of the kill switch • Refer to SMS 056 Drilling Safety Guidelines
Underground utilities	• Call the one-call utility locator (811) at least three days prior to subsurface activities • Mark dig locations in white if possible • Use all possible clues to identify/locate utilities (asphalt patches, meters, as-build drawings, facility operators) • Hire a private utility locate company if questions regarding utility locations remain • Use hydrovac, air knife, or a hand auger to clear the first six feet (1.8 meters) if questions regarding utility locations remain • Refer to SMS 034 Utility Clearances and Isolation
Overhead utilities	• Note the location of overhead utilities prior to work • Maintain a safe distance from utilities • When heavy equipment is in use, mark the location of overhead lines with signs at ground level • Refer to SMS 034 Utility Clearances and Isolation
Excavations and/or trenching	• Excavation deeper than four feet (1.2 meters) deep must be appropriately sloped and/or shored • A competent person must inspect the excavation daily and issue an excavation/trenching permit prior to entry • Avoid entry when possible by collecting samples from equipment buckets or by using long-handled scoops • Never stand adjacent to an open excavation due to the potential for the ground to cave in below you • Some excavation may be considered confined spaces • Refer to SMS 015 Excavations
Noise	• Use hearing protection when heavy equipment is operating • Refer to SMS 026 Noise and Hearing Conservation
Aggressive individuals or potentially dangerous locations (e.g. high crime areas or deserted buildings)	• Get approval from property owners prior to access and see if the owner will accompany you • Work in teams of two or more • If you are alone maintain contact with someone at the office • Leave and/or contact help if you are threatened • Refer to SMS 084 Lone Worker
Driving/vehicle safety	• Inspect vehicles before use • Avoid driving when drowsy

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General Physical Hazards and Controls	
Potential Hazards	**Controls**
	• Obey traffic rules • Use extra caution when entering roadways or backing • Completely exit roadways to park • Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud) • Use a tow strap and proper procedures to remove a vehicle that is stuck in mud or snow • Do not use cell phones and avoid other distractions when operating vehicles • Secure all loads, including equipment within the cab • Wear seat belts • Leave enough time to get to your destination without hurrying • Never follow to close • Avoid backing when possible • Be aware of heavy equipment and do not park or conduct work in the blind spot of the equipment operator; remember that "blind spots" of some equipment can be very large • Verify back-up alarms are functional for all heavy equipment; for pick-ups or SUVs with obstructed rear view, a back-up alarm or use a spotter when backing up • Refer to SMS 057 Vehicle Safety Program
Cold stress	• Stay inside when possible during extreme cold • Schedule outdoor work during mild weather • Stay dry • Dress in layers • Have a warm hat and socks available • Take breaks in heated areas • Refer to SMS 059 Cold Stress
Heat stress	• Stay inside when possible during extreme heat • Drink plenty of liquids and have plenty of water available in the field • Take breaks in a cool area as necessary • Wear a hat and use sun screen • Wear loose fitting, light colored clothing • Moisten clothing to promote cooling • Avoid excessive alcohol or caffeine the night before work • Go someplace cool if you feel ill • Seek medical attention if symptoms of heat exhaustion or heat stroke appear (e.g., dizzy, pale dry skin, confusion) • Refer to SMS 018 Heat Stress
Severe weather	• Check the radio or internet for severe weather warnings • Check road conditions with the state highway department • During high winds watch for blowing doors, gates and other objects • During lightning follow the 20/20 rule – if you hear thunder with 20 seconds of seeing lightning, take a 20 minute break • Know safe locations and/or evacuation routes in case of severe weather such as hurricanes and tornadoes
Lifting	• Healthy employees should lift no more than 50 pounds – know your personal limit

General Physical Hazards and Controls	
Potential Hazards	**Controls**
	• Get help to lift heavy objects • Bend at the knees; do not use your back • Do not twist during lifts • Minimize the movement of heavy objects • Pack items to keep their weight below 50 pounds • Stretch before lifting • Store heavy objects off the ground • Refer to SMS 069 Manual Material Handling
Sharp objects	• Wear appropriate work safety-toe boots and work gloves • Use caution when working with any hand tool • Whenever possible use safety cutting tools instead of fixed open blade knives • Periodically inspect tools and equipment to insure that they remain in good operating condition • Watch out for barbed wire and electrical fences • Refer to SMS 064 Hand Safety and SMS 016 Hand Tools and Portable Equipment
Slips, trips, and falls	• Maintain good housekeeping • When possible, avoid steep and uneven terrain • Wear sturdy boots with good tread • Keep the work area free from water, ice or debris • Literally, watch where you step – mark slip, trip, fall hazards with flagging, etc. • Take the time to find a safe route to the desired location • Do not perform any activity with a fall exposure of 6 feet (1.8 meters) (construction industry) or 4 feet (1.2 meters) (general industry) or more without using fall protection • Use a backpack to avoid carrying too many items • Refer to SMS 021 Housekeeping and SMS 040 Fall Protection
Vehicle traffic	• Implement traffic control in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) if lane closures are required • Contact the responsible authority for the road to determine if a right-of-way permit is required • For shoulder work and work near roadways, use a combination of orange cones and vehicle placement to ensure the work zone is protected from motorists • Wear ANSI Class 2 high-visibility vests (Class 3 for night work or work when there is low visibility) • Expect the unexpected • Refer to SMS 032 Work Zone Traffic Control
Fire/Explosion	• Refer to SMS 014 Fire Protection and Prevention • Refer to SMS 020 Hot Work
Confined space entry	• Confined spaces have limited means for entry and exit and are not designed for occupancy • Entry to a confined space requires training, air monitoring, special equipment and rescue provisions • Simply crossing the plane of the space with any part of your body is considered an entry • Refer to SMS 010 Confined Space Entry

Chemical Hazards and Controls	
Potential Hazards	**Controls**
Potential chemical hazards	• Use nitrile gloves when handling potentially contaminated materials • Implement site control • Stay up wind from contamination • Minimize handling or contaminated materials • Contain or cover contaminated materials to minimize release of vapors • Using good personal hygiene practices; wash hands and face prior to eating or drinking) • The "buddy system" must be used in hazardous areas • Refer to provisions throughout this HASP • Refer to SMS 050 Toxic and Hazardous Substances • Refer to SMS 017 Hazardous Waste Operations
Hazardous materials	• Safety Data Sheets (SDS) must be available for all chemicals brought on site (e.g., sample preservatives, decontamination solutions). Copies of the SDS are provided in Attachment D. • Label all containers with chemical name and hazard warning • Use protective gear recommended on the SDS • Refer to SMS 048 Hazardous Materials/Dangerous Goods Shipping • Refer to SMS 002, Hazard Communication

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Biological Hazards and Controls	
Potential Hazards	**Controls**
Ticks	• Deer ticks can carry Lyme disease, other ticks can carry Rocky Mountain Spotted Fever and other disease • Use repellants containing DEET and/or permethrin • Wear light colored clothing so you can see ticks • Perform tick checks periodically and at the end of the day • Refer to SMS 047 Biological Hazards
Poisonous plants	• Know how to identify poison oak and poison ivy and avoid it • Burning or cutting poison plants can cause respiratory problems • Oils from these plants can transfer from clothing to equipment and cause reactions • Refer to SMS 047 Biological Hazards
Vectorborne disease	• Hantavirus may be present in mouse droppings or nesting materials • Histoplasmosis may be present in bird droppings • Plague may be transmitted by fleas • Do not generate dust from areas impacted by mouse or bird droppings • Eliminate locations for potential mouse and bird nests in equipment storage areas • Stay away from all animals especially if they appear to be ill or injured
Others	• Use caution when lifting objects that may provide shelter for spiders, snakes, hornets and rodents • Use repellant with DEET if mosquitoes are a problem at the site • Livestock, domestic animals, and wild animals are all biological hazards to consider • Refer to SMS 047 Biological Hazards

Job Safety Analysis

Contractor:	Date:		JSA No:	
Location of worksite:	JSA team members: Name	Initials	Name	Initials
Description of work: De-Mobilization of Equipment and Materials from the site				
Personal Protective Equipment (PPE): ☐ Goggles ☐ Face Shields ☐ Safety Glasses ☐ NOMEX/FRC ☐ Tyvek Regular Poly_____ ☐ Lifeline/Body Harness ☐ Hearing Protection ☐ Hard Hat	☐ Steel Toed Boots ☐ Supplied Air Respirator ☐ Air Purifying Respirator ☐ Welding/Pipe Clothing ☐ Welding Mask/Goggles ☐ Safety Vest or High Visibility clothing		☐Life Vest – Over water/Boat ☐Glove Type (s): _____ ☐Other: _____ _____	

Activity List the tasks required to perform the activity in the sequence they are carried out.	Hazard Category	How/Where/When Could a hazard be present? What am I about to do? What could go wrong?	Control Mitigations -Eliminate – Control- Protect Risk control measures List the control measures required to eliminate, control, or protect against unwanted hazard.	Who is responsible ? Write the name of the person responsible (supervisor or above) to implement the control measure identified.	Stop Trigger Discuss what needs to happen (or not happen) to stop the job during this task

Job Safety Analysis

					.

Job Safety Analysis

Job Safety Analysis
Direct Push Drilling and Groundwater Sampling

Contractor: Zebra	Date: 5/27/14	JSA No:		
Location of worksite: 10 East Chester Street Kingston, NY	JSA team member: Name	Initials	Name	Initials
Description of work: Direct Push Drilling and Groundwater Sampling	J Gillies	JG		

Personal Protective Equipment (PPE): ☐ Goggles ☐ Face Shields ☒ Safety Glasses ☐ NOMEX/FRC ☒ Tyvek Regular X Poly_____ ☐ Lifeline/Body Harness ☒ Hearing Protection ☒ Hard Hat	☒ Steel Toed Boots ☐ Supplied Air Respirator ☐ Air Purifying Respirator ☐ Welding/Pipe Clothing ☐ Welding Mask/Goggles ☒ Safety Vest or High Visibility clothing	☐Life Vest – Over water/Boat ☒Glove Type (s): Nitrile ☐Other: _____ _____

Activity - List the tasks required to perform the activity in the sequence they are carried out.	Hazard Category	How/Where/When - Could a hazard be present? - What am I about to do? - What could go wrong?	Control Mitigations Eliminate - Control - Protect Risk control measures List the control measures required to eliminate, control, or protect against unwanted hazard.	-Who is responsible ? -Write the name of the person responsible (supervisor or above) to implement the control measure identified.	- Stop Trigger - Discuss what needs to happen (or not happen) to stop the job during this task
Mobilization / Demobilization to / from the Site	Motion	- Pedestrians - Traffic - Potential Accidents	- No use of cell phones while operating vehicle - Wear seatbelt at all times while inside vehicle - Follow Site Route Map and Directions (included in HASP) - Drive defensively.	TBD	- Route not established - Unable to follow Control Mitigations

Job Safety Analysis
Direct Push Drilling and Groundwater Sampling

Site Safety Orientation	Environment	- Must be conducted by Site Safety Officer (SSO) - Must review Health and Safety Plan (HASP)	- SSO conduct tailgate safety meeting by reviewing Health & Safety Plan (HASP), Vehicle Safety, Job Safety Analysis (JSA), and Traffic Control Plan - Sign compliance agreement to comply with HASP / JSA -Review location of emergency stop - Only properly trained personnel are allowed to operate equipment - Operators must follow equipment manufacturer guidelines during operation	TBD	- Daily tailgate meeting not conducted - HASP, JSA, or Traffic Control Plan not reviewed
Unloading / Loading Equipment and Supplies	Motion	- Lifting heavy equipment - Pinch points - Uneven surfaces - Slip, trip, and fall hazards	- Lift heavy objects using leg strength and proper posture - Obtain assistance when lifting >50 lbs – do not lift alone - Avoid placing hands / fingers beneath heavy objects - Wear leather gloves when handling equipment / supplies - Watch hand position when opening / closing hinged lids / gates (i.e., tailgates, utility boxes, doors, hood, etc) - Establish a set route to unload equipment to the work zone -Forklift usage by qualified drivers only	TBD	-Observe someone lifting >50 lbs alone - Obstructions in established route

Job Safety Analysis
Direct Push Drilling and Groundwater Sampling

Drill Soil Boring / Install Well	Motion and Energized Systems	- Heavy equipment - Lifting heavy objects - Drilling Operations - Chemical - Drilling operations - Noise - Cross Contamination - Pinch Points	- Maintain eye contact with operators at all times - Do not proceed if operator has not acknowledged your presence - Only authorized personnel are allowed in the exclusion zone - Visitors must never enter exclusion zone while equipment is operating - Verify overhead obstructions are not present prior to raising the drill rig mast - Stay at least 10 feet away from energized lines; see table in “General Physical Hazards and Control” section - Only properly trained personnel are allowed to operate heavy equipment - Be aware of auger movements – do not approach augers in motion. - Obtain assistance when lifting >50 lbs – do not lift alone / split material bags - Maintain equipment in an organized manner - Stop work when working on equipment – discuss plan with client representative - Wear leather gloves while conducting mechanical work - Wear nitrile gloves while handling soil cuttings - Monitor work area and breathing zone according to HASP - Ensure helper is taking breaks – switching labor intensive chores often during shift - Wear hearing protection while drill rig is operating - Decontaminate equipment before/between locations - Attempt to conduct soil sampling from least-impacted to most-impacted - Watch hand/finger positioning when working	TBD	- Failure to follow any of the Control Mitigations

Job Safety Analysis
Direct Push Drilling and Groundwater Sampling

Monitor Vapors in the work area / breathing zone	Chemical	- Potential chemical exposure to vapors	- Monitor organic vapors with a PID equipped with a minimum 10.6 eV lamp (onsite) for total VOCs - Regularly monitor operator's breathing zone during drilling and sampling activities (typically every 5 to 10 minutes) - Regularly monitor augers and waste cuttings pile during drilling with hollow-stem auger - Monitor borehole opening with PID in areas specified above, prior to starting work / drilling each day and after stopping of drilling activities for any period (e.g., after lunch break, drilling shutdown for sample retrieval, etc.). - Notify URS field supervisor and drilling contractor's supervisor if PID readings exceed action levels in HASP to determine whether upgrade of PPE is necessary - Never allow personnel to stand directly over open borehole during drilling or sampling activities unless borehole has been monitored for vapors and it is documented that vapor concentrations are below action levels immediately prior to working over borehole and continually while person is working directly over open borehole	TBD	- Detection of VOCs in concentrations exceeding action levels in HASP
Sample Collection	Motion Chemical	- Potential chemical exposure to contaminated soil	- Wear nitrile gloves – replace often - Use appropriate tools and sample containers - Verify sample labels for accuracy prior to placing in cooler containing ice - Inspect glass for breaks/cracks – do not attempt to use broke/cracked glass – place immediately in trash - Close glass sample containers carefully to avoid breakage – use finger tip strength	TBD	- Detection of VOCs in concentrations exceeding action levels in HASP
Site Clean-up	Motion	- Slip, trip, and fall hazards	- Visually inspect site for debris before leaving site – place in trash can - Uneven ground exists – maintain footing awareness	TBD	- Unsafe site conditions

Job Safety Analysis
Direct Push Drilling and Groundwater Sampling

Disposal of Investigation Derived Waste (IDW)	Motion Chemical	- Lifting heavy equipment - Pinch points - Uneven surfaces - Slip, trip, and fall hazards	- Wear nitrile gloves – replace often - Wear leather gloves when transporting containment drums - Watch hand / finger positioning when opening / closing / transporting drums - Use appropriate tools for opening / closing / transporting drums – ratchet/dolly - Lift heavy objects using leg strength and proper posture - Obtain assistance when lifting >50 lbs – do not lift alone - If possible, use power lift truck, drum dolly, and / or other mechanical methods to transport drums to a staging area - Place drum label on waste containers identifying contents, contents origin, contact person, contact number, and generation date .	TBD	- Detection of VOCs in concentrations exceeding action levels in HASP - Unsafe site conditions

URS

ATTACHMENT D

SAFETY DATA SHEETS

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

Water

MSDS Number: W0600 --- ***Effective Date: 11/12/01***

1. Product Identification

Synonyms: Hydrogen oxide; Dihydrogen oxide; Distilled water
CAS No.: 7732-18-5
Molecular Weight: 18.02
Chemical Formula: H2O
Product Codes: J.T. Baker: 4218, 4219, 6906, 9823
Mallinckrodt: 6795, H453, V564

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Water	7732-18-5	100%	No

3. Hazards Identification

Emergency Overview

Not applicable.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 0 - None
Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight
Contact Rating: 0 - None
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Green (General Storage)

Potential Health Effects

Water is non-hazardous.

Inhalation:
Not applicable.
Ingestion:
Not applicable.
Skin Contact:
Not applicable.
Eye Contact:
Not applicable.
Chronic Exposure:
Not applicable.
Aggravation of Pre-existing Conditions:
Not applicable.

---

4. First Aid Measures

Inhalation:
Not applicable.
Ingestion:
Not applicable.
Skin Contact:
Not applicable.
Eye Contact:
Not applicable.

---

5. Fire Fighting Measures

Fire:
Not applicable.
Explosion:
Not applicable.
Fire Extinguishing Media:
Use extinguishing media appropriate for surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Non-hazardous material. Clean up of spills requires no special equipment or procedures.

---

7. Handling and Storage

Keep container tightly closed. Suitable for any general chemical storage area. Protect from freezing. Water is considered a non-regulated product, but may react vigorously with some specific materials. Avoid contact with all materials until investigation shows substance is compatible.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Not applicable.
Ventilation System:
Not applicable.
Personal Respirators (NIOSH Approved):
Not applicable.
Skin Protection:
None required.
Eye Protection:
None required.

---

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Odorless.
Solubility:
Complete (100%)
Specific Gravity:
1.00
pH:
7.0
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
100C (212F)
Melting Point:
0C (32F)
Vapor Density (Air=1):
Not applicable.
Vapor Pressure (mm Hg):
17.5 @ 20C (68F)

Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Not applicable.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong reducing agents, acid chlorides, phosphorus trichloride, phosphorus pentachloride, phosphorus oxychloride.
Conditions to Avoid:
No information found.

---

11. Toxicological Information

For Water: LD50 Oral Rat: >90 ml/Kg. Investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Water (7732-18-5)	No	No	None

---

12. Ecological Information

Environmental Fate:
Not applicable.
Environmental Toxicity:
Not applicable.

---

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be flushed to sewer. If material becomes contaminated during use, dispose of accordingly. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Not regulated.

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: No Chronic: No Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **0** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
Not applicable.
Label Precautions:
Keep in tightly closed container.
Label First Aid:
Not applicable.
Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Date Prepared: 2/13/97
Date Revised: 11/01/01
MSDS

HYDROCHLORIC ACID

1. Chemical Product Identification
Material Identity
Product Name: HYDROCHLORIC ACID
General or Generic ID: MURIATIC ACID

Omega Chemistries
7623 North 67th Ave Suite 301
Glendale, AZ 85301
Bus: 623-842-9304
Fax: 623-842-4983

Emergency Telephone Number
602-686-9252
24 hours

2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name:	CAS #	Weight %
Hydrogen Chloride	7664-93-9	15-35
Water	7732-18-5	65-85

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
Severity of injury will depend on quantity, concentration and duration of contact. Both liquid and vapor contact can cause irritation, corneal burns, and conjunctivitis. Permanent damage with loss of sight can occur.

Skin
Severity of injury will depend on quantity, concentration and duration of contact. Liquid contact: can cause severe burns, pain and brownish or yellow stains. Solution contact: May cause irritation, dermatitis or burns. Vapor contact can cause irritation or burns. Mist contact can cause irritation.

Swallowing:
Ingestion can cause irritation and corrosive burns to the gastrointestinal tract. May perforate stomach or esophagus in extreme cases. Asphyxia may occur from edema of the larynx.

Inhalation:
Inhalation of fumes or mists can cause irritation or corrosive burns to the upper respiratory system. Intense tearing, coughing, throat irritation, sneezing and labored breathing may occur. Following high exposures, lung irritation and pulmonary edema can also occur, sometimes delayed. Concentrations of 0.13 to 0.2% of hydrogen chloride in air can be lethal to humans in a few minutes.

Delayed Effects
Excessive exposure, repeated or prolonged, may cause erosion of the teeth; Gastritis and chronic bronchitis among workers exposed to hydrochloric acid have been reported.

Target Organ Effects
No data

Developmental Information
No data
Cancer Information
No data
Other Health Effects
No data
Primary Route(s) of entry
No data

4. FIRST AID MEASURES

Eyes

Immediately flush with plenty of water for at least 15 minutes. Hold eyes open by separating eyelids with fingers to assure adequate flushing. Speed is essential. Do not use chemical antidotes. GET MEDICAL ATTENTION!

Skin

Immediately flush affected area with plenty of water for at least 15 minutes, while removing any contaminated clothing. Deluge showering is required if exposure to liquid acid is extensive. Speed is essential. GET MEDICAL ATTENTION! Destroy clothing.

Ingestion

If conscious and free of convulsions, give large amounts of water immediately. DO NOT INDUCE VOMITING! Give a non-gassing neutralizer, such as milk, milk of magnesia of calcium hydroxide. Don not give carbonates, bicarbonates or chalk. GET PROMPT MEDICAL ATTENTION.

Inhalation

Promptly remove to fresh air! If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen, provided a qualified operator is available. GET PROMPT MEDICAL ATTENTION.

Note to Physicians
Treat according to symptoms present.

5. **FIRE FIGHTING MEASURES**

Flash point
Not applicable
Exposure limit
Not applicable
Auto Ignition Temperature
Not applicable
Unusual Fire and Explosion Hazards
Hydrochloric acid reacts with steel and most other metals to generate hydrogen gas, which is a serious fire and explosive hazard.

Fire Fighting Precautions

Use NIOSH - approved, self-contained breathing apparatus with full-face piece and protective clothing. Use water spray to cool fire- exposed containers. Take precautions so as not to splash this material onto other personnel.

6. **ACCIDENTAL RELEASE MEASURES**

SPILLS OR LEAKS

(Always wear recommended personal protective equipment.) Provide for adequate ventilation. Fully protected personal should cautiously dilute small spills or leaks with plenty of water. Carefully neutralize the dilute liquid with caustic soda, lime or other alkaline material. Dilution and neutralization procedures will generate heat. For major spills, keep unprotected personnel away. Contain the acid by diking the spill with soil or clay or there suitable material. Recover the acid, if possible. Cautiously dilute and neutralize as described above. Attempt to keep acid out of the sewer.

7. **HANDLING AND STORAGE**

Normal Handling

Always wear recommended personal protective equipment.) Do not get in eyes, on skin or on clothing. Avoid breathing mist and vapor.
Store in approved container only. Store in a dry, well-ventilated area away from heat, out of sun and away from oxidizing substances (Nitric acid, etc.) or other incompatible materials. Diking of storage tanks is recommended. Elevated temperatures will increase vapor pressure of product; use care when opening container.

8. **EXPOSURE CONTROL/ PERSONAL PROTECTION**

Engineering Handling

Provide corrosion- resistant ventilation sufficient to reduce acid mist and vapor concentrations to or below current TLV levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems or local exhaust.
Personal Protection:

Skin

Prevent any contact of liquid with body. As a minimum, wear acid-resistant apron and gauntlet gloves, protective clothing and rubber boots for routine product handling and use. For increased protection, include acid-resistant trousers and jacket. Diluted solutions also require such protection. Wash contaminated clothing before reuse.

Respiratory Protection

Where required, use a respirator approved by NIOSH for hydrogen chloride gas and/or mist, as applicable. Some exposures may require use of an NIOSH-approved, self-contained breathing apparatus, or supplied air.

Eyes and Face

As a minimum, wear hard hat, chemical safety goggles, and full-face plastic shield. Do not wear contact lenses.

Additional Recommendations

Provide eyewash stations and quick-drench shower facilities convenient to areas of handling, use or storage. Keep neutralization supplies and equipment for handling spills at hand.

Exposure Guidelines

Ingredient Name	ACHIH TLV	OSHA PEL	OTHER LIMIT
Hydrogen Chloride	5 ppm - Ceiling	5 ppm- ceiling	none

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point
20^o Be = 83^o C
22^o Be = 61^o C
Vapor Pressure 10.10^o Be =.03 mm Hg at 20^o C
20^o Be = 25mm Hg at 20^o C
22^o Be = 84mm Hg at 20^o C
Vapor Density
Air = (1.0) 1.27
Specific Gravity
(Water = 1.0) 20^o Be = 1.16 *20^o Be = 31.5% HCL
22^o Be = 1.18 22^o Be = 35.2% HCL
10.10^o Be = 1.07 10.10^o Be = 15% HCL
Liquid Density
Not applicable
Percent Volatile
15 -35 (HCL only)
Evaporation Rate
< 1 Compared to: Ether
Appearance
Clear water white
Physical State
Liquid
Molecular Weight
36.46 for anhydrous HCL
Odor
Pungent
Chemical Formula
HCL (15-35 wt. % in water
Solubility in Water
pH: 0.8 (1% solution)

10. STABILITY AND REACTIVITY

Hazardous Polymerization
Will not occur
Hazardous Decomposition
Hydrogen chloride vapors (released normally at ambient conditions) are released in increasing amounts at higher temperatures. Will release hydrogen when in contact with some metals.
Normally Stable? (Conditions to Avoid)
Stable under normal conditions. Avoid elevated temperatures (increase vapor pressure of product; may rupture container.)
Incompatibilities
Most metals: yields hydrogen gas: Alkalis, metallic oxides, amines, ethers, and certain other organic such as beta-propiolactone, propylene oxide: causes exothermic reactions, possibly violent. Carbonates, cyanides, and sulfides: yields toxic gases. Water- reactive materials, such as sulfuric acid, oleum and acetic anhydride: causes exothermic reaction

11. TOXICOLOGICAL INFORMATION

Immediate (Acute) Effects

LC_{50} (inhale-rat): 3124 ppm/1hr

LD_{50}(oral rabbit): 900 mg/kg

Delayed Effects (Subchronic & Chronic)

May cause erosion of teeth. Gastritis and chronic bronchitis have also been reported

12. ECOLOGICAL

Ecotoxcity

Not available

Environmental Fate

Not available

Degradability

Not applicable -inorganic

Aquatic toxicity

282 ppm/96hr/mosquito fish/TLm/fresh water: 100-330ppm/ 48hr/ shrimp/ LC_{50}/salt water

13. DISPOSAL CONSIDERATIONS

Disposal Considerations

Waste muratic acid (28-35%) should be cautiously diluted with water and neutralization with an alkali. Neutralized waste must be disposed of in accordance with applicable disposal regulations. Users should review their operations in terms of applicable federal, state and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material. Waste may have to be disposed of by an approved contractor.

14. TRANSPORT INFORMATION

SARA Title III/CERCLA

Rqs & TPQs (Reportable Quantities) and/or (Threshold Planning Quantities) exist for the following ingredients:

Hydrogen Chloride SARA/CERCLA/RO(lbs.) -5000 SARA EHS/TPO(lbs.) -500 (Gas only)

Spills/releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center (1-800-424-8802) and to your Local Emergency Planning Committee.

Section 311 Hazard Class

Immediate Delayed

SARA 313 Toxic Chemicals

The following ingredients are SARA 313 “Toxic Chemicals”. CAS #’s and wt% are found in section #2. Ingredient Hydrogen Chloride Comment: as HCL acid

State Right to Know

In addition to the ingredients found in section 2, the following are listed for state right to know purposes: No ingredients listed in this section.

Additional Regulatory Information

DEA listed Precursor and essential chemicals (21 CFR 1310.04)

OSHA Process Safety Management Standard: Highly hazardous Chemicals (29 CFR 1910.119,App A)

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 0-23.5%; Isobutylene, 0.0005-0.9%

SYNONYMS: Not Applicable
CHEMICAL FAMILY NAME: Not Applicable
FORMULA: Not Applicable
Document Number: 50054

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
SUPPLIER/MANUFACTURER'S NAME:	AIR LIQUIDE AMERICA CORPORATION
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-6400
General MSDS Information	1-713/868-0440
Fax on Demand:	1-800/231-1366

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	OTHER
Oxygen	7782-44-7	0 - 23.5%	There are no specific exposure limits for Oxygen.					
Isobutylene	115-11-7	0.0005 - 0.9%	There are no specific exposure limits for Isobutylene.					
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. C = Ceiling Limit. See Section 16 for Definitions of Terms Used.

NOTE : All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a colorless, odorless gas. Releases of this product 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 product is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this product, 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 product 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 .

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH	(BLUE)	1
FLAMMABILITY	(RED)	0
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		B

EYES	RESPIRATORY	HANDS	BODY
See Section 8			

For routine industrial applications

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 product, 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: There are currently no known adverse health effects associated with chronic exposure to this gas mixture.

TARGET ORGANS: Respiratory system.

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT 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 product, due to the small cylinder size. If any adverse symptom develops after over-exposure to this product, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary.

4. FIRST-AID MEASURES (Continued)

Victim(s) who experience any adverse effect after over-exposure to this product 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).

5. FIRE-FIGHTING MEASURES

FLASH POINT, (method): Not applicable.

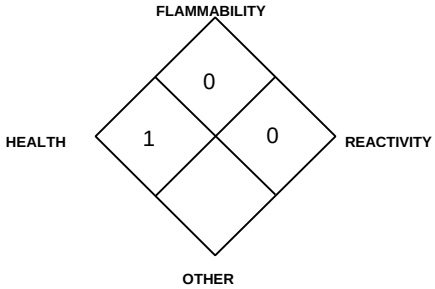
AUTOIGNITION TEMPERATURE: Not applicable.

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.

NFPA RATING



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 product 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, especially if work is done in a poorly-ventilated area; exposures to fatal concentrations of this product could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify 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 product in well-ventilated areas. If this product is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if oxygen levels are below 19.5 % or unknown during emergency response to a release of this product. If respiratory protection is required for emergency response to this product, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134) or equivalent State standards.

EYE PROTECTION: Safety glasses.

HAND PROTECTION: No special protection is needed under normal circumstances of use.

BODY PROTECTION: No special protection is needed under normal circumstances of use.

9. PHYSICAL and CHEMICAL PROPERTIES

Unless otherwise specified, the following information is for Nitrogen, the 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)

FREEZING/MELTING POINT @ 10 psig -210°C (-345.8°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906 **pH**: Not applicable.

SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023 **MOLECULAR WEIGHT:** 28.01

EVAPORATION RATE (nBuAc = 1): Not applicable. **EXPANSION RATIO**: Not applicable.

ODOR THRESHOLD: Not applicable. **SPECIFIC VOLUME (ft^3/lb)**: 13.8

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for this gas mixture.

APPEARANCE AND COLOR: This product is a colorless, odorless gas.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this product.

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 Nitrogen (the main component of this product). Lithium reacts slowly with Nitrogen at ambient temperatures. A component of this product (Isobutylene) are 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 product:

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

ISOBUTYLENE:
LC_{50} (inhalation, rat) = 620,000 mg/kg/4 hours
LC_{50} (inhalation, mouse) = 415,000 mg/kg

11. TOXICOLOGICAL INFORMATION (Continued)

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: Not applicable.

SENSITIZATION TO THE PRODUCT: This gas mixture is not known to cause sensitization in humans.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for this gas mixture.
Embryotoxcity: No embryotoxic effects have been described for this gas mixture.
Teratogenicity: No teratogenicity effects have been described for this gas mixture.
Reproductive Toxicity: No reproductive toxicity effects have been described for 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.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to the components of this product.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms; eliminate exposure.

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 product.

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 this product's effects on plant and animal life.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects 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 MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (Nitrogen, Oxygen)
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 (1996): 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).

14. TRANSPORTATION INFORMATION (Continued)

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 MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: This product is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

COMPONENT	SARA 302	SARA 304	SARA 313
Oxygen	NO	NO	NO
Nitrogen	NO	NO	NO
Isobutylene	NO	NO	NO

SARA THRESHOLD PLANNING QUANTITY: Not applicable.

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

CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

OTHER U.S. FEDERAL REGULATIONS:

- No component of this product is subject to the requirements of CFR 29 1910.1000 (under the 19 89 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).
- 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 (4,553 kg) or greater.

OTHER CANADIAN REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

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 PROPOSITION 65: No component of this product is on the California Proposition 65 lists.

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. Air Liquide America 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.

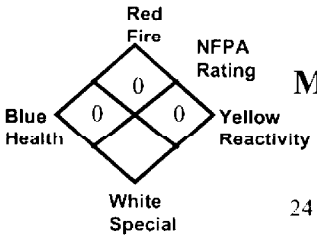
P-1 *"Safe Handling of Compressed Gases in Containers"*
AV-1 *"Safe Handling and Storage of Compressed Gases"*
"Handbook of Compressed Gases"

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
619/565-0302

Fax on Demand: 1-800/231-1366

AIR LIQUIDE™

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide America Corporation's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.



Liqui-Nox ®

MATERIAL SAFETY DATA SHEET

Alconox, Inc.
30 Glenn Street. Suite 309
White Plains, NY 10603
24 Hour Emergency Number – Chem-Tel (800) 255-3924

I. IDENTIFICATION

Product Name (as appears on label)	LIQUI-NOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 1999
Chemical Family:	Anionic Liquid Detergent
Manufacturer Catalog Numbers for sizes	1232, 1201, 1215 and 1255

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

There are no hazardous ingredients in LIQUI-NOX™ as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F):	214°F
Vapor Pressure (mm Hg):	No Data
Vapor Density (AIR=1):	No Data
Specific Gravity (Water=1):	1.075
Melting Point:	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Slower
Solubility in Water:	Completely soluble in all proportions.
Appearance:	Yellow liquid, nearly odorless

IV. FIRE AND EXPLOSION DATA

Flash Point:	None (Cleveland Open Cup)
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO_2, foam
Special Fire fighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

V. REACTIVITY DATA

Stability:	Stable
Conditions To Avoid:	None
Incompatibility (Materials To Avoid):	Oxidizing agents.
Hazardous Decomposition or Byproducts:	May release SO_2 on burning

VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? No Skin? Yes Ingestion? Yes
Health Hazards (Acute and Chronic):	Skin contact may prove locally irritating, causing drying and/or chapping. Ingestion may cause discomfort and/or diarrhea.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Prolonged skin contact may cause drying and/or chapping.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs administer fluids. See a physician for discomfort.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. For small spills recover as much as possible with absorbent material and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	No special precautions in storing. Use protective equipment when handling undiluted material.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Not Required
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are recommended.
Eye Protection:	Goggles and/or splash shields are recommended.
Other Protective Clothing or Equipment:	Not required
Work/Hygienic Practices:	No special practices required

THE INFORMATION HEREIN IS GIVEN IN GOOD FAITH BUT NO WARRANTY IS EXPRESSED OR IMPLIED.

Omega Chemistries
7623 North 67th Ave Suite 301
Glendale AZ 85301
623-842-9304

Material Safety data Sheet (MSDS)

Section 1: Product Identification

Product Name: Nitric Acid

Chemical or common name: Aqua Fortis, Azotic acid, hydrogen nitrate
Chemical Family: Inorganic Acid
Formula: HNO
CAS # 7697-37-2

Section 2: Component Data

Chemical Name: Nitric Acid
CAS#: 7697-37-2
Percentage Range: 60-71%
Hazardous per 29 CFR 1910.1200: YES
Exposure Standars

	OSHA (PEL)		ACGIH(TLV)	
	ppm	mg/cubic-meter	ppm	mg/cubic-meter
TWA:	2	5	2	5
Ceiling:	None			None
STEL:	4	10	4	10

CAS or Chemical Name: Water
CAS Number: 7732-18-5
Percentage Range: 29 – 40%
Hazardous per 29 CFR 1910.1200: NO
Expousure Standards: None established

Section 3: Physical Data

Appearance: Colorless to slightly yellow liquid
Freezing point: -22 to –41 deg C (-7.6 to –42 deg F)
Boiling point: 120 to 122 Deg C. (248 to 252 deg F)
Decomposition temperature: No data
Specific gravity: 1.37 –1.42
Bulk Density: 1.37 – 1.42 (g/cc)
pH @ 25 deg C: < 1 (1% solution)
Vapor pressure @ 25 Deg C: 49-55mm Hg
Solubility in water: complete
Volatiles, percent by volume: 100%
Evaporation Rate: No data
Vapor density: No data
Molecular weight: 63.01 (active ingredient)
Odor: Irritating, suffocating
Coefficient of oil/water distribution: No data

Section 4: Personal protective equipment requirments

Ventilation: Use local exhaust ventilation to maintain levels to below the TLV.

Skin Protection: Wear gloves, boots, apron and face shield with safety glasses. A full impermeable suit is recommended if exposure is possible to large portion of the body.

Other: Emergency eye wash and safety showers must be provided in he immediate work area.

Equipment specifications:

Respirator type:	NIOSH/MSHA approved acid gas full facepiece respirator
Glove type:	Neoprene
Boot type:	Neoprene
Apron type:	Neoprene
Protective Suite:	Neoprene

Section 5: Fire and explosion hazard information

Flammability data:
Flammable: No
Combustible: No
Pyrophoric: No
Flash Point: None
Autoignition temperature: Not applicable
Flammable limits at normal atmospheric temperature and pressure (percent volume in air)
LEL – not applicable UEL – Not applicable

NFPA ratings:
Health: 3
Flammability 0
Reactivity 0
Special Hazard warning: Oxidizer

HMIS Ratings:
Health: 3
Flammability 0
Reactivity 0

Extinguishing media: Not applicable

Fire fighting techniques and comments: Use water to cool container exposed to fire. Use water in flooding quantities as fog. This material is non-combustible but may ignite or react with many substances.

Section 6: Reactivity Information

Conditions under which this product may be unstable
Temperatures above: No data
Mechanical shock or impact: No
Electrical (static) discharge: No

Hazardous polymerization: Will not occur
Incompatible materials: Reacts with a wide variety of metals (especially when powdered) bases, carbides, sulfides, fulminates, picrates, chlorates, oxidizable inorganic compounds, organic chemicals turpentine, and combustible materials.

Hazardous decomposition products: Nitrogen oxides, hydrogen gas
Other conditions to avoid: heat and light

Summary of reactivity:

Oxidizer:	Yes
Pyrophoric:	No
Organic Peroxide:	No
Water Reactive:	No
Corrosive:	Yes

Section 7: Handling and Storage

Do not take internally; avoid contact with skin, eyes and clothing, upon contact with skin or eyes, wash off with water.
Storage conditions: Store in a cool, dry, well –ventilated area.
Do not store at temperatures above 38Deg C (100 deg F)
Do not expose to direct light.
Product Stability ad compatibility:
Shelf life limitations: 1 year
Incompatible materials for packaging: Polyethylene bottles, metal containers
Incompatible materials for storage or transport: Refer to incompatible materials, Section

Section 8: Fist Aid

Eyes: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Call a physician at once.

Skin: Immediately flush with water for at least 15 minutes. Call a physician. If clothing comes in contact with the product, the clothing should be removed immediately and should be laundered before re-use.

Ingestion: Immediately drink large quantities of water. Do not induce vomiting. Call a physician at once. Do not give anything by mouth if the person is unconscious of if having convulsions.

Inhalation: If person experiences nausea, headache or dizziness, person should stop work immediately and move to fresh air until these symptoms disappear. If breathing is difficult, administer oxygen, keep the person warm and at rest. Call a physician. In the event that an individual inhales enough vapors to lose consciousness, person should be moved to fresh air at once and a physician should be called immediately. If breathing has stopped, artificial respiration should be give immediately. In all cases insure adequate ventilation and provide respiratory protection before the person returns to work.

Note to physician: Delayed pulmonary edema may occur

Section 9: Toxicology and health information

Routes of Absorption:
Oral, dermal, inhalation, eye contact

Warning statements and warning properties
Corrosive to all tissues contacted. May be fatal if swallowed. Harmful if inhaled.

Human threshold response data:
Odor threshold: No data
Irritation threshold: No data
Immediately dangerous to life or health: The IDLH concetration for nitric acid is 100 ppm

Signs and Symptoms, and effects of exposure:

Inhalation:

Acute:
Inhalation of nitric acid mist is severely irritation to the mucus membranes and respiratory tract, the effects of which may not show immediately after exposure. Signs exhibited after inhalation may include dryness in the throat and nose, cough, choking chest pain and shortness of breath. In some individuals, similar or more severe signs may be observed after a latent period of several hours following inhalation. These severe effects may be a bronchopneumonia, severe shortness of breath and or pulmonary edema. Severe exposures have been reported to cause tooth erosion, although these reports are complicated by exposure to multiple acids.

Chronic:
Repeated inhalation at exposure levels greater than currently excepted limits may cause chronic bronchitis and or chemical pneumonitis.

Skin:

Acute:
Direct contact with the liquid is corrosive, producing immediate burns with skin destruction and possible ulceration. A yellow-brown discoloration may appear from contact with dilute and concentrated solutions. High mist concentrations may cause irritation of the skin and possible burns, along with yellow discoloration of the skin.

Chronic:
There is no information available on chronic exposure by this route. Chronic dermal contact with significant amounts of the acid is unlikely because of the corrosive nature of the product.

Eye:

Direct contact with the eye will cause an immediate corrosive action with burns to the cornea and conjuctival epithelia. Permanent eye damage and impairment of vision may result. High mist concentrations may cause mild to severe eye irritation, and in extreme cases, be corrosive to the eye.

Ingestion:

Acute:
Ingestion may cause burns to the mouth, throat and stomach, and gastroenteritis with any or all of the following symptoms. Nausea, vomiting, lethargy, diarrhea, bleeding or ulceration, and may be fatal.

Chronic:
There is no data available on the chronic ingestion of Nitric Acid.

Medical Conditions aggravated by exposure:
Asthma, emphysema, and other respiratory diseases

Interactions with other chemicals which enhance toxicity:
Oxides of nitrogen, which may evolve from fuming nitric acid, may enhance the respiratory effects of nitric acid.

Animal Toxicity:
Acute Toxicity:
Oral LD 50: No data
Dermal LD 50: No data
Inhalation LC 50: 2500 ppm/1hour (rat)

Acute and chronic target organ toxicity:

Studies of acute and repeated exposures to nitric acid in laboratory animals have shown the lung to be the target organ of toxicity.

Reproductive and developmental toxicity:

There are no known or reported effects on fetal development of reproduction from nitric acid exposure in humans. In the literature there are unsubstantiated reports on developmental and reproductive effects in laboratory animals; however these studies were not performed according to accepted protocols or practices.

Mutagenicity:

There are no known or reported studies on the mutagenicty of nitric acid.

Aquatic Toxicity:

The aquatic toxicity of nitric acid is related to the pH of the water which it achieves. For rainbow trout, the reported LC50 is about a pH of 4.0 for a 7 day bipassay. Other reported aquatic toxicity data show TLm values of 180 ppm for the shore crab, 100-300 ppm for the starfish and armed bullhead, and 330-100 ppm for the cockle.

Section 10: Transportation information

This material is regulated a s DOT Hazardous Material
DOT description from the hazardous materials table 49 CFR 172.101:
Land (U.S. DOT) Nitric acid, 8, UN2031
PG I Greater than 70% nitric acid
PG II Less than or equal to 70% nitric acid

Water (IMO): Same as above
Air (IATA/ICAO): Forbidden
Hazard Label/Placard: Corrosive
Reportable quantity: 1000 lbs. (per 49CFR 172.101. appendix)
Emergency Guide NO: 44

Section 11: Spill and Leak procedures

For all transportation accidents, call chemtrec at 800-424-9300.
Reportable quantity: 1000 lbs as 100% nitric acid per 40 CFR 302.4

Spill Mitigation procedures:
Hazardous concentrations in air may be found in local spill area and immediately downwind. Remove all sources or ignition. Stop source of spill if it may be done safely. Evacuate the immediate area and mark off accordingly but only after obtaining the proper personnel protective equipment.

Air release:

Vapors may be suppressed by the use of water fog. All water must be contained and treated as a hazardous waste and or neutralized.

Water Release:

This material is heavier than and soluble in water. Notify all downstream municipal, public, or industrial water users of possible contamination. Create an earthen dike to contain the material if at all possible and treat as necessary.

Land Spill:

Create a dike or containment area using earth, clay, sand, etc. do not use items such as sawdust or wood based absorbents. Dig a trench or packet to contain the material, if necessary and treat/neutralize as soon as possible.

Section 12: Disposal Considerations

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under 40 CFR 261 and wouls have the following EPA hazardous waste number: D001, D002.

If this product becomes a waste, it will be a hazardous waste which is subject to the Land Deiposal Restriction under 40 CFR 268 and must be managed accordingly.

As a hazardous liquid waste, it must be disposed of in accordance with local, state, and federal regulations in permitted hazardous waste treatment, storage and disposal facility by treatment.

Section 14: Additional Regulatory Status information

Toxic Substances control Act:
This substance is listed on the toxic substances control act inventory.

Superfund Amendment and reauthorization act title III:
Hazardous Categories, per 40 CFR 370.2
Health

Immediate (acute)

Physical:
Fire

Emergency planning and community right to know, per 40 CFR 355, app.a:
Extremely hazardous substance – threshold-planning quantity: 1000 lbs.

Supplier Notification requirements, Per 40 CFR 372.45:

This mixture or trade name product contains a toxic chemical or chemicals subject to the reporting requirements of section 313 or Title III of the superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

Chemicals listed are: Nitric Acid

Section 15:

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Omega Chemistries makes no representation as to it accuracy or sufficiency. Condition or use are beyond Omega Chemistries control and therefore users are responsible to verify this data under their own operation condition to determine whether the product is suitable for their particular purposes and they assume all risks of their use. Handling and disposal of the product, of from the publication or use, or reliance upon, information contained herein. This information relates only to the product designate herein, and does not relate to its use in combinations with any other material or in any other process.

MATERIAL SAFETY DATA SHEET: SIMPLE GREEN®

I. PRODUCT & COMPANY INFORMATION

PRODUCT NAME: **SIMPLE GREEN® CLEANER / DEGREASER**

COMPANY NAME: **SUNSHINE MAKERS, INC.**

15922 Pacific Coast Highway
Huntington Harbour, CA 92649 USA
Telephone: 800-228-0709 • 562-795-6000
Fax: 562-592-3034
Website: www.simplegreen.com

Version No. 1006
Issue Date: March, 1999

For 24-hour emergency, call Chem-Tel, Inc.: 800-255-3924

USE OF PRODUCT: An all purpose cleaner and degreaser used undiluted or diluted in water for direct, spray, and dip tank procedures.

II. INGREDIENT INFORMATION

The only ingredient of Simple Green® with established exposure limits is undiluted 2-butoxyethanol (<6%) (Butyl Cellosolve; CAS No. 111-76-2): the OSHA PEL and ACGIH TLV is 25 ppm (skin). Note, however, that Butyl Cellosolve is only one of the raw material ingredients that undergo processing and dilution during the manufacture of Simple Green®. Upon completion of the manufacturing process, Simple Green® does not possess the occupational health risks associated with exposure to undiluted Butyl Cellosolve. Verification of this is contained in the independent test results detailed under "Toxicological Information" on Page 3 of this MSDS.

The Butyl Cellosolve in Simple Green® is part of a chemical category (glycol ethers) regulated by the Emergency Planning and Community Right-to-Know Act (SARA, Title III, section 313); therefore, a reporting requirement exists. Based upon chemical analysis, Simple Green® contains no known EPA priority pollutants, heavy metals, or chemicals listed under RCRA, CERCLA, or CWA. Analysis by TCLP (Toxicity Characteristic Leaching Procedure) according to RCRA revealed no toxic organic or inorganic constituents.

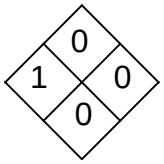
All components of Simple Green® are listed on the TSCA Chemical Substance Inventory.

III. HAZARDS IDENTIFICATION

UN Number: Not required
Dangerous Goods Class: Nonhazardous

Hazard Rating (NFPA/HMIS)

Health = 1* Reactivity = 0
Fire = 0 Special = 0



Rating Scale

0 = minimal 1 = slight
2 = moderate 3 = serious
4 = severe

*Mild eye irritant, non-mutagenic and non-carcinogenic. **None of the ingredients in Simple Green® are regulated or listed as potential cancer agents by Federal OSHA, NTP, or IARC.**

IV. FIRST AID MEASURES

SYMPTOMS OF OVEREXPOSURE AND FIRST AID TREATMENT

Eye contact: Reddening may develop. Immediately rinse the eye with large quantities of cool water; continue 10-15 minutes or until the material has been removed; be sure to remove contact lenses, if present, and to lift upper and lower lids during rinsing. Get medical attention if irritation persists.

Skin contact: Minimal effects, if any; rinse skin with water, rinse shoes and launder clothing before reuse. Reversible reddening may occur in some dermal-sensitive users; thoroughly rinse area and get medical attention if reaction persists.

Swallowing: Essentially non-toxic. Give several glasses of water to dilute; do not induce vomiting. If stomach upset occurs, consult physician.

Inhalation: Non-toxic. Exposures to concentrate-mist may cause mild irritation of nasal passages or throat; remove to fresh air. Get medical attention if irritation persists.

V. FIRE FIGHTING MEASURES

Simple Green® is stable, not flammable, and will not burn.

Flash Point/Auto-Ignition:	Not flammable.
Flammability Limits:	Not flammable.
Extinguishing Media:	Not flammable/nonexplosive. No special procedures required.
Special Fire Fighting Procedures:	None required.

VI. ACCIDENTAL RELEASE MEASURES

Recover usable material by convenient method; residual may be removed by wipe or wet mop. If necessary, unrecoverable material may be washed to drain with large quantities of water.

VII. HANDLING, STORAGE & TRANSPORT INFORMATION

No special precautions are required. **This product is non-hazardous for storage and transport according to the U.S. Department of Transportation Regulations.** Simple Green® requires no special labeling or placarding to meet U.S. Department of Transportation requirements.

UN Number:	Not required
Dangerous Goods Class:	Nonhazardous

VIII. EXPOSURE CONTROLS

Exposure Limits: The Simple Green® formulation presents no health hazards to the user when used according to label directions for its intended purposes. Mild skin and eye irritation is possible (please see Eye contact and Skin contact in Section IV.).

Ventilation: No special ventilation is required during use.

Human Health Effects or Risks from Exposure: Adverse effects on human health are not expected from Simple Green®, based upon twenty years of use without reported adverse health incidence in diverse population groups, including extensive use by inmates of U.S. Federal prisons in cleaning operations.

Simple Green® is a mild eye irritant; mucous membranes may become irritated by concentrate-mist.

Simple Green® is not likely to irritate the skin in the majority of users. Repeated daily application to the skin without rinsing, or continuous contact of Simple Green® on the skin may lead to temporary, but reversible, irritation.

Medical Conditions Aggravated by Exposure: No aggravation of existing medical conditions is expected; dermal-sensitive users may react to dermal contact by Simple Green®.

IX. PERSONAL PROTECTION

Precautionary Measures:	No special requirements under normal use conditions.
Eye Protection:	Caution, including reasonable eye protection, should always be used to avoid eye contact where splashing may occur.
Skin Protection:	No special precautions required; rinse completely from skin after contact.
Respiratory Protection:	No special precautions required.
Work and Hygienic Practices:	No special requirements. Wash or rinse hands before touching eyes or contact lenses.

X. PHYSICAL AND CHEMICAL PROPERTIES

Appearance/odor: Translucent green liquid with characteristic sassafras odor.
Specific Gravity: 1.0257 **Vapor Pressure:** 17 mm Hg @ 20 °C; 22 mm Hg @ 25 °C
pH of concentrate: 9.5 **Vapor Density:** 1.3 (air = 1)
Evaporation: >1 (butyl acetate = 1) **Density:** 8.5 lbs./gallon
Boiling Point: 110 °C (231 °F)
Freezing Point: -9 °C (16 °F) If product freezes, it will reconstitute without loss of efficacy when brought back to room temperature and agitated.

VOC Composite Partial Pressure: 0.006 mm Hg @ 20 °C
Volatile Organic Compounds (VOCs): 7.96 g/L per ASTM Method 3960-90. Per California AQMD's VOC test method, product must be diluted at least 2 parts of water to 1 part Simple Green® in order to meet SCAQMD Rule 1171 & Rule 1122 and BAAQMD Regulation 8-16 VOC requirements for solvent cleaning operations.

Water Solubility: Completely soluble in water. The higher salt concentrations in marine ecosystems will lead to complexes with Simple Green® that may become visible at ratios above one part Simple Green® to 99 parts seawater.

Ash Content: At 600 °F: 1.86% by weight.
Nutrient Content: Nitrogen: <1.0% by weight (fusion and qualitative test for ammonia).
Phosphorus: 0.3% by formula.
Sulfur: 0.6% by weight (barium chloride precipitation method).

Detection: Simple Green® has a characteristic sassafras odor that is not indicative of any hazardous situation.

XI. STABILITY AND REACTIVITY INFORMATION

Nonreactive. Simple Green® is stable, even under fire conditions, and will not react with water or oxidizers. Hazardous polymerization will not occur.

XII. TOXICOLOGICAL INFORMATION

Nonhuman Toxicity

Acute Mortality Studies:

Oral LD_{50} (rat): >5.0 g/kg body weight

Dermal LD_{50} (rabbit): >2.0 g/kg body weight

Dermal Irritation: Only mild, but reversible, irritation was found in a standard 72-hr test on rabbits. A value of 0.2 (non-irritating) was found on a scale of 8.

Eye Irritation: With or without rinsing with water, the irritation scores in rabbits at 24 hours did not exceed 15 (mild irritant) on a scale of 110.

Subchronic dermal effects: No adverse effects, except reversible dermal irritation, were found in rabbits exposed to Simple Green® (up to 2.0 g/kg/day for 13 weeks) applied to the skin of 25 males and 25 females. Only female body weight gain was affected. Detailed microscopic examination of all major tissues showed no adverse changes.

Fertility Assessment by Continuous Breeding: The Simple Green® formulation had no adverse effect on fertility and reproduction in CD-1 mice with continuous administration for 18 weeks, and had no adverse effect on the reproductive performance of their offspring.

XIII. BIODEGRADABILITY AND ENVIRONMENTAL TOXICITY INFORMATION

Biodegradability:

Simple Green® is readily decomposed by naturally occurring microorganisms. The biological oxygen demand (BOD), as a percentage of the chemical oxygen demand (COD), after 4, 7, and 11 days was 56%, 60%, and 70%, respectively. Per OECD Closed Bottle Test, Simple Green® meets OECD and EPA recommendations for ready biodegradability.

In a standard biodegradation test with soils from three different countries, Butyl Cellosolve reached 50% degradation in 6 to 23 days, depending upon soil type, and exceeded the rate of degradation for glucose which was used as a control for comparison.

Environmental Toxicity Information:

Simple Green® is considered practically non-toxic per EPA's aquatic toxicity scale. Simple Green® is non-lethal to any of the marine and estuarine test animals listed in the following table at concentrations below 200 mg/L (0.02%). This table shows the Simple Green® concentrations that are likely to be lethal to 50% of the exposed organisms.

	LC_{50} in mg/L (ppm)	
	48-hour	**96-hour**
Marine Fish:		
Mud minnow *(Fundulus heteroclitus)*	1690	1574
Whitebait *(Galaxias maculatus)*	210	210
Marine/Estuarine Invertebrates:		
Brine Shrimp *(Artemia salina)*	610	399
Grass Shrimp *(Palaemonetes pugio*)	270	220
Green-lipped Mussel *(Perna canaliculus)*	220	220
Mud Snail *(Potamopyrgus estuarinus)*	410	350

XIV. DISPOSAL CONSIDERATIONS

Simple Green® is fully water soluble and biodegradable and will not harm sewage-treatment microorganisms if disposal by sewer or drain is necessary. Dispose of in accordance with all applicable local, state, and federal laws.

XV. OTHER INFORMATION

Containers: Simple Green® residues can be completely removed by rinsing with water; the container may be recycled or applied to other uses.

Electrical Wiring Compatibility: Polyimide insulated wiring is not affected by exposure to Simple Green®. After immersion in Simple Green® for 14 days at 74°F, the 61 cm piece of polyimide insulated wire passed a one minute dielectric proof test at 2500 volts (ASTM D-149).

Contact Point: Sunshine Makers, Inc., Research and Development Division: 562-795-6000.

*** NOTICE ***

All information appearing herein is based upon data obtained by the manufacturer and recognized technical sources. Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of this information, Sunshine Makers, Inc. or its distributors extends no warranties, makes no representations and assumes no responsibility as to the suitability of such information for application to purchaser's intended purposes or for consequences of its use.

MATERIAL SAFETY DATA SHEET
SULFURIC ACID CR (40%)

CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Omega Chemistries
7623 North 67th Ave Suite 301
Glendale, AZ 85301
623-842-9304

EMERGENCY PHONE #'S:
602-686-9252
24 HOURS A DAY

COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENT	CAS NUMBER	% (BY WEIGHT)
SULFURIC ACID	7664-93-9	40.0
WATER		60.0
GENERIC: INORGANIC ACID		

HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS

EYE	Exposure can cause irreversible eye damage. Symptoms may include stinging, tearing, redness, swelling, corneal damage, and blindness.
SKIN	Exposure can cause irreversible skin damage. Symptoms may include redness, swelling, burns, and severe skin damage.
SWALLOWING	Exposure may be harmful or fatal. Symptoms may include severe stomach and intestinal irritation (nausea, vomiting, diarrhea), abdominal pain, and vomiting of blood. Swallowing this material may cause burns and destroy tissue in the mouth, throat, and digestive tract. Low blood pressure and shock may occur as a result of severe tissue injury.
INHALATION	Exposure to vapor or mist is possible. Exposure may be harmful or fatal. Symptoms may include severe irritation and burns to the nose, throat and respiratory tract.
SYMPTOMS OF EXPOSURE	No data
TARGET ORGAN EFFECTS	No data
DEVELOPMENTAL INFORMATION	No data
CANCER INFORMATION	This product contains sulfuric acid. The international agency for Research on Cancer has listed strong inorganic acid mists containing sulfuric acid as causing cancer in humans.
OTHER HEALTH EFFECTS	No data
PRIMARY ROUTE (S) OF ENTRY	Inhalation, skin contact

FIRST AID MEASURES

EYES	If material gets into the eyes, immediately flush eyes gently with water for at least 15 minutes while holding eyelids apart. If symptoms develop as a result of vapor exposure, immediately move individual away from exposure and into fresh air before flushing as recommended above. Seek immediate medical attention.
SKIN	Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Wash clothing before reuse and decontaminate or discard contaminated shoes.
SWALLOWING	Seek immediate medical attention. Do not induce vomiting. Vomiting will cause further damage to the mouth and throat. If individual is conscious and alert, immediately rinse mouth with water and give milk or water to drink. If possible, do not leave individual unattended.
INHALATION	If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.
NOTE TO PHYSICIANS	No data

FIRE FIGHTING MEASURES

FLASH POINT	Not applicable
EXPLOSIVE LIMIT	Not applicable
AUTOIGNITION TEMPERATURE	No data
HAZARDOUS PRODUCTS OF COMBUSTION	May form: acid vapors, sulfur dioxide
FIRE AND EXPLOSION HAZARDS	No data
EXTINGUISHING MEDIA	Dry chemical
FIRE FIGHTING INSTRUCTIONS	Water or foam may cause frothing which can be violent and possibly endanger the life of the firefighter. Water may be used to keep fire-exposed containers cool until fire is out. Wear a self contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn out gear and chemical resistant personal protective equipment.
NFPA RATING	HEALTH - 3 FLAMMABILITY - 0 REACTIVITY - 2

ACCIDENTAL RELEASE MEASURES

SMALL SPILL

Cover the contaminated surface with sodium bicarbonate or a soda ash/flaked lime mixture (50-50). Mix and add water if necessary to form a slurry. Scoop up slurry and wash site with soda ash solution. Proper mixing procedures are essential. Trained personnel should conduct this procedure. Untrained personnel should be removed from the spill area.

LARGE SPILL

Persons not wearing protective equipment should be excluded from area of spill until clean-up is completed. Stop spill at source. Dike to prevent spreading. Pump to salvage tank.

HANDLING AND STORAGE

HANDLING

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. Addition to water releases heat which can result in violent boiling and spattering. Always add slowly and in small amounts. Never use hot water. Never add water to acids. Always add acids to water.

EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE PROTECTION	Chemical splash goggles and face shield (8" min) in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses.
SKIN PROTECTION	Wear resistant gloves such as: neoprene. To prevent skin contact, wear impervious clothing and boots.
RESPIRATORY PROTECTIONS	If workplace exposure limit(s) of product or any component is exceeded, a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions. Engineering or administrative controls should be implemented to reduce exposure.
ENGINEERING CONTROLS	Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV's.
EXPOSURE GUIDELINES	COMPONENT: SULFURIC ACID(7664-93-9) OSHA VPEL 1.000mg/m3 - TWA ACGIH TLV 1.000mg/m3 - TWA ACGIH TLV 3.000mg/m3 - STEL WATER - no exposure limits established

PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT (for product)	554.0 F (290.0C) @ 760 mmHg	
VAPOR PRESSURE (for product)	.010 mmHg @ 68.00 F	
SPECIFIC VAPOR DENSITY	Not applicable	
SPECIFIC GRAVITY	1.843 @ 60.00 F	
LIQUID DENSITY	15.350 lbs/gal @ 60.00 F	1.843 kg/1 @ 15.60 C
PERCENT VOLATILES	1.0 - 5.0 %	
EVAPORATION RATE	slower than ethyl ether	
APPEARANCE	No data	
STATE	liquid	
PHYSICAL FORM	homogeneous solution	
COLOR	clear, syrupy colorless	

ODOR	No data
pH	No data

STABILITY AND REACTIVITY

HAZARDOUS POLYMERIZATION	Product will not undergo hazardous polymerization
HAZARDOUS DECOMPOSITION	May form: acid vapors, sulfur dioxide
CHEMICAL STABILITY	Stable
INCOMPATIBILITY	Avoid contact with: alkali metals, organic materials, strong alkalies. Acid reacts with most metals to release hydrogen gas which can form explosive mixtures with air.

TOXICOLOGICAL INFORMATION

No data

ECOLOGICAL INFORMATION

No data

DISPOSAL CONSIDERATION

WASTE MANAGEMENT INFORMATION:

Dispose of in accordance with all applicable local, state and federal regulations.

TRANSPORT INFORMATION

DOT INFORMATION - 49 CFR 172.101
DOT DESCRIPTION: SULFURIC ACID, 8, UN2796,PGII
CONTAINER MODE: 55 GAL DRUM/TRUCK PACKAGE
NOS COMPONENT: NONE
RQ (REPORTABLE QUANTITY) - 49 CFR 172.101 - SULFURIC ACID - 1020 LBS.

REGULATORY INFORMATION

US FEDERAL REGULATIONS	The intentional ingredients of this product are listed.
TSCA (TOXIC SUBSTANCES CONTROL ACT) STATUS	
CERCLA RQ - 40 CFR 302.4	SULFURIC ACID - 1000 LBS. RQ
SARA 302 COMPONENTS - 40-CFR 355 APPENDIX A	SULFURIC ACID -1000 LBS RQ & TPQ
SECTION 311/312 HAZARD CLASS - 40 CFR 370.2	IMMEDIATE (X)
SARA 313 COMPONENTS - 40 CFR 372.65	SULFURIC ACID (ACID AEROSOLS) 7664-93-9 96.00%
INTERNATIONAL REGULATIONS	NOT DETERMINED
INVENTORY STATUS	
STATE AND LOCAL REGULATIONS:	NJ & PA RTK LABEL: SULFURIC ACID 7664-93-9

OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

URS

ATTACHMENT E

SAFETY MANAGEMENT STANDARDS (SMS)

URS

SMS CHECKLIST

Issue Date: August 2010

The following URS Safety Management Standards (SMS) generally apply to all field projects. Review the requirements of each SMS and determine appropriate steps to ensure project compliance with the requirements.

Determine the applicability of these SMS to your project	Yes	See SMS #	Determine the applicability of these SMS to your project	Yes	See SMS #
Emergency Preparedness Plan	**Yes**	003	Sanitation	**Yes**	030
Housekeeping	**Yes**	021	Regulatory Inspections	**Yes**	001
Vehicle Safety	**Yes**	057	Health, Safety, and Environment Training	**Yes**	055
New Employee HSE Orientation	**Yes**	025	Incident Reporting and Notifications	**Yes**	049
Significant Incident Investigation	**Yes**	066	Injury and Claims Management	**Yes**	065
Behavior Based Safety	**Yes**	072	Managing HSE Related Risks	**Yes**	086
Management of Change	**Yes**	098			

The following URS SMS only apply when specific activities are conducted by URS and URS subcontractor personnel. If you answer "Yes" to any of the questions below, review the SMS indicated and determine the appropriate steps necessary to ensure project compliance with the requirements.

Will project activities involve any of the following?	No	Yes	See SMS #	Will project activities involve any of the following?	No	Yes	See SMS #
Abrasive blasting or exposure to abrasive blasting media or waste?	☐	☐	006	Excavations or exposure to excavation hazards?	☐	☐	013
Potential exposure to ticks, snakes, poisonous plants, and other biological hazards?	☐	☐	047	Flammable or combustible materials used or stored which could constitute a fire hazard?	☐	☐	014,015
Use of aerial lifts?	☐	☐	007	Use of portable, gas powered, electric, and/or powder actuated hand tools?	☐	☐	016
Potential exposure to air contaminants in hazardous concentrations?	☐	☐	043, 042, 050	Hazardous materials shipping?	☐	☐	048
Asbestos surveys or abatement oversight?	☐	☐	008	Hazardous substances – chemical or health hazards?	☐	☐	002
Potential exposure to Bloodborne Pathogens (i.e. blood or other bodily fluids)?	☐	☐	051	Hazardous waste activities (investigative or remedial)?	☐	☐	017
Work over or near water?	☐	☐	027	Heat Stress potential to employees working in: • Hot environments; or • Impermeable Chemical Protective Clothing?	☐	☐	018

URS

SMS CHECKLIST

Issue Date: August 2010

Will project activities involve any of the following?	No	Yes	See SMS #	Will project activities involve any of the following?	No	Yes	See SMS #
California job activities?	☐	☐	005	Heavy equipment in use at this project site?	☐	☐	019
Corrosive materials used or handled?	☐	☐	009	Hot Work (welding, cutting, grinding)?	☐	☐	020
Confined space entries?	☐	☐	010	Industrial site access of any kind?	☐	☐	004
Cranes or hoists?	☐	☐	038,041	Lead exposures (lead paint removal, lead in dust, etc)?	☐	☐	022
Demolition activities of any type of structures?	☐	☐	011	International travel?	☐	☐	036
Drilling activities?	☐	☐	056	Use of Manbasket (Crane Suspended Personnel Platforms) for working at heights?	☐	☐	038, 041
Use of small watercraft (e.g., boats, canoes)?	☐	☐	053	Work on or near streets and/or roadways?	☐	☐	032
Exposure to chemical/physical/biological agents and/or activities that require Medical Surveillance? Examples would include exposures to; Noise, Asbestos, Lead, Hazardous Waste, High Altitudes, Carcinogens, Respirator Use.	☐	☐	024	Exposure to uncontrolled energy sources including electrical, fluid, pneumatic, fuel, steam, gravity, and hazardous material?	☐	☐	023
Noise exposures?	☐	☐	026	Potential exposure to subsurface and/or overhead utilities?	☐	☐	034
Ladder use?	☐	☐	028	Potential exposure to Unexploded Ordnance/Chemical Warfare agents?	☐	☐	039
Exposure to eye, head, hand, foot, or other hazards that require the use of personal protective equipment?	☐	☐	029	Underground Storage Tank investigation, removal, etc.?	☐	☐	033
Use of portable gauges (e.g., nuclear-density gauges) containing sealed radioactive source materials?	☐	☐	044	Work with live electrical systems?	☐	☐	012
Respiratory protection use – required and/or voluntary?	☐	☐	042	Work at altitudes greater than 7,000 feet (~ 2,100 meters)?	☐	☐	035
Scaffolding?	☐	☐	031	Working at heights of greater than 4 feet (1.22 meters) or 6 feet (1.83 meters) for construction/demolition?	☐	☐	040
Manual lifting and/or material handling?	☐	☐	069	Use of computer workstations for data entry, CADD, word processing, etc.?	☐	☐	054
Work on or near railroad transportation systems?	☐	☐	063	Exposure to recognized hand hazards?	☐	☐	064

URS

SMS CHECKLIST

Issue Date: August 2010

Will project activities involve any of the following?	No	Yes	See SMS #	Will project activities involve any of the following?	No	Yes	See SMS #
Work at a client site requiring compliance with the OSHA Process Safety Management Standard?	☐	☐	058	Are employees or contractors required to operate Powered Industrial Vehicles (i.e. forklift trucks)?	☐	☐	070
Subcontractors to perform high risk activities (including drilling and excavation) with their own personnel and/or equipment?	☐	☐	046	Potential exposure to ionizing radiation?	☐	☐	052
Potential personnel exposure to temperatures below 32^{o}F?	☐	☐	059	Down-hole geologic logging operations associated with geotechnical explorations or caisson inspections?	☐	☐	077
URS personnel newly hired or transferred from another position?	☐	☐	078	Potential inhalation of chromium VI (hexavalent chromium)?	☐	☐	083
Diving activities?	☐	☐	085	Working alone in an area where they cannot be seen/heard by another person?	☐	☐	084
Work at a site regulated by the Mine Safety Health Administration (MSHA)?	☐	☐	037	Hoists, elevators or conveyors being used?	☐	☐	045
Coordinate building material storage on-site?	☐	☐	062	Tunnels, shafts and caissons?	☐	☐	082
Operating and testing compressed air systems?	☐	☐	087	Signs, signals or barricades will be used onsite?	☐	☐	088
Temporary floors being created?	☐	☐	089	Project security will be required?	☐	☐	090
Concrete will be poured or handled?	☐	☐	091	Installation of cofferdams being performed?	☐	☐	092
Steel erection activities being performed?	☐	☐	093	Use or handling of explosive or blasting agents?	☐	☐	094
Work on or transfer to/from marine transportation (e.g. barge, vessel)?	☐	☐	095	Mining operations are conducted or controlled by URS?	☐	☐	096
Working conditions or schedule (more than 12 hours/day) may increase worker fatigue?	☐	☐	060				

URS Safety Management Standards (SMS) can be provided upon request.

APPENDIX B

COMMUNITY AIR MONITORING PLAN

WALGREEN COMPANY

104 Wilmot Road MS#1630
Deerfield, Illinois 60015

COMMUNITY AIR MONITORING PLAN

WALGREEN COMPANY STORE 02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK

BCP Site No. C356032

May 2014

Prepared By:

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

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FIGURES

1.0 INTRODUCTION

URS Corporation-New York (URS), on behalf of the Walgreen Company (Walgreens), is submitting this Community Air Monitoring Plan (CAMP) to the New York State Department of Environmental Conservation (NYSDEC) to provide real time air monitoring for volatile organic compounds (VOCs) and particulates during the investigative work outlined in the Workplan to Delineate Soil and Groundwater Impacts at the Walgreens Store located at 10 East Chester Street in Kingston, New York. As per NYSDEC DER-10, the intent of the CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities.

2.0 WORK DESCRIPTION

The subject property (site) is located at 10 East Chester Street in Kingston, New York (Figure 1). The site consists of approximately one-acre of land and is currently Walgreens Store No. 02077. The construction of the store was completed in 2010. The site is commercially zoned with surrounding properties that include a mix of commercial businesses and residential lots.

According to available information, portions of the site have historically been occupied by a dry cleaning facility, a vehicle fueling/service station, and a trolley barn that became a school bus maintenance garage. The constituents of potential concern at the site include volatile organic compounds (VOCs) associated with solvents (i.e., trichloroethylene and tetrachloroethylene) and petroleum products.

In order to delineate the shallow soil and groundwater impacts at the site, URS will advance soil borings at the site and will collect grab groundwater samples from the soil boring locations. The work will be conducted using a Geoprobe Rig, which will limit the diameter of the soil boring and limit the amount of soil that will be exposed and the amount of dust generated. The scope of work includes the advancement of up to ten soil borings at the site. URS will use a concrete corer that uses water to suppress dust generation to core through the concrete cover at the site. The proposed soil borings are shown in Figure 2. Soil cuttings generated during the activities will be containerized immediately after sampling is complete. In addition, the boreholes will be backfilled with bentonite as soon as the sampling is complete.

3.0 VOLATILE ORGANIC COMPOUND MONITORING

An Exclusion Zone will be defined prior to the commencement of work. VOCs will be monitored at the perimeter of the Exclusion Zone on a periodic basis. The upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. Wind direction will be monitored throughout the day so that monitoring locations can be adjusted as necessary.

If total organic vapor levels exceed 5 parts per million (ppm) above the background, work activities will be halted and monitoring will be continued. Work may resume if levels drop below 5 ppm above background.

If total organic vapor levels at the downwind perimeter of the exclusion zone remain at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors will be identified, corrective actions will be taken to abate emissions, and monitoring will be continued.

All readings will be recorded and be made available for the NYSDEC and the New York State Department of Health (NYSDOH) personnel to review, if requested.

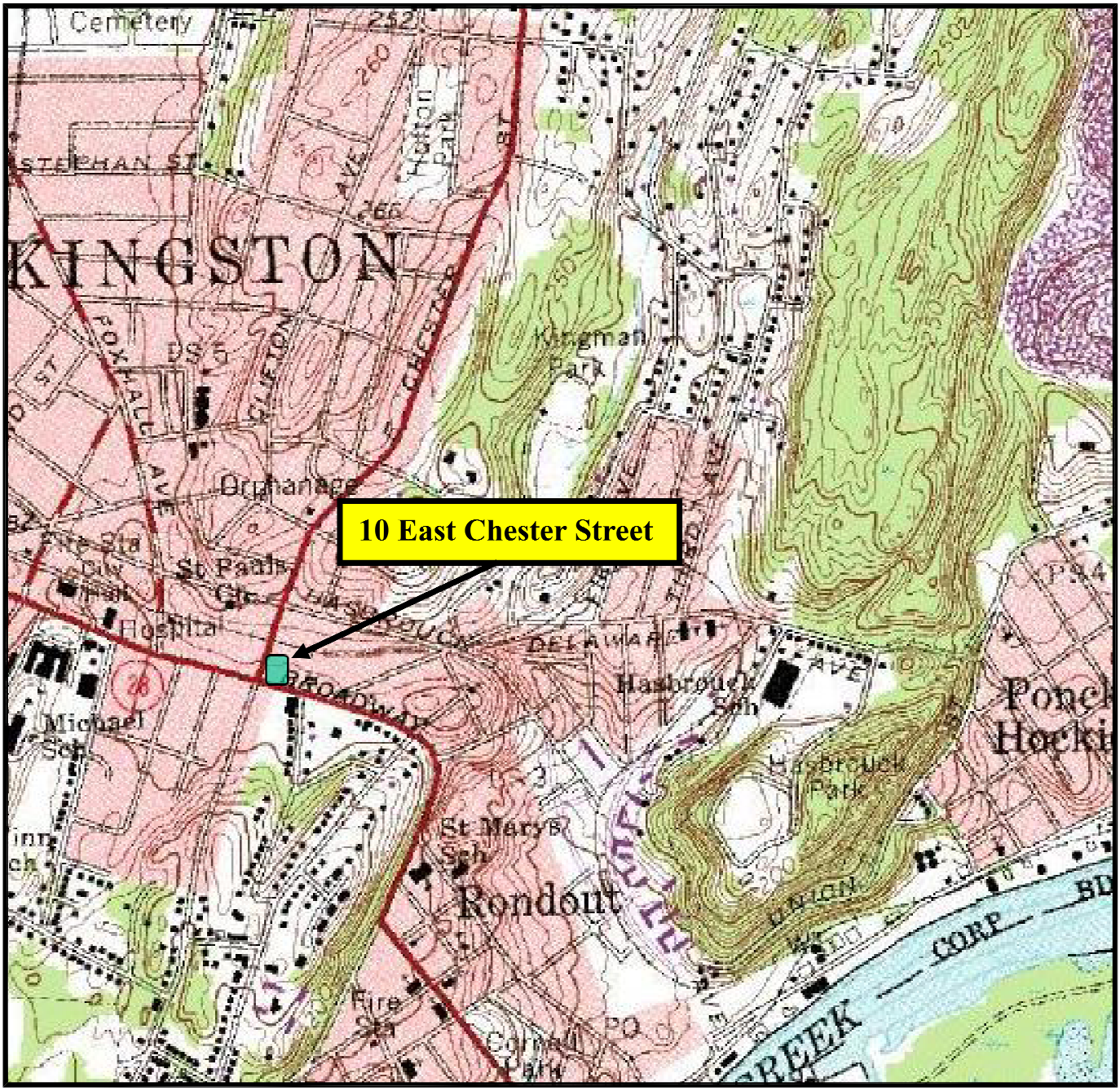
4.0 PARTICULATE MONITORING

An Exclusion Zone will be defined prior to the commencement of work. It is not anticipated that dust will be generated during the Geoprobe activities. A concrete corer equipped with water to suppress dust generation will be used to core through the concrete surface at the site. Therefore, particulate monitoring will consist of making visual observations regarding dust leaving the work area.

If dust is visually observed leaving the site, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that dust is not observed migrating from the site.

All observations will be recorded and be made available for the NYSDEC and the NYSDOH personnel to review, if requested.

FIGURES



SCALE: 1:12,000

1 0 1/4 1/2 MILE

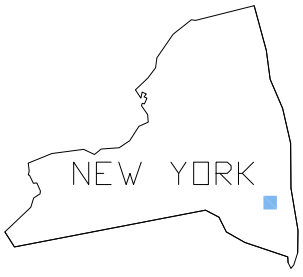
500 0 500 1000 1500 2000 2500 3000 3500 FEET

1 0 1/4 1/2 KILOMETER

NORTH

MAP REFERENCE:

PORTION OF U.S.G.S. QUADRANGLE MAP
7 ½ MINUTE SERIES (TOPOGRAPHIC)



QUADRANGLE LOCATION

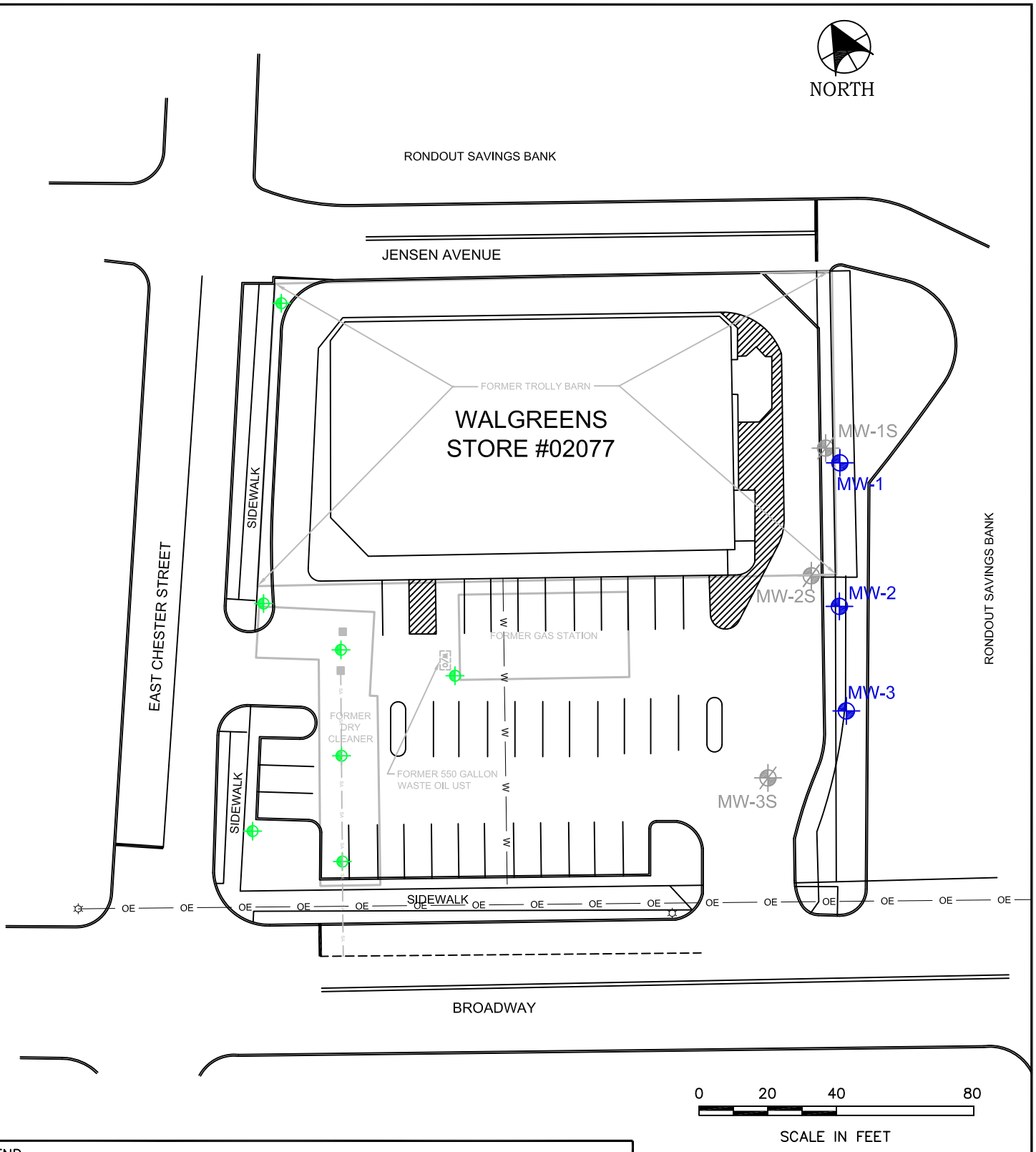
WALGREEN STORE #02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK 12401

FIGURE 1
SITE LOCATION MAP

DATE:	Mar 30, 2011
JOB NO.:	25368188
DRAWN BY:	JMM
CHK'D BY:	GG
SCALE:	AS SHOWN

URS
100 SOUTH WACKER DRIVE, SUITE 500
CHICAGO, ILLINOIS 60606
PHONE: (312) 939-1000
FAX: (312) 939-4198

PLOTTED: March 30, 2011 BY: Jeff Mcmahon CTB USED: ---- PAPER SPACE TAB: Figure 1 - Site Location Map
DWG PATH: C:\Users\Jeff Mcmahon\Documents\URS-Shell\Chicago-Office\walgreens\KINGSTON, NY\DWG\FIGURE 1 - SITE LOCATION MAP.dwg



LEGEND:

- CURB
- ABANDONED MONITORING WELL LOCATION
- MONITORING WELL LOCATION
- STREET LIGHT
- OE — OVERHEAD ELECTRIC
- W — WATER LINE
- SA — FORMER SEWER LINE
- FORMER FLOOR DRAIN
- PROPOSED SOIL BORING LOCATION
- W/O — FORMER 550 GALLON WASTE OIL UST

NOTE: LOCATIONS OF KNOWN UTILITIES ARE APPROXIMATE

WALGREENS STORE #02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK 12401

FIGURE 2
PROPOSED SAMPLING LOCATIONS

DATE:	Feb 04, 2014
JOB NO.:	25368188
DRAWN BY:	MAW
CHK'D BY:	JGG
SCALE:	AS SHOWN

URS
3 CORPORATE DRIVE, SUITE 203
CLIFTON PARK, NEW YORK 12065
PHONE: (518) 688-0015
FAX: (518) 688-0022

PLOTTED: February 4, 2014 BY: Wasson, Melissa CTB USED: 0-6 Black.ctb PAPER SPACE TAB: MW LOCATION MAP
DWG PATH: J:\25368188 Walgreens Kingston, NY\2014 Work\plan\KINGSTON - FIGURE2_rev 2014.dwg

APPENDIX C

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

WORKPLAN TO DELINEATE SOIL AND GROUNDWATER IMPACTS

WALGREEN COMPANY STORE 02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK

BCP Site No. C356032

Prepared By:

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

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APPENDICES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared by URS Corporation (URS) on behalf of the Walgreen Company (Walgreens) for the investigation to delineate soil and groundwater impacts at the Walgreens store located at 10 East Chester Street in Kingston, New York. The location of the site is shown in Figure 1. The QAPP is designed to provide an overview of quality assurance/quality control (QA/QC) procedures and programs that will be adhered to during field and laboratory activities to be implemented in support of the Investigation.

2.0 PROJECT/SITE DESCRIPTION

A description of the project and site is provided in the Work Plan. A summary of the anticipated samples to be collected and the required analytical parameters is provided in Table 1.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The URS Project Quality Assurance Officer (QAO) will ensure that all project deliverables undergo a thorough QA review by senior staff members who are qualified and experienced in appropriate disciplines. The URS Project QAO for this project will be Patrick Rabideau, PG, MBA.

The URS Project Manager, Jennifer Gillies, 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 the client throughout the project and will be responsible for successful implementation of the field QA/QC activities. The URS Project Manager may delegate a portion of the tasks required for successful implementation of the work plans to a qualified individual who will be on site during the investigation (e.g., the Onsite Geologist). This person 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.

The URS Project Manager is responsible for verifying that the analytical laboratories adhere to the QA/QC requirements specified in this QAPP. The URS Project Manager will be the point of contact for the Laboratory Project Manager and will be in continual contact with the Laboratory Project Manger to verify that all efforts are being made to perform sample analyses in a manner such that the resulting data will be of sufficient quality for its intended purpose.

The laboratories providing standard analytical testing services in support of the Site Characterization will hold applicable New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certifications for the analyses to be performed. The laboratories will maintain their own QA/QC program and employ the required staff to implement this program. The Laboratory QA Officers are responsible for verifying that all sample analyses are performed in accordance the analytical methods, laboratory QA/QC procedures, this QAPP, and other applicable regulations.

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.

4.2 Environmental Problem

The objective of the Investigation is to delineate the shallow soil and groundwater impacts at the site. A summary of the anticipated samples to be collected during the Investigation is presented in Table 1.

4.3 Sampling Techniques

URS will collect soil and groundwater samples as described in the Workplan and in accordance with the general procedures listed below.

Soil

The soil samples will be collected using a geoprobe rig with dual-tube technology.

1) Inspect the sampling equipment to ensure proper working condition.

2) Insert dedicated disposable acetate liner into the sampler and select additional components for the¬ sampler as required (i.e., leaf spring core retainer for clays, or a sand trap for non-cohesive sands).

3) Lower the sampler to the ground surface, or bottom of the hole previously made by the sampler, and check the depth against length of the rods and the sampler.

4) Attach the drive head assembly to the sample rods.

5) Push the sampler in 4-foot increments into the subsurface up to the desired depth with a hydraulic press.

6) Rotate the sampling rods clockwise and remove the sampler.

7) Split the sample lengthwise and screen the soil with a PID for volatile organic vapors.

8) Document all properties and sample locations in the field notebook, and later on the Direct-Push Log form.

9) Abandon the direct-push boring by backfilling with bentonite pellets and hydrate with potable water or use concrete patch in impervious areas.

10) Use nitrile gloves while filling appropriate laboratory-supplied sample bottleware. Encore samplers will be used to collect soil samples for VOCs. Sample container, preservation, and holding

time requirements for the collected samples are identified in Table 2. Samples will be labeled and stored in coolers on ice after collection under proper chain of custody documentation until received by the laboratory.

Groundwater

Groundwater samples will be collected using Geoprobe's direct push technology. The following is a typical procedure for collection of groundwater samples using this technology.

1) A Screen Point Sampler 15 (SP15) groundwater sampler, or an equivalent unit, will be utilized to collect groundwater samples in direct push borings that intercept the groundwater table.

2) To collect groundwater samples, a clean sampler will be threaded onto the leading end of the probe rod and lowered or driven to the desired sampling interval (approximately 1 foot below the top of the water table). While the sampler is driven to depth, O-ring seals at the drive head and expendable drive point will provide a watertight system.

3) Once at the desired sampling depth, chase rods will be sent down-hole until the leading rod contacts the bottom of the sampler screen. The tool string will then be retracted while the screen is held in place by the chase rods. As the tool string is retracted, the expendable point is released from the sampler sheath. An O-ring on the screen head maintains the seal at the top of the screen. As a result, any liquid entering the sampler during screen deployment must first pass through the screen.

4) The tool string and sheath may be retracted the full length of the screen or as little as a few inches if a small sampling interval is desired. The SP15 Sampler utilizes a screen with a standard slot size of 0.004 inches and an exposed length of 41 inches.

5) A minimum of 1 gallon of water will be purged from the sampler prior to sample collection with dedicated Teflon or polyethylene tubing and a check valve. The groundwater sample will be collected with dedicated Teflon or polyethylene tubing and a check valve.

6) Groundwater samples will be placed on ice and shipped to the laboratory under COC documentation. Sample container, preservation, and holding time requirements for the collected samples are identified in Table 2.

7) Upon the completion of the sampling, the sampler will be removed and the borehole will be backfilled with bentonite pellets and the surface will be repaired with similar material (i.e., concrete, asphalt or topsoil); and marked with spray paint.

4.4 Target Analytes/Contaminants and Analytical Methods

Soil samples and groundwater samples collected during this investigation will be analyzed for USEPA Superfund target compound list (TCL) VOCs. These parameters are identified in Table 1, which provides a complete summary of the anticipated samples and required analyses for the Investigation. Instruments and procedures to be used for field screening purposes are discussed in the Workplan.

4.5 Measurement Performance Criteria

The data quality indicators of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) will be measured from data collected from offsite chemical analyses performed by the laboratory.

4.5.1 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. RPDs will be evaluated in accordance with the methods listed in Table 1 and the applicable data validation guidelines identified in Section 12 of this QAPP, where applicable.

4.5.2 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. Acceptable ranges of recovery for all analyses being performed will be performed in accordance with the methods listed in Table 1, where applicable.

4.5.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represents 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 have been selected with the goal of obtaining representative samples for the media of concern.

4.5.4 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 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.

4.5.5 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. For the data generated, a goal of 90% is required for completeness (or usability) of the analytical data. If this goal is not met, then the client and URS project personnel will determine whether the deviations may cause the data to be rejected and what, if any, further actions need to be taken. Completeness of the analytical data obtained for the samples collected during this investigation will be evaluated during the validation process, and will be discussed in the Data Usability Summary Report (DUSR), which will be prepared in accordance with *DER-10 Technical Guidance for Site Investigation and Remediation, Appendix 2B*, (NYSDEC, May 2010).

4.5.6 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. The laboratory will be required to periodically update MDLs for the parameters to be analyzed as part of this work assignment, at the frequency required by each analytical method.

5.0 SAMPLING LOCATIONS AND PROCEDURES

As shown in Figure 2, seven soil borings will be advanced at the site to delineate shallow soil and groundwater impacts. An additional three soil borings may be advanced east or west of the former sanitary sewer line, depending on field observations, to further delineate impacts.

As described in the Workplan, continuous soil samples will be collected utilizing a Geoprobe with dual-tube sampling technology with a five-foot macrocore sampler for field screening and soil classification. Soil samples will be visually classified in the field according to lithology, sorting, grain size, and relative moisture content. The sampling equipment will be decontaminated prior to each sample interval using a Simple Green™ or Alconox™ solution followed by a deionized water rinse.

A representative portion of each soil sample collected will be placed into a re-sealable plastic bag. After allowing soil vapors to gather in the headspace of the plastic bag, the soil sample will be field screened for the presence of total volatile organic vapors utilizing a PID equipped with a 10.6 eV lamp. The PID will be calibrated utilizing ambient air and a 100 ppm isobutylene span gas prior to initiating site activities. In order to vertically delineate soil impacts, soil samples will be collected over two-foot intervals throughout the soil boring. It is anticipated that five soil samples will be collected from each soil boring.

Once the soil sampling is complete, the dual-tube sampling equipment will be advanced five-feet into the water table. A stainless steel screen will be placed into the hole through the dual tube casing. A grab groundwater sample will be collected from each soil boring location.

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 Onsite Geologist (or his/her designee).
- Under Custody - A sample is "Under Custody" if:
  - It is in one's possession, or
  - It is in one's view, after being in one's possession, or
  - It was in one's possession and one placed it under lock, or
  - It is in a designated secure area.

6.2 Responsibilities

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

- Review sample labels or tags, closure tapes, and COC records.
- Ensure that field sampling personnel are properly trained 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 Manager.

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 will notify the URS Project Manager immediately if there are any problems with the COC documentation.

6.4 Sample Containers and Holding Times

Sample container and preservation requirements and analytical holding times for the analytical methods being used for this work assignment are listed in Table 2. All holding times begin with the validated time of sample receipt (VTSR) at the laboratory except as noted otherwise on Table 2.

7.0 ANALYTICAL PROCEDURES

The specific analytical methods to be used for the analysis of samples collected during this work assignment are identified in Table 1. Quality control criteria to be followed by each laboratory when performing the analyses will be performed in accordance with the methods listed in Table 1.

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 will be obtained from sources traceable to National Institute of Standards and Technology (NIST), 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 methods referenced in Table 1. All standards and standard solutions are to be formally documented (i.e., in a bound logbook) and should identify the supplier, lot number, purity/concentration, receipt/preparation date, preparer's name, method of preparation, expiration date, and any other pertinent information. All standard solutions will 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 will continually monitor the quality of the standards and reagents through well-documented procedures.

Balances - The analytical balances will be calibrated and maintained in accordance with manufacture specifications. Calibration is conducted with two American Society of Testing Materials (ASTM) Class 1 weights that bracket the expected balance use range. The laboratory will 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 will be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised and the integrity of the analytical samples is upheld. Appropriate acceptance ranges (4°C ± 2°C for refrigerators) will be clearly posted on each unit in service.

Water Supply System – Laboratories 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.

Air Supply System – Laboratories performing air/soil vapor sample analyses must maintain a sufficient supply of analyte-free air for all project needs. The grade of air must be of the highest quality in order to eliminate false-positives from the analytical results. Appropriate documentation of the quality of the air supply system(s) will be performed on a regular basis by the laboratory.

Sample Containers - All sample containers supplied by the laboratories will meet the requirements of the analytical methods identified in Table 1 and/or the requirements specified in the NYSDEC Analytical Services Protocol (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 identified in Table 1 and/or the NYSDEC Analytical Services Protocol (most current), whichever is more stringent. Documentation of sample cleaning procedures and/or certifications provided by vendors will be maintained by the laboratories.

Air Sampling Canisters - All Summa (or equivalent) canisters supplied by the laboratories must be cleaned following the requirements of the analytical methods. The canisters shall be individually or batch certified analyte-free to a level below the laboratory quantitation limit for each analyte. Documentation showing the certification of the canisters shall be submitted in each laboratory report package.

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 (QLs) for each analytical method. Each instrument for organic analysis will be calibrated with

standards appropriate to the type of instrument and linear range established within the analytical method(s) and/or the specific requirements of the work assignment. Calibration of laboratory instruments will be performed according to the analytical methods specified 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 work assignment, which may include one or more of the following: photoionization detectors (PID) 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. Other instruments may also be used as needed based on the requirements of the work assignment. The calibration and maintenance of field instrumentation will be performed according the manufacturer's requirements or as otherwise documented by the Onsite Geologist.

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 listed in Table 1 and the specific requirements of this work assignment. Acceptable criteria and/or target ranges for these QC samples will be performed in accordance with the methods listed in Table 1.

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, solid, or humidified ultra pure zero air 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 listed in Table 1. Concentrations of all analytes in the method blanks should be below the method QLs. The Laboratory Project Manager will contact the URS Project Manager to determine the appropriate course of action if analyte concentrations in any blank are greater than the allowable concentrations as specified in the analytical methods.

Laboratory Control Samples (LCS) – An LCS or MSB is an aliquot of laboratory demonstrated analyte-free water, solid, or humidified ultra pure zero 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 listed

in Table 1. Acceptance criteria for LCS (or MSB) analyses will be performed in accordance with the methods listed in Table 1.

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 collected and analyzed at the frequency specified in Table 1. Acceptance criteria for MS/MSD analyses will be in accordance with the methods listed in Table 1. In those instances where no MS/MSD sample will be collected, the laboratory will provide results for batch MS/MSD analyses.

9.3 Additional QC

Additional QC samples that may be collected as part of this work assignment are described in this section. The specific number and type of QC samples to be collected are listed in Table 1.

Equipment/Rinsate Blanks – An equipment or rinsate blank is used to indicate potential contamination from sample instruments used to collect and transfer samples, and also serves as a measure of potential contamination from ambient sources during sample collection. 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 will be collected, transported, and analyzed in the same manner as the samples acquired that day. Equipment blanks typically are not needed when dedicated and/or disposable sampling equipment is used.

Trip Blanks - Trip blanks are only required when collecting aqueous samples for VOC analyses. They 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. 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.

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 (or 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 work assignment shall be consistent with the analytical methods listed in Table 1.

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 work assignment shall be consistent with the analytical methods listed in Table 1.

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 Onsite Geologist will discuss with and receive approval from the URS Project Manager prior to taking any corrective actions in the field that may need to be implemented in order to meet project objectives. The Onsite Geologist 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 Manager 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 Manager immediately for problem resolution. All corrective actions shall be documented thoroughly.

11.3 Instrument Calibration

Sample analysis shall not be allowed until all laboratory instrumentation is properly calibrated in accordance with method requirements. If any initial/continuing calibration standards 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 QLs as specified for each method listed in Table 1. The laboratory QLs should also be equal to or below any applicable regulatory or disposal criteria/guidance values against which the data will be compared. However, it is not always possible for laboratories to achieve such QLs. In these instances, the laboratory will report sample results down to the MDLs.

Sample-specific QLs 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 QLs due to a particular sample matrix, the Laboratory Project Manager will contact the URS Project Manager 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 Manager 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 for the analytical methods listed in Table 1. Failure to meet 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 Manager 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 Manager 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. Where applicable, the standard NYSDEC Data Package Summary Forms should be completed by the analytical laboratories and included in the deliverable data packages. The laboratory will provide the data in electronic format that is compatible with NYSDEC EqUIS.

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. Results for air/soil vapor samples will be reported in units of micrograms per cubic meter ($\mu g/m^3$).

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 be performed by a qualified chemist. All analytical samples collected will receive a limited data review including a review of holding times, completeness of all required deliverables, 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 referenced in Table 1 will be used to aide the chemist during the limited data review. In addition, the "EPA Region II Data Validation Guidelines" currently listed on their website will also be used, as applicable. EPA Region II is currently updating their Data Validation Guidelines. The guidelines for SW-846 methods are currently not on the website. The references listed below were the most recent versions prior to removal from the website. These documents will be referenced until the website is updated.

- Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B, HW-24, Revision 2, August 2008;
- Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, HW-22, Revision 4, August 2008;
- Validating Pesticide Compounds – Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B, HW-44, Revision 1, October 2006;
- Validating PCB Compounds – PCBs by Gas Chromatography SW-846 Method 8082A, HW-45, Revision 1, October 2006;
- Validating Chlorinated Herbicides – GC, SW-846, Method 8151A, HW-17, Revision 2, September 2006; and
- Validation of Metals for the Contract Laboratory Program (CLP) Based on SOW ILMO5.3, HW-2, Revision 13, September 2006.

12.3 Data Usability

A DUSR will be submitted to Walgreens as part of the investigation report, and will describe the number and type of collected samples and the analytical methodologies used by the laboratories. Any 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 DUSR requirements is provided in Appendix A. The DUSR will be conducted by Peter Fairbanks. Mr. Fairbank's resume is included in Appendix B.

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 are 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*

USEPA. 2006. Validation of Metals for the Contract Laboratory Program (CLP) Based on SOW ILMO5.3, HW-2, Revision 13. September.

USEPA. 2006. Validating Pesticide Compounds – Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B, HW-44, Revision 1. October.

USEPA. 2006. Validating Chlorinated Herbicides - GC, SW-846, Method 8151A, HW-17, Revision 2. September.

USEPA. 2006. Validating PCB Compounds – PCBs by Gas Chromatography SW-846 Method 8082A, HW-45, Revision 1. October.

USEPA. 2008. Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, HW-22, Revision 4, August.

USEPA. 2008. Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B, HW-24, Revision 2. Region II. August.

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

NYSDEC. 2005. Analytical Services Protocol.

NYSDEC. 2010. DER-10 Technical Guidance for Site Investigation and Remediation. May.

USEPA. National Enforcement Investigations Center (NEIC) Office of Enforcement. NEIC Policies and Procedures. Washington.

*The most current data validation reference will be utilized as available on EPA Region II's website.

TABLES

TABLE 1

SUMMARY OF SAMPLES AND ANALYTICAL PARAMETERS

10 EAST CHESTER STREET

KINGSTON, NEW YORK

			Field QC Samples				
Parameter	**Analytical Method[1,2]**	**Estimated Number of Samples**	**Field Duplicates[3]**	**MS/MSD Pairs[3]**	**Rinsate Blanks[3]**	**Trip Blanks[4]**	**Total No. of Samples**
I. Soil Borings							
TCL VOCs	8260C	35	2	2	0	0	41
II. Groundwater Samples							
TCL VOCs	8260C	7	2	2	0	2	15

Notes:

1. NYSDEC Analytical Services Protocol (ASP), July 2005 Edition.
2. Test Methods for Evaluating Solid Waste, Physical Chemical Methods (SW-846) USEPA Final Update III, June 1997
   Standard Methods (SM) for the Examination of Water and Wastewater, 20th Edition, 1998
   Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, USEPA, Revised March 1983
3. Assumes a 5% frequency (one per 20 field samples)
4. Approximate-Assumes one per day of field sampling for water samples only

MS/MSD - Matrix spike/matrix spike duplicate
TCL - Target Compound List as listed in USEPA Statement of Work OLM04.2 (1999) with subsequent contract modifications.
VOC - Volatile Organic Compounds

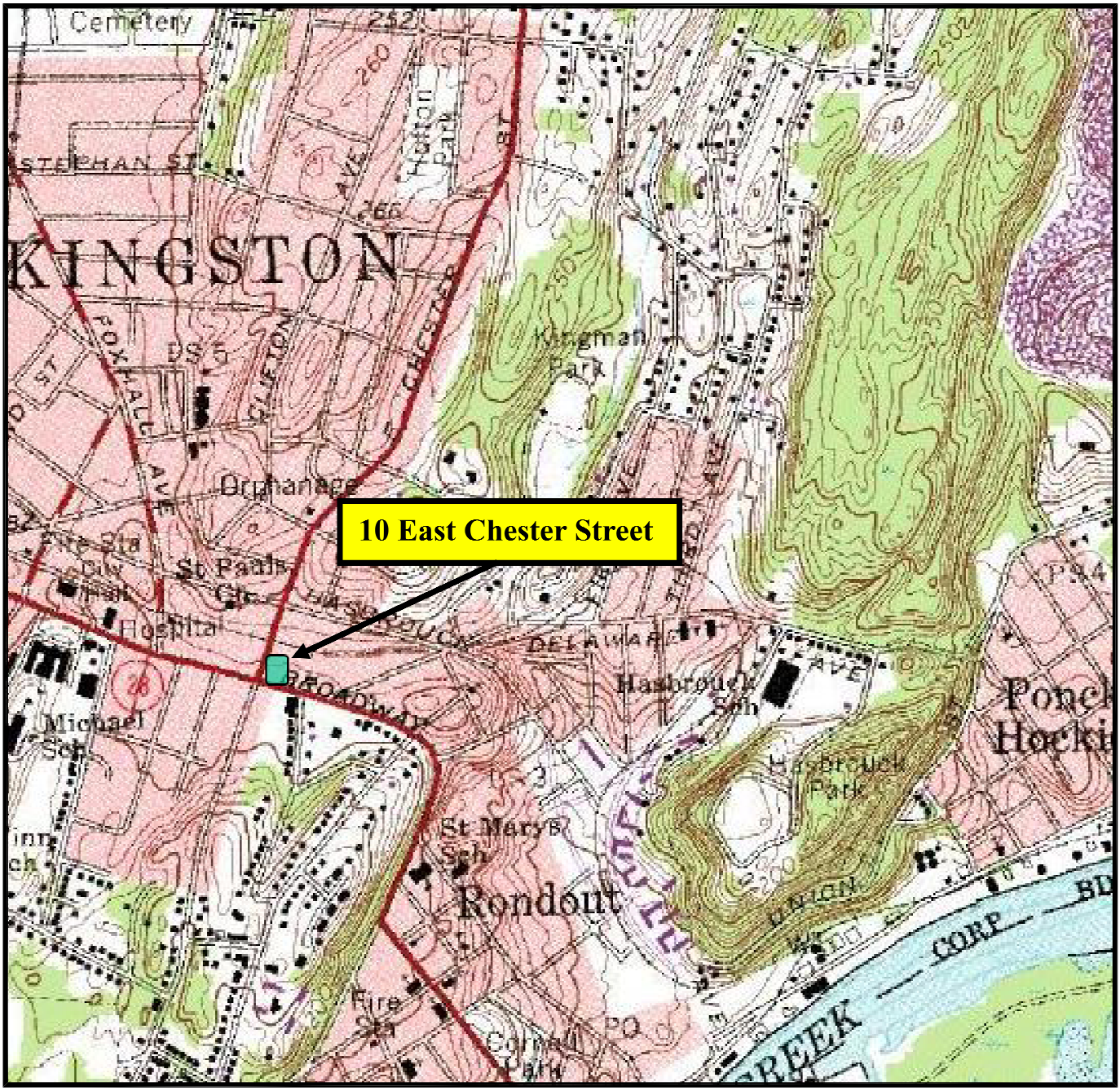
TABLE 2
SAMPLE CONTAINER, PRESERVATION, AND HOLDING TIME REQUIREMENTS
10 EAST CHESTER STREET
KINGSTON, NEW YORK

Analytical Method/Parameter	Container Size/Type*	Number of Containers to Be Collected	Preservation	Maximum Holding Time (from VTSR except as noted)
Aqueous Samples				
TCL VOCs	40 mL glass vial	2	HCl to pH<2, 4 °C	Analysis: 14 days (5 days if not preserved to pH<2)
Soil Samples				
TCL VOCs	Encore samplers (~5 grams per encore)	3	4 °C	Preservation: Within 48 hours, laboratory will preserve with methanol or freeze sample Analysis: 14 days from preservation

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

VTSR - Validated time of sample receipt
VOC - Volatile Organic Compounds
NA-Not Applicable

FIGURE



SCALE: 1:12,000

1 0 1/4 1/2 MILE

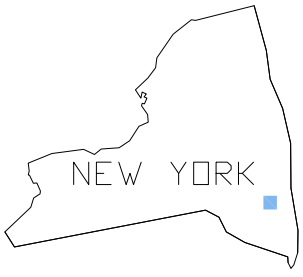
500 0 500 1000 1500 2000 2500 3000 3500 FEET

1 0 1/4 1/2 KILOMETER

NORTH

MAP REFERENCE:

PORTION OF U.S.G.S. QUADRANGLE MAP
7 ½ MINUTE SERIES (TOPOGRAPHIC)



QUADRANGLE LOCATION

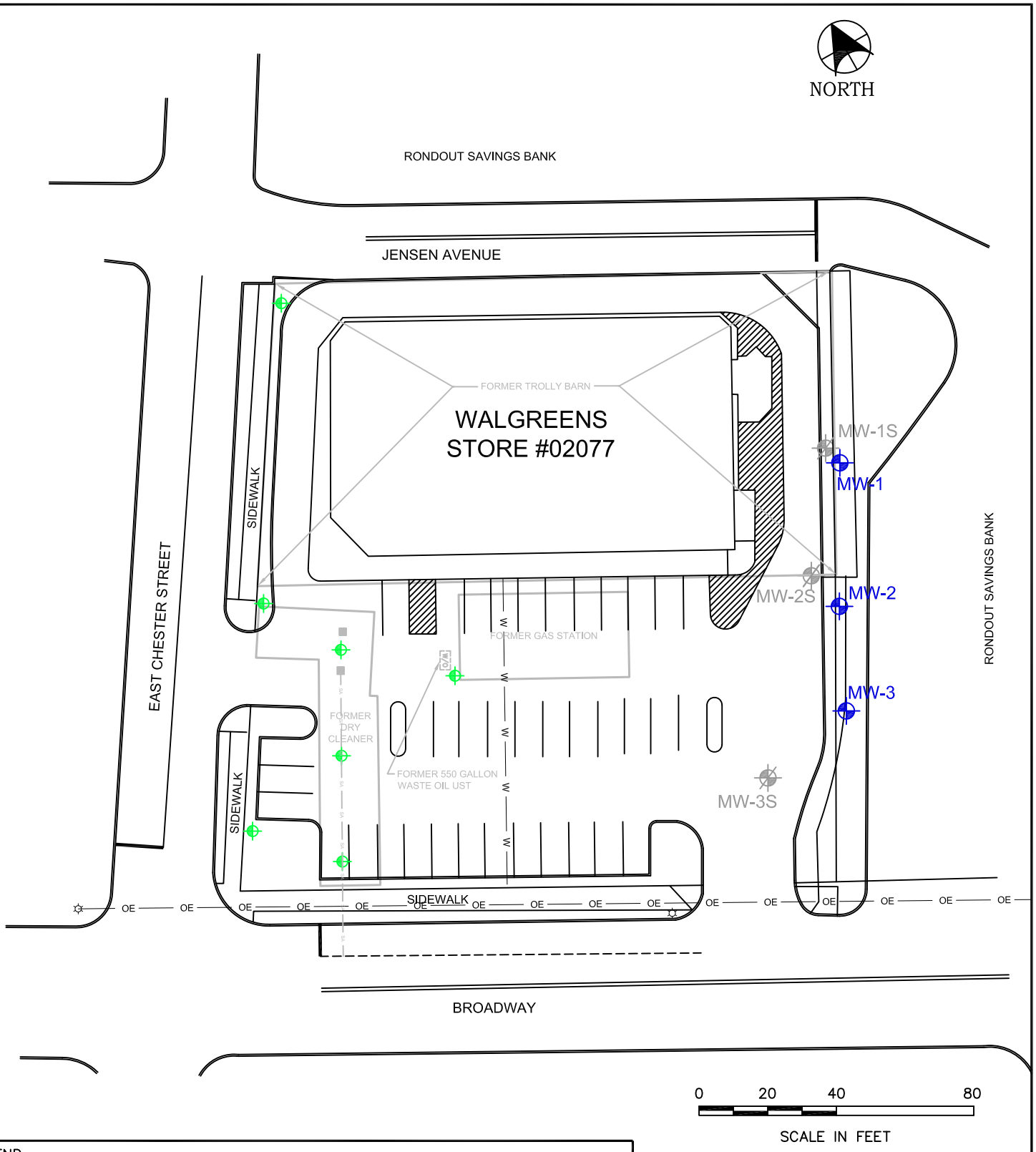
WALGREEN STORE #02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK 12401

FIGURE 1
SITE LOCATION MAP

DATE:	Mar 30, 2011
JOB NO.:	25368188
DRAWN BY:	JMM
CHK'D BY:	GG
SCALE:	AS SHOWN

URS
100 SOUTH WACKER DRIVE, SUITE 500
CHICAGO, ILLINOIS 60606
PHONE: (312) 939-1000
FAX: (312) 939-4198

PLOTTED: March 30, 2011 BY: Jeff Mcmahon CTB USED: ---- PAPER SPACE TAB: Figure 1 - Site Location Map
DWG PATH: C:\Users\Jeff Mcmahon\Documents\URS-Shell\Chicago-Office\walgreens\KINGSTON, NY\DWG\FIGURE 1 - SITE LOCATION MAP.dwg



LEGEND:

- CURB
- ABANDONED MONITORING WELL LOCATION
- MONITORING WELL LOCATION
- STREET LIGHT
- OE — OVERHEAD ELECTRIC
- W — WATER LINE
- SA — FORMER SEWER LINE
- FORMER FLOOR DRAIN
- PROPOSED SOIL BORING LOCATION
- W/O — FORMER 550 GALLON WASTE OIL UST

NOTE: LOCATIONS OF KNOWN UTILITIES ARE APPROXIMATE

WALGREENS STORE #02077
10 EAST CHESTER STREET
KINGSTON, NEW YORK 12401

FIGURE 2
PROPOSED SAMPLING LOCATIONS

DATE:	Feb 04, 2014
JOB NO.:	25368188
DRAWN BY:	MAW
CHK'D BY:	JGG
SCALE:	AS SHOWN

URS
3 CORPORATE DRIVE, SUITE 203
CLIFTON PARK, NEW YORK 12065
PHONE: (518) 688-0015
FAX: (518) 688-0022

PLOTTED: February 4, 2014 BY: Wasson, Melissa CTB USED: 0-6 Black.ctb PAPER SPACE TAB: MW LOCATION MAP
DWG PATH: J:\25368188 Walgreens Kingston, NY\2014 Work\plan\KINGSTON - FIGURE2_rev 2014.dwg

APPENDIX A

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.

APPENDIX B

CURRENT RESUMES

URS

Patrick S. Rabideau, PG, MBA

Branch Manager

Years of Experience

With URS: 10
With Other Firms: 11 Years

Education

MBA/Environmental Management and Policy, Rensselaer Polytechnic Institute/ 2004

BS/ Geology, State University of New York at Plattsburgh/ 1996

Registration/Certification

Professional Geologist – TN Geophysical

Application/Theory of Subsurface Interface Radar (Geophysical Survey Systems, Inc.)

Global Positioning System Real-Time Surveying (Trimble Navigation)

Overview

Mr. Rabideau has over 21 years of experience overseeing a variety of environmental projects. Mr. Rabideau's experience includes managing environmental compliance studies, subsurface investigations, aquifer studies, feasibility studies, remedial design and construction projects, multimedia environmental site assessments, geophysical studies, and geotechnical investigations. His experience also includes evaluating and implementing both traditional and innovative in-situ and ex-situ remedial systems for private, municipal, and industrial clients. Mr. Rabideau has managed large government term contracts under the Dormitory Authority of the State of New York (DASNY), New York State Office of General Services (NYSOGS), and United States Army Corps of Engineers (USACE). Mr. Rabideau has also managed and performed over 350 UST/AST projects and related investigations in New York State.

Project Specific Experience

ENVIRONMENTAL (State Government):

Dormitory Authority of the State of New York (DASNY) on behalf of the New York State Office of Mental Health (NYSOMH)

Environmental Compliance Support, 18 NYSOMH Facilities, Statewide

Program Manager for environmental compliance at 18 NYSOMH facilities throughout New York State. Manage and coordinate URS regional compliance teams to conduct the work. URS provides assistance to these NYSOMH facilities to ensure that they are in compliance with all applicable federal, state, and local environmental regulations. URS conducts monthly visits, prepares a summary of findings, and coordinates with site representatives to resolve compliance issues related to the following program areas: EPCRA, TSCA, FIFRA, RCRA, CAA, CWA, PBS, SPCC, OSHA, and USDOT. The NYSOMH is part of the USEPA voluntary self-disclosure program. URS also conducts multi-media environmental compliance audits per the schedule and scope in the NYSOMH facility audit agreement with the USEPA. Regulatory findings are corrected and disclosed to the USEPA within the 60-day time frame specified in the audit agreement. URS provides assistance to the facilities to close the regulatory findings. URS also provides assistance to the facilities that are audited by the NYSDEC to help coordinate and close regulatory findings.

NYSOMH Statewide Tank Inspections

Sr. Project Manager responsible for managing tank inspection work for over 30 tanks at various NYSOMH facilities located in the New York City

Metropolitan Area and Hudson Valley Region. In addition to completing inspections, URS helped to develop a comprehensive checklist to be used for future designs or inspections of existing AST fuel oil piping, transfer pump sets, day tanks, emergency generators, boilers, fuel oil monitoring and alarm systems, and related appurtenances. Checklist criteria included compliance with the NYS Building Code, NYS Mechanical Code, National Fire Protection Association (NFPA) standards, as well as rules and regulations of the NYC Fire Department and NYS Department of Environmental Conservation, as well as good engineering practice. URS prepared summary reports documenting the inspection findings and recommendations. Mr. Rabideau provided detail reviews of these documents before they were presented to the client.

Facilities inspected to date include:

1. Bronx Psychiatric Center, Bronx, NY
2. Bronx Children's Psychiatric Center, Bronx, NY
3. Creedmoor Psychiatric Center, Queens Village, NY
4. Kingsboro Psychiatric Center, Brooklyn, NY
5. Kirby Forensic Psychiatric Center, Wards Island, NY
6. Manhattan Psychiatric Center, Wards Island, NY
7. Mid-Hudson Forensic Center, New Hampton, NY
8. Pilgrim Psychiatric Center, West Brentwood, NY
9. Queens Children's Psychiatric Center, Queens Village, NY
10. Rockland Psychiatric Center, Middletown Campus, Middletown, NY

Statewide Tank Closure and Spill Related Site Investigation Activities at Various NYSOMH Facilities

Program Manager responsible for the coordination and execution of multiple tank closure and related site investigation activities at various NYSOMH facilities throughout New York. As part of this work, URS has performed tightness testing, tank closures, site investigation and remediation, coordinated with contractors, and provided construction oversight. Furthermore, URS has prepared tank closure reports, site investigation workplans, feasibility studies, remedial designs, NYSDEC notifications, tank cathodic protection system testing, tank leak detection system testing and updated PBS registrations. URS performed this tank work at the following NYSOMH facilities:

1. Bronx Psychiatric Center,
2. Creedmoor Psychiatric Center,
3. Kings Park Psychiatric Center,

4. Kingsboro Psychiatric Center,
5. Pilgrim Psychiatric Center,
6. Capital District Psychiatric Center,
7. Rochester Psychiatric Center,
8. Hutchings Psychiatric Center, and
9. South Beach Psychiatric Center.

Bronx PC Redevelopment Site Investigation, NYSOMH Bronx Psychiatric Center

Sr. Project Manager for a remedial investigation at the Bronx Psychiatric Center in Bronx, New York for the Dormitory Authority of New York State (DASNY). DASNY is currently working with the New York State Office of Mental Health (OMH) on a major redevelopment project at the Bronx Psychiatric Center. The redevelopment project consists of the construction of a new adult facility, a new 78-bed children's facility, a residential village consisting of a transitional living residence, studio apartments, a crisis residence building, and new site work and site utilities. Contaminated soils were encountered during the geotechnical investigation conducted to determine subsurface conditions and to make recommendations for foundation design and construction.

The objective of the remedial investigation and survey was to collect the appropriate site data necessary to determine the lateral and vertical extent of subsurface contamination in the proposed construction footprint. A total of 17 soil borings were advanced in the construction footprint using a Geoprobe. The soil borings were advanced to the water table. Soil samples were collected using a four-foot MacroCore open sampler. The sample tubes were retrieved from the subsurface, cut along its length, and screened visually with a photoionization detector (PID) for the presence of contamination. Soil samples were submitted to the laboratory for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), including creosote, Target Analyte List (TAL) metals, Hexavalent Chromium, and polychlorinated biphenyls (PCBs). At the completion of the field investigation, URS had the soil sampling locations surveyed to provide datum elevations and horizontal coordinates.

URS prepared a Remedial Investigation Report (RI Report) for DASNY and OMH. The RI Report included a thorough summary of the background information and investigative procedures and a discussion of the analytical data collected during the RI. Contaminated materials were segregated from clean material and sent offsite for disposal. Clean materials were reused onsite as landfill.

Interim Remedial Measure (Feasibility Study), NYSOMH Bronx Psychiatric Center

Sr. Project Manager for an interim remedial measure (feasibility study) to evaluate the efficacy of potential remedial measures to address polychlorinated biphenyl (PCB) contaminated soil underneath Building No.1 (Transformer Rooms Nos. 1 and 2) at the Bronx Psychiatric Center, Bronx, New York. The PCB's originated from former leaking transformers that lied within the aforementioned transformer rooms, which adversely impacted the concrete and soil beneath them. An order-on-consent (order) was executed in 2012 for this project. Thus far, URS has prepared and submitted to the NYSDEC a participation plan and records research report in accordance with the provisions of the order. URS is currently preparing the RI report.

Pilgrim PC Retention Pond/Overflow Basin Investigation and Remedial Design, NYSOMH Pilgrim Psychiatric Center

Sr. Project Manager for a sediment/subsurface investigation to determine the extent of the VOC, SVOC, and metals contamination present in the storm water settling and overflow basins. The NYSDEC initially wanted the entire overflow basin (approximately one acre) remediated. URS recommended using the four-point method to properly delineate the extent of contamination before developing a remedial approach. The investigation revealed low concentrations of VOCs, SVOCs, and metals were present in the settling basin sediment and the shallow overflow basin soil. In addition, a small isolated hot spot of metals contamination was found in the overflow basin. URS prepared a focused feasibility study and a remedial action plan to address the onsite contamination. The remedy called for removing .2 acres of shallow (one foot bgs) contaminated soil in the overflow basin. The NYSDEC approved the remedy but also asked that NYSOMH remediate the settling basin sediments as well. Given the size of the settling basin and the depth of water present in the settling basin, the cost to remediate the sediment would have been substantial. Upon further negotiation with the NYSDEC, the NYSDEC agreed to withdraw their recommendation to remediate the settling basin sediments at this time.

The overflow basin remedy was completed in July 2009. URS provided oversight of the remedial activities to ensure health and safety, quality control, RCRA compliance, and investigation protocols were followed. URS also reviewed manifests and verified subcontractor compliance with their Part 364 Waste Transporter Permit.

Kingsboro PC Evaluation of Remedial Strategies (FS), NYSOMH Kingsboro Psychiatric Center

Sr. Project Manager to evaluate remedial options for the New York State Office of Mental Health (OMH) Kingsboro Psychiatric Center (PC) site in Brooklyn, New York for a diesel fuel release at the facility's emergency

generator. Four applicable remedial technologies were identified and evaluated, and estimated implementation costs were developed to assist OMH in selecting the most appropriate remediation strategy.

Approximately 1,600-gallons of diesel fuel were spilled due to an equipment failure on the 275-gallon generator day tank at the Kingsboro PC. Diesel fuel was observed on the generator cabin floor and stained soil was observed on the ground surrounding the generator. Upon identification of the release, approximately 180-cubic yards (cy) of contaminated soil was removed from the western side of the generator cabin. Additional excavation was not conducted due to the potential to adversely affect the structural integrity of the generator and the underlying concrete slab.

URS examined four remedial technologies to address the contaminated soil beneath and west of the generator at the Kingsboro PC including:

- In-Situ Chemical Oxidation (ISCO);
- Enhanced Bioremediation;
- Soil Vapor Extraction (SVE) and/or Bioventing; and
- In-Situ Solidification (ISS) by Jet Grouting.

The technologies were evaluated with respect to feasibility, ability to meet the remedial objectives (NYSDEC Recommended Soil Cleanup Objectives (RSCOs), established in the Technical and Administrative Guidance Memorandum (TAGM) #4046), and estimated implementation costs based on typical unit prices. Additional site-specific considerations including disruption or inconvenience to the facility operations, timeframe for on-site treatment activities, operation, maintenance and monitoring requirements, security of remediation operations and equipment, and timeframe to achieve the remedial endpoint were also considered when evaluating the remedial strategies.

URS recommended ISCO to the client as the best remedial strategy for the site. ISCO provides the most flexibility in media to be treated, its effectiveness can be monitored in real time during treatment, it destroys contaminants without producing residuals, it can be implemented and completed in a relatively short period of time with no long-term operation and maintenance, and it results in post-treatment conditions conducive to bioremediation of residual contaminants. The feasibility study was approved by the NYSDEC. URS is currently preparing the Remedial Design.

Mold Investigation and Remediation, 5 NYSOMH Facilities, New York State

Program Manager for mold investigation and remediation for five NYSOMH facilities. URS has completed several small to medium sized mold inspection projects for DASNY on behalf of the NYSOMH in numerous buildings at NYSOMH campuses throughout New York State.

Many of these mold inspection projects were initiated as part of a response to water damaged materials from leaking pipes, leaking roofs, or in basements with high groundwater table issues. As part of these investigations, a detailed inspection and sampling was completed for mold and bacteria. URS completed thermal imaging scans of all surfaces and performed moisture mapping to ascertain the sources of the water damaged areas. URS then reviewed the sampling and thermal imaging results and prepared a report summarizing the findings, analytical results, and the recommendations to remediate any mold issues. URS then prepared a design for the recommended remedy and provided oversight of the mold remediation project. URS prepared project specific mold and bacteria cleanup specifications and procedures for each project. Mold cleanup included removal of mold impacted surfaces, cleaning of non-porous surfaces, dust control, cleaning of bacterial contamination where necessary, improving air flow through the space, fogging, and de-humidifying the space. URS also provided limited oversight of removal of Asbestos Containing Materials impacted with mold. Upon completion of the remediation work, URS prepared a project closeout report.

URS performed mold projects at the following NYSOMH campuses:

1. Kingsboro Psychiatric Center;
2. South Beach Psychiatric Center;
3. Creedmoor Psychiatric Center;
4. New York Western Children's Psychiatric Center; and
5. Middletown Psychiatric Center.

Industrial Hygiene Services, NYSOMH, Statewide

Program Manager for Industrial Hygiene Services for DASNY on behalf of the NYSOMH at various NYSOMH campuses. URS conducted the following Industrial Hygiene investigations:

1. NYSOMH *Bronx Psychiatric Center (BPC) Cyanide Evaluation*

   NYSOMH reported that the Bronx Psychiatric Center (BPC) received an anonymous letter indicating that the food at their facility had been laced with cyanide. In response, NYSOMH removed all of the food items from BPC, secured it in truck trailer No. 1-038903, and transported it to the Cook Chill campus for safekeeping. URS coordinated with NYSOMH and Cook Chill staff to inspect and sample the food waste stored at CCPC. There were a total of the 15 different food product samples collected and submitted to a Food and Drug Administration (FDA) approved laboratory for analysis.

   The laboratory analytical report confirmed cyanide concentrations in two of the food products. URS advised

NYSOMH and Cook Chill to keep the truck trailer secured and then notified the proper authorities that cyanide was found in two of the food samples collected from the truck trailer. URS evaluated the need to inspect and decontaminate the source area of the food to ensure that cyanide was not present on any hard surfaces at the facility. URS coordinated this work with staff within the following agencies; DASNY, NYSOMH, FDA, New York City Police Department, US Postal Service, and the Federal Bureau of Investigation.

2. NYSOMH *Creedmoor Psychiatric Center (CPC) Asian Bird Flu Evaluation*

NYSOMH Creedmor Psychiatric Center (CPC) staff informed URS that bird droppings had become an issue on select outdoor surfaces of the campus. URS conducted a visual assessment of the areas where bird droppings had been identified and observed bird droppings on portico floor surfaces, sidewalks, window ledges, and surfaces of window mounted air conditioning units. Chlamydophila pstittaci and Cryptococcus neoforman species were not detected in any of the surface wipe samples; however, Histoplasma capsulatum species was detected in one sample.

URS recommended that CPC staff remove the bird dropping stains from the aforementioned areas using a steam cleaner. Upon completion of the steam cleaning work by NYSOMH staff, URS noted that all identified areas were clean and free of bird dropping stains and recommended that CPC restrict clients from feeding birds to help control bird droppings around building surfaces. URS also recommended that CPC equip window ledges, and the surfaces under the window mounted air conditioning units, with metal spikes and grates to prevent bird nesting. URS suggested installing electronic bird control devices (ultrasonic bird repeller or bird fence deterrence system) at select locations to deter nesting around and within the building if the metal spikes and grates did not succeed. URS also recommended that all openings below the air conditioning units be sealed to prevent birds from building new nests and that CPC conduct routine inspections around the building to identify and remove bird nests.

3. NYSOMH, *44 Holland Ave Facility, IAQ Study*

URS performed a Limited Indoor Air Quality Assessment (LIAQA) of the Eighth Floor offices because of persistent odor complaints from the office staff. This assessment included a visual inspection, indoor air quality monitoring, ambient air sampling for both asbestos fibers and mold spores, and vacuum canister sampling for Volatile and Semi Volatile Organic Compounds (VOCs & SVOCs). The sample results indicated

that none of the chemicals evaluated were at or above their respective OSHA PEL. The indoor air quality monitoring results were also within the ASHRAE accepted ranges for carbon dioxide, carbon monoxide, temperature and relative humidity. URS suggested that the possible cause of the nuisance odor may have been when a building becomes negatively pressured (the building indoor air pressure was less than the outside air pressure), outdoor air is allowed to enter a building. In this case, due to recent roof work, it is likely that chemical fumes from the roof entered the building through cracks and seams surrounding the doors that access the roof. To prevent this from happening in the future, after roof work is completed, URS recommended to have an HVAC contractor provide a temporary source of fresh-air to the building until the existing roof materials have adequately hardened and mounted fresh air intakes can be safely operated. The fresh air should come from a source that is not in the roof construction area.

4. NYSOMH, *44 Hollland, Division of Forensic Sciences Office (DFSO) IAQ Study*

   URS performed a Limited Indoor Air Quality Assessment (LIAQA) of the staff offices at the site because of persistent upper respiratory complaints by the office staff. This assessment included a visual inspection, indoor air quality monitoring, and ambient air sampling. In addition, an electromagnetic field (EMF) survey was conducted. The monitoring results showed elevated EMF readings emitted from a closed circuit security monitor adjacent to the complainant, high skin cell concentrations within the offices, and higher than normal relative humidity readings within the offices. Based on the study results, URS recommended the following:

   1. Even though the relative humidity was just within the high-end recommend range, URS recommended that the DFSO HVAC system be adjusted to lower the relative humidity by 10 to 15%.
   2. Replace the HVAC filter to reduce skin cell concentrations in air, and
   3. Either relocate or shield the closed circuit monitor in Office #15 to reduce EMF concentrations.

5. NYSOMH *Bed Bug Prevention*

   NYSOMH had had a handful of bed bug outbreaks at various campuses and asked URS to prepare a procedure to follow that would help prevent further bed bug outbreaks in the future. URS developed a Bed Bug Standard Operating Procedure (SOP) to provide the following:

- Background on bed bugs;
- Looking for bed bugs;
- Reporting bed bug infestations;
- Cordoning off the infested area;
- Bed bug treatments available; and
- Avoiding bed bug infestations.

The SOP incorporates considerations for NYSOMH new client admittance procedures, client interaction with NYSOMH staff, and client living conditions.

Asbestos Building Inspection, Project Design, and Project Abatement Monitoring, NYSOMH, New York State

Program Manager for a variety of asbestos building inspections, asbestos project designs, and asbestos project abatement monitoring. URS has performed asbestos building inspections within multiple buildings for DASNY on behalf of the NYSOMH at 18 NYSOMH campuses throughout New York State. The asbestos building inspections included a review of existing construction documents, as-built plans, renovation plans, material safety data sheets, and previous asbestos inspection reports. A site walk was then conducted to classify additional suspect building materials not previously inspected and to collect building material samples of the additional suspect building material. The collected building material samples were then sent to an ELAP accredited laboratory for analysis using proper chain of custody procedures. The laboratory analytical results were reviewed and asbestos inspection reports were written. The reports included figures of sample locations, photographs of the sampled materials and locations, inspector certifications, and URS' recommendations.

URS has performed asbestos project monitoring services during asbestos abatement activities at the South Beach Psychiatric Center. Project monitoring services were also performed at SUNY Plattsburgh - Hood Hall, SUNY Albany - Mohawk Tower, and various Office for People With Developmental Disabilities (OPWDD) facilities. Project monitoring services included daily air sampling, daily visual inspections inside the abatement work area, final clearance air sampling, and ensuring abatement activities were performed in compliance with applicable NYSDOL Code Rule 56 requirements. The non-friable abatement work was performed under negative pressure in a full enclosure and consisted of the removal of floor tiles and floor tile mastic. URS interfaced with the client, facility representative, and the asbestos abatement subcontractor to ensure satisfactory and timely results.

URS prepared an asbestos project design for a floor tile asbestos abatement project (105 square feet) at the South Beach Psychiatric Center. The asbestos project design included a work area setup, engineering and administrative controls, asbestos project monitoring, and the asbestos waste disposal requirements. The design was prepared for the renovation

of Building 2-Ward 400 at South Beach. URS also prepared a large asbestos project design at South Beach Building 3 and asbestos project design for minor renovations at four OPWDD facilities in Troy, New York, Castleton, New York, Porters Corners, New York, and Loudonville, New York.

URS has conducted NEAs on various operations affecting asbestos containing joint compound at the Hutchings Psychiatric Center. The NEA operations included drilling a ¼" hole into asbestos containing joint compound, installing screws and nails, and cutting a hole to repair damaged sheetrock. URS scheduled the NEAs, provided oversight of the contractor performing the NEAs, including interfacing with the HPC as to their needs from the NEAs, and ensuring that the contractor completed the activities and repairs at the facility in accordance with the regulatory requirements.

Landfill Sampling and Monitoring, 3 NYSOMH Facilities, New York State

Program Manager for landfill sampling and monitoring at three NYSOMH facilities. URS has performed groundwater and surface water monitoring and landfill inspections to support post closure monitoring for DASNY on behalf of the NYSOMH at three NYSOMH facilities in New York State. Groundwater and/or surface water (seep) sampling points are maintained, monitored, and/or sampled to assess potential residual impacts to the environment immediately surrounding the facility to support eventual site closure and assess surface water and groundwater quality. The physical condition of the landfill cap itself is also inspected to ensure that it is not compromised.

As part of the inspection and monitoring work, URS collects groundwater and surface water samples and submits them to a certified laboratory for analysis. Notes are taken summarizing the condition of the landfill cover during the time of the inspection. Common items found during an inspection can be slumping or surface erosion, tears in the cap liner, new seeps, etc. Once the sampling data is received from the laboratory, URS summarizes the analytical data and inspection information and develops a summary report.

URS has provided landfill monitoring and sampling at the following NYSOMH facilities:

1. Kings Park Psychiatric Center;
2. Hudson River Psychiatric Center; and
3. Rockland Psychiatric Center.

Spill Prevention Control and Countermeasure (SPCC) Plans, NYSOMH, New York State

Program Manager for a program to assess if NYSOMH facilities required a Spill Prevention Control and Countermeasure (SPCC) Plan in accordance with 40 CFR Part 112. The United States Environmental Protection Agency (USEPA) regulations in 40 CFR Part 112 apply to non-transportation related facilities that reasonably could be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines, and that have an aggregate oil storage capacity of over 1,320 gallons aboveground or 42,000 gallons underground. The purpose of preparing and implementing an SPCC Plan is to prevent any discharge of oil into or upon the navigable waters of the United States or adjoining shorelines. If a facility already had an existing SPCC Plan, URS reviewed the existing SPCC Plan for accuracy and completeness. If an inadequacy was identified, URS worked with the facility to correct the issue. If a new SPCC Plan was created or if a significant modification was made to an existing SPCC Plan, the work was done with the approval and certification of a licensed engineer.

Environmental Health and Safety Training, 30 NYSOMH Facilities, Statewide

Program manager for training at NYSOMH facilities for the following environmental compliance topics: asbestos awareness, New York State Department of Transportation (NYSDOT) shipping, pharmacy hazardous waste management, Hazard Communication (HAZCOM), regulated medical waste, universal waste, and Spill Prevention Control and Countermeasure (SPCC). URS prepared training presentations, visual aids, and testing for these programs and has also created online refresher training modules for some programs.

Confined Space Program Development and Training, NYSOMH facilities, Statewide

Program Manager for developing confined space programs for seven NYSOMH facilities. URS inspects each of the confined spaces at these sites, writes space specific confined space entry procedures, develops a confined space program document that summarizes the procedures and confined space regulation, and trains site staff to the site specific program that we prepared. URS has prepared confined space programs for the following NYSOMH facilities:

- Rockland Psychiatric Center
- Rockland Children's Psychiatric Center
- Buffalo Psychiatric Center
- Rochester Psychiatric Center
- Pilgrim Psychiatric Center
- Manhattan Psychiatric Center
- Kirby Psychiatric Center

Asbestos Management Program, 18 NYSOMH Facilities, Statewide

Program Manager for a Statewide Asbestos Management Program. URS prepared Asbestos Operations and Maintenance Plans (O&M Plan) for DASNY on behalf of the NYSOMH for use at 18 NYSOMH campuses. The O&M Plan includes the general asbestos and NYSDOL Code Rule 56 standards. Each NYSOMH facility has received a copy of their respective O&M Plan and has been trained on the contents of their O&M Plan. Each facility is required to conduct a bi-annual surveillance inspection of known or presumed asbestos-containing material (ACM) to identify changes in material condition. URS has conducted asbestos inspections and testing, as necessary, to update the O&M Plan to reflect site-specific conditions.

URS also conducted an Asbestos Hazard Emergency Response Act (AHERA) inspection for campuses that have an accredited school on-site and prepared an AHERA Asbestos Management Plan (AMP) for those campuses. Several of the NYSOMH facilities have an accredited school on-site. These facilities include: Bronx Children's Psychiatric Center, Capital District Psychiatric Center, Greater Binghamton Health Center, Elmira Psychiatric Center, Hutchings Psychiatric Center, Rockland Children's Psychiatric Center, Sagamore Children's Psychiatric Center, South Beach Psychiatric Center, St. Lawrence Psychiatric Center, and Western New York Children's Psychiatric Center.
URS provides annual asbestos awareness training to facility staff, performs asbestos sampling on an on-call basis, and generates abatement designs and specifications to assist removal efforts. URS continues to support the facilities to safely manage the asbestos containing materials in a manner protective to clients, facility staff, the general public, and the environment.

Pharmaceutical Hazardous Waste Management, 17 NYSOMH Facilities, New York State

Program Manager for the development of a pharmaceutical hazardous waste management program for 17 NYSOMH facilities throughout New York State. Pharmaceutical wastes may include, but are not limited to: expired pharmaceuticals; patients' personal medications; waste materials containing excess pharmaceuticals (i.e., intravenous bags, tubing, vials); open pharmaceuticals that cannot be used; containers that held pharmaceuticals; pharmaceuticals that are intended to be discarded; and contaminated garments, absorbents, and spill clean up materials. URS developed a standard operating procedure (SOP) to describe the procedures to be used by all NYSOMH Pharmacy Departments for the proper handling, storage, and disposal of pharmaceuticals that are classified as hazardous waste. This procedure was developed to comply with the requirements of state and federal environmental regulations, to minimize employee exposure to hazardous materials, and to protect the environment.

Stormwater Management Program Plans (MS-4), Statewide

Program Manager for developing Stormwater Management Program (SWMP) handbooks for seven NYSOMH facilities. The purpose of the SWMP is to reduce the discharge of pollutants from the facility's Municipal Separate Storm Sewer System (MS4) to the maximum extent practical in order to protect water quality and to satisfy the appropriate water quality requirements of the New York State Environmental Conservation Law and the Federal Clean Water Act. URS conducted baseline stormwater surveys and testing at each facility to verify their connection and discharge points. Upon verification, URS prepared MS4 plans for each facility in accordance with all applicable NYSDEC and USEPA regulations. Where connections could not be verified or where false connections occurred, URS provided guidance to resolve the connections. URS then trained facility staff to their respective MS4 plan. URS continues to provide compliance support to each facility to maintain their MS4 plan.

Job Hazard Analyses (JHA's), 17 NYSOMH Facilities, Statewide

Program Manager for Statewide Job Hazard Analyses. URS conducted job hazard analyses (JHA's) for DASNY on behalf of the NYSOMH at 17 NYSOMH campuses in New York State. These campuses have rehabilitation work programs designed to help rehabilitate patients. The rehabilitation programs consist of packaging operations, wood shops, upholstering activities, kitchen/snack bar operations, periodical production, picture frame assembly, and greenhouse operations.

The JHA's involved conducting an environmental, health and safety audit at each site and preparing a summary report of the observations, findings, and recommendations to correct the findings. URS coordinated correcting the findings with each respective NYSOMH site representative. Some observations and findings were the need for anti-fatigue mats where employees stand for long periods of time, personal protective equipment (i.e. safety glasses, hearing protection, gloves, etc.), limited work area ventilation, personal exposure to air contaminants, employee training, labeling, replacing damaged electrical cords, and machine guarding.

URS developed preventative and corrective actions for each of the observations and findings. For example, URS recommended and performed an engineering study on a ventilation system to determine its effectiveness. After completion of the engineering study, URS made recommendations to repair the ventilation system. URS also performed personal air monitoring to determine the workers exposure to airborne hardwood dust. Based on the personal air monitoring results, URS wrote a respiratory protection program for the site and provided training on proper respirator use. URS assisted sites in implementing the preventative and corrective measures provided in each site report.

URS performed JHA's at the following NYSOMH sites:

1. Greater Binghamton Health Center;
2. Bronx Psychiatric Center;
3. Buffalo Psychiatric Center;
4. Capital District Psychiatric Center;
5. Central New York Psychiatric Center;
6. Creedmoor Psychiatric Center;
7. Elmira Psychiatric Center;
8. Hudson River Psychiatric Center;
9. Hutching Psychiatric Center – Cedar Industries;
10. Kingsboro Psychiatric Center;
11. Kirby Psychiatric Center;
12. Mid-Hudson Psychiatric Center;
13. Mohawk Valley Psychiatric Center – Evergreen Industries;
14. Rochester Psychiatric Center;
15. South Beach Psychiatric Center;
16. St. Lawrence Psychiatric Center; and
17. Western New York Industries.

Hutchings Psychiatric Center Respiratory Protection Program, NYSOMH Hutchings Psychiatric Center

Program Manager for the development of a Respiratory Protection Program. URS developed a comprehensive Respiratory Protection Program for DASNY on behalf of the NYSOMH Hutchings Psychiatric Center (HPC). The Respiratory Protection Program was developed by meeting with HPC staff and assessing their respiratory protection needs based on specific projects the HPC staff would be performing, such as repairing damaged walls with <1% asbestos containing joint compound. The Respiratory Protection Program included respiratory hazard analysis, proper respirator selection for the types of contaminants encountered, training, respirator inspection, maintenance, storage, and the voluntary use of respirators.

URS trained the HPC staff on the proper use and care of respiratory protection. The training was hands on and included respirator fit tests for each HPC employee.

Environmental Compliance Website, NYSOMH, New York State

Sr. Project Manager for developing and maintaining an environmental compliance and environmental health and safety website for the

NYSOMH. The environmental compliance and environmental health and safety website is a tool for all NYSOMH facilities to use. URS compiled relevant regulatory information related to program areas such as Resources Conservation and Recovery Act (RCRA), petroleum bulk storage, stormwater, Emergency Planning and Community Right-to-Know Act (EPCRA), lead, and asbestos and provided live links to the regulatory agencies so that the information available to the user is always accurate and up to date. URS actively compiles site-specific documents related to the program areas and includes them on the website so they are readily available to NYSOMH staff.

Former Production Well Closures, NYSOMH, Rochester Psychiatric Center

Project Manager for a project to properly close two former production wells at Rochester PC in Rochester, New York. Rochester PC had two 12-inch diameter former production wells that were previously used to supply groundwater to the facility. These former production wells were approximately 100-feet deep. URS selected a drilling firm to close these production wells in accordance with applicable NYSDEC and County regulations. URS provided oversight and site coordination for the closures. Upon completion, URS prepared a production well closure report and submitted it to the NYSDEC and County to finalize the closures.

Environmental Planning-SEQR Review, NYSOMH, Pilgrim Psychiatric Center

Program Manager for Statewide Environmental Planning-SEQR evaluations. URS performed State Environmental Quality Review Act (SEQR) evaluations for DASNY on behalf of the NYSOMH at four NYSOMH campuses:

Pilgrim Psychiatric Center (PPC), West Brentwood, New York
URS performed a SEQR evaluation of the U.S. Department of Transportation's Design/Draft Environmental Impact Statement for the proposed Long Island Truck-Rail Intermodal Facility. URS evaluated environmental impacts to the PPC and assessed the proposed mitigation measures. The review focused on the impacts associated with traffic, noise, and light. URS recommended including a reconfiguration alternative, evaluating traffic generated by the project versus the proposed 2010 traffic volumes, assessing light and glare impacts, evaluating air quality impacts associated with truck traffic, and calculating horizontal and vertical noise levels at sensitive receptor locations on the PPC campus.

Creedmoor Psychiatric Center (CPC), Queens Village, New York
URS performed a SEQRA evaluation for the preparation of the full Environmental Assessment Form for the Milestone/SNAP Project at the CPC Campus. The Milestone project involved the

construction of four residential buildings and one Community Center and the SNAP project included the construction of a senior center. URS reviewed the Full Environmental Assessment Form that was prepared by the project sponsor and provided comments to ensure that all potential impacts had been completely evaluated.

Capital District Psychiatric Center (CDPC), Albany, New York
URS provided a Short Environmental Assessment Form for the installation and removal of two Underground Storage Tanks (USTs) at the CDPC. Adverse effects identified included aesthetic resources, cultural resources, and noise. Based on the size and location of the project, no significant adverse environmental impacts were identified.

Rockland Psychiatric Center (RPC), Orangeburg, New York
URS reviewed an EIS that proposed a new zoning district and the acceptance of a conceptual plan for the redevelopment of a portion of the former RPC campus. URS evaluated environmental impacts to the RPC and assessed the proposed mitigation measures. The review focused on the impacts associated with traffic, noise, stormwater, and wetlands. URS recommended that construction noise be evaluated at the nearest receptors. URS also provided mitigation measures to be included in the final EIS.

Hazardous Materials Testing, NYSOMH, Statewide

Program Manager for Hazardous Materials Testing where URS performed lead based paint studies for DASNY on behalf of the NYSOMH at the various NYSOMH facilities.

At the Rochester Psychiatric Center (RPC) URS collected 39 paint chip samples from various locations throughout building 2. Analytical data showed that 13 of the samples exhibited lead concentrations that exceeded the USEPA criteria of 0.5% by weight. URS prepared a lead based paint program manual for NYSOMH and provides training to appropriate site personnel on this program.

At the Buffalo Psychiatric Center (BPC) URS conducted lead based paint testing at the BPC daycare center using XRF technology. Surfaces throughout the facility were evaluated for paint condition and deterioration using the XRF. URS prepared a letter report summarizing the results of the evaluation for BPC reference.

URS collected lead paint chip samples in Buildings 14, 76, and 78 at the Creedmoor Psychiatric Center (CPC) to determine if deteriorated paint was lead based. The samples were sent to an accredited laboratory for analysis following proper chain of custody procedures. It was determined

that the paint in Building 76 was lead based. URS will advise the facility on proper clean-up protocols.

URS conducts annual Polychlorinated Biphenyl (PCB) wipe sampling at the Bronx Psychiatric Center in Transformer Rooms 1 and 2. The annual wipe sampling is part of a signed consent order with the New York State Department of Environmental Conservation (NYSDEC). URS collects PCB wipe samples in each transformer room and submits them to an accredited laboratory for analysis using proper chain of custody procedures. URS then prepares a letter report summarizing the results and submits the report to the NYSDEC on behalf of NYSOMH.

New York State Research Foundation, Imperial Dam Geophysics Study

Project Manager for a ground penetrating radar (GPR) study in Plattsburgh, NY. Conducted a GPR geophysical survey to determine sediment thickness and depth to bedrock in the backwater area (approximately 13 acres) behind the Imperial Dam. The GPR study was conducted in the winter when the backwater area was frozen and GPR profiles were collected through the ice.

FACILITIES (Government):

Dormitory Authority of the State of New York (DASNY) on behalf of the New York State Office of Mental Health (NYSOMH)

Noise Mitigation Analysis of Roof-Mounted Chillers – Building Number 62 Buffalo Psychiatric Center

Project Manager for a project where URS performed a visual inspection of the two chillers mounted on the southwest corner of the roof of Building 62 at Buffalo Psychiatric Center (BPC) to determine the existing conditions and arrangement of associated components for the purpose of devising a suitable solution to mitigate noise propagation towards the affected neighbors. General dimensions of the major components were determined (i.e., chiller outline, arrangement of supporting structural steel, railings, and miscellaneous features) as indicated in attached Sketches 1 and 2. In addition, photographs of the existing conditions were taken.

In order to mitigate the transmission of sound to the affected neighbors, URS recommended that the following be performed:

- A sound-absorbing barricade should be installed as indicated on Sketches 1 and 2. This barricade is described below. Refer also to the typical installations at similar roof-mounted HVAC equipment in the attached photographs. A suitable acoustic barricade, which are commercially available, can be installed at the on the south side of the chillers to mitigate noise propagation. In addition, essentially all suppliers of acoustic barricades are capable of performing an analysis

of the anticipated noise reduction based on the specific conditions at the site and the performance of the manufacturer's product.

- The sound-absorbing barricade, which will serve the purpose of both adsorbing noise generated by the chillers and deflecting incidental residual noise upward, would have to be constructed of sufficient structural integrity to withstand the wind loads as required by building codes and standard engineering practices.
- The sound-absorbing barricade should be designed to permit the relatively free movement of air, to permit proper operation of the chillers, yet absorb nominally 40 decibels or more of the noise generated by the chillers. In addition, placement of the barricade must be such that maintenance on the chillers is not hampered or restricted.
- In order to create a reasonable appearance of the sound-adsorbing barricade, it is suggested that this barricade be secured to the structural members supporting the chillers and that the surfaces, exposed to view from street-level, be furnished by the supplier in a suitable color to blend with the existing façade of the building.

Backflow Preventor System Design, NYSOMH Bronx Psychiatric Center

Project Manager to prepare a 30 percent schematic design to install new and/or replace backflow preventors in several buildings throughout the Bronx Psychiatric Center campus. The backflow preventors would provide cross connection protection to the domestic water service throughout the facility. The domestic water service enters the facility by means of two-sepaarate eight-inch service mains and supplies water directly to the facility loop. In all, URS made design recommendations for thirteen buildings onsite.

Sunmount Hamilton Row Boiler System, Sunmount Developmental Center, Tupper Lake, New York

Project Manager to prepare a 30, 60, 90, and 100 percent schematic design for the abandonment in place of an existing trenched steam tunnel and installing five new boilers in each of the Hamilton Row row houses (Bldgs 17 through 22. URS conducted a site reconnaissance to inspect the steam system and basement layouts of the five aforementioned buildings. URS also extensively researched a variety of boiler systems and selected five new low-pressure (2-5 psig) steam boilers with individual condensate collection systems. The existing steam lines would be cut and capped and the new boilers would be installed to tie into the existing building heating system. The boilers would be supplied by fuel oil from two 275-gallon fuel oil tanks and fitted with alarm systems wired to the outside of the buildings.

Statewide Construction Administration, NYSOMH

Program manager for construction management who performed consulting from design review to closeout for new construction and renovations on the University of Albany campus. Assistance included constructability reviews of 30, 60, and 100 percent documents for DASNY, utilization plan checks and revision suggestions, document reviews including hazardous material abatement, MEP's, structural, architectural, civil, and telecommunications, and, as it pertains to constructability, client requirements and campus standards, code requirements and field coordination and site logistics.

During construction URS provided quality assurance and code compliance working directly with the architect, owner, contractor, and authority having jurisdiction to ensure a timely and successful project. URS also reviewed and approved submittals in conjunction with the A/E of record and the client and crafted and responded to RFI's utilizing the construction central project file software Primavera Contract Manager.

At closeout URS reviewed As-Built documents, O&M manuals, and submittal logs and packages; generated a comprehensive narrative report including relevant communications and documented deficiencies; and worked with the contractor and owner to complete A/E punchlists.

- Liberty Terrace 500 Bed Dormitory, DASNY, 2011
- Mohawk Tower Renovation, DASNY, 2012

URS has created, maintained, and managed schedules during DASNY multi-phase, multi-location projects ranging in scope from environmental feasibility studies, hazardous material removal and abatement, and construction from $800,000 to $22 million. Scope has included the generation of CPM schedules utilizing Primavera Project Management P6 software to create accurate and usable products for progress documentation. URS has also provided consulting work for third-party schedule reviews to interpret network logic, review constructability, and predict associated delays. As a means of project controls and risk management for the client, owner, or contractor, URS has also incorporated Change Management into the WBS to analyze time-impact on the project and provide recovery options.

- CNYPC Building #39 Renovation Project
- Imperial Dam Engineering Study
- Whiteside Dam Engineering Study
- Kingdom Dam Engineering Study
- Stewarts Landing Dam Engineering Study
- Palmer Dam Engineering Study
- Lens Lake Dam Engineering Study
- SUNY, Oswego Townhouse Project

Asbestos and Lead Inspection and Sampling Services, NYSOMH Facilities Statewide

Program Manager to provide asbestos and lead inspection and sampling services to the New York State Office of Mental Health (NYSOMH). URS has provided the aforementioned services at several locations within 18 NYSOMH campuses throughout New York. A brief summary of some of the work URS conducted is summarized below:

- Buffalo Psychiatric Center: URS conducted lead based paint testing at a daycare center at the Buffalo Psychiatric Center using XRF technology. Surfaces throughout the facility were evaluated for deterioration and condition using the XRF. URS prepared a letter report summarizing the results of the evaluation.

- Creedmor Psychiatric Center: URS acted as Asbestos Inspector when a limited asbestos survey was performed on ceiling plaster within a building on the Creedmor Psychiatric Center campus. URS collected 14 asbestos samples throughout the building. URS prepared a letter report summarizing the results of the evaluation.

- Rochester Psychiatric Center: URS acted as Asbestos Inspector for a limited asbestos survey that was performed on the window glazing in the windows throughout the power plant at the Rochester Psychiatric Center campus. URS prepared a letter report summarizing the results of the evaluation.

SECURITY DESIGN (State Government):

New York State Office of General Services (NYSOGS) on behalf of the New York State Office of Mental Health (NYSOMH)

NYSOMH Standards Review, NYSOMH, Statewide

Program manager for the general statewide security services contract. As part of the OGS Statewide Security Services contract, URS was asked to review and comment on the OMH Security Standards to determine if discrepancies were identified during the design phases of a project. Some of the OMH Security Standard modifications recommended by URS are summarized below:

1. Temperature monitoring will be needed at each CCTV head-end rack. There is a need to standardize the system in which this alarm should be connected, such as Access Control, Security, IP addressable transmitter to e-mail alarm messages to selected personnel, etc.

2. The configuration of the multiplexer switcher and keyboard in a CCTV head-end is unclear and needs to be clarified.
3. There is no description on duty station monitors set up with respect to functions that are to be available to the duty officer in multi-screen view, single-screen, PTZ functions etc.
4. There are currently no standard mounting details for cameras.
5. There are currently no standard mounting details for card readers, maglocks, door contacts and related devices, etc. This relates not only to mounting heights but also to surface mounted or recessed requirements.
6. Split system AC units should become standard for CCTV head-ends being added in data closets.
7. There are no guidelines for vehicle gate interlocking.
8. There is currently no standard to monitor activity at vehicle gates or mangates.
9. The current standards allow for multipiece mangates that tend to deteriorate over time.
10. There is no specific standard to indicate raceways at final connection of gate-mounted equipment.

The total project cost of the general security services work was approximately $350,000.

Upgrade Security Systems, NYSOMH, Nathan Kline Research Institute

Program manager for a security upgrade project at the Nathan Kline Research Institute, Rockland, New York. URS designed and provided 100% Construction Documents in accordance with the OMH Statewide Security Standards to replace the existing malfunctioning card access system at Nathan Kline Institute. The use, condition, placement, and effectiveness of the existing security system and security measures were also examined.

The Construction Documents addressed the items outlined in the March 7, 2005 Program Report and incorporate the following specific facility requirements:

1. Replace and expand the existing black & white closed circuit television (CCTV) system.
2. Integrate the Access Control/Facility Management System (AC/FMS) with the CCTV system.
3. Redesign the Safety Office and the Main Reception Desk.
4. Install card reader control on access doors in Building 35 and 39.
5. Increase access control in the animal facility.

The total project cost was approximately $85,400.

Replace CCTV System, NYSOMH, Elmira Psychiatric Center

Program manager for a new Internet Protocol CCTV system at the Elmira Psychiatric Center. URS prepared a Program Report, construction estimates and schematic sketches meeting OMH Statewide Security Standards and incorporated Program Report recommendations into final Construction Documents including an Internet Protocol Devices Pilot Study at the Elmira Psychiatric Center.

URS conducted an initial site visit to determine the extent of CITER required fiber optic trunk and OMH camera requirements. Once the scope was verified, URS provided a Program Report for upgraded systems with a construction estimate. Design documents were prepared for the new closed circuit television system for an upgraded campus surveillance system. In addition, the URS design documents included a fiber optic backbone to accommodate the new camera system with additional fiber capacity for CITER related data transmission and future Fire System connectivity. The overall system included fiber optic trunk for video transmission to head-end, pan-tilt-zoom control to cameras, and DVR support. A related sub-system included five interior cameras configured to operate as Internet Protocol devices as a network pilot study commissioned by OMH.

URS has provided pre-construction management and resolution of field items related to the initial fiber backbone construction. The total project cost was approximately $116,400.

Provide Card Access System, Buildings 46, NYSOMH, Mid-Hudson Psychiatric Center

Program manager for a new Card Access System at the Mid-Hudson Psychiatric Center. URS has performed detailed site surveys to identify existing systems, component locations, and reviewed existing drawings, reports, and documentation. URS produced minutes of meetings attended and prepared a Program Report with schematic drawings. URS has prepared 100% Construction Documents covering facility requirements:

1. Upgraded the access control system.
2. Upgraded the CCTV system.
3. Upgraded the entry mangate system.
4. Provided cooling fans and temperature monitoring equipment within the existing security system head end cabinet.
5. Reviewed a gate report prepared by ADT to assess the status of the existing magnate and vehicle sallyport gates and made recommendations to upgrade the OMH standards based on this report.

The total project cost was approximately $68,500.

Safety Office and Miscellaneous Renovations, NYSOMH, Rockland Psychiatric Center

Program manager for a new Safety Office at the Rockland Psychiatric Center. URS has reviewed existing Construction Documents, conducted a site survey and attended a scope development meeting. Based on our construction document review, URS prepared a report summarizing our conclusions and recommendations for modifying the construction documents. URS prepared a drawing of the additional access control items to be added at building 59. URS provided construction management services to ensure that the installation complied with the construction documents. The total project cost was approximately $35,000.

Digital Video Recording System for the Parking Lot - Building 39, NYSOMH, Central New York Psychiatric Center

Program manager for a new digital video camera recording system for the Building 39 parking lot. URS provided a Program Report and 100% Construction Documents for a four-camera and DVR system for the parking area in front of Building 39. Existing poles were used for camera installation.

NYSOMH sought a simple camera system and Digital Video Recorder to provide coverage of the existing parking area and proposed parking lot expansion to the West. The DVR was installed in the Building 39 Entry Control Point with an associated Monitor. The recorder has minimal elapsed time recording capability sufficient to record immediate events in the parking areas. The total project cost was approximately $39,800.

Review Security Systems Design - Building 62, NYSOMH, Mohawk Valley Psychiatric Center

Program manager for a new building security systems design at the Mohawk Valley Psychiatric Center. Trudeau Architects produced contract documents (conceptual design) for renovations at the Mohawk Valley PC CITER Data Center. URS was asked to review these documents against the OMH security standards for standard compliance. URS conducted an initial review of the conceptual design and provided coordination with OGS, OMH, and Trudeau Architects to evaluate the appropriate OMH Standards to use to complete the Data Center security design. It was determined that the Adult Care Facility Standards were sufficient for this project. URS has reviewed the first draft design against the OMH Adult Care Facility standards and provided comments. The total project cost was approximately $15,000.

ENVIRONMENTAL (Federal Government):

<u>UNITED STATES ARMY CORPS of Engineers (USACE)</u>

Wastewater Treatment Plant Sludge Bed RCRA Upgrades, USACE, Watervliet Arsenal

Project Manager for a Resource Conservation Recovery Act (RCRA) upgrade project for five sludge beds at the Watervliet Arsenal, Watervliet, NY. The existing sludge beds were open-air dry beds that drained through a series of well-sorted sand and gravel to bedrock underlying the beds. The sand and gravel filtered out any residual contamination left in the sludge as it was deposited into the beds. Once a sludge bed was full, the sludge was allowed to dry. The dried sludge (cake) was then excavated from the bed and disposed as a non-hazardous waste. To meet RCRA requirements, URS' design included secondary containment and monitoring. Additional design components included deepening the beds to increase capacity, removable fencing to accommodate more efficient cake removal, lighting, and improved access to the beds. URS selected a contractor and provided construction management during construction. The total project cost was approximately $750,000.

Asbestos Survey and Data Management, USACE, Watervliet Arsenal

Project Manager for an asbestos survey and data management project in Watervliet, NY. URS provided oversight of the asbestos inventory subcontractor while conducting asbestos surveys for 70 facilities at the Watervliet Arsenal, Watervliet, New York. The survey data indicated that the majority of the facilities onsite have asbestos containing materials. The data was summarized and ranked by severity in an operation and maintenance plan for each facility. The data was then entered into a proprietary database management system.

Bituminous Cap Design, USACE, Watervliet Arsenal

Project Manager for remedial design and construction management services to cap approximately seven acres of a 14-acre parcel of petroleum and metals contaminated soil at the Watervliet Arsenal, Watervliet, New York. The soil was landfarmed by a prior consultant to reduce the petroleum concentrations in the soil onsite prior to capping. The cap consisted of the controlled placement of approximately seven acres of material, grading and compaction to specification.

Bldg 15 Oil-Water Separator Engineering Assessment, USACE, Watervliet Arsenal

Project Manager for an oil-water separator engineering assessment in Watervliet, NY. Conducted a condition assessment and a due diligence review of the bldg 15 oil-water separator system that was currently in use for onsite wash water operations at the Watervliet Arsenal, Watervliet, New York. URS prepared a summary report describing the results of the engineering assessment and made recommendations for engineering upgrades to the system.

Former Burn Pit Soil Removal Action, USACE, Watervliet Arsenal

Supervised and conducted the removal of approximately 1,600 cubic yards of soil contaminated with PAHs and VOCs at a site in Watervliet, NY. Responsible for contractor coordination and implementation of soil IRM. Implemented cost-saving measures, which included segregation of soil from C&D waste material that resulted in a decrease in the volume of soil requiring treatment. The 1,600 cubic yards of contaminated soil was ultimately bioremediated on-site.

Siberia STI Test Plot Pilot Study, USACE, Watervliet Arsenal

Supervised and conducted an in-situ Simtec Triad Ionate (STI) technology pilot study to evaluate the efficacy of an innovative technology to treat soils contaminated with polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (TPH) at a site in Watervliet, NY. Seven test cells (approximately one cubic yard each) were operated under varying conditions to treat contaminated soils via catalysis and subsequent biodegradation.

MMA Building 25 HRC Pilot Study, USACE, Watervliet Arsenal

Supervised and conducted an in-situ hydrogen release compound (HRC) pilot study to evaluate the technologies ability to treat soils contaminated with chlorinated hydrocarbons. Six injection wells (one upgradient and five downgradient) and two monitoring wells were installed for the pilot. 4,000 pounds of HRC was injected into the injection wells and the groundwater chemical quality was monitored over a period of four months.

Siberia Biosparge/ORC Pilot Study, USACE, Watervliet Arsenal

Supervised and conducted an in-situ biosparge and organic release compound (ORC) pilot study in Watervliet, NY. The purpose of the pilot study was to evaluate the efficacy of these technologies to treat soils contaminated with polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (TPH). One injection well and seven monitoring wells were installed for each test plot. Air and ORC injections were conducted in their respective plot and the groundwater chemical quality was monitored over a period of 16 weeks.

Siberia Landfarming Pilot Study, USACE, Watervliet Arsenal

Supervised and conducted an innovative landfarming approach to treat soils contaminated with polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (TPH) at a site in Watervliet, NY. Unlike most landfarming plots designed for shallow (1-2 feet) treatment zones, the Watervliet plot used a specialized construction trencher to mix the soils, achieving a treatment zone depth of 6-7 feet, and reducing the surface area required for treatment. Coordinated the field activities for this two-year pilot study.

United States Army Corps of Engineers (USACE)

Fire Protection/HVAC Design (Bldgs, 38, 114, 120, and 124), Watervliet Arsenal, Watervliet, New York

Program Manager for the following fire protection and HVAC design projects at the Watervliet Arsenal.

Fire Protection
Buildings 38 & 114: URS was requested to design a wet pipe, dry pipe and clean agent fire suppression system with interconnection to the facility-wide fire alarm system. Areas to be addressed include a museum, library, archives, offices, laboratories and storage space. This design will also incorporate structural provisions in Building 38 for additional second floor space to be utilized by the client for future expansion.

HVAC
Buildings 120 & 124: URS will be providing engineering services for the replacement in kind of 41 fan coil air conditioning units. Included in this design are: removal and replacement of the fan coil units and corroded chilled water supply and return piping, as well as replacement of the pneumatic thermostatic controls with an electric temperature control system.

ENVIRONMENTAL (Private):

Manufactured Gas Plant Remedial Investigation, New York State Electric and Gas (NYSEG)

Project Manager for a subsurface investigation at a MGP facility in Geneva, NY. The objectives of the investigation were to delineate the extent of MGP related wastes in the overburden and bedrock aquifers onsite, determining the groundwater flow direction and contaminant migration pathways, and defining potential source areas.

Professional Societies/Affiliates

Geological Society of America
Hudson-Mohawk Professional Geologists Association
Sigma Xi Scientific Research Society

URS

Jennifer Gillies
Project Geologist

Years of Experience
With URS: 13 Years

Education
M.S./Geology/ Rensselaer Polytechnic Institute, Troy, New York/2000

B.S./Hydrogeology, Magna Cum Laude/Rensselaer Polytechnic Institute, Troy, New York/1999

Certifications
HAZWOPER

OSHA Supervisor

Overview
Ms. Gillies is a URS Certified Project Manager with over thirteen years of experience overseeing a variety of environmental projects. Ms. Gillies' experience includes managing and conducting subsurface investigations, feasibility studies, and remedial design.

Project Specific Experience

ENVIRONMENTAL (State Government):

Dormitory Authority of the State of New York (DASNY) on behalf of the New York State Office of Mental Health (NYSOMH)

Environmental Compliance Support, 18 NYSOMH Facilities, Statewide

Task Leader for environmental compliance at 18 NYSOMH facilities throughout New York State. Ms. Gillies provides assistance to these NYSOMH facilities to ensure that they are in compliance with all applicable federal, state, and local environmental regulations. Ms. Gillies conducts monthly visits, prepares a summary of findings, and coordinates with site representatives to resolve compliance issues related to the following program areas: EPCRA, TSCA, FIFRA, RCRA, CAA, CWA, PBS, SPCC, OSHA, and USDOT. The NYSOMH is part of the USEPA voluntary self-disclosure program. Ms. Gillies also provides assistance to the facilities that are audited by the NYSDEC to help coordinate and close regulatory findings.

Bronx PC Redevelopment Site Investigation, NYSOMH Bronx Psychiatric Center, Bronx, New York

Project Manager for a remedial investigation at the Bronx Psychiatric Center in Bronx, New York for the Dormitory Authority of New York State (DASNY). DASNY is currently working with the New York State Office of Mental Health (NYSOMH) on a major redevelopment project at the Bronx Psychiatric Center. The redevelopment project consists of the construction of a new adult facility, a new 78-bed children's facility, a residential village consisting of a transitional living residence, studio apartments, a crisis residence building, and new site work and site utilities. Contaminated soils were encountered during the geotechnical investigation conducted to determine subsurface conditions and to make recommendations for foundation design and construction. The site was used as a freight yard between 1919 and 1947. Operations at the freight yard included rail car maintenance and fueling. Therefore, potential contaminants at the site include solvents, heavy metals, petroleum compounds, and creosote.

The objective of the remedial investigation and survey was to collect the appropriate site data necessary to determine the lateral and vertical extent of subsurface contamination in the proposed construction footprint. A total of 17 soil borings were advanced in the construction footprint using a Geoprobe. The soil borings were advanced to the water table. Soil samples were collected using a four-foot MacroCore open sampler. The sample tubes were retrieved from the subsurface, cut along its length, and screened visually with a photoionization detector (PID) for the presence of contamination. Soil samples were submitted to the laboratory for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), including creosote, Target Analyte List (TAL) metals, Hexavalent Chromium, and polychlorinated biphenyls (PCBs). At the completion of the field investigation, URS had the soil sampling locations surveyed to provide datum elevations and horizontal coordinates.

In addition, Ms. Gillies conducted a supplemental remedial investigation to further delineate mercury, arsenic, acetone, and SVOC contamination encountered during the initial remedial investigation. Ms. Gillies prepared a Supplemental Remedial Investigation Report for DASNY and NYSOMH.

Remedial Investigation and Remedial Design, NYSOMH Pilgrim Psychiatric Center, Storm Water Settling and Overflow Basins, West Brentwood, New York

Sub-Project Manager for a sediment/subsurface investigation to determine the extent of the VOC, SVOC, and metals contamination present in the storm water settling and overflow basins. The investigation revealed low concentrations of VOCs, SVOCs, and metals were present in the settling basin sediment and the shallow overflow basin soil. A small isolated hot spot of metals contamination was also found in the overflow basin. URS prepared a focused feasibility study and a remedial action plan to address the onsite contamination. The remedy called for removing only the shallow contaminated soil in the overflow basin. The NYSDEC approved the remedy but also asked that NYSOMH remediate the settling basin sediments as well. Given the size of the settling basin and the depth of water present in the settling basin, the cost to remediate the sediment would have been substantial. Upon further negotiation with the NYSDEC, the NYSDEC agreed to withdraw their recommendation to remediate the settling basin sediments at this time.

The overflow basin remedy was completed in July 2009. Ms. Gillies provided oversight to ensure RCRA compliance. Ms. Gillies reviewed manifests and verified subcontractor compliance with their Part 364 Waste Transporter Permit.

Interim Remedial Measure (Feasibility Study), NYSOMH Bronx Psychiatric Center, Bronx, New York

Task Leader for an interim remedial measure (feasibility study) to address soil contaminated with PCBs underneath a high-rise building at a hospital in Bronx, New York. The PCBs originated from former leaking transformers, which adversely impacted the concrete and soil beneath them. Project sampling duties include biannual interior wipe sampling of the affected concrete floors with comparison of analytical results to the TSCA clean-up standard, low flow groundwater sampling with comparison of analytical results to NYSDEC groundwater standards and annual air sampling using fluorisil tubes. Project reporting requirements include biannual monitoring reports and quarterly progress reports submitted to the NYSDEC. Ms. Gillies worked with the NYSOMH and NYSDEC to close the order on consent in 2007.

Kingsboro PC Evaluation of Remedial Strategies (FS), NYSOMH Kingsboro Psychiatric Center, Brooklyn, New York

Evaluated remedial options for the New York State Office of Mental Health (NYSOMH) Kingsboro Psychiatric Center (PC) site in Brooklyn, New York for a diesel fuel release at the facility's emergency generator. Four applicable remedial technologies were identified and evaluated, and estimated implementation costs were developed to assist NYSOMH in selecting the most appropriate remediation strategy.

Approximately 1,600-gallons of diesel fuel were spilled due to an equipment failure on the 275-gallon generator day tank at the Kingsboro PC. Diesel fuel was observed on the generator cabin floor and stained soil was observed on the ground surrounding the generator. Upon identification of the release, approximately 180-cubic yards (cy) of contaminated soil was removed from the western side of the generator cabin. Additional excavation was not conducted due to the potential to adversely affect the structural integrity of the generator and the underlying concrete slab.

Ms. Gillies examined four remedial technologies to address the contaminated soil beneath and west of the generator at the Kingsboro PC including:

- In-Situ Chemical Oxidation (ISCO);
- Enhanced Bioremediation;
- Soil Vapor Extraction (SVE) and/or Bioventing; and
- In-Situ Solidification (ISS) by Jet Grouting.

The technologies were evaluated with respect to feasibility, ability to meet the remedial objectives (NYSDEC Recommended Soil Cleanup Objectives (RSCOs), established in the Technical and Administrative Guidance Memorandum (TAGM) #4046), and estimated implementation

costs based on typical unit prices. Additional site-specific considerations including disruption or inconvenience to the facility operations, timeframe for on-site treatment activities, operation, maintenance and monitoring requirements, security of remediation operations and equipment, and timeframe to achieve the remedial endpoint were also considered when evaluating the remedial strategies.

Ms. Gillies recommended ISCO to the client as the best remedial strategy for the site. ISCO provides the most flexibility in media to be treated, its effectiveness can be monitored in real time during treatment, it destroys contaminants without producing residuals, it can be implemented and completed in a relatively short period of time with no long-term operation and maintenance, and it results in post-treatment conditions conducive to bioremediation of residual contaminants.

Landfill Sampling and Monitoring, 3 NYSOMH Facilities, New York State

Project Manager for landfill sampling and monitoring at three NYSOMH facilities. Ms. Gillies has performed groundwater and surface water monitoring and landfill inspections to support post closure monitoring for DASNY on behalf of the NYSOMH at three NYSOMH facilities in New York State. Groundwater and/or surface water (seep) sampling points are maintained, monitored, and/or sampled to assess potential residual impacts to the environment immediately surrounding the facility to support eventual site closure and assess surface water and groundwater quality. The physical condition of the landfill cap itself is also inspected to ensure that it is not compromised.

As part of the inspection and monitoring work, Ms. Gillies collects groundwater and surface water samples and submits them to a certified laboratory for analysis. Notes are taken summarizing the condition of the landfill cover during the time of the inspection. Common items found during an inspection can be slumping or surface erosion, tears in the cap liner, new seeps, etc. Once the sampling data is received from the laboratory, Ms. Gillies summarizes the analytical data and inspection information and develops a summary report.

Ms. Gillies has provided landfill monitoring and sampling at the following NYSOMH facilities: Kings Park Psychiatric Center and Hudson River Psychiatric Center.

Tank Closure and Spill Related Site Investigation Activities at Various NYSOMH Facilities

Project Manager responsible for the coordination and execution of multiple tank closure and related site investigation activities at various NYSOMH facilities throughout New York. As part of this work, URS has performed tightness testing, tank closures, site investigation and remediation, coordinated with contractors, and provided construction

oversight. Furthermore, Ms. Gillies has prepared tank closure reports, site investigation workplans, feasibility studies, remedial designs, NYSDEC notifications, tank cathodic protection system testing, tank leak detection system testing and updated PBS registrations. Ms. Gillies performed this tank work at the following NYSOMH facilities: Bronx Psychiatric Center, Kingsboro Psychiatric Center, and Capital District Psychiatric Center.

Spill Prevention Control and Countermeasure (SPCC) Plans, NYSOMH, New York State

Task Leader for a program to assess if NYSOMH facilities required a Spill Prevention Control and Countermeasure (SPCC) Plan in accordance with 40 CFR Part 112. The United States Environmental Protection Agency (USEPA) regulations in 40 CFR Part 112 apply to non-transportation related facilities that reasonably could be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines, and that have an aggregate oil storage capacity of over 1,320 gallons aboveground or 42,000 gallons underground. The purpose of preparing and implementing an SPCC Plan is to prevent any discharge of oil into or upon the navigable waters of the United States or adjoining shorelines. If a facility already had an existing SPCC Plan, URS reviewed the existing SPCC Plan for accuracy and completeness. If an inadequacy was identified, URS worked with the facility to correct the issue. If a new SPCC Plan was created or if a significant modification was made to an existing SPCC Plan, the work was done with the approval and certification of a licensed engineer.

Hazardous Materials Testing, NYSOMH, Statewide

Task Leader for Hazardous Materials Testing where URS performed lead based paint studies for DASNY on behalf of the NYSOMH at the various NYSOMH facilities.

URS conducts annual Polychlorinated Biphenyl (PCB) wipe sampling at the Bronx Psychiatric Center in Transformer Rooms 1 and 2. The annual wipe sampling is part of a signed consent order with the New York State Department of Environmental Conservation (NYSDEC). URS collects PCB wipe samples in each transformer room and submits them to an accredited laboratory for analysis using proper chain of custody procedures. URS then prepares a letter report summarizing the results and submits the report to the NYSDEC on behalf of NYSOMH.

Environmental Compliance Website, NYSOMH, New York State

Task Leader for developing and maintaining an environmental compliance and environmental health and safety website for the NYSOMH. The environmental compliance and environmental health and safety website is a tool for all NYSOMH facilities to use. Ms. Gillies compiled relevant regulatory information related to program areas such as Resources Conservation and Recovery Act (RCRA), petroleum bulk storage,

stormwater, Emergency Planning and Community Right-to-Know Act (EPCRA), lead, and asbestos and provided live links to the regulatory agencies so that the information available to the user is always accurate and up to date.

ENVIRONMENTAL (Private):

Retail Petroleum Portfolio, Confidential Client, New York State

Project Manager for 25 active and former retail petroleum sites in New York State. Responsibilities include coordination of site redevelopment activities, monitoring well installation, groundwater sampling and quarterly reporting to the NYSDEC, geophysical investigations to locate potential sources of contamination, closure of tanks in accordance with NYSDEC PBS regulations, remedial system design and air compliance monitoring, soil excavation, transportation and disposal of contaminated media, access agreements with adjacent property owners, and closure of open spill numbers.

Retail Petroleum Portfolio, Confidential Client, New York State

Responsible for the operation and maintenance of numerous remedial systems at various sites. Analyze influent flow and hydrocarbon recovery data in order to maximize system performance. Supervise troubleshooting, repairing, refurbishing, or calibrating remedial system equipment to achieve a high percentage of operations uptime. Interpret effluent analytical data to ensure compliance with agency directives and permits.

Soil Excavation, Confidential Client, Colonie, New York

Project Manager for implementation of an approved RAP at a commercial property in New York State that is being developed by a retail pharmaceutical company. Responsibilities included development of a HASP, community air monitoring plan (CAMP), a geophysical investigation to mark utilities and underground structures, oversight of soil excavation activities, screening soils with a PID, waste characterization sampling, coordination for transport and disposal of impacted soil, dry well removal, hydraulic lift removal, confirmation soil sampling in accordance with NYSDEC DER-10, and spill closure.

Hydraulic Lift Removal, Confidential Client, Colonie, New York

Project Geologist for the removal of two semi-hydraulic single post lifts at a former service center garage in Colonie, New York. A semi-hydraulic lift has its oil tank integrated within the hydraulic cylinder. The hydraulic oil was removed from the oil tanks within the hydraulic cylinders of both lifts prior to excavation. Oil samples were collected and analyzed for polychlorinated biphenyls (PCBs) for waste characterization. The soil surrounding each lift was excavated. Soil samples were collected from the

sidewalls and the base of excavation and analyzed for semivolatile organic compounds (SVOCs) and PCBs as these are typical contaminants associated with hydraulic oil. The excavations were backfilled with clean soil. The hydraulic oil, superstructure, and hydraulic cylinder from each lift were disposed of off-site for recycling.

Various Phase II Environmental Site Investigations

Project Geologist for a soil and groundwater investigation at a chemical manufacturing facility in Rensselaer, New York. The contaminants of concern at the facility include chlorinated solvents. Field duties included oversight of the advancement of soil borings using hollow stem auger techniques, the collection of Shelby Tubes for analysis of physical parameters, and routine low flow groundwater monitoring. Two pilot studies were conducted at the site to assess potential remedial technologies. Soil mixing with the addition of hydrogen peroxide was used to target the unsaturated zone. Enhanced Emulsified Food-Grade Oil (EOS) was injected into the subsurface to stimulate anaerobic biodegradation in the saturated zone.

Project Geologist for a soil and groundwater investigation at an active bus garage in Otego, New York. Field duties included Geoprobe borings to characterize the lateral extent of petroleum contamination and quarterly groundwater sampling to monitor the biodegradation of the petroleum compounds. An Oxygen Releasing Compound (ORC) was injected into the subsurface to promote aerobic biodegradation.

Project Geologist for a soil and groundwater investigation at a manufacturing facility in Schenectady, New York. Field duties included oversight of the installation of permanent monitoring wells and Geoprobe borings, low-flow groundwater sampling, water level measurements, and NAPL measurements. The contaminants of concern included chlorinated solvents, BTEX, and PAHs.

Task Manager for compliance monitoring at an active plastics facility in Selkirk, New York. The tasks included assisting in directing field work, managing budgets, maintaining a geochemical database, analyzing data, preparing quarterly summary reports, and presenting findings to the NYSDEC. Contaminants of concern include toluene, phenolics, methanol, and metals.

Project Geologist for a quarterly groundwater monitoring event at a shallow land disposal area in western Pennsylvania. Groundwater sampling was performed using USEPA low-flow sampling techniques and consisted of the sampling of over 50 monitoring wells. The contaminants of concern included radiation and PCE and her daughter products.

Project Geologist for a soil and groundwater investigation at an active sheet metal manufacturing plant in Coxsackie, New York. Field duties included Geoprobe borings and the collection of groundwater samples

from temporary monitoring wells to determine if the site had been impacted by site operations.

Geologist for a systematic random soil sampling collection program at an active plant that formerly manufactured black and smokeless powder in Belvidere, New Jersey.

URS

Peter R. Fairbanks

Environmental Chemist

Years of Experience

With URS: 23 Years
With Other Firms: 11 Years

Education

BS /Chemistry/ 1987/ SUNY at Buffalo

BS /Biology/ 1979/ SUNY at Brockport

Registration/Certification

NYS Teachers Certification/ Secondary Science/ 1980

Overview

Mr. Fairbanks is an Environmental Chemist with over twenty-three years of experience in data auditing/determining data usability, field/lab coordination, and preparing RFPs, subcontract agreements, and QAPPs. He has over four years of experience in preparing, analyzing, and interpreting of volatile and extractable organics, water quality, metals, and waste characterization samples. Responsible for data validation training of new personnel in accordance with NYSDEC and USEPA methodologies. Over three years experience as a clinical chemistry technologist and over four years as a secondary science teacher in chemistry and physics.

Mr. Fairbanks is a GC/MS Analytical Senior Chemist with over four years experience operating Finnigan and Hewlett Packard mass spectrometers. Analyses performed according to USEPA and NYSDEC methodologies. Responsible for daily maintenance of instruments, employee training, and data review.

He is also is an Inorganic Chemist with over three years experience in analyses of various matrices for metals using Perkin Elmer Furnace, AA, and ICP instruments. Also, analyses of water quality and water characterization parameters.

Project Specific Experience

NYSPA, Relicensing for Niagara Power Project Site, New York (2003-2005): Environmental Chemist responsible for performing data validation and determining data usability on groundwater samples in accordance with USEPA Region II data validation guidelines and USEPA methodologies (i.e., organics and inorganics, including methyl mercury).

AFCEE/AFRPA, Loring Air Force Base, Maine (2006-2012): Project Chemist responsible for preparing Installation-Wide Quality Project Plan (IWQPP); coordinating field, laboratory, and data validation activities; database management; determining data usability on environmental samples in accordance with USEPA Region I data validation guidelines and USEPA methodologies (i.e., organics and inorganics); and preparing monthly/annual site reports to MEDEP.

AFCEE/AFRPA, Pease Air Force Base, New Hampshire (2006-2012): Project Chemist responsible for preparing Installation-Wide Quality Project Plan (IWQPP); coordinating field, laboratory, and data validation activities; database management; determining data usability on environmental samples in accordance with USEPA Region I data validation guidelines and USEPA methodologies (i.e., organics and inorganics); and preparing monthly/annual site reports to NHDES.

AFCEE, Niagara Falls Air Reserve Station, New York (2010-present): Project Chemist responsible for field/lab coordination and evaluating routine monitoring and waste disposal analytical results for disposable purposes in accordance with project-specific requirements. Perform sample collection of various matrices for lab analysis and monitor sewer outfalls during rain events.

USACE Buffalo HTRW, Balance of Plant Operable Unit Field Investigation under FUSRAP for Niagara Falls Storage Site, New York (2012 -present): Environmental Chemist responsible for preparing Quality Assurance Project Plan (QAPP), coordinating field and laboratory activities, and assisting with on-site sample shipment to laboratory for radiochemistry parameters (i.e., isotopic thorium and uranium by alpha spectrometry; gamma spectrometry; radium-226 by radon emanation; radium-228 by gas-flow proportional counting; and waste disposal parameters in accordance with USDOE and USEPA methodologies.

USACE Buffalo HTRW, Remedial Investigation (RI) under FUSRAP for Shallow Land Disposal Area (SLDA) Site, Pennsylvania (2001-2004): Environmental Chemist responsible for preparing Quality Assurance Project Plan (QAPP), coordinating field and laboratory activities, and performing data validation and determining data usability on environmental samples for radiochemistry parameters (i.e., isotopic plutonium, thorium and uranium by alpha spectrometry; gamma spectrometry; gross alpha/beta activity and radium-228 by gas-flow proportional counting; plutonium-241 by liquid scintillation; and radium-226 by radon emanation) and waste disposal parameters (i.e., TCLP/RCRA/PCB) in accordance with USDOE and USEPA methodologies.

USACE Buffalo HTRW, Preliminary Assessment/Site Inspection (PA/SI) under FUSRAP for Dayton Unit I Site, Ohio (2001-2003): Environmental Chemist responsible for preparing QAPP, coordinating field and laboratory activities, and performing data validation and determining data usability on environmental samples for radiochemistry parameters (i.e., lead-210 and radium-226 by gamma spectrometry) and organic/inorganic parameters in accordance with USDOE and USEPA methodologies.

USACE Buffalo HTRW, Site Inspection (SI) under FUSRAP for Dayton Unit III and IV Sites, Ohio (2001-2003): Environmental Chemist responsible for preparing QAPP, coordinating field and laboratory activities, and performing data validation and determining data usability on environmental samples for radiochemistry parameters (i.e., lead-210 by gamma spectrometry) and total lead in accordance with USDOE and USEPA methodologies.

USACE Buffalo HTRW, Preliminary Assessment/Site Inspection (PA/SI) under FUSRAP for Dayton Warehouse Site, Ohio (2001-2003): Environmental Chemist responsible for preparing QAPP,

coordinating field and laboratory activities, and performing data validation and determining data usability on environmental samples for radiochemistry parameters (i.e., lead-210 by beta spectrometry and radium-226 by radon emanation) and total beryllium in accordance with USDOE and USEPA methodologies.

USACE Baltimore HTRW, Atlantic Wood Industries, Inc. Superfund Site, Virginia (1997-1998): Environmental Chemist responsible for electronic data validation and determining data usability in accordance with USEPA Region III data validation guidelines and USEPA methodologies (i.e., organics and inorganics).

USACE Baltimore HTRW, Vint Hill Farms, Photo-Neutralization IMMC Pit Site, Virginia (1998): Environmental Chemist responsible for data validation and determining data usability in accordance with USEPA Region III data validation guidelines and USEPA methodologies (i.e., organics and inorganics).

USACE Seattle HTRW, McCormick and Baxter Superfund Site, California (1995-2001): Environmental Chemist responsible for electronic data validation and determining data usability in accordance with USEPA National Functional Guidelines for Data Validation and USEPA methodologies (i.e., organics and inorganics).

USACE Seattle HTRW, Former Tongue Point Naval Air Station, Oregon (2006-09): Environmental Chemist responsible for data validation and determining data usability of dioxins/furans in accordance with USEPA National Functional Guidelines for Data Validation and USEPA methodologies (i.e., EPA 1613B).

USACE Seattle HTRW, Ft. Lewis East Gate Disposal Yard, Washington (1998-99): Environmental Chemist responsible for electronic data validation and determining data usability in accordance with USEPA National Functional Guidelines for Data Validation and USEPA methodologies (i.e., organics and inorganics).

AFCEE, F.E. Warren AFB, Wyoming (1998-1999): Environmental Chemist responsible for data validation and determining data usability of landfill gas samples (EPA Methods 3C and 25C) in accordance with USEPA National Function Guidelines for Organic Data Review. Perform onsite laboratory audits of ITS, Quanterra Labs, Kemron Environmental Services, and E&E.

USACE Baltimore HTRW, Colonie Site, New York: (1997) Environmental Chemist responsible for data validation of split sample data and preparing Chemical Quality Assurance Report (CQAR) in accordance with USACE guidelines and USEPA methodologies (i.e., TAL/TCLP metals, gross alpha/beta, gamma/alpha spectroscopy, and isotopic thorium/uranium).

Ft. Meade, Malcolm Pirnie, Inc. (1996): Environmental Chemist responsible for data validation and determining data usability in accordance with USEPA Region III data validation guidelines and USEPA methodologies (i.e., organics and inorganics).

Housatonic River, Roy F. Weston (2001): Environmental Chemist responsible for performing data validation and determining data usability on environmental samples in accordance with USEPA Region I, Tier II data validation guidelines and USEPA methodologies.

Valmont TCE Site, Roy F. Weston (2001): Environmental Chemist responsible for performing data validation and determining data usability on air and groundwater samples in accordance with USEPA Region III data validation guidelines and USEPA Method TO-15.

NYCDEP Kensico Facility, Roy F. Weston (2000): Environmental Chemist responsible for performing data validation and determining data usability on dioxin samples in accordance with USEPA Region II data validation guidelines and USEPA Methods 8290 and 23.

Astoria Gas Turbine Facility and Arthur Kill Generating Station, New York (2002-present): Environmental Chemist responsible for performing data validation and determining data usability on environmental samples in accordance with USEPA Region II data validation guidelines and USEPA methodologies.

Former EMCA Site, New York (2002-present): Environmental Chemist responsible for performing data validation and determining data usability on environmental samples in accordance with USEPA Region II data validation guidelines and USEPA methodologies. Developed Freon-113 breakdown product pathway for incorporation into scope of work. Coordinate benchscale treatability and in-situ studies for biodegradation of Freon-113 and its breakdown products in groundwater and soil using proprietary mixture of bacterial organisms.

Federal Creosote Superfund Site, Sevenson Environmental Services (2000-2011): Environmental Chemist responsible for performing data validation and determining data usability on environmental samples in accordance with USEPA Region II data validation guidelines and USEPA methodologies.

DTE Tonawanda, New York (2006-present): Environmental Chemist responsible for preparing QAPP and performing data validation and determining data usability on environmental samples in accordance with USEPA Region II data validation guidelines and USEPA methodologies.

Hazorb SI/RAR, New York (1996): Environmental Chemist responsible for performing data validation and determining data usability on environmental samples in accordance with USEPA Region II data validation guidelines and USEPA methodologies.

Abbey Street/Hickory Woods/Boone Park, New York (1996-1998): Environmental Chemist responsible for performing data validation and determining data usability on environmental samples in accordance with USEPA Region II data validation guidelines and USEPA methodologies.

USACE Baltimore HTRW (1997): Environmental Chemist responsible for comparing EPTOX lead versus TCLP lead data.

Westover Air Reserve Base, Massachusetts (1997): Environmental Chemist responsible for performing onsite laboratory audit of Ecology and Environment, Inc., Lancaster, New York for volatile organics under the AFCEE program.

Voice of America Relay Station, Sri Lanka (1998): Environmental Chemist responsible for data validation and determining data usability on environmental samples in accordance with USEPA methodologies.

TAMS Consultants, New York (1996-1997): Environmental Chemist responsible for data validation and determining data usability on environmental samples from numerous sites in accordance with NYSDEC and USEPA methodologies.

NASA Lewis Research Center, Ohio (1997): Environmental Chemist responsible for data validation and determining data usability of radiological samples in accordance with HASL 300 and the project-specific QAPP. Perform onsite audit of Quanterra Labs, Earth City, Missouri.

USACE Baltimore HTRW, Fort Drum, New York (1996): Environmental Chemist responsible for preparing QAPPs in accordance with USACE specifications. Perform data validation and determine data usability in accordance with USEPA Region II data validation guidelines and USEPA methodologies.

Fort Edward, New York (1995): Environmental Chemist responsible for performing limited review of influent/effluent data.

ARCS Contract, Newmark Groundwater Contamination Superfund Site, California (1997): Environmental Chemist responsible for data validation and determining data usability of groundwater samples in accordance with USEPA methodologies.

USEPA (Various Sites, Utah and Colorado) (1996-1997): Environmental Chemist responsible for performing data validation and determining data usability of Manitou Graben Dump, South Temple, and Parker Landfill samples in accordance with USEPA methodologies.

NYSDEC Standby Contract, Hastings-on-Hudson, New York (1998): Environmental Chemist responsible for procuring laboratory

subcontract, performing data validation and determining data usability of fish tissue samples for PCBs (Aroclors and congeners) in accordance with USEPA Methods 8082 and 1668A using quantitative and qualitative (fingerprinting) techniques.

USACE Baltimore HTRW, Aberdeen Proving Ground Westwood Study Area Site, Maryland (1993-2008): Environmental Chemist responsible for data validation and determining data usability for radiochemistry parameters (i.e., isotopic thorium/uranium and total alpha radium by alpha spectrometry; gamma spectrometry; gross alpha/beta activity, radium-228 and strontium-90 by gas-flow proportional counting; and tritium by liquid scintillation) and inorganic parameters in accordance with USDOE and USEPA methodologies.

USACE Baltimore HTRW, Ft. Story 80th Division Reserve Site, Virginia (2004): Environmental Chemist responsible for data validation and determining data usability in accordance with USEPA Region III data validation guidelines and USEPA methodologies (i.e., organics and inorganics).

USACE Baltimore HTRW, Peck Portsmouth PCB Site, Virginia (2004-2008): Environmental Chemist responsible for data validation and determining data usability of PCB data (Aroclors and congeners) in accordance with USEPA Methods 8082 and 1668A using quantitative and qualitative (fingerprinting) techniques.

USACE Baltimore HTRW, Aberdeen Proving Grounds - Clusters 2, 3, 4, 5, 6 and 10, Maryland (1995-2000): Environmental Chemist responsible for data validation and determining data usability in accordance with USEPA Region III data validation guidelines and USEPA/USATHAMA methodologies (i.e., organics, inorganics, explosives, chemical agent degradation products, radiochemistry, and wet chemistries).

USACE Baltimore HTRW, Aberdeen Proving Grounds - Clusters 2, 10, 14 and 21, Maryland (1995-2000): Environmental Chemist responsible for data validation and determining data usability in accordance with USEPA Region III data validation guidelines and USEPA/USATHAMA methodologies (i.e., organics, inorganics, explosives, chemical agent degradation products, radiochemistry, and wet chemistries).

USACE Baltimore HTRW, Fort Eustis -DOL Storage Yard, Bldg. 1607 and Browns Lake, Virginia (2001-2006): Environmental Chemist responsible for data validation and determining data usability in accordance with USEPA Region III data validation guidelines and USEPA methodologies.

USACE Baltimore HTRW, Fort Monmouth, New Jersey (2001): Environmental Chemist responsible for data validation and determining

data usability in accordance with USEPA Region II and NJDEP data validation guidelines and USEPA approved methodologies.

USACE Baltimore HTRW, Nike Battery BU 51/52; Air Force Plant 51; Miller Field; Schenectady Army Depot; and Voorheesville Army Depot, New York (1997-1998): Environmental Chemist responsible for preparing Chemical Data Acquisition Plans (CDAPs) in accordance with USACE specifications. Review analytical data for compliance, per USEPA Region II data validation guidelines. Prepare data validation reports and QCSRs.

USACE Baltimore HTRW, Tobyhanna Army Depot and Fort Indiantown Gap, Pennsylvania (1997-1998): Environmental Chemist responsible for preparing Quality Assurance Project Plans (QAPPs) in accordance with USACE specifications. Perform data validation and determine data usability in accordance with USEPA Region III data validation guidelines and methodologies.

USACE Omaha HTRW, Former Naval Auxiliary Landing Field, Rhode Island (1997): Environmental Chemist responsible for performing data validation on environmental samples and preparing a Quality Control Summary Report (QCSR) in accordance with USEPA Region I data validation guidelines and USACE requirements, respectively.

BP Wood River, Illinois (2011): Environmental Chemist responsible for data validation and determining data usability of groundwater samples in accordance with USEPA methodologies.

Underground Storage Tank, Multiple Site Investigations, New Jersey (1996): Environmental Chemist responsible for preparing cost proposals for analytical services and subcontract specifications to provide chemical analyses of environmental samples.

McGuire Air Force Base, New Jersey (1998): Reviewed site investigative reports to determine usability of data prior to RI/FS phase of investigation.

Greenbrook Flood Control Project, New Jersey (1993): Environmental Chemist responsible for performing data validation on dioxin/furan data for Hazardous, Toxic and Radioactive Waste Feasibility Study.

NYSDOT Routes I490/I590, New York (1999): Environmental Chemist responsible for performing data validation on dioxin/furan data.

General Motors Lansing Automotive Division, Michigan (1996): Environmental chemist for General Motors Corporation Environmental Assessment Assistance. Responsible for preparing RFPs, cost quotations, and subcontract specifications to provide chemical analyses of environmental samples. Performed data validation, database management,

and determined data usability of environmental samples, in accordance with the State of Michigan and USEPA regulations. Prepared QA/QC sections for reports, which discusses the analytical results.

CRDA Atlantic City Corridor, New Jersey (1990-1995): Environmental Chemist for the Casino Reinvestment Development Authority (CRDA) site investigation. Responsible for preparing QAPP, RFQs, and subcontract specifications to provide chemical analyses of environmental samples, in accordance with NJDEP and USEPA regulations. Performed data validation and determined data usability of environmental samples.

Koppers/ChemMasters, Ohio EPA (1992): Environmental Chemist responsible for performing data audit on environmental samples in accordance with USEPA methodologies. Prepared analytical scope of services for resampling programs.

Site Investigation, Ohio EPA (1995): Environmental Chemist responsible for overseeing data validation of environmental samples in accordance with USEPA CLP methodologies.

Navy CLEAN, Northwest US (1993): Environmental Chemist responsible for determining the data usability on several sites, as part of the Comprehensive Long-Term Environmental Action Navy (CLEAN Program) Phase II Remedial Investigation.

Xavier University, Ohio (1994): Environmental Chemist responsible for performing data validation and determined data usability for Phase I and II Investigation of environmental samples, according to USEPA methodologies.

Scott Avenue, Iowa (1995): Environmental Chemist responsible for performing data validation of environmental samples in accordance with USEPA methodologies.

North East Landfill, New York (1996): Environmental Chemist responsible for reviewing laboratory SOPs as part of the laboratory audit procedure.

Pennsylvania/Fountain Avenue Landfills, New York (1996): Environmental Chemist responsible for performing data validation and determining data usability for Remedial Investigation.

Fresh Kills Landfill, New York (1997): Environmental Chemist, provided technical guidance for data validation services for proposal.

Hyatt Clark Industries, New Jersey (1991-2011): Environmental Chemist for preparation of Discharge to Groundwater Permit. Performed on-site laboratory audits of NET, Inc., Thorofare, New Jersey; Envirotech Research, Inc., Edison, New Jersey; and New Jersey Labs,

New Brunswick, New Jersey under the direction of General Motors and NJDEP.

Hyatt Clark Industries, New Jersey (1991-2011): Environmental Chemist for Decommissioning Program. Responsible for preparing RFPs, cost quotations, and subcontract specifications to provide chemical analyses of environmental samples. Performed data audit and determined data usability of soil and groundwater data, in accordance with NJDEP and USEPA regulations. Prepared soil re-use plan. Prepared site "fact sheet" for public distribution.

Keyspan-Hempstead MGP Site, Hempstead, New York (2008-present): Project Chemist responsible for performing data audit and determining data usability of groundwater, soil, and waste characterization samples, in accordance with approved NYSDEC and USEPA methodologies. Provided an integral part in interpreting petroleum forensics/fingerprinting analyses.

National Grid, Front Street Former Gas Holder Site, New York City, New York (2008 to present): Project Chemist responsible for field/lab coordination and performing data audit and determining data usability of groundwater, soil, and solid/aqueous waste characterization samples, in accordance with approved NYSDEC and USEPA methodologies.

PACTIV Advanced Packaging Solutions Site, Macedon, New York City (2011-2012): Project Chemist responsible for soil screening using XRF monitor, soil sampling, field/lab coordination and performing data audit and determining data usability of soil samples, in accordance with approved NYSDEC and USEPA methodologies.

Waste Management, Hazardous Waste Landfill, Lewiston, New York (2011): QA/QC Officer responsible for reviewing routine monitoring analytical data prior to disposal.

Kirkman Boulevard Site, New Jersey (1990): Data Interpreter for the Atlantic County Improvement Authority. Formulated theory for presence of high levels of volatile and semivolatile organic compounds in deep aquifers as compared to middle and shallow aquifers for former McAllister and South Jersey Coal Gasification sites, New Jersey.

Kirkman Boulevard Site, New Jersey (1990-1996): Environmental Chemist for Atlantic County Improvement Authority - Kirkman Boulevard Site, Atlantic City, NJ. Performed data audit of quarterly and semi-annual groundwater monitoring and soil boring waste classification/contamination delineation programs, in accordance with current NJDEP and USEPA regulations; determined data usability and responsible for subcontract specifications.

Dunlop Tire Corporation, New York (1997): Environmental Chemist, performed data audit and determined data usability of groundwater and

surface water samples, in accordance with approved USEPA methodologies.

B-O-C Leeds, Missouri (1995): Environmental Chemist for General Motors Corporation Environmental Assessment Assistance. Responsible for preparing RFPs and cost quotations to provide chemical analyses of environmental samples.

Lockport Landfill, New York (1994): Environmental Chemist, performed data audit and determined data usability of environmental samples, in accordance with current NYSDEC ASP methodologies.

Ringwood Chemicals LLC, Ringwood, Illinois (2009 to present): Environmental Chemist for Rohm & Haas. Responsible for performing data audit and determining data usability of groundwater, soil, and waste characterization samples, in accordance with approved USEPA methodologies.

Riverwalk Site and Elmira Arterial, New York (1996): Environmental Chemist for two New York State Department of Transportation (NYSDOT) projects. Responsible for preparing RFPs and cost quotations for provision of chemical analyses of soil samples.

Plattsburgh AFB, New York (1992-1996): Environmental Chemist for remedial investigation of numerous sites. Responsible for data audit and determining data usability of soil and groundwater samples in accordance with NYSDEC ASP and USEPA CLP methodologies. Prepared analytical program and cost estimate for several remedial investigations.

Plattsburgh AFB, New York (1997-1999): Environmental Chemist for the Supplemental Evaluation to the Environmental Baseline Survey. Responsible for data audit and determining data usability of soil, sediment, groundwater, wastewater, concrete chip, solid waste, and wipe samples in accordance with Air Force Center for Environmental Excellence (AFCEE). Perform onsite laboratory audits of Intertek Testing Services (ITS), Quanterra Labs, Kemron Environmental Services, and Ecology and Environment, Inc. (E&E).

Salem Acres Site, Massachusetts (1998-2000): Environmental Chemist responsible for preparing QAPP, RFQs, and subcontract specifications to provide chemical analyses of environmental samples, in accordance with USEPA regulations. Performed data validation and determined data usability of environmental samples for the Site Monitoring, Clean Area Delineation and Bench/Pilot Scale Treatability Studies, in accordance with USEPA Region I guidelines. Recommended the use of 49 CFR Part 173, Appendix E procedures for determining ignitability on complex (sludge-like) matrices. Prepared Analytical Specifications for the 65% Design Phase of the RI/FS. Review technical documents (i.e., Sampling and Analysis Plans) prior to initiation of RI/FS field work.

Global Landfill, New Jersey (1995-1996): Environmental Chemist responsible for preparing cost quotation and subcontract specifications to provide chemical analyses of surface water and stream sediment samples, in accordance with NJDEP and USEPA regulations. Performed data audit and determined data usability in accordance with USEPA methodologies. Also prepared analytical scope of services for Phase II Biological/Sediment Ecological Study.

Pope AFB, North Carolina (1997): Environmental Chemist responsible for preparing QAPP, RFQs, and subcontract specifications to provide chemical analyses of environmental samples, in accordance with USEPA regulations. Perform on-site audit of field laboratory.

Paterson Plank Site, New Jersey (1994-1996): Environmental Chemist responsible for preparing the scope of services to provide chemical analyses of environmental samples, in accordance with NJDEPE and USEPA regulations. Perform data validation and determine data usability in accordance with USEPA and NJDEP data validation guidelines.

North East Landfill, New York: Environmental Chemist responsible for preparing RFQs and contract specifications to provide chemical analyses of environmental analyses, in accordance with NYSDEC regulations.

Consolidated Edison Co., East 138th Street Site, New York (2012): Environmental Chemist responsible for performing data audit and determined data usability of groundwater and soil samples in accordance with NYSDEC and USEPA methodologies.

NYSDEC Standby Contract, Tonawanda Forge Site, New York (2014): Environmental Chemist responsible performing data audit and determined data usability of soil, groundwater, and solid waste samples in accordance with NYSDEC and USEPA methodologies.

NYSDEC Standby Contract, Old Agway Site, New York (2013): Environmental Chemist responsible performing data audit and determined data usability of soil, groundwater, and solid waste samples in accordance with NYSDEC and USEPA methodologies.

NYSDEC Standby Contract, College Point Site, New York (2013): Environmental Chemist responsible performing data audit and determined data usability of soil, groundwater, and solid waste samples in accordance with NYSDEC and USEPA methodologies.

NYSDEC Standby Contract, Meeker Avenue Site, New York (2013): Environmental Chemist responsible performing data audit and determined data usability of soil, groundwater, and solid waste samples in accordance with NYSDEC and USEPA methodologies.

NYSDEC Standby Contract, Former Klink Cosmo Cleaners Site, New York (2011-2012): Environmental Chemist responsible performing data audit and determined data usability of soil, groundwater, and solid waste samples in accordance with NYSDEC and USEPA methodologies.

NYSDEC Standby Contract, Polymer Applications Site, New York (2012): Environmental Chemist responsible for evaluating preliminary stockpile soil results for disposable purposes. Performing data audit and determined data usability of soil and solid/liquid waste samples in accordance with NYSDEC and USEPA methodologies.

NYSDEC Standby Contract, Kliegman Brothers Site, New York (2007): Environmental Chemist responsible for conducting vapor intrusion air sampling at residential properties.

NYSDEC Standby Contract, Bedford Malls Site, New York (1997): Environmental Chemist responsible for providing assistance in preparing RFPs and subcontract analytical costs and requirements. Performed data audit and determined data usability of groundwater, stream sediment, and waste samples, in accordance with current NYSDEC ASP 1989 and NYS Chapter 1 State Sanitary Code, Part 5 Drinking Water Supplies, Public Health Law 225 criteria.

Delaware Sand & Gravel Site, Delaware (1991-1996): Environmental Chemist for Pre-Design Site Investigation for the U.S. Army Corps of Engineers. Performed data audit and determined data usability of soil and waste samples, in accordance with USEPA criteria.

NYSDEC Standby Contract, Frontier Chemical Site, New York (1993-1994): Environmental Chemist responsible for performing data audit and determined data usability of soil, surface water, stream sediment, waste, and groundwater samples, for a variety of analytical parameters including dioxin/furan analysis.

NYSDEC Standby Contract, Gorick C&D Landfill, New York (1993-1994): Environmental Chemist responsible for performing data audit and determined data usability of soil, stream sediment, surface water, and groundwater samples, in accordance with current NYSDEC and USEPA methodologies.

NYSDEC Standby Contract, Golden Road Disposal Site, New York (1999): Environmental Chemist responsible for performing data audit and determined data usability of soil, solid/liquid waste, sediment, and groundwater samples in accordance with NYSDEC and USEPA methodologies.

Helen Kramer Landfill Superfund Site, New Jersey (1994-1996): Environmental Chemist for remedial design for the U.S. Army Corps of Engineers. Prepared RFPs, cost quotations, and subcontract specifications to provide chemical analyses of environmental samples. Perform data validation

and usability determination in accordance with USEPA and NJDEP data validation guidelines.

NYSDEC Standby Contract, Pollution Abatement Services Site, New York (1993-1996): Environmental Chemist responsible for preparing RFPs, cost quotations, and subcontract specifications to provide chemical analysis of groundwater, stream sediment, surface water, and leachate samples. Performed data audit and determined usability of environmental samples, in accordance with current USEPA methodologies.

NYSDEC Standby Contract, Johnson City Wellfield, New York (1994): Environmental Chemist for groundwater investigation. Performed data audit and determined data usability of groundwater samples, in accordance with current NYSDEC ASP methodologies.

NYSDEC Standby Contract, Phase II Investigations, New York (1995-1997): Environmental Chemist for Phase II Investigations, NYSDEC, State Superfund Site Assignment No. D002340-3 (Boonville Dump, Halfmoon Landfill, Mohawk Valley Oil, Monarch Chemical, New York Emulsions, Old Johnstown Dump, Queensbury Landfill, Saratoga Springs Landfill, Colonie Landfill, Utica City Dump, and Utica Harbor). Performed data audits and determined data usability of above-referenced sites, in accordance with NYSDEC ASP criteria.

NYSDEC Standby Contract, Phase II Investigations, New York (1995-1998): Environmental Chemist for Phase II Investigations NYSDEC, State Superfund Site Assignment No. D002340-6 (Burton Junkyards, Turf Tailors, Paine Jones, Colture Property, Irwin Property, East Seneca St., Fulton - 6th Ward, Canastota Landfill, Keck Farms, Quanta Resources, Val's Dodge, Onondaga Nations - Site B, Town Line Road, Cole-Zaiser, and Plumb Sand and Gravel). Performed data audits and determined data usability of above referenced sites in accordance with NYSDEC ASP criteria.

Gratwick-Riverside Park, New York (1994): Environmental Chemist for Pot Hole Program. Review of volatile and semivolatile tentatively identified compounds (TICs) for identification and quantification.

Ramapo Landfill, New York (1995-1996): Environmental Chemist responsible for performing data audit and determined data usability of environmental samples, in accordance with NYSDEC ASP and USEPA criteria.

Roebling Steel Superfund Site, New Jersey (1998-1999): Environmental Chemist for remedial action design for the U.S. Army Corps of Engineers. Responsible for monitoring daily sampling activities and sample analysis prior to data submission. Performed data audit and determined data usability in accordance with USACE and USEPA regulations.

North Franklin Street RI/FS, New York (1999-2000): Environmental Chemist responsible for preparing cost quotations and subcontract specifications to provide chemical analyses of environmental samples in accordance with NYSDEC ASP methodologies.

NYSDEC Standby Contract, Pfohl Brothers Landfill, New York (1994-1996): Environmental Chemist responsible for performing data audit and determining data usability of soil, drum waste, groundwater, and air samples for a variety of analytical parameters including dioxin/furan analysis.

Main-LaSalle Redevelopment, New York (1996): Environmental Chemist for the City of Buffalo, Department of Community Development, to obtain analytical laboratory cost estimates and perform data validation/usability on environmental samples in accordance with USEPA Region II data validation guidelines.

Laboratory Audit, New York (1995-1997): Environmental Chemist for NYSDEC Standby Contract Laboratory Audit of Galson Laboratories, Syracuse, New York; Inchcape Testing Services, Colchester, Vermont; and H2M Labs, Inc., Melville, New York. Performed an on-site laboratory audits under the direction of the NYSDEC Division of Hazardous Waste Remediation.

Laboratory Audit, New Jersey (1997-1998): Environmental Chemist for General Motors Corporation to perform on-site laboratory audits of National Environmental Testing, Inc., Thorofare, NJ; Envirotech Research, Inc., Edison, NJ; and NJ Labs, New Brunswick, NJ.

Laboratory Audit, North Carolina (1997): Environmental Chemist for U.S. Air Force to perform on-site audit of Environmental Services, Inc. field laboratory at Pope AFB, Fayetteville, NC.

Laboratory Audit, AFCEE (1997-1998): Environmental Chemist for F.E. Warren Air Force Base, Plattsburgh Air Force Base, Loring Air Force Base, and Pease Air Force Base to perform on-site laboratory audits of ITS, Richardson, Texas; Kemron Environmental Services, Marietta, Ohio; Quanterra Labs, Arvada, Colorado; Ecology and Environment, Inc., Lancaster, New York; Mitkem Corporation, Warwick, Rhode Island; and Katahdin Analytical Services, Scarborough, Maine.

Laboratory Audit, Missouri: Environmental Chemist for NASA Lewis Research Center and R&R International to perform onsite laboratory audit of Quanterra Labs, Earth City, Missouri.

Clinical Chemistry Technologist, Children's Hospital of Buffalo, NY (1984-1987): Technologist with over three years experience operating Beckman and Dacos spectrometers for routine blood chemistries. Night supervisor and responsible for reporting results to physicians, and instrument maintenance.

Secondary Science Teacher (1979-1984) with over five years of experience teaching chemistry, physics, and health science.

Professional Societies/Affiliates

American Chemical Society

Publications

Przybyl, Bruce J., et. al. "Successful Remediation of 1,1,2-Trichloro-1,2,2-Trifluoroethane in Groundwater by Stimulating Anaerobic Biodegradation," Proceedings of the Fifth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, sponsored by Battelle, Monterey, California, May 22-25, 2006.

Fairbanks, Peter R., "Data Usability: The Next Step to Data Validation for Site Remediation," Technonic Publishing Company, Inc., Lancaster, PA 1996.