ONONDAGA LAKE PRE-DESIGN INVESTIGATION: PHASE IV WORK PLAN ADDENDUM 1: HABITAT

Onondaga County, New York

Prepared For:

Honeywell

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JULY 2008

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

PHASE IV PRE-DESIGN INVESTIGATION WORK PLAN – ADDENDUM 1: HABITAT

1.0 INTRODUCTION

Onondaga Lake is a 4.6-mi^2 (2900-acre) lake located northwest of the City of Syracuse in central New York State (Figure 1). The lake, its tributaries, and the upland hazardous waste sites related to the lake have been identified as a federal Superfund site on USEPA's National Priorities List (CERCLIS NYD986913580). The remedial investigation (RI) for the Onondaga Lake bottom subsite was completed in December 2002, the Feasibility Study (FS) was completed in November 2004, the Phase I Pre-Design Investigation (PDI) was completed in 2005, the Phase II PDI was completed in 2006, and the Phase III PDI was completed in 2007. Additional information on the site can be found in the FS (Parsons, 2004) and the Record of Decision (ROD) issued by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) on July 1, 2005 (NYSDEC and USEPA, 2005).

The Phase IV PDI has been structured in a similar fashion as the Phase III effort to collect additional information for the Onondaga Lake design and to fulfill additional data gaps. Unless otherwise noted, the field activities identified in this addendum will be conducted in accordance with the procedures outlined in the Phase I - IV PDI Work Plans and associated appendices (Parsons, 2005, 2006, 2007, and 2008). This addendum describes the sample collection activities required to fulfill several key data needs identified by the Habitat Technical Work Group (TWG). Additional data needs may be required based on continuing discussion with the Habitat TWG. If additional PDI is required, these activities will be covered in another addendum, if necessary. The details regarding the objectives program, sample collection and analysis, implementation of field activities, data management, and reporting are described in the sections below.

2.0 PROJECT OBJECTIVES

Before any of the remedial actions are implemented, additional information is required to complete the remedial design. Since many of the details around the design have not been finalized, this work plan is intended to address several remaining gaps within the existing data set that are needed to advance the conceptual design. Any additional PDI required in 2008 beyond the scope of this work plan will be submitted to NYSDEC as future addenda to the Phase IV PDI Work Plan.

The specific objectives for the habitat PDI are as follows:

- characterize centrarchid (bass and sunfish) nests;

- characterize aquatic macrophytes; and
- evaluate the colonization rates of biota on different substrates.

The tasks discussed in this addendum focus on collecting data related to habitat conditions that will be used in the remedial design. The objectives are based on several data gaps identified by the Habitat TWG.

The first objective, characterize centrarchid (bass and sunfish) nests, will address the data gap related to substrate thickness and protection of the cap. While several factors will be used to design the thickness and substrate characteristics of the habitat layer, there is limited information in the literature on the actual depth of centrarchid nest depression into the surrounding substrate. These data are expected to provide information, along with other sources of information (e.g., other fish species as well as plants and invertebrates, reference sites, literature), to determine the appropriate thickness of the habitat layer, which, as per the ROD, will be no less than 1 ft.

The second objective, characterize aquatic macrophytes will fill the data gap related to macrophyte presence and the relationship with physical factors (e.g., substrate characteristics, energy regimes, and water depth). In addition, analysis of seasonal changes will be completed to document habitat conditions during the various fish life cycles (reproductive cover, juvenile cover, adult cover) and potential limitations in habitat during any of these stages. These data are necessary during design to identify suitable or unsuitable habitat for macrophyte recolonization areas and facilitate the creation of diverse habitats following remediation.

The third objective, evaluate the colonization rates of biota on different substrates, provides data for the type of substrate to use in areas where natural recolonization may be used for restoration (primarily coarse substrates and sand, likely to be available in the quantities needed for the habitat layer). It is important to determine whether the selected substrates support the selected target species early in the design to allow time for sourcing of the material.

The Phase IV habitat data will be combined with the existing information for the lake for use during remedial design. An overall assessment of remaining data gaps for intermediate and/or final design will need to be conducted based on a review of data collected through the Phase IV PDI.

3.0 MOBILIZATION AND LOGISTICS

Health and Safety

Subcontractor Safety Plans (SSPs) will be used for this investigation and will be strictly followed by all field personnel. Any task outside of the previous field efforts will have a new Job Safety Analysis (JSA) completed before the task begins. Minor modifications to the SSP have been made to account for the activities identified in this work plan (Appendix A). Copies of the SSPs will be maintained at the support zone and on each vessel.

Site Facilities, Decontamination, and Waste Handling

The support zone and facilities utilized for the previous phases of the PDI work will be relocated to the clearing off the upper road to Harbor Brook (Figure 2). The dock will be located west of the causeway, closer to the entry gate to the Onondaga Lake site. The support zone will be relocated due to field work for the installation of the Willis portion of the Willis/Semet IRM barrier wall. All decontamination and waste management activities will be conducted in accordance with the Phase I PDI Work Plan (Parsons, 2005).

4.0 SAMPLE COLLECTION AND ANALYSIS

Additional data collection is needed to understand habitat conditions in the lake. In order to address existing data gaps and further the design process, additional habitat related information will be collected from the lake in 2008.

4.1 Fish Nest Characterization

Centrarchids (bass and sunfish) create nests in the littoral zone during spring each year. Nest characteristics, such as depth and substrate, will be used as one of several factors in designing the thickness and substrate characteristics of the habitat layer. The ROD-specified minimum thickness of the habitat layer is 1 ft, and data from this task will be used to determine the appropriate thickness of the habitat layer. This task involves measuring nest characteristics of each species, including the depth of the depression, height of the sides in relation to nest depression and surrounding substrate, and sediment composition of the nest. An annual nest survey is conducted by Onondaga County Department of Water Environment Protection (OCDWEP), which estimates the number of nests along the perimeter of the lake. No additional data are collected as part of the OCDWEP nest survey. This task will provide additional information on the nest characteristics.

A maximum of 30 nests per species (largemouth bass, smallmouth bass, bluegill sunfish, pumpkinseed sunfish) will be evaluated during approximately two weeks in June from locations around the lake to assess their characteristics. Differences between the nests of each species will be noted and used to aid in the determination of the habitat layer thickness. The nest characteristics will be measured based on the methods summarized below and detailed in the Standard Operating Procedures (SOP) shown in Appendix B.

Nest characterization will be conducted when water clarity is sufficient to see at least through 2 m of water and conditions are calm. Based on previous assessments, centrachid nests have been observed around the lake; in 2006 more than 2/3 of the nests were located in the north basin and the remaining nests were in the south basin (EcoLogic et al., 2007). The approximate center of each nest will be recorded using a differential global positioning system (DGPS; allows sub-meter accuracy). Sites will be approached slowly so that the species guarding the nest can be identified and recorded. The following will be measured and recorded at each nest selected for characterization:

- water depth;
- nest width and length;
- maximum depth of nest depression;
- height of nest relative to surrounding substrate;
- substrate size and percent composition based on modified Wentworth scale;
- percent embeddeness;
- other cover types (e.g., logs, vegetation, large rocks) within 1.5 m of the nest; and
- general shoreline slope and nest site slope.

4.2 Aquatic Macrophyte Survey

Aquatic macrophytes within the littoral zone of Onondaga Lake will be characterized to understand the relationship between physical factors (e.g., substrate, energy, water depth) and the presence of aquatic macrophytes, including the two threatened and endangered species currently known to exist in the lake. In addition, analysis of seasonal changes will be completed to document habitat conditions during the various fish life cycles (reproductive cover, juvenile cover, adult cover) and potential limitations in habitat during any of these stages. The survey methods are summarized below; detailed methodology is provided in the SOP (Appendix B).

Aquatic macrophyte species composition and distribution will be characterized monthly from May to October along points distributed approximately every 2 acres (total of 397 points) in 0 to 7 m water depths to allow for evaluation of changes in the size and shape of the macrophyte bed and species composition over the growing season (Figure 3). Points will be identified based on GPS coordinates and will be sampled each month. Sampling will be conducted at each point according to Madsen (1999). Species presence or absence will be evaluated using a rake toss method. In addition, water depth will be recorded at each point along the transect. Energy regimes will be as used in the OCDWEP Ambient Monitoring Program (EcoLogic, 2001).

During each sampling event, biomass samples will be collected at 120 set points: 40 points within the dredge and cap areas, 40 points in the cap only areas, and 40 points in the unremediated areas (Figure 3). A 6 inch inside diameter core sampler constructed of PVC will be used to collect the plants to determine above ground biomass. The sampler is pushed approximately 20 cm into the sediments and a rubber cap placed on the open end of the handle to create a vacuum. The sampler is removed from the sediment, brought above the water and placed in a 5 gallon bucket with a mesh bottom. The cap is removed and the entire sample released into the bucket. The bucket can then be dipped in the water several times to remove excess sediment. Plant samples will be sorted by species in the field, and placed into resealable plastic bags labeled with a unique sample number, date, station, species, and sampler initials, placed in a cooler on wet ice, and transported to the laboratory. In the laboratory, plant samples

will be separated into above ground (shoots) and below ground (roots and rhizomes) fractions and the number of plants recorded. Wet weight will be determined for the below ground and aboveground biomass samples by species and recorded on the field log. Dry weights will be obtained by drying samples at 70^{o}C for at least 24 hours until constant mass is obtained. Dry weight will be recorded for each species and sample type. Samples will be archived and stored for one year.

During one of the monthly surveys, a substrate evaluation will be conducted along the transects at each of the biomass locations. Sediment will be collected with a petite ponar and placed into a labeled container for grain size analysis by ASTM Method D422 in the laboratory.

4.3 Evaluation of Substrate Suitability

This task is designed to evaluate the natural recolonization of different substrate types (primarily coarse substrates and sand, likely to be available in the quantities needed for the habitat layer) by macrophytes, macroinvertebrates, and fish. Rates of recolonization will be evaluated for three substrate types and three energy regimes. Energy regimes are initially based on the general categories currently used by OCDWEP (EcoLogic et al, 2007). If necessary, additional information on energy within the sample locations is available in the wind/wave analysis submitted to the Capping TWG (Verduin and LaRosa, 2008). Sampling methods are summarized below and detailed in the SOP (Appendix B).

Three substrate types will be evaluated during the study including sand (diameter between 0.0029 inches and 0.187 inches); sand and fine gravel (diameter between 0.0029 inches and 0.75 inches), and coarse gravel and cobble (diameter between 1.0 inches and 3.0 inches). These substrates are associated with the habitat modules where natural recolonization will be the primary method used for restoration. However, these substrates may not represent the final substrates to be used in the lake, since these have not been decided to date. Three locations, representing different wind/wave energy regimes, will be used to evaluate the three substrate types. Proposed locations are just south of Sawmill Creek (medium energy), near Nine Mile Creek (low energy), and near Bloody Brook (high energy). At each location, three pools each will be placed at two depths: 0 m to 0.75 m, 0.75 m to 1.5 m, to assess potential colonization differences with depth. This will result in a total of 18 pools per location (total 54 pools).

Wading pools (approximately 36 inch diameter, 8 inches deep) will be filled to the top with the proposed substrates and placed on the sediment surface in the littoral zone at each location in late July. Previous studies by ESF students indicate that invertebrates are able to colonize artificial containers placed above the substrate surface (Neil Ringler, ESF, personal communication with Margaret Murphy, QEA). Additional substrate will be placed around the pools to create a slope from the sediment surface to the top of the wading pool. Pools will be left in place through September to assess colonization rates over the summer months. Bi-weekly monitoring (i.e., every two weeks) will be conducted at each location to assess plant growth and fish use of these locations. Invertebrate composition will be assessed at the end of the study

period. In addition, a sediment sample will be collected from each pool with a petite ponar and analyzed for grain size and total organic carbon. Pools will be left in place over the winter and a subset (9 pools per location) sampled once the following spring for invertebrates, plant composition, grain size, and total organic carbon.

During the bi-weekly monitoring, fish sampling will be conducted with minnow traps to identify if juvenile species are using the areas. One minnow trap will be placed in each pool and allowed to set overnight and checked the following morning for fish. During each sampling visit, visual assessments will be conducted at each pool to assess plant growth. If plants are observed growing within a pool, the species will be recorded and percent coverage estimated based on the Daubenmire cover classes ranging from 1 to 6 (1 – 0% coverage; 2- less than 5% coverage; 3 – 25 to 50% coverage; 4 – 50 to 75% coverage; 5 – 75 to 95% coverage; 6 – greater than 95% coverage) . In addition, a digital photograph may be taken to assess percent coverage using available computer software (e.g., sigmascan). Any plants growing adjacent to the pools also will be noted to assess the source population available to colonize the pools (information from the monthly macrophyte surveys will be used for this as well).

Following completion of the study, invertebrate samples will be collected from each pool using a petite ponar sampler. In addition, a sample will be collected adjacent to the pool to assess the source population available to colonize the pools. Invertebrates will be preserved in 10% buffered formalin with rose bengal dye and identified in the laboratory. Invertebrate samples will be processed with a 100 organism subsample using the methods utilized by NYSDEC (Bode et al., 2002). The organisms will be identified to the lowest taxonomic level possible, sorted into vials by taxa, preserved in 75% ethanol and archived. Each vial will be labeled with the sample code, station location, replicate number, date of collection, name of organism, and number of individuals within the vial. The remainder of the sample, as well as the separate vials, will be retained for up to one year.

5.0 DATA MANAGEMENT AND REPORTING

Field Database

Field and laboratory data generated during the habitat PDI will be maintained in an Access database developed for the habitat PDI. Unique sample identifiers will be generated for each sample to maintain quality control and will consist of site location, sample type, and sampling event.

Sample Holding, Collection, and Recordkeeping

Samples will be collected and handled according to the procedures outlined in the Phase I PDI WP and associated appendices. Samples will be managed by the field database as described above. Invertebrate samples and macrophyte samples will be archived as noted above and stored for up to one year.

Reporting

Upon completion of the Phase IV PDI field activities and associated analyses, Parsons will submit applicable data to NYSDEC in accordance with the Consent Decree for the lake. Once the Phase IV investigation and evaluation has been completed, a Data Summary Report will be prepared and submitted to NYSDEC.

6.0 REFERENCES

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2002. Quality Assurance Work Plan for Biological Stream Monitoring in New York State. NYSDEC Bureau of Monitoring and Assessment, Division of Water, Stream Biomonitoring Unit.

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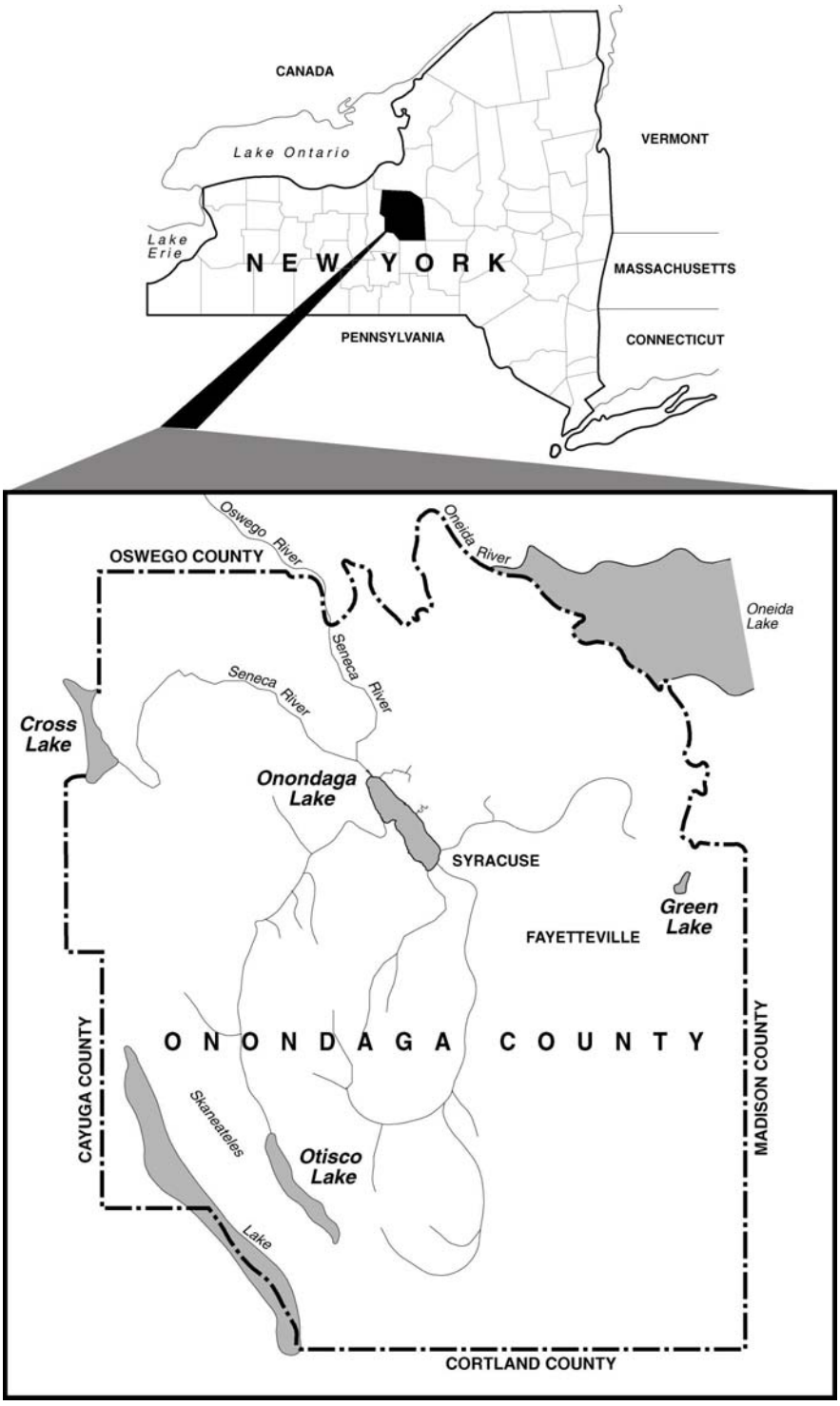
TABLES

TABLE 1

SUMMARY OF PROPOSED SAMPLING LOCATIONS, FREQUENCY OF COLLECTION, NUMBER OF SAMPLES, SAMPLE TIMING, AND DURATION OF SAMPLING

Activity	Number of Locations	Frequency of Collection	Number of Samples/Surveys	Sampling Timing	Duration of Each Sampling Event
Fish Nest Characterization	N/A	One event	Maximum of 30 nests per species	June	Approximately 2 weeks
Macrophyte Survey	397	Monthly	6 surveys	May - Oct	1 week
Macrophyte Biomass Assessment	120	Monthly	40 points each in cap and dredge, dredge only, and non-remediated locations each month	May - Oct	1 week
Substrate Suitability Study	3	Every two weeks	8 fish and plant surveys; invertebrate survey at end of study	July - September	2 days every two weeks for fish and plant surveys; 4 months for invertebrates

FIGURES



Source: Modified from TAMS 2002c.

FIGURE 1

Honeywell

ONONDAGA LAKE
SYRACUSE, NEW YORK

LOCATION OF ONONDAGA LAKE

PARSONS

290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, NY 13088 PHONE: (315) 451-9560

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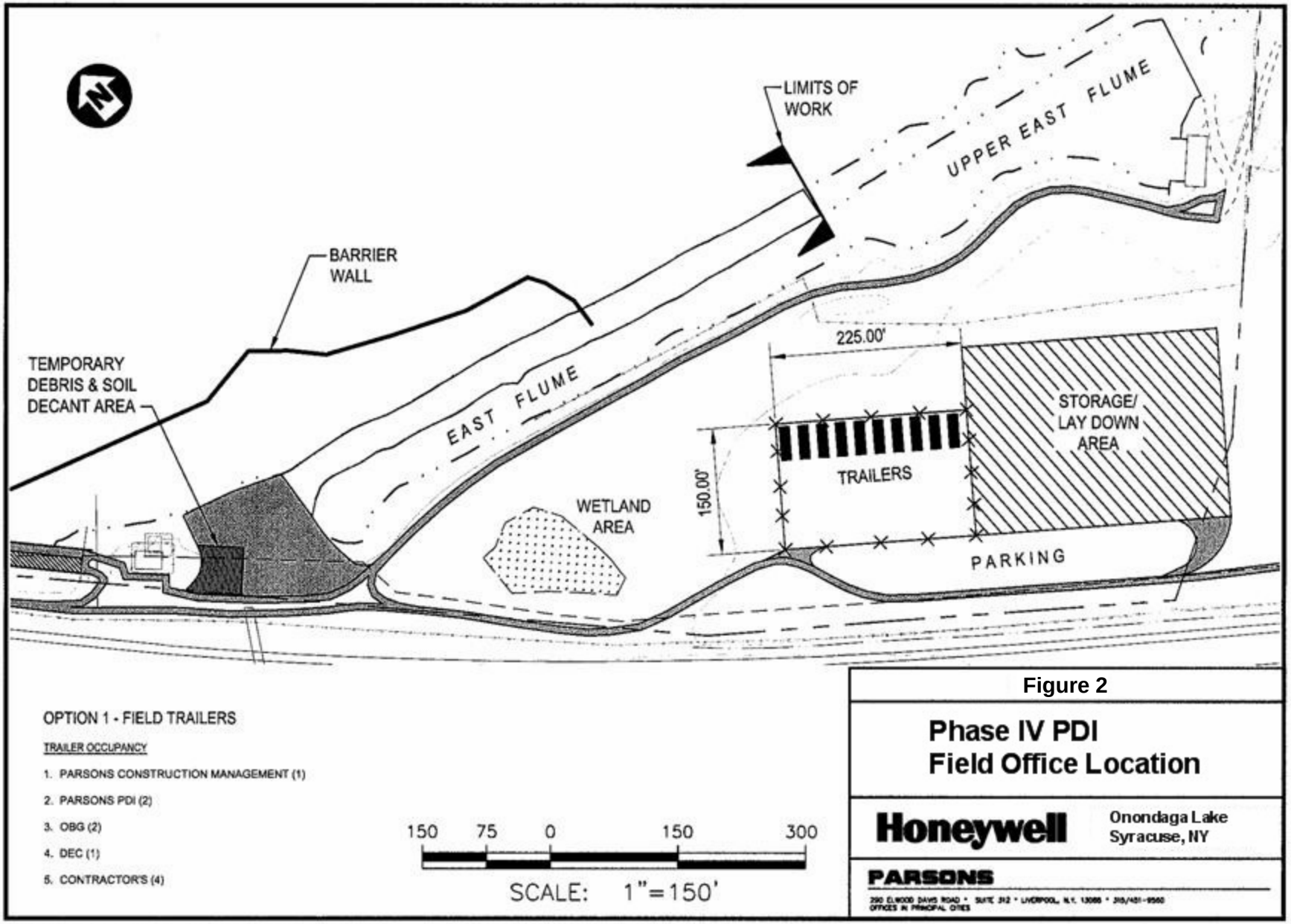


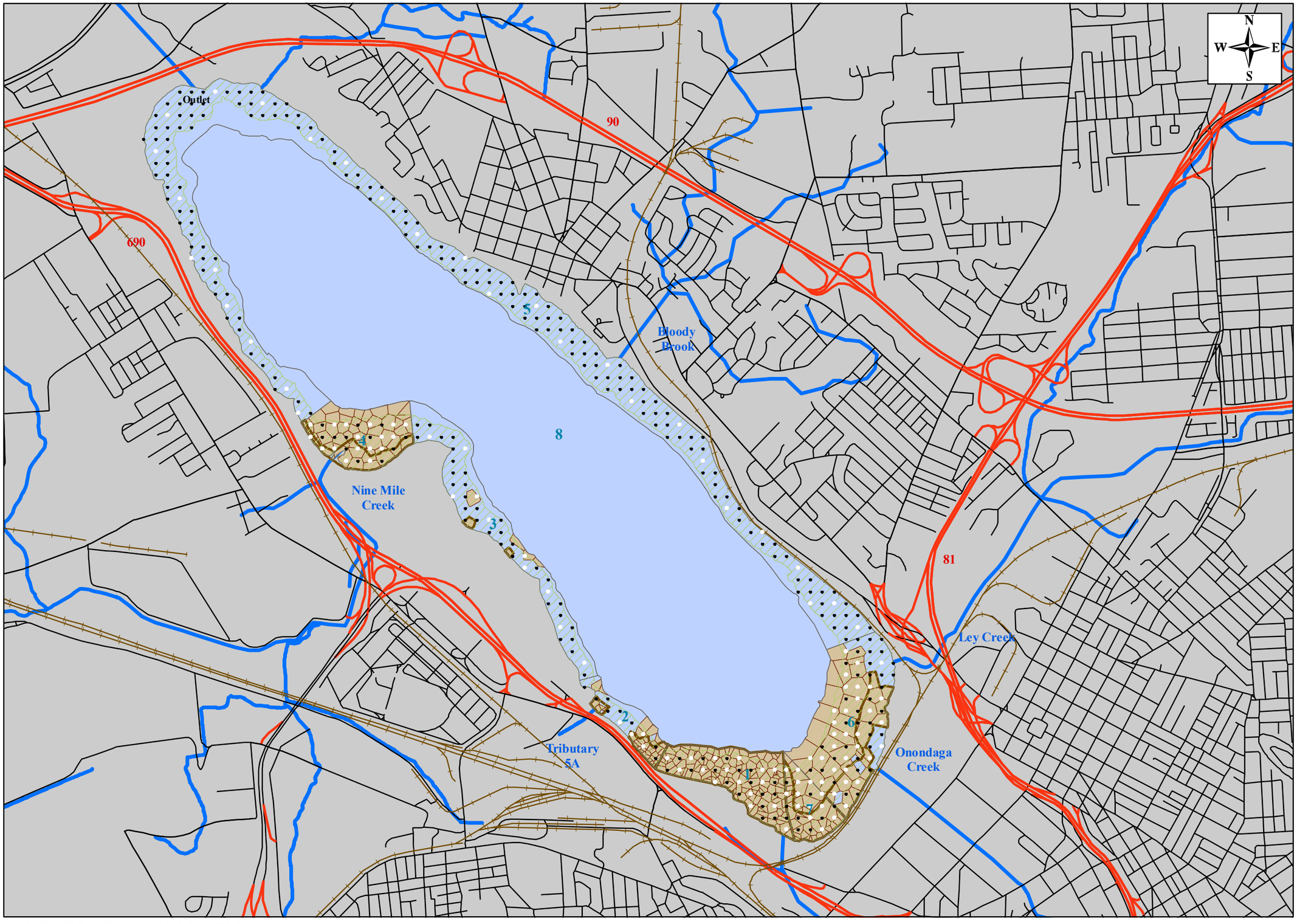
Figure 2

Phase IV PDI
Field Office Location

Honeywell Onondaga Lake
Syracuse, NY

PARSONS

FILE NAME: P:\Honeywell -SYR\Phase IV PDI\Work Plan\Figure 1.jpg



Locator

Scale

Feet

0 1,500 3,000

Legend

Locations

- Community Samples
- Community and Biomass Samples*
- Railroad

Roads

- Road
- Highway/Interstate
- Shore to 7m bathymetry
- Drege and Cap Areas
- Cap Only
- SMU Boundaries
- Tributaries

** Indicated as white dots on the map.*

Figure 3.
Macrophyte Sampling Locations.

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QEA
Quantitative Environmental Analysis, LLC

PARhwg July 2008

CALL - \\Frodo\D_Drive\QEA_Syracuse\Jobs\PARbas\GIS\PARbas_samplelocs_macrophytes.mxd

APPENDIX A

PROJECT SAFETY PLAN MODIFICATIONS

SUBCONTRACTOR SAFETY PLAN (SSP)

Prepared For:

Honeywell Syracuse Portfolio
Health and Safety Program

Quantitative Environmental Analysis, LLC
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Liverpool, NY 13088

Project Name:

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Phase IV of the Onondaga Lake Pre-Design Investigation
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Prepared By:

Quantitative Environmental Analysis, LLC

80 Glen Street, Suite 2
Glens Falls, NY 12801
Author: Laurie E. Scheuing, P.G., C.P.G., Senior Managing Scientist/Corporate Health and Safety Officer

REVIEWED AND APPROVED BY:

Subcontractor Project Manager: _____ 7/16/08
Date

Revised: July 16, 2008

TABLE OF CONTENTS

Page

LIST OF ACRYNOMS

ACGIH	American Conference of Governmental Industrial Hygienists
AED	Automated External Defibrillator
AHA	Activity Hazard Analysis
ATV	All-Terrain Vehicle
BEI	Biological Exposure Index
CFR	Code of Federal Regulations
CNS	Central Nervous System
CPR	Cardio Pulmonary Resuscitation
DDT	Dichloro-Diphenyl-Trichloroethane
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSP^2	Honeywell Syracuse Portfolio Health and Safety Program
JSA	Job Safety Analysis
MSDS	Material Safety Data Sheet
MSP	Medical Surveillance Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PM	Project Manager
PPE	Personal Protective Equipment
PPM	Parts per million
QEA	Quantitative Environmental Analysis, LLC
SAMHSA	Substance Abuse and Mental Health Service Administration
PSP	Project Safety Plan
SCBA	Self-Contained Breathing Apparatus
SHSO	Site Health and Safety Officer
SSP	Subcontractor Safety Plan
TLV	Threshold Limit Value

1. RESPONSIBILITY/IDENTIFICATION OF KEY LINE PERSONNEL

The following personnel have the authority and responsibility for implementing the provisions of this Subcontractor Safety Plan (SSP) for:

1.1 Site Contact Information

Project Site Location	On-site Contact No.
Onondaga Lake, NY	Field Trailer: 315-487-0614
	Sara Chmura: 716-913-0614 (cell)

1.2 Key Project Personnel

Contractor:	Quantitative Environmental Analysis, LLC (QEA)	
Address:	290 Elwood Davis Road, Liverpool, NY 13088	
Telephone:	315-453-9009	Email: krussell@qeallc.com
Company Executive responsible for project:		Contact No.
Kevin Russell		315-453-9009
Manager/Superintendent:		Contact No.
Mark LaRue		315-453-9009
Safety Representative/Manager:		Contact No.
Laurie Scheuing		518-792-3709
Key Foreperson(s):		Contact No.
James Ryan		315-453-9009
Client Project Management Point of Contact: Tim Johnson		Contact No. 315-453-9560

Safety is everyone's responsibility. All levels of management at Quantitative Environmental Analysis, LLC (QEA) are responsible for providing the resources necessary to maintain a safe working environment, for establishing health and safety policies, and for ensuring policy implementation. Supervisors are responsible for implementing health and safety policies and ensuring that day-to-day activities are conducted in a safe and healthy manner. Employees are responsible for adhering to established health and safety policies and for performing their tasks in a manner that does not endanger themselves, other individuals, or property. A copy of this SSP is provided to all employees working on the field tasks of this project and will be maintained on-site at all times. A signature on the Health and Safety Plan Certification Form (Appendix A) is required by each person working on the Site.

2. STATEMENT OF SUBCONTRACTOR'S SAFETY AND HEALTH POLICY

This Project Safety Plan (PSP) presents the health and safety requirements and procedures that will be followed by QEA personnel during field activities for the Phase IV of the Onondaga Lake Pre-Design Investigation. This PSP has been developed in accordance with Title 29 of the Code of Federal Regulations (CFR), Part 1910.120 (b) and will be used in conjunction with QEA's Corporate Health and Safety Program (QEA 1998). This PSP will be modified by addendum if the scope of these activities is modified in a way that is not addressed by this PSP or if there is a change to key personnel. QEA is committed to providing a safe working environment for its employees. QEA employees will not work on sites where unsafe working conditions exist.

2.1 Drug and Alcohol Free Workplace

QEA has developed safety and health procedures that are designed to ensure that all employees, subcontractors, and co-workers are provided with a safe, healthy, and drug-free working environment. The unlawful or improper presence or use of controlled substances or alcohol in the workplace presents a danger for everyone and poses a significant threat to our goals. For these reasons, we have established the following drug-free workplace program that balances our respect for individuals with the need to maintain an alcohol and drug-free environment.

QEA explicitly prohibits:

- The use, possession, solicitation for, or sale of narcotics or other illegal drugs, alcohol, or prescription medication without a prescription on QEA's or a client's premises or while performing a job assignment.
- Being impaired or under the influence of legal or illegal drugs or alcohol while at work, while on QEA's or a client's premises, or while on company business. "Prohibited substances" include illegal drugs, alcohol, or prescription drugs not taken in accordance with a prescription given to the employee.

DRUG TESTING: To ensure the accuracy and fairness of our testing program, all testing will be conducted according to Substance Abuse and Mental Health Services Administration (SAMHSA) guidelines, where applicable, and will include a review by a Medical Review Officer. All QEA employees involved in the medical surveillance program (as required by OSHA 1910.120) will be subject to annual drug testing as required by some of our clients. Additionally, QEA may conduct drug testing of any employee under any of the following circumstances:

For Cause Testing: QEA may ask an employee to submit to a drug test at any time it feels that the employee may be under the influence of drugs or alcohol, including, but not limited to, the

following circumstances: evidence of drugs or alcohol on or about the employee's person or in the employee's vicinity, unusual conduct on the employee's part that suggests impairment or influence of drugs or alcohol, negative performance patterns, or excessive and unexplained absenteeism or tardiness.

Post-Accident Testing: Any employee involved in an on-the-job accident or injury under circumstances that suggest possible use or influence of drugs or alcohol in the accident or injury event may be asked to submit to a drug and/or alcohol test. "Involved in an on-the-job accident or injury" means not only the one who was injured, but also any employee who potentially contributed to the accident or injury event in any way.

An employee who tests positive will be given an opportunity to provide a legitimate medical explanation, such as a physician's prescription.

If an employee is tested for drugs or alcohol outside of the employment context and the results indicate a violation of this policy, the employee may be subject to appropriate disciplinary action. In addition, any employee who is convicted of a criminal drug violation in the workplace must notify QEA in writing within five calendar days of the conviction. QEA will take appropriate action within 30 days of notification.

Any employee who tests positive for drugs or alcohol will be immediately subject to potential disciplinary action, which may include removal from duty or other actions at the discretion of the company management. Disciplinary action may include a verbal warning, written warning (as documented on a significant event form), suspension, and/or discharge. In addition, the employee may be referred to a substance abuse professional for assessment and recommendations. The appropriate action will be determined upon review of the incident. The company does not guarantee that one form of action will necessarily precede another.

QEA assures that any information concerning an individual's drug or alcohol use will remain confidential. All drug-testing information will be maintained in separate confidential records.

Communicating our drug-free workplace policy to both supervisors and employees is critical to our success. To ensure all employees are aware of their role in supporting our drug-free workplace program:

- All employees will receive a written copy of the policy.
- The policy will be reviewed in orientation sessions with new employees.

A safe and productive drug-free workplace is achieved through cooperation and shared responsibility. Both employees and management have important roles to play. All employees are required to report to work or be subject to duty without impairments induced by alcohol or drugs. In addition, employees are encouraged to:

- Be concerned about working in a safe environment;
- Seek appropriate medical attention; and
- Report dangerous behavior to their supervisor.

It is the supervisor's responsibility to:

- Inform employees of the drug-free workplace policy;
- Observe employee performance;
- Investigate reports of dangerous conduct or practices;
- Document negative changes and problems in performance;
- Counsel employees as to expected performance improvement;
- Refer employees to seek appropriate medical attention; and
- Clearly state the consequences of policy violations.

3. IDENTIFICATION OF COMPETENT/QUALIFIED PERSONS

The names of key Site personnel are presented in 3.1. Should key Site personnel change during the course of the project, a new list will be established. Copies of training certificates have been provided to Parsons.

3.1 Competent/Qualified Personnel

Name	Job Title	40-hr HAZWOPER	8-hr HAZWOPER Supervisor	8-hr HAZWOPER refresher expires	Other training (i.e. CPR, excavation, confined space)
Laurie Scheuing	Senior Managing Scientist/ Corporate HAS Officer	7/27/89	9/19/91	4/15/2009	10 Hr Construction – 4/15/2008; Bloodborne Pathogens– 4/6/07; Confined Space Entry – 3/6/02; Confined Space Rescue-1/27/01; CPR/AED/First Aid – 4/24/08 (new certificates pending); Railway Safety – 4/13/07; Fork Lift– 4/13/06: Hazardous Materials Transportation-1/17/03; Hazardous Waste Management-6/16/06 ; NYS Boating Safety-3/27/03; Open Water Diver-12/10/07; Patient Packaging-1/27/01
Mark LaRue	Director of Field Programs	11/12/87	11/12/87	7/18/08	CPR/AED/First Aid-5/30/08; NYS Boating-4/3/03

James Ryan	Scientist	8/19/02	6/22/06	4/15/09	10 Hr Construction – 4/15/2008; Bloodborne Pathogens– 4/6/07; CPR/AED/First Aid (new certificates pending) - 4/24/08; NYS Boating Safety-5/12/04
Margaret Murphy	Managing Scientist	5/22/92	8/29/02	7/18/08	CPR/AED/First Aid-5/30/08; NYS Boating-4/16/03
Chris Pelrah	Scientist	3/29/07	N/A	4/15/09	10 Hr Construction – 4/15/2008; NYS Boating Safety-8/1/96
Ramzy Makhlouf	Engineer	3/16/06	N/A	3/29/08	CPR/AED/First Aid-5/3/07
Deirdre Reidy	Project Engineer	8/3/02	N/A	7/12/07	CPR/AED/First Aid-5/30/08
Brian Solomon	Engineer	6/30/00	N/A	7/11/08	CPR -11/17/06
Ben Dickerson	Scientist	9/27/01	8/3/07	4/9/09	Bloodborne Pathogens– 4/6/07; Confined Space Entry – 3/6/02; CPR/AED/First Aid – 4/24/08 (new certificates pending); Railway Safety – 4/13/07; NYS Boating Safety-4/11/03; Open Water Diving-7/8/07;
Nathan Kelsall	Project Scientist	4/15/04	N/A	7/18/08	CPR/AED/First Aid-5/30/08

Irena Felty	Project Engineer	8/16/01	N/A	7/18/08	CPR/AED/First Aid-5/30/08; NYS Boating-3/27/03

Training requirements include:

- 40-hour HAZWOPER and 8-hour annual refresher certificates – required for general site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazard.
- 8-hour HAZWOPER Supervisor certificate – required for on-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations.
- Respirator Clearance – required for all personnel that may need to wear a half facepiece, full facepiece or supplied air respirator, or self-contained breathing apparatus (SCBA). QEA personnel are not cleared to wear respirators on this project, therefore no certificates are provided.
- Excavation Competent Person certificate – required for daily inspections of excavations greater than four feet in depth, the adjacent areas, and protective systems for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are required when employee exposure can be reasonably anticipated. QEA personnel are not trained as excavation competent persons.
- CPR/First Aid certification –A person who has a valid certificate in first-aid training from the U.S. Bureau of Mines, the American Red Cross, or equivalent training that can be verified by documentary evidence, shall be available at the worksite to render first aid in the absence of an infirmary, clinic, hospital, or physician, that is reasonably accessible in terms of time and distance to the worksite. For on-the-water activities, time, rather than distance, is the critical factor in determining whether first aid and CPR trained personnel are required. The vessel itself shall be considered the worksite.
- Confined Space Entry (Supervisor) certificate – the employer shall ensure that each entry supervisor knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure. Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the

permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin. Terminates the entry and cancels the permit as necessary. Verifies that rescue services are available and that the means for summoning them are operable. Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations. Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained. Entrants and attendants, before assignment to a confined space operation, must demonstrate written documentation of confined space training appropriate to their assignment. QEA does not anticipate confined space entry as part of this project.

No worker will enter the exclusion zone, be exposed to hazardous substances or conditions or be assigned work unless they are properly trained, and the up-to-date documentation of such training has been submitted in advance.

4. SCOPE OF WORK EVALUATION

The work activities that will take place are described below. Activities of lower tier subcontractors will either be included in this section, or the lower tier subcontractor will complete their own SSP.

For this project, there will not be any lower tier subcontractors. Lower tier subcontractor activities are not included in this section.

4.1 The lower tier subcontractors that will be working on the project will be:

SUBCONTRACTOR	WORK ACTIVITIES	HONEYWELL EVALUATION GRADE
N/A	N/A	N/A

Major Activities of Contractor –

The Phase IV scope of work includes chemical characterization of sediment, pore water, and groundwater using a variety of sampling techniques. The tasks for Phase IV are summarized in the Onondaga Lake Pre-Design Investigation Phase IV Work Plan (Parsons 2008). Specifically, QEA will potentially be conducting or assisting Parsons' staff with the following tasks:

- On-site data management;
- Sediment core sampling, collected manually and/or using vibracore equipment;
- Sediment core processing;

- Sediment grab sampling
- Water sampling;
- Groundwater seepage meter installation;
- Deployment and retrieval of peeper devices for sediment pore water sampling;
- GeoProbe® sampling to map chloride/conductivity profiles in the shallow sediments; and
- Biota sampling (fish and benthic).

Major Activities of lower tier subcontractor(s) – N/A

5. HAZARD/RISK/EXPOSURE ASSESSMENT AND CONTROL MEASURES

A job hazard analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. Hazards associated with the scope of work are listed below and Activity Hazard Analysis' (AHA) have been developed and are included in Appendix B. AHAs are updated annually and are communicated to all affected parties at the daily health and safety meetings, or as frequently as necessary. Training for AHAs is documented on the Activity Hazard Analysis Training Record included in Appendix A.

Work tasks and references to relevant AHAs are listed below:

5.1 Job Safety Analysis

Task	Hazards/Risks	Controls
Field activities	See AHA001	See AHA001
Motor vehicle operation	See AHA002	See AHA002
Decontamination area setup	See AHA003	See AHA003
Boat/barge operations	See AHA004	See AHA004
Boat/barge fueling	See AHA005	See AHA005
Sediment core sampling	See AHA006	See AHA006
Sediment core processing	See AHA007	See AHA007
Sediment grab sampling	See AHA008	See AHA008
Water sampling	See AHA009	See AHA009

Groundwater seepage meter installation	See AHA010	See AHA010
Sediment pore water sampling	See AHA011	See AHA011
Geoprobe® sampling	See AHA012	See AHA012
Biota sampling	See AHA013	See AHA013
Personal decontamination	See AHA014	See AHA014
Tool and equipment decontamination	See AHA015	See AHA015
Boat/barge decontamination	See AHA016	See AHA016

5.2 Chemical Safety Analysis

The following table identifies for those chemicals or classes of chemicals that workers may potentially be exposed to during the project the OSHA Permissible Exposure Limit (PEL) and ACGIH Threshold Limit Value (TLV), as well as the hazards and organs affected by exposure at unsafe levels. This table has been adapted from Table C6.1 of the Onondaga Lake Pre Design Investigation Phase 1 Project Safety Plan (Parsons 2005).

Chemical or Class	PEL/TLV (ppm)	Hazards, Target Organs
Acetone	1,000 / 750	Irritates nose, eyes, and throat. Causes headaches, dizziness, central nervous system (CNS), depression, and dermatitis.
Benzene	1 / 0.5	Eye, nose, skin, and respiratory system irritant. Causes depression of the CNS, marked by drowsiness, dizziness, headache, nausea, loss of coordination, confusion and unconsciousness. Mutagen, experimental teratogen, and carcinogen.

Chemical or Class	PEL/TLV (ppm)	Hazards, Target Organs
Cadmium Sulfide	0.005 mg/m^3 / 0.002 mg/m^3	Causes vomiting, diarrhea, headaches, and muscle cramps. Mutagen and carcinogen.
Chlorobenzene	75 / 10	Irritates eyes, nose, and skin. Causes drowsiness, numbness, cyanosis, increased sensation, muscle spasms, and CNS depression. Mutagen and experimental teratogen.
Chromium II and III	0.5 mg/m^3 / 0.5 mg/m^3	Irritates eyes and causes sensitization dermatitis.
Chromium VI	0.005 mg/m^3 / 0.05 mg/m^3	Causes respiratory and skin irritation. Causes nasal septum perforation, eye injury, conjunctivitis, skin ulcers, sensitization dermatitis, blood cell disorders, liver and kidney damage, and lung cancer. Mutagen and carcinogen
4,4'-DDT	1 mg/m^3/ 1 mg/m^3	Causes tingling of tongue, lips, face, and hands; tremors; apprehension; dizziness; confusion; vague discomfort; headache; fatigue; vomiting; convulsions; and partial paralysis of the hands. Also affects kidneys and liver. Mutagen, teratogen, and carcinogen.
1,2-Dichlorobenzene	50 / 25	Irritates eyes, skin, nose, and mucous membranes. Causes liver and kidney damage and skin blisters. Mutagen, experimental teratogen, and questionable carcinogen.

Chemical or Class	PEL/TLV (ppm)	Hazards, Target Organs
1,4-Dichlorobenzene	75 / 10	Causes eye swelling, profuse runny nose, headaches, anorexia, nausea, vomiting, low-weight, jaundice, and cirrhosis. Mutagen, experimental teratogen, and carcinogen.
Ethylbenzene	100 / 100	Irritates eyes, skin, and mucous membranes. Causes dermatitis, headaches, narcosis, and coma. Mutagen and experimental teratogen.
Fluorine	0.2 mg/m^3 / 1.6 mg/m^3	Absorbed through the body by inhalation or skin/eye exposure. Causes irritation to eyes, nose, respiratory system. Also causes laryngeal spasm, wheezing, pulmonary edema; eye, skin, burns.
Hydrogen Sulfide	10 / 10	Rapidly fatigues sense of smell. Irritates eyes and respiratory tract. Causes interrupted breathing, coma, convulsions, conjunctivitis, eye pain, tearing, visual intolerance to light, corneal vesicles, dizziness, headaches, fatigue, irritability, insomnia, and gastrointestinal disturbances.
Hexachlorobenzene	NA/ 0.002 mg/m^3	Effects the liver and CNS, resulting in impaired functions of organs and skin lesions. Possible carcinogen.

Chemical or Class	PEL/TLV (ppm)	Hazards, Target Organs
Lead	0.05 mg/m^3 / 0.05 mg/m^3	Causes weakness, exhaustion, insomnia, facial pallor, anorexia, low-weight, malnutrition, constipation, abdominal pain, gastritis, colic, constipation, gingival lead line, anemia, wrist and ankle paralysis, joint pains, tremors, low blood pressure, and kidney disease. Mutagen, experimental teratogen, and suspected carcinogen.
Mercury (alkyl, organo)	0.01 mg/m^3 / 0.01 mg/m^3	Causes skin tingling, incoordination, joint dysfunction, visual and hearing disturbances, spasticity, jerking limbs, dizziness, salivation, tearing, nausea, vomiting, diarrhea, constipation, skin burns, emotional disturbances, kidney injury, and possible teratogenic effects.
Mercury (aryl, inorganic & vapor)	0.1 mg/m^3 / 0.1 mg/m^3	Corrosive to skin, eyes, and mucous membranes. Causes dermatitis, coughing, chest pain, shortness of breath, bronchitis, lung inflammation, ringing in the ears, tremors, insomnia, irritability, indecision, headaches, fatigue weakness, fever, salivation, inflammatory disease of the mouth, gastrointestinal disturbances, anorexia, low-weight, and protein the urine. Mutagen, experimental teratogen, and questionable carcinogen.
Methanol	200 / 200	Irritates eyes, skin, and upper respiratory system. Cause shortness

Chemical or Class	PEL/TLV (ppm)	Hazards, Target Organs
		of breath, headaches, drowsiness, dizziness, vertigo, lightheadedness, nausea, vomiting, visual disturbances, tearing, blindness, and dermatitis. Mutagen, experimental teratogen, and carcinogen.
Naphthalene	10 / 10	Irritates eyes, skin, and bladder. Causes headaches, confusion, excitement, convulsions, coma, vague discomfort, nausea, vomiting, abdominal pain, profuse sweating, jaundice, hematoma, hemoglobin in the urine, renal shutdown, dermatitis, optic nerve disorders, and corneal and liver damage. Experimental teratogen and questionable carcinogen.
Nickel (soluble)	1 mg/m^3 / 1.5 mg/m^3 (elemental)	Causes nausea, vomiting, diarrhea, conjunctivitis, sensitization, dermatitis, allergic asthma, pneumontis, and lung and nasal cancer. Mutagen, experimental teratogen, and carcinogen.
Phenol	5 /5	Causes anorexia, low-weight, weakness, muscle aches and pain, dark urine, blue skin, skin burns, dermatitis, tremors, twitching, convulsions, and damage to the liver, kidneys, pancreas, spleen, and lungs. Ingestion can cause gangrene and corrosion of the lips, mouth, throat, esophagus, and stomach. Mutagen, experimental teratogen, and questionable carcinogen.

Chemical or Class	PEL/TLV (ppm)	Hazards, Target Organs
Toluene	100 / 50	Irritates eyes and nose. Causes fatigue, weakness, dizziness, headaches, hallucinations or distorted perceptions, confusion, euphoria, dilated pupils, nervousness, tearing, muscle fatigue, insomnia, skin tingling, dermatitis, bone marrow changes, and liver and kidney damage. Mutagen and experimental teratogen.
1,2,4-Trichlorobenzene	5 /5	Irritates eyes, skin, and mucous membranes. Experimental teratogen.
Xylene	100 / 100	Irritates eyes, skin, nose, and throat. Causes dizziness, drowsiness, staggered gait, incoordination, irritability, excitement, corneal irregularities, conjunctivitis, dermatitis, anorexia, nausea, vomiting, abdominal pain, and olfactory and pulmonary changes. Also targets blood, liver, and kidneys. Mutagen and experimental teratogen.
Zinc	5 mg/m^3 / 5 mg/m^3	Irritates respiratory system. Causes metallic taste, cough, chills, fever, tight chest, headaches, rales, blurred vision, muscle aches, nausea, vomiting, dry throat, weakness, lower back pain, exhaustion, fatigue, vague discomfort, shortness of breath, and decreased pulmonary function. Fumes cause metal fume fever. Mutagen and experimental teratogen.

Chemical or Class	PEL/TLV (ppm)	Hazards, Target Organs
Zinc Sulfide	NA/NA	Causes gastritis, vomiting, and diarrhea. May form hydrogen sulfide in the body.

5.3 Chemical Monitoring Requirements

Tasks for which chemical monitoring may be required are done concurrently with Parson's staff, therefore QEA does not anticipate conducting any air monitoring for this project. The action levels and monitoring requirements are listed in Table C6.2.1 of the Onondaga Lake Pre Design Investigation Phase 1 Project Safety Plan (Parsons 2005). QEA personnel are not authorized to upgrade from Modified Level D to Level C. Should these action levels be exceeded, QEA personnel must stop work and contact the project manager and corporate health and safety manager.

Chemical	Instrument	Location	Frequency
N/A			

5.4 Action Levels and Response Summary

Chemical (or Class)	Action Level	Response
N/A		

Activity Hazard Analyses for specific tasks are included in Appendix B. These AHAs specify PPE requirements and engineering controls to mitigate hazards for each task.

6. SUBCONTRACTOR PERIODIC SAFETY INSPECTIONS/AUDITS

Inspections and audits shall be performed by competent persons or observers in the various areas of our workplace. Inspections will focus on worker behaviors as well as site and equipment conditions. An inspection is not considered completed until all identified corrective actions are implemented.

Daily inspections are required by the Site Health and Safety Officer (SHSO), foreman or other responsible party. The completion of the daily inspection must be noted in the construction

or safety log. Any corrective actions taken or required must be noted as well. Daily tailgate meetings will also be held. A Daily Health and Safety Meeting Form is included in Appendix A.

Periodic, documented inspections are performed according to the following schedule:

- At least weekly;
- When we initially establish our PSP;
- When new substances, processes, procedures or equipment which present potential new hazards are introduced into our workplace;
- When new, previously unidentified hazards are recognized;
- When occupational injuries and illnesses occur;
- When we assign workers to unfamiliar processes, operations, or tasks; and
- Whenever workplace conditions warrant an inspection.

Periodic inspections consist of identification and evaluation of workplace hazards or behaviors, and specifying corrective actions that will eliminate or mitigate the identified hazards. The corrective actions will be assigned to a responsible person with a target completion date and tracked to completion. Temporary or interim measures will be applied and documented as well. Copies of the Health and Safety Inspection Checklist and the Boating Safety Checklist are included in Appendix A.

7. SUBCONTRACTOR RISK MITIGATION: TWO-WEEK LOOK-AHEAD

The Risk Mitigation Two-Week Look-Ahead Form is used to review risk mitigation strategies for previously identified tasks at weekly progress meetings. A Weekly Safety Planning Form is included in Appendix A.

The addition of previously unanticipated activities that have not been evaluated for risks and mitigation strategies typically will require the completion of additional AHA(s).

8. COMPLIANCE REQUIREMENTS POLICY

Management is responsible for ensuring that all safety and health policies and procedures are clearly communicated and understood by all employees. Managers and supervisors are expected to enforce the rules fairly and uniformly.

All employees are responsible for using safe work practices, for following all directives, policies and procedures, and for assisting in maintaining a safe work environment.

Our system of ensuring that all workers comply with the rules and maintain a safe work environment includes:

- Informing workers of the provisions of our SSP;
- Responding to concerns expressed by the workers;
- Evaluating the safety performance of all workers;
- Recognizing employees who perform safe and healthful work practices;
- Providing training to workers whose safety performance is deficient; and
- Disciplining workers for failure to comply with safe and healthful work practices.

9. WRITTEN PROGRESSIVE DISCIPLINARY PROGRAM

The safety and health procedures that have been developed by QEA are designed to provide all employees, subcontractors, and co-workers with a safe and healthy working environment and to protect employees from injury and illness. All employees and subcontractors are to abide by the established corporate and site-specific health and safety policies and procedures. Violations of these policies and procedures are considered very serious and are subject to disciplinary actions. Examples of violations that will be considered for disciplinary action include:

- Violation of corporate or site-specific health and safety policies and procedures;
- Willful damage to QEA equipment;
- Dangerous driving, including speeding;
- Any act which puts any person in danger, whether an injury or damage results; and
- Improper disposal of hazardous waste.

Disciplinary action may be considered upon review of any accident or incident that occurs. In addition, the company reserves the right to require a drug test following any incident or accident. Failure to comply with this requirement can result in termination of employment. The company assures that any information concerning an individual's drug or alcohol use will remain confidential.

Disciplinary action may include a verbal warning, written warning (as documented on a significant event form), suspension, and/or discharge. The appropriate action will be determined upon review of the incident. The company does not guarantee that one form of action will necessarily precede another.

Nothing in this policy is designed to modify QEA's employment-at-will policy.

10. HAZARD CORRECTION POLICY

Unsafe or unhealthy work conditions, practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

- When observed or discovered;
- When an imminent hazard exists which cannot be immediately abated without endangering employees or property, we will remove all exposed workers from the area except those necessary to correct the existing condition. Workers necessary to correct the hazardous condition shall be provided with the necessary protection; and
- All such actions taken and dates they are completed shall be documented on the appropriate forms (Appendix A).

11. TRAINING AND INSTRUCTION

All workers, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices. Training and instruction shall be provided as follows:

- When the SSP is first established;
- To all new workers;
- To all workers with respect to hazards specific to each employee's job assignment;
- To all workers given new job assignments for which training has not previously provided;
- Whenever new substances, processes, procedures or equipment are introduced to the workplace and represent a new hazard;
- Whenever the employer is made aware of a new or previously unrecognized hazard; and
- To supervisors to familiarize them with the safety and health hazards to which workers under their immediate direction and control may be exposed.

Workplace safety and health practices for include, but are not limited to, the following:

- Explanation of the employer's PSP;
- HSP^2 requirements;
- Honeywell Contractor's Safety Handbook;
- Site Emergency Action Plan;

- Measures for reporting any unsafe conditions, work practices and injuries; and
- Means for identifying when additional instruction is needed.

In addition, we provide specific instructions to all workers regarding hazards unique to their job assignment, to the extent that such information was not already covered in other training.

12. PROJECT SITE EMPLOYEES ORIENTATION PROGRAM SUBJECTS

As a condition of working on a remediation project involving the potential for exposure to hazardous substances and health hazards, our workers will receive information about the following subjects:

- Names of personnel responsible for site safety and health;
- Honeywell's contractor safety requirements;
- Promptly reporting emergencies, incidents and unsafe conditions;
- Emergency/evacuation plans;
- Provisions for medical services and first aid including emergency procedures;
- Safety, health and other hazards at the site;
- Review of all activities on site and related AHAs;
- Proper use of personal protective equipment;
- Work practices by which a worker can minimize risk from hazards;
- Safe use of engineering controls and equipment on site;
- Acute and chronic effects of compounds at the site;
- Decontamination procedures; and
- Hygiene requirements - Availability of toilet, hand-washing, and drinking water facilities.

In addition to the above-mentioned information, we also orient our employees on:

12.1 Site Orientation Topics

Covered or N/A	Site Orientation Topic
Y	Good housekeeping
Y	Road and highway safety practices – flagging, traffic control

N/A	~~Heavy equipment operation – cranes, excavators, articulating dump trucks, etc.~~
Y	Driver safety - defensive driving, operation of pick-up trucks, all-terrain vehicles (ATVs), etc.
Y	Ladder and scaffold inspection and safety rules;
N/A	~~Use of elevated platforms – aerial lifts and scissor lifts~~
Y	Other fall protection measures
Y	Fire prevention including Hot Work Permits
Y	Cleaning, repairing and servicing equipment and machinery
Y	Proper use of hand and power tools
Y	Guarding of belts and pulleys, gears and sprockets, and conveyor nip points
Y	Machine, machine parts, and prime movers guarding
N/A	~~Lockout/Tagout procedures~~
Y	Materials handling
Y	Chainsaw and other power tool operation
Y	Unsafe weather conditions – lightning, high winds, etc.
Y	Mobilization/demobilization
Y	Yard operations: moving vehicles and equipment, receiving and shipping
N/A	~~Landing and loading areas – rigging, tag lines, landing areas, release of rigging~~
Y	Ergonomic hazards - proper lifting techniques
Y	Personal protective equipment
Y	Hazardous chemical exposures
Y	Hazard Communication/Right to Know
Y	Physical hazards
Y	Heat and cold stress
Y	Noise
N/A	~~Ionizing and non-ionizing radiation~~

Y	Biological hazards – poisonous plants, animals, bloodborne pathogens, etc. and
Y	Other job-specific hazards, such as:
	• Safe boating practices
	• Decontamination
	• Emergency evacuation plans

13. EMPLOYEE COMMUNICATION SYSTEM AND POLICY

We recognize that open, two-way communication between management and staff on health and safety issues is essential to an injury-free, productive workplace. The following system of communication is designed to facilitate a continuous flow of safety and health information between management and staff in a form that is readily understandable and consists of one or more of the following checked items:

- New worker orientation including a discussion of safety and health policies and procedures;
- Review of our SSP and Parson's Construction Manager's Project Safety Plan (PSP);
- Workplace safety and health training programs;
- Regular daily and weekly safety meetings;
- Effective communication of safety and health concerns between workers and supervisors, including translation where appropriate;
- Awareness campaign: Posted or distributed safety information;
- A system for workers to anonymously inform management about workplace hazards; and
- A labor/management safety and health committee that
  - Meets regularly;
  - Keeps written records of the safety and health committees meetings;
  - Reviews results of the periodic scheduled inspections;
  - Reviews investigations of accidents and exposures;
  - Makes suggestions to management for the prevention of future incidents;
  - Reviews investigations of alleged hazardous conditions; and

- Submits recommendations to assist in the evaluation of employee safety suggestion.

14. RECORDKEEPING POLICY

We have taken the following steps to document implementation of our SSP:

- Records of hazard assessment inspections, including:
  - The persons conducting the inspection;
  - The unsafe conditions and work practices that were identified; and
  - The action(s) taken to correct the identified unsafe conditions or work practices.
- Documentation of safety and health training for each worker, including:
  - The worker's name or other identifier;
  - Training dates;
  - Types/topics of training; and
  - Training provider.
- Air monitoring and other exposure records.
- Written reports describing in detail, any accidents, incidents or near misses. A root cause shall be determined for such events. Corrective actions will be implemented and communicated to all site team members.
- Other records are retained as required by contract specifications or by local, state or federal (Occupational Safety and Health Administration (OSHA) regulations). Where regulations do not specify the length of records retention, a minimum period of three years after project completion will be used.

15. INCIDENT/NEAR-MISS INCIDENT INVESTIGATIONS POLICY

Procedures for investigating workplace incidents and near-miss incidents include:

- Responding to the incident scene as soon as possible;
- Implementing measures to prevent further injury or damage and to preserve evidence;
- Providing First Aid or coordinating any needed medical care;
- Reporting incidents and near-miss incidents immediately to the appropriate point-of-contact. DO NOT delay! Certain levels of incident require immediate communication to Honeywell's upper management, and possibly to regulatory authorities;
- Interviewing injured workers and witnesses;

- Examining the workplace for factors associated with the incident/near-miss incident;
- Determining the root cause of the incident/near-miss incident;
- Taking corrective action to prevent the incident/near-miss incident from reoccurring;
- Recording the findings and corrective actions taken; and
- Coordinating post-accident substance abuse testing, as appropriate.

Near miss and accident/illness investigation reports are included in Appendix A.

16. EMERGENCY ACTION PLAN

In the event of a site emergency, QEA personnel will congregate at the Site office trailers adjacent to Onondaga Lake. The QEA SHSO will complete a head count of all QEA personnel on Site that day, assess the need for additional assistance and call 911, as appropriate. The Parsons Project Safety Manager and SSO will be notified and appropriate measures to stabilize the site will be taken. The QEA SSO will then contact the QEA project manager and corporate health and safety officer.

The following provides contingency measures for spills and unintentional discharges from handling hazardous materials. Spill and discharge control practices should follow specific procedures to ensure the safety of responders and bystanders and to limit environmental impacts.

Immediate action should be taken to control and contain any spill following the general guidelines below:

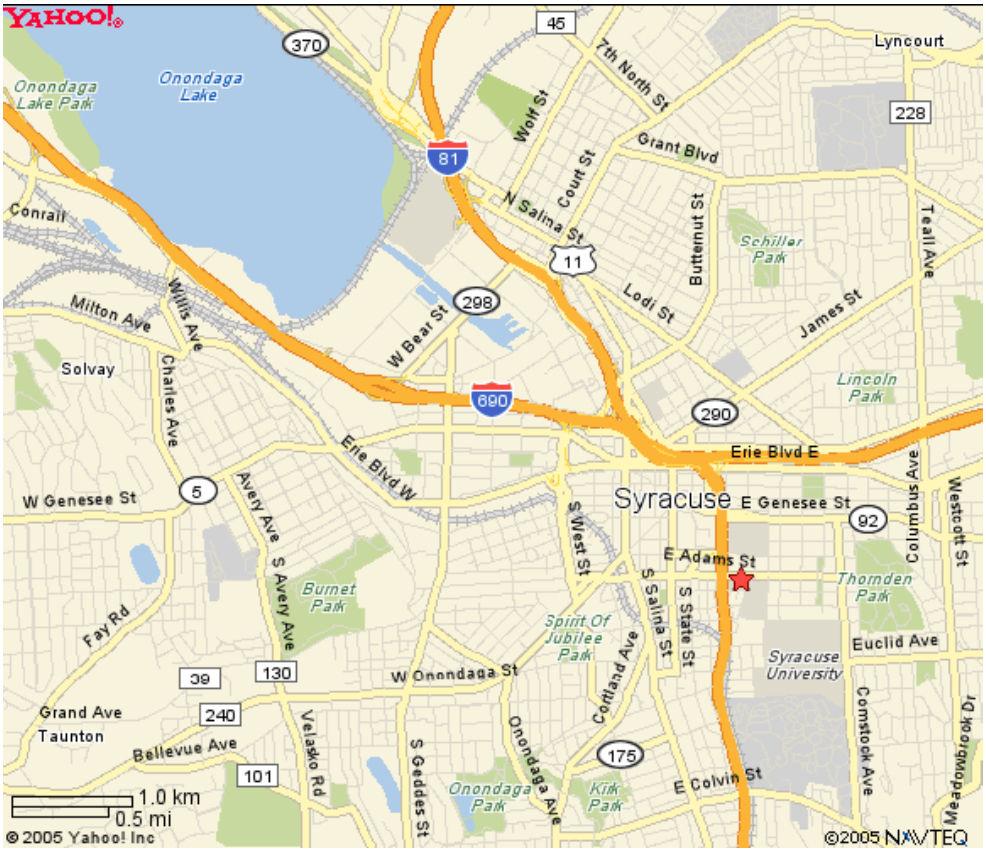
- Report ALL INCIDENTS that involve Honeywell-related property or personnel to the Project Manager, Pete Petrone and Consultant's Program Manager immediately after securing the scene and activating the emergency response plan, as needed
- Keep unnecessary personnel away from the spill or discharge;
- Isolate the hazardous area;
- If the spill or discharge creates a hazardous situation or results in injury or an environmental release, the emergency procedures above should be implemented. Emergency response telephone numbers and designated contacts are listed below.
- Stay upwind of the spill or discharge;
- Eliminate all sources of ignition if the spill involves combustible materials;

- Identify and cover or protect any drains, manholes, waterways, or sewers;
- Control the spill using appropriate absorbent media or devices;
- Collect the material after the spill or discharge is fully contained;
- If the spill or discharge is solid and nonreactive, scoop up the material and place it in a suitable and compatible container for disposal; and
- Following cleanup, evaluate the spill area by collecting soil samples and/or screening the area with air monitoring equipment, if necessary.

17. SITE SPECIFIC MEDICAL EMERGENCY PLAN

In the case of a medical emergency, a map and directions to University Hospital are below:

University Hospital
750 E. Adams Street, Syracuse, NY 13210
(315) 464-5611



Route to Hospital:

1. Follow driving path away from the trailers (parallel to Causeway)

2. Take a left onto the access road

3. Take a left onto State Fair Blvd.

2. Travel southeast approximately 1.0 miles and turn left onto the I-690 on-ramp.

3. Take I-690 East approximately 6 miles and exit onto Route 81 south.

4. Take Route 81 south approximately 100 yards and exit at the Harrison/Adams St. exit.

Stay left on the exit ramp. Merges to Almond Street (under Route 81).

5. Take Almond Street 2 lights and turn left onto Adams Street. Hospital Emergency Room

Project personnel with current First Aid/CPR/AED training are listed in Table 17.3 and certificates have been provided to Parsons.

17.1 Emergency Medical Care

Hospital/Emergency Care	Address	Telephone Number(s)
University Hospital	750 E. Adams Street, Syracuse, NY 13210	911 or (315) 464-5611

17.2 Occupational Medicine Clinic

Occupational Medicine Clinic	Address	Telephone Number(s)
N/A		

17.3 Competent First Aid/CPR Personnel

Name(s) Competent Persons	First Aid Expiration Date	CPR Expiration Date

Laurie Scheuing	4/23/09	4/23/09
Mark LaRue	5/3/10	5/3/08
James Ryan	4/23/09	4/23/09
Margaret Murphy	5/3/10	5/3/08
Ramzy Makhlouf	5/3/10	5/3/08
Deirdre Reidy	5/3/10	5/3/08
Ben Dickerson	4/23/09	4/23/09
Nathan Kelsall	5/3/10	5/3/08
Irena Felty	5/3/10	5/3/08

CPR training for personnel with expiration dates in May is scheduled for the May 2008.

18. HAZARD COMMUNICATION PROGRAM

The following individuals have responsibility for QEA's Hazard Communication Program:

Corporate Health and Safety Officer (CHSO): The CHSM is the hazard communication program coordinator, with overall responsibility for the program, including reviewing and updating this plan as necessary. The SHSO shall ensure compliance with the requirements identified in this hazard communication program by conducting annual audits.

Project Manager: Project managers shall ensure that all hazard communication program requirements have been identified and addressed within this PSP.

Site Health and Safety Officer (SHSO): The SHSO shall be the main point of contact for this hazard communication program compliance during on-site phases of project operations.

The following is a list of chemicals to be used on the site:

- Acetone;
- Hexane; and
- Gasoline

QEA's Hazard Communication Program is in Appendix C and the MSDSs for this project are in Appendix D.

19. RESPIRATORY PROTECTION PROGRAM

QEA personnel are not authorized to upgrade to Level C and therefore no Respiratory Protection Program is included.

20. MEDICAL SURVEILLANCE AND RESPIRATORY PROTECTION PROGRAMS

All project personnel performing intrusive work or entering the restricted area where intrusive work is being conducted, must be involved in a medical surveillance program meeting, at a minimum, the requirements of 29 CFR 1910.120.

The following is a list of elements of QEA's Medical Surveillance Program (MSP) for this project:

- Medical examinations. The QEA MSP includes the following types of medical examinations: baseline, annual, post-exposure, and exit examination.
- The medical exams include the following: medical and occupational history, physical examination, vision test, audiometric examination, chest x-ray, electrocardiogram (EKG), pulmonary function test, blood chemistry profile, complete blood count, urinalysis, non-DOT drug screen.

Copies of the medical clearance forms for project personnel have been provided to Parsons.

20.1 Medical Surveillance Requirements

Name	Job Title	Respiratory Clearance	Medical Exam	Respirator Fit Test	Other Med Surveillance Requirement
Laurie Scheuing	Senior Managing Scientist/ Corporate HAS Officer	N/A	6/27/08	N/A	N/A
Mark LaRue	Director of Field Programs	N/A	9/17/08	N/A	N/A
James Ryan	Scientist	N/A	9/11/08	N/A	N/A
Margaret Murphy	Managing Scientist	N/A	9/18/08	N/A	N/A
Chris Pelrah	Scientist	N/A	3/21/09	N/A	N/A
Ramzy Makhlouf	Engineer	N/A	4/8/09	N/A	N/A
Deirdre Reidy	Project Engineer	N/A	9/21/08	N/A	N/A
Brian Solomon	Engineer	N/A	10/23/08	N/A	N/A
Ben Dickerson	Scientist	N/A	9/18/08	N/A	N/A
Nathan Kelsall	Project Scientist	N/A	4/8/09	N/A	N/A
Irena Felty	Project Engineer	N/A	10/8/08	N/A	N/A

21. OTHER WRITTEN PLANS OR PROGRAMS AS REQUIRED BY REGULATION AND APPLICABLE TO THIS PROJECT.

21.1 Other Written Plans or Programs

Included or N/A	Name of Plan or Program
N/A	Site sanitation plan
N/A	Layout/material storage plans
N/A	Access and haul road plan/traffic patterns

N/A	Procedures and tests
N/A	Wild fire prevention plan
N/A	Diving plan
Included with AHA004	Man overboard plan
Included with AHA004	Fire Aboard/Abandon ship plan
N/A	Asbestos abatement plan
N/A	Lead abatement plan
N/A	Abrasive blasting
N/A	Critical lift procedures
N/A	Dangerous weather contingency planning
N/A	Demolition plan
N/A	Formwork and shoring erection and removal plans
N/A	Blasting plan
N/A	Nighttime operations plan
N/A	Control of Hazardous Energy (Lockout/Tagout)
N/A	Operation of a Forklift
N/A	Confined Space Entry
N/A	100 % Fall Protection Plan
N/A	Other:

22. SUBCONTRACTOR SAFETY PLAN (SSP) REVIEW AND MODIFICATIONS

The SSP shall be submitted to the Project Manager (PM) at least ten days before commencement of any field activities. The SSP will be reviewed, and may be returned with comments or requests for more details or clarification. Fieldwork shall not commence until the PM has provided written acceptance that the SSP meets contractual requirements. The responsibility for completeness, accuracy and regulatory compliance of the SSP rests solely with the subcontractor.

Minor modifications, such as typographical corrections, changing names or updating contact information, may be made by means of a routine submittal to the PM. JSA's for a new activity

or previously unanticipated methodology should be submitted to the PM for review at least ten days before commencement of the new activity, or as early as practicable. Acceptable JSA's become an appendix to the existing SSP.

23. LIST OF TABLES, FORMS, APPENDICES AND ATTACHMENTS

List in detail any tables, forms, appendices and attachments. These elements are attached to and become part of the completed PSP.

Tables

- 1.1 Site Contact Information
- 1.2 Key Project Personnel
- 3.1 Competent/Qualified Personnel
- 5.1 Job Safety Analysis
- 5.2 Chemical Safety Analysis
- 12.1 Site Orientation Topics
- 17.1 Emergency Medical Care
- 17.2 Competent First Aid/CPR Personnel
- 20.1 Medical Surveillance Requirements

Forms (Appendix A)

- Health and Safety Plan Certification Form
- Activity Hazard Analysis Training Record
- Daily Health and Safety Meeting Form
- Health and Safety Inspection Checklist
- Boat Checklist
- Weekly Safety Planning Form
- Near Miss Form
- Accident/Illness Investigation Form

Appendices

- Appendix A – Health and Safety Forms
- Appendix B – Activity Hazard Analysis

- Appendix C – Hazard Communication Program
- Appendix D – Material Safety Data Sheets

Attachments

- N/A

APPENDIX A
Health and Safety Forms

Quantitative Environmental Analysis, LLC

Quantitative Environmental Analysis, LLC

HEALTH AND SAFETY PLAN CERTIFICATION FORM

Project Name: _____

Project Number: _____

My signature below certifies that I have read and understand the policies and procedures specified in this Health and Safety Plan and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the safety requirements specified in this plan. For non-QEA employees, this HASP may include company-specific appendices to this plan developed by entities other than QEA.

Name (Print)	Signature	Company	Date

cc: Corporate Health and Safety Officer
Site Health and Safety Officer

Activity Hazard Analysis Training Record

Job Number: _____

AHA Number: _____

Job Location:_____

Date: _____

Name of Trainer: _____

Subjects Covered:_____

_____

_____

_____

Training Aids Used: _____

_____

_____

_____

Attendees (Please Sign Name Legibly):

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Use additional sheets if necessary)

Daily Health and Safety Meeting Form

Client_____ Location _____

Project _____ Project Number _____

Conducted by _____ Date/Time _____

(Use back of page if further description is needed.)

Planned Activities
Potential Physical and Environmental Hazards
PPE Requirements and Procedures
Decontamination Procedures
Emergency Procedures

Signatures of attendees

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Health and Safety Inspection Checklist

Project: _____ Date: _____

Conducted by: _____ Time: _____

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

	Yes	No
Safe Access and Workspace		
Are safe access and adequate space for movement available for:		
Emergencies	_____	_____
Work area	_____	_____
Walkways and passageways	_____	_____
Are ladders, stairways, and elevators properly located and functioning?	_____	_____
Is protection provided for floor and roof openings?	_____	_____
Is overhead protection provided for all areas of exposure?	_____	_____
Is lighting adequate?	_____	_____
Planning Work for Safety		
Are employees provided with all required protective equipment?	_____	_____
Have other contractors and trades been coordinated with to prevent congestion and avoid hazards?	_____	_____
Is all temporary flooring, safety nets, and scaffolding provided where required?	_____	_____
Utilities and Services Identification		
High voltage lines?	_____	_____
Have all been identified by signs?	_____	_____
Have high voltage lines been moved or de-energized, or barriers erected to prevent employee contact?	_____	_____
Sanitary Facilities		
Drinking water?	_____	_____
Are toilet facilities adequate?	_____	_____
Work Procedures - Materials Handling		
Is material handling space adequate?	_____	_____
Is material handling equipment adequate and proper?	_____	_____
Is material handling equipment in good condition?	_____	_____
Marine Safety		
Slip, trip, fall hazards	_____	_____
Heat or cold stress	_____	_____
Insect bites	_____	_____
Other		
Waves, surges, currents		
Noise exposure	_____	_____
Muscle strain from improper lifting		
Pinch points	_____	_____
Inhaling, touching, ingesting contaminants	_____	_____
Drowning	_____	_____

Comments: _____

Daily Boat Checklist

Date: _____ Completed by: _____

Boat ID: _____

Item	Yes	No	N/A	Comments
Vessel Registration Numbers Displayed				
Vessel Registration Documentation on Board				
PFDs – One Available Per Person				
PFDs – Condition/Inspection				
First Aid Kit				
Eye Wash Solution				
Fire Extinguisher				
Visual Distress Signal				
Sound Producing Device				
Navigation Lights				
Paddle				
Rescue Ring				
Project Health and Safety Plan,				
Cellular phone				
Spill kit				
PPE (Hard hats, safety glasses, steel toe boots, etc.)				
Cold Weather Suit				
GFI				
Radio Check				
Clear Deck, Work Area				

Comments:_____

_____

_____

_____

_____

Weekly Safety Planning Form

Project: _____ **Date:** _____

Prepared by: _____ **Time:** _____

Activities planned for the week of: _____

_____

_____

_____

Safety Concerns Associated with Activities Listed Above Addressed in PSP and SSP:

_____

_____

_____

Safety Concerns Associated with Activities Listed Above NOT Addressed in PSP and SSP:

_____

_____

_____

Proposed Alternative Safety Procedures (if required):

_____

_____

_____

Comments: _____

_____

Near Miss Incident Form

(Not to be used for OSHA recordable cases or cases involving Worker's Compensation)

Report date:_____ Office: _____

Site name: _____ Project number: _____

Site address, city, state, ZIP _____

(If necessary, use back of page or a separate sheet for additional description.)

Type of incident:

- ☐ **Near-miss injury**
- ☐ **Fire or explosion**
- ☐ **Equipment damage**
- ☐ **Operational error**
- ☐ **Environmental release**
- ☐ **Other (explain on back of page)**

Describe incident:
Results of incident (explain fully—damage, losses, etc.):
Basic causes (designate all possible causes):
Corrective measures taken:
Additional corrective measures to be taken:

_____ _____

Signature of Project Manager Date

_____ _____

Signature of Employee Date

_____ _____

Reviewed by Date

cc: Corporate Health and Safety Officer
Site Health and Safety Officer

Accident/Illness Investigation Form

To: _____ Prepared by: _____

CHSO

CC: _____ --Position: _____

Project Manager

CC: _____ --Position: _____

QEA Human Resources

CC: _____ --Office: _____

Project Name: _____ --Telephone: _____

Job Number: _____ --Fax: _____

Date of accident _____ **Time of accident** _____

Location of accident:

Address _____

City, county, state, zip code _____

Did accident occur on employer's premises? ☐ yes ☐ no On job site: ? ☐ yes ☐ no

(Please attach copies of police reports or related information about the accident to this report.)

Information regarding injured or ill employee:

Name: _____ Occupation (job title): _____

Home Address: _____ Gender: ☐ M ☐ F No. of dependents _____

_____ Marital Status: _____

Home Telephone: _____ Date of Birth: _____

Emergency Contact: _____ Contact Phone: _____

Information regarding injury or illness:

Nature of injury or illness: _____

Part of body affected: _____

Describe the object or substance that affected the employee: _____

Did the employee die? ☐ Yes ☐ No Was employee performing regular job duties? ☐ Yes ☐ No

Was safety equipment provided? ☐ Yes ☐ No Was safety equipment used? ☐ Yes ☐ No

QEA employee receiving first report: _____

Date of first report: _____ Time of first report: _____

How did the accident/illness occur?

(Explain how accident occurred and what the employee was doing. Use the back of this page or another sheet if necessary.)

Medical treatment:

Was treatment required? ☐ Yes ☐ No First aid only? ☐ Yes ☐ No

Physician's Name: _____ Hospital or Treatment Center: _____

Address: _____ Address: _____

Physician's Phone: _____ Treatment Center Phone: _____

Lost work day:

Last Date Worked: _____ Time Employee Left Work: _____

Number of Days Lost: _____ Number of Restricted Work Days: _____

Date of Return to Work: _____

Were there witnesses?

_____	_____	_____
Name	Address	Phone
_____	_____	_____
Name	Address	Phone
_____	_____	_____

Name Address Phone

Corrective action taken: *(Please explain fully.)*

Corrective action still to be taken *(Please explain fully.)*

Project Manager (print name)	Signature	Date
Corporate HAS Coordinator (print name)	Signature	Date
Site Safety Coordinator (print name)	Signature	Date
Employee (Print Name) or Representative	Signature	Date

Information about injured/ill employee to be completed by Human Resources

SSN _____ Date of hire _____

Position at time of hire _____ Current position _____

Wages _____ Hire date for current position _____

Work status: ☐ Full-time ☐ Part-time (Hours per week ____ Days per week _____) ☐ Temporary

To be completed for Workers Compensation Insurance Carrier

Date reported _____ Reported by _____

Name of contact _____ Confirmation number _____

Field office or claims adjuster _____

APPENDIX B
Activity Hazard Analysis

Quantitative Environmental Analysis, LLC

Activity Hazard Analysis

Field Activities

AHA001

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 001	**Date:** August 23, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Irena Felty	**Date:** August 22, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots. Depending on activity, the following PPE may also be required: safety glasses/ splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Laurie Scheuing	**Revised:** April 29, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 1, 2008
		Approved by: Laurie Scheuing	**Date:** May 1, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor, Physical Activity	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	

Activity Hazard Analysis

Field Activities

AHA001

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High Winds, Dust Storm	Wear goggles if dust/debris is visible.	
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	

Activity Hazard Analysis

Field Activities

AHA001

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Motor Vehicle Operation

AHA002

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 002	**Date:** April 29, 2008	**New:** Yes
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Laurie Scheuing	**Date:** April 29, 2008
Required Personal Protective Equipment:	Wear seat belt at all times; make sure that clothing will not interfere with driving.	**Revised by:**	**Revised:**
Work Operation: Motor Vehicle Operation	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 1, 2008
		Approved by: Laurie Scheuing	**Date:** May 1, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Driving to, from, and within the job site	Vehicle Accident	Plan your travel route and check maps for directions or discuss with colleagues. Clean windows and mirrors, as needed throughout the trip. Wear sun glasses, as needed. Follow vehicle maintenance schedule to reduce possibilities of breakdown while driving.	Inspect all fluid level, air pressure in tires, adjust mirrors and seat positions appropriately, watch fuel level and fill up when level is low.
	Distraction While Driving	Stop driving a vehicle, regardless of the speed (i.e. even 5 mph) or location (i.e. private road), when the potential of being distracted by conversation exists. Drivers are prohibited from using hand-held communication devices (e.g., cell phones) while operating any motor vehicle.	
	Fatigue/Falling Asleep	Get adequate rest prior to driving. Pull over and rest if experiencing drowsiness Change seat position, stretch, open the window, adjust radio if experiencing drowsiness.	
	Weather/Road Conditions	Check road and weather conditions prior to driving. Be prepared to adjust driving if conditions change. Travel in daylight hours, if possible. Give yourself plenty of time to allow for slow downs due to construction, accidents, or other unforeseen circumstances. Use lights at night and lights/wipers during inclement weather.	

Training Requirements:

All drivers are required to have a valid driver's license and all vehicles registered in NY must have vehicle registration and inspection stickers. The use of hand-held wireless devices is prohibited while driving any vehicle for business use at any time, for personal use during business hours, and as defined by law.

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

Activity Hazard Analysis

Decontamination Area Setup

AHA003

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 003	**Date:** August 23, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Irena Felty	**Date:** August 23, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/splash goggles. Depending on activity, the following PPE may also be required: hard hat, leather work gloves, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Laurie Scheuing	**Revised:** April 29, 2008
Work Operation: Decontamination Area Setup	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 1, 2008
		Approved by: Laurie Scheuing	**Date:** May 1, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontamination area setup	Vehicle and Heavy Equipment Traffic in Work Area	Be alert when working around heavy equipment. Ground guides for the backing of all vehicles. No heavy equipment will be operated without a ground guide. Barriers, warning signs, designated walkways or other safeguards must be provided where pedestrians are exposed to the risk of collision.	Follow operations manual maintenance and inspection procedures for each piece of equipment used on site.

Activity Hazard Analysis

Decontamination Area Setup

AHA003

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Muscle Strain/Injuries From Improper Lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	
	Injury from Hand or Power Tool Operation	Be sure that all tools are in good condition and are in proper working order. Use tools for their intended use only. When power operated tools are designed to accommodate guards, the guard must be in place on the tool. Fuel powered tools may be refueled, serviced, or maintained only while the tools are stopped and not operating. No damaged equipment will be issued until repaired or replaced. Be aware of potential hazards from hand tool operation and the proper use of hand tools. Inform SSO or Project Manger if tools require repair or replacement.	Follow operations and maintenance procedures for each piece of equipment used on site. Inspect tools daily prior to use.

Activity Hazard Analysis

Decontamination Area Setup

AHA003

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High Winds, Dust Storm	Wear goggles if dust/debris is visible.	
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	

Activity Hazard Analysis

Decontamination Area Setup

AHA003

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Boat/Barge Activities

AHA004

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 004	**Date:** August 22, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Irena Felty	**Date:** August 22, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/splash googles, and personal floatation device. Depending on activity, the following PPE may also be required: hard hat, nitrile outer gloves and latex inner gloves, and tyvek coveralls.	**Revised by:** Laurie Scheuing	**Revised:** June 3, 2008
Work Operation: Boat/Barge Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** June 4, 2008
		Approved by: Laurie Scheuing	**Date:** June 4, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Boat/Barge Activities	Marine Operation Hazards	Follow the Marine Safety Standard Operating Procedures when working near or on the water.	The Boating Checklist should be reviewed daily.

Activity Hazard Analysis

Boat/Barge Activities

AHA004

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Loading/unloading equipment onto vessel	General	Secure boat. Use rails or assistance from someone on the dock. Be cautious when entering or exiting the vessel. With one hand on the boat, quickly lower straight down into the center of the craft. Never jump into or off of a vessel. If others are boarding, have them step along the fore-and aft centerline of the boat while the boat is held in place along the pier. Avoid directly carrying anything on or off the vessel. Load the items off the pier or have someone hand them to you one by one. Never overload the vessel. Keep weight toward center of the boat and center of gravity as low as possible. Distribute equipment evenly on vessel.	
Sampling activities	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Proceed carefully on floating docks and ramps. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Slips, trips, falls off boat Drowning hazards	Wear footwear that has sufficient traction to reduce risk of slipping. Wear personal flotation device. Be aware of any obstacles on boat deck.	PFDs should be inspected daily prior to use.

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Man Overboard	Yell "man overboard" If the engine is running take it out of gear and swing the stern clear to keep from hitting the person. Call 911, as appropriate Assign a spotter to keep the person in sight at all times Contact nearby vessels for assistance Throw flotation devices immediately Recover person from water If you fall overboard, hold your mouth and nose closed and protect your head When you reach the surface, look for movement, listen for sounds and call for help. Use the whistle attached to the PFD and activate the beacon light. It is only sensible to swim if there is reason to believe that a chance of reaching your destination exists. Too much movement in cold water causes hypothermia. Wear personal flotation device.	Man Overboard Plan should be reviewed daily with the Boating Check List. Man Overboard drill should be done on an annual basis.
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects. Load items off from the boat or have someone hand them to you one by one.	
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.

Activity Hazard Analysis

Boat/Barge Activities

AHA004

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights.
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
Navigation	Boat traffic	Maintain a safe operating distance from shoreline, other vessels, etc.	
	Waves, surges, currents.	Be aware of sudden surges caused by incoming waves, unstable waters, and currents.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Fire or major emergency - Abandon Ship	Be prepared to abandon ship in the event of fire that is too large to control with fire extinguisher or other major emergency. Only the boat captain can order abandon ship Communicate intent to abandon ship to all personnel on board Call 911 Notify nearby vessels of intent to abandon ship Notify Project Manager and CHSO, if time permits Be aware of position of the propeller before abandoning ship Identify a rally point for all personnel Know the dangers of hypothermia Use the buddy system to support injured personnel	Abandon Ship Plan should be reviewed daily with the Boating Check List. Abandon Ship drill should be done on an annual basis.

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training. All boat operators must have successfully completed the NYS Safe Boating Course.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Boat or Barge Fueling

AHA005

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 005	**Date:** August 23, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Irena Felty	**Date:** August 23, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/splash goggles, nitrile outer gloves and latex inner gloves, and personal floatation device. Depending on activity, the following PPE may also be required: hard hat, and tyvek coveralls.	**Revised by:** Laurie Scheuing	**Revised:** April 29, 2008
Work Operation: Boat or Barge Fueling	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 1, 2008
		Approved by: Laurie Scheuing	**Date:** May 1, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Boat or barge activities	Marine Operation Hazards	Follow the Marine Safety Standard Operating Procedures when working near or on the water.	The Boating Checklist should be reviewed daily.
Boat or barge fueling	Overflow/spills of fuel in or onto boat or water	Ensure that fuel pumps have a UL listed automatic closing valve. Use approved safety containers Be aware of the capacity of fuel tank/container. Have spill kit available.	Follow operations manual maintenance and inspection procedures for each piece of equipment used on site.
	Explosion	Ensure that all fuel is in approved safety containers. No smoking or open flame within 50 feet. Equipment/motors that use flammable fuel shall be shut down during fueling, servicing, or maintenance activities.	
	Spill on clothing	Be aware of capacity of fuel tank. Wear gloves while fueling. Change clothing if saturated with fuel.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training. All boat operators must have successfully completed the NYS Safe Boating Course.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Sediment Core Sampling

AHA006

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 006	**Date:** August 23, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Jim Ryan	**Date:** August 23, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots. Depending on activity, the following PPE may also be required: safety glasses/ splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Jim Ryan	**Revised:** May 6, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Sediment Core Sampling	Boating Hazards	Personnel will follow the AHA004 - Boat/Barge Activities when working near or on the water.	
	Inhalation of contaminated dust Inhalation of volatile contaminants Ingestion of contaminants Skin/eye contact with contaminated materials	Wear appropriate PPE. Contact 911, as necessary. If a person breathes in a large amount of organic vapor, move the exposed person to fresh air, rinse mouth. Perform CPR if breathing stops. If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Keep the affected person warm and at rest.	PPE should be inspected daily prior to use.

Activity Hazard Analysis

Sediment Core Sampling

AHA006

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Slips, trips, falls off boat Drowning hazards	Wear footwear that has sufficient traction to reduce risk of slipping. Wear personal flotation device. Be aware of any obstacles on boat deck.	PFDs should be inspected daily prior to use.
	Noise exposure	Hearing protection will be worn in high noise areas or when working around heavy machinery or equipment (action level of 85 decibels [dBA] averaged over an eight-hour day).	PPE should be inspected daily prior to use.
	Struck by Pinch Points	Maintain awareness of procedures underway and be attentive of sampling operations. Maintain distance when lowering spuds Maintain safe distance from winches when in operation	
	Overhead Hazards	Attach safety strap to vibracore when overhead. Wear hardhat Watch for swinging vibracore due to wave action or boat being in motion. Tighten bolts on spud sections	Inspect boat Derek, safety strap, and winch cable.
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	

Activity Hazard Analysis

Sediment Core Sampling

AHA006

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High winds, dust storm	Wear goggles if dust/debris is visible.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Sediment Core Processing

AHA007

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 007	**Date:** August 23, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Jim Ryan	**Date:** August 23, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/ splash goggles, nitrile outer gloves and latex inner gloves, and tyvek coveralls.	**Revised by:** Jim Ryan	**Revised:** May 6, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Sediment Core Processing	Inhalation of contaminated dust Inhalation of volatile contaminants Ingestion of contaminants Skin/eye contact with contaminated materials	Wear appropriate PPE. Contact 911, as necessary. If a person breathes in a large amount of organic vapor, move the exposed person to fresh air, rinse mouth. Perform CPR if breathing stops. If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Keep the affected person warm and at rest.	PPE should be inspected daily prior to use.

Activity Hazard Analysis

Sediment Core Processing

AHA007

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Noise exposure	Hearing protection will be worn in high noise areas or when working around heavy machinery or equipment (action level of 85 decibels [dBA] averaged over an eight-hour day).	PPE should be inspected daily prior to use.
	Struck by Pinch Points	Maintain awareness of procedures underway and be attentive of sampling operations. Maintain distance when lowering spuds Maintain safe distance from winches when in operation	
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Inhalation of vapors from contaminated sediment	Maintain proper ventilation in work trailer. Keep windows open. Have fans available.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Cuts	Use newer blades. Use retractable knife.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Sediment Grab Sampling

AHA008

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 008	**Date:** August 23, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Jim Ryan	**Date:** August 23, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots. Depending on activity, the following PPE may also be required: safety glasses/ splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Jim Ryan	**Revised:** May 6, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Sediment Grab Sampling	Boating Hazards	Personnel will follow the AHA004 - Boat/Barge Activities when working near or on the water.	
	Inhalation of contaminated dust Inhalation of volatile contaminants Ingestion of contaminants Skin/eye contact with contaminated materials	Wear appropriate PPE. Contact 911, as necessary. If a person breathes in a large amount of organic vapor, move the exposed person to fresh air, rinse mouth. Perform CPR if breathing stops. If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Keep the affected person warm and at rest.	PPE should be inspected daily prior to use.

Activity Hazard Analysis

Sediment Grab Sampling

AHA008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Slips, trips, falls off boat Drowning hazards	Wear footwear that has sufficient traction to reduce risk of slipping. Wear personal flotation device. Be aware of any obstacles on boat deck.	PFDs should be inspected daily prior to use.
	Noise exposure	Hearing protection will be worn in high noise areas or when working around heavy machinery or equipment (action level of 85 decibels [dBA] averaged over an eight-hour day).	PPE should be inspected daily prior to use.
	Struck by Pinch Points	Maintain awareness of procedures underway and be attentive of sampling operations. Maintain distance when lowering spuds Maintain safe distance from winches when in operation	
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	

Activity Hazard Analysis

Sediment Grab Sampling

AHA008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High winds, dust storm	Wear goggles if dust/debris is visible.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Water Sampling

AHA009

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 009	**Date:** August 23, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Jim Ryan	**Date:** August 23, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, safety glasses/splash goggles, steel-toed boots. Depending on activity, the following PPE may also be required: hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Laurie Scheuing	**Revised:** June 4, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** June 4, 2008
		Approved by: Laurie Scheuing	**Date:** June 4, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Water Sampling	Boating Hazards	Personnel will follow the AHA004 - Boat/Barge Activities when working near or on the water.	
	Inhalation of contaminated dust Inhalation of volatile contaminants Ingestion of contaminants Skin/eye contact with contaminated materials	Wear appropriate PPE. Contact 911, as necessary. If a person breathes in a large amount of organic vapor, move the exposed person to fresh air, rinse mouth. Perform CPR if breathing stops. If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Keep the affected person warm and at rest.	PPE should be inspected daily prior to use.

Activity Hazard Analysis

Water Sampling

AHA009

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Slips, trips, falls off boat Drowning hazards	Wear footwear that has sufficient traction to reduce risk of slipping. Wear personal flotation device. Be aware of any obstacles on boat deck.	PFDs should be inspected daily prior to use.
	Noise exposure	Hearing protection will be worn in high noise areas or when working around heavy machinery or equipment (action level of 85 decibels [dBA] averaged over an eight-hour day).	PPE should be inspected daily prior to use.
	Struck by Pinch Points	Maintain awareness of procedures underway and be attentive of sampling operations. Maintain distance when lowering spuds Maintain safe distance from winches when in operation	
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	

Activity Hazard Analysis

Water Sampling

AHA009

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High winds, dust storm	Wear goggles if dust/debris is visible.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Groundwater Seepage Meter Installation

AHA010

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 010	**Date:** May 6, 2008	**New:** Yes
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Jim Ryan	**Date:** May 6, 2008
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots. Depending on activity, the following PPE may also be required: safety glasses/ splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:**	**Revised:**
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Groundwater Seepage Meter Installation	Boating Hazards	Personnel will follow the AHA004 - Boat/Barge Activities when working near or on the water.	
	Inhalation of contaminated dust Inhalation of volatile contaminants Ingestion of contaminants Skin/eye contact with contaminated materials	Wear appropriate PPE. Contact 911, as necessary. If a person breathes in a large amount of organic vapor, move the exposed person to fresh air, rinse mouth. Perform CPR if breathing stops. If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Keep the affected person warm and at rest.	PPE should be inspected daily prior to use.

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Slips, trips, falls off boat Drowning hazards	Wear footwear that has sufficient traction to reduce risk of slipping. Wear personal flotation device. Be aware of any obstacles on boat deck.	PFDs should be inspected daily prior to use.
	Noise exposure	Hearing protection will be worn in high noise areas or when working around heavy machinery or equipment (action level of 85 decibels [dBA] averaged over an eight-hour day).	PPE should be inspected daily prior to use.
	Struck by Pinch Points	Maintain awareness of procedures underway and be attentive of sampling operations. Maintain distance when lowering spuds Maintain safe distance from winches when in operation	
	Overhead Hazards	Attach safety strap to vibracore when overhead. Wear hardhat Watch for swinging vibracore due to wave action or boat being in motion. Tighten bolts on spud sections	Inspect boat Derek, safety strap, and winch cable.
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High winds, dust storm	Wear goggles if dust/debris is visible.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Sediment Pore Water Sampling

AHA011

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 011	**Date:** May 6, 2008	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Jim Ryan	**Date:** May 6, 2008
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/ splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:**	**Revised:**
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Sediment Pore Water Sampling	Boating Hazards	Personnel will follow the AHA004 - Boat/Barge Activities when working near or on the water.	
	Inhalation of contaminated dust Inhalation of volatile contaminants Ingestion of contaminants Skin/eye contact with contaminated materials	Wear appropriate PPE. Contact 911, as necessary. If a person breathes in a large amount of organic vapor, move the exposed person to fresh air, rinse mouth. Perform CPR if breathing stops. If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Keep the affected person warm and at rest.	PPE should be inspected daily prior to use.

Activity Hazard Analysis

Sediment Pore Water Sampling

AHA011

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Slips, trips, falls off boat Drowning hazards	Wear footwear that has sufficient traction to reduce risk of slipping. Wear personal flotation device. Be aware of any obstacles on boat deck.	PFDs should be inspected daily prior to use.
	Noise exposure	Hearing protection will be worn in high noise areas or when working around heavy machinery or equipment (action level of 85 decibels [dBA] averaged over an eight-hour day).	PPE should be inspected daily prior to use.
	Struck by Pinch Points	Maintain awareness of procedures underway and be attentive of sampling operations. Maintain distance when lowering spuds Maintain safe distance from winches when in operation	
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	

Activity Hazard Analysis

Sediment Pore Water Sampling

AHA011

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High winds, dust storm	Wear goggles if dust/debris is visible.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

GeoProbe® Sampling

AHA012

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 012	**Date:** May 6, 2008	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Jim Ryan	**Date:** May 6, 2008
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/ splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:**	**Revised:**
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
GeoProbe Sampling	Boating Hazards	Personnel will follow the AHA004 - Boat/Barge Activities when working near or on the water.	
	Inhalation of contaminated dust Inhalation of volatile contaminants Ingestion of contaminants Skin/eye contact with contaminated materials	Wear appropriate PPE. Contact 911, as necessary. If a person breathes in a large amount of organic vapor, move the exposed person to fresh air, rinse mouth. Perform CPR if breathing stops. If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Keep the affected person warm and at rest.	PPE should be inspected daily prior to use.

Activity Hazard Analysis

GeoProbe® Sampling

AHA012

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Slips, trips, falls off boat Drowning hazards	Wear footwear that has sufficient traction to reduce risk of slipping. Wear personal flotation device. Be aware of any obstacles on boat deck.	PFDs should be inspected daily prior to use.
	Noise exposure	Hearing protection will be worn in high noise areas or when working around heavy machinery or equipment (action level of 85 decibels [dBA] averaged over an eight-hour day).	PPE should be inspected daily prior to use.
	Struck by Pinch Points	Maintain awareness of procedures underway and be attentive of sampling operations. Maintain distance when lowering spuds Maintain safe distance from winches when in operation Hammering steel posts into sediment Spud and crane winch	
	Overhead Hazards	Crane Boom Spuds GeoProbe sections	Inspect boat Derek, safety strap, and winch cable.
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	

Activity Hazard Analysis

GeoProbe® Sampling

AHA012

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High winds, dust storm	Wear goggles if dust/debris is visible.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Biota Sampling

AHA013

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 013	**Date:** May 6, 2008	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Jim Ryan	**Date:** May 6, 2008
Required Personal Protective Equipment:	Modified Level D - Long pants, safety glasses. Depending on activity, the following PPE may also be required: splash goggles, steel-toed boots, hard hat, nitrile gloves, electrical gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Laurie Scheuing	**Revised:** June 4, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Margaret Murphy	**Date:** June 4, 2008
		Approved by: Laurie Scheuing	**Date:** June 4, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Biota Sampling	Boating Hazards	Personnel will follow the AHA004 - Boat/Barge Activities when working near or on the water.	
	Night time boat operation	Have proper lights installed on boat to maintain visibility. Use navigation and anchor lights.	Test all lights prior to use.
	Inhalation of contaminated dust Inhalation of volatile contaminants Ingestion of contaminants Skin/eye contact with contaminated materials	Wear appropriate PPE. Contact 911, as necessary. If a person breathes in a large amount of organic vapor, move the exposed person to fresh air, rinse mouth. Perform CPR if breathing stops. If exposure to contaminated materials occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Keep the affected person warm and at rest.	PPE should be inspected daily prior to use.

Activity Hazard Analysis

Biota Sampling

AHA013

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Slips, trips, falls off boat Drowning hazards	Wear footwear that has sufficient traction to reduce risk of slipping. Wear personal flotation device. Be aware of any obstacles on boat deck.	PFDs should be inspected daily prior to use.
	Noise exposure	Hearing protection will be worn in high noise areas or when working around heavy machinery or equipment (action level of 85 decibels [dBA] averaged over an eight-hour day).	PPE should be inspected daily prior to use.
	Struck by Pinch Points	Maintain awareness of procedures underway and be attentive of sampling operations. Maintain distance when lowering spuds Maintain safe distance from winches when in operation	
	Wading	Inspect waders for leaks. B e aware of slips, trips, and falls in the water: fallen brush, logs, rocks, and other debris. Be aware of water depth.	
	Electrofishing	Wear electrical gloves when netting fish. Do not reach into water Keep watch of other personnel to avoid getting hit or hitting someone with long handled net.	

Activity Hazard Analysis

Biota Sampling

AHA013

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Muscle strain/injuries from improper lifting	Personnel will utilize proper lifting techniques or ask for assistance with moving/lifting objects.	
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	

Activity Hazard Analysis

Biota Sampling

AHA013

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	High winds, dust storm	Wear goggles if dust/debris is visible.	
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Decontamination- Personnel

AHA014

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 014	**Date:** August 24, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Irena Felty	**Date:** August 24, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Laurie Scheuing	**Revised:** May 7, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontaminate Personnel Exiting the Exclusion Zone	General	Personnel should use appropriate PPE to reduce exposure. Collect rinse water and dispose of per appropriate standard operating procedures. Follow decontamination procedures.	PPE should be inspected daily prior to use.
	Site Hazardous Material Exposure	Training and safety awareness of potential exposure to chemicals of concern at the site and decontamination procedure. Review chemicals of concern. Appropriate PPE will be worn (e.g. tyvek, nitrile gloves, safety glass, etc.).	PPE should be inspected daily prior to use.

Activity Hazard Analysis

Decontamination- Personnel

AHA014

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Tool and Equipment Decontamination

AHA015

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 015	**Date:** August 24, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Irena Felty	**Date:** August 24, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Laurie Scheuing	**Revised:** May 7, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Process items through decontamination in accordance with the PSP	Site Hazardous Material Exposure	Training and safety awareness of potential exposure to contaminates at the site and decontamination procedure. Appropriate PPE will be worn. Review chemicals of concern. Personnel will follow appropriate decontamination procedures.	PPE should be inspected daily prior to use.
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	

Activity Hazard Analysis

Tool and Equipment Decontamination

AHA015

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

Activity Hazard Analysis

Decontamination of Boat or Barge

AHA016

Project Name & Number: Onondaga Lake Pre-Design Investigation 441797	**AHA No.** 016	**Date:** August 24, 2005	**New:** No
Location: Onondaga Lake, Onondaga County, New York	**Contractor:** QEA	**Analysis by:** Irena Felty	**Date:** August 24, 2005
Required Personal Protective Equipment:	Modified Level D - Long pants, steel-toed boots, safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, tyvek coveralls, and personal floatation device.	**Revised by:** Laurie Scheuing	**Revised:** May 7, 2008
Work Operation: Field Activities	**Superintendent/Competent Person:** Mark LaRue	**Reviewed by:** Mark LaRue	**Date:** May 7, 2008
		Approved by: Laurie Scheuing	**Date:** May 7, 2008

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontamination of boat (decontaminated water allowed to return to the lake)	Site Hazardous Material Exposure	Training and safety awareness of potential exposure to contaminates at the site and decontamination procedure. Appropriate PPE will be worn. Review chemicals of concern. Personnel will follow appropriate decontamination procedures.	PPE should be inspected daily prior to use.
	Slips, Trips, Falls	Be aware of potentially slippery surfaces and tripping hazards. Wear footwear that has sufficient traction to reduce risk of slipping. Wear steel-toed rubber boots versus over-the-shoe rubber boots. Work slowly during transit. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to deter any unnecessary trips and falls. Clean up all spills immediately. Notify the SSO of any unsafe conditions.	

Activity Hazard Analysis

Decontamination of Boat or Barge

AHA016

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Heat Stress	Adjust work schedules, as necessary. Perform work during cooler hours of the day if possible or at night if possible and if adequate lighting can be provided. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Cold Stress	Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Have a dry change of clothing available. Train workers to recognize the symptoms of cold related illness.	Monitor workers physical conditions. Monitor outside temperature versus worker activity.
	Rain	Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working near water, etc.	PPE should be inspected daily prior to use.
	Sunshine	Have sunscreen available for ultraviolet protection. Have water available for dehydration.	
	Fog	Wait for fog to lift and there is adequate visibility before operating sampling vessel.	Inspect boat lights
	Lightning	Do not begin or continue work until lightning subsides for 20 minutes. Immediately head for shore if on the water and lightning is observed. If you are not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	
	High winds, dust storm	Wear goggles if dust/debris is visible.	

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Pollen	Take medication (i.e. anti-histamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary.	PPE should be inspected daily prior to use.
	Streams	Observe depth of stream and speed of current before proceeding.	
	Biological Hazards (flora [poison ivy, poison oak, etc.] and fauna [ticks, bees, mosquitoes, snakes, etc.])	Personnel will be aware of potential exposure to biological hazards. Wear appropriate clothing (hat, long-sleeve shirt, long pants, leather gloves, boots, tyvek coveralls, as appropriate) and insect repellant. Personnel will wear thick gloves when clearing plants or debris from work area.	

Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour, 8 hour Supervisor and annual 8-hour refresher training.

Medical clearance must be received on an annual basis as required by 29 CFR 1910.120 (f).

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

APPENDIX C
Hazard Communication Plan

Quantitative Environmental Analysis, LLC

Hazard Communication Program

May 8, 2008

Table of Contents

List of Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
CFR	Code of Federal Regulations
CHSO	Corporate Health and Safety Officer
HASP	Health and Safety Plans
IARC	International Agency for Research on Cancer
MSDS	Material Safety Data Sheet
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
QEA	Quantitative Environmental Analysis, LLC
SHSO	Site Health and Safety Officer

SECTION 1
HAZARD COMMUNICATION PROGRAM

1.1 INTRODUCTION

This hazard communication program has been developed to protect the right of Quantitative Environmental Analysis, LLC (QEA) employees and subcontractors to access information on chemical and physical hazards of materials they use in the workplace. This program was prepared in accordance with the requirements in Title 29 of the Code of Federal Regulations (CFR), Part 1910.1200, the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard.

The purpose of this program is to inform employees of the Hazard Communication Standard and define the measures to communicate the hazards of materials used in the workplace and the safe handling procedures and measures to take to protect them from these materials. This program applies to all work operations where personnel may be occupationally exposed to hazardous chemicals under normal working conditions or during an emergency situation. This hazard communication program shall be available to all employees, subcontractors, and their representatives.

This hazard communication program does not apply to hazardous wastes, but does apply to all hazardous materials, such as acids and caustics used in sample preparation and cleaning solvents brought onto and used at a work site. The responsibilities and elements associated with this hazard communication program are discussed below.

1.2 PROGRAM RESPONSIBILITIES

Corporate Health and Safety Officer (CHSO): The CHSO is the program coordinator, with overall responsibility for the program, including reviewing and updating this plan as necessary. CHSO shall ensure compliance with the requirements identified in this hazard communication program by conducting annual audits.

Project Manager: Project managers shall ensure that all hazard communication program requirements have been identified and addressed within site-specific health and safety plans (HASP) for their projects. This task may include, but is not limited to, the following:

- Identification of work tasks (routine and non-routine) and performance of an associated hazard analysis;
- Completion of a chemical inventory for the project;
- Procurement of material safety data sheets (MSDSs) for chemicals used exclusively for the project;
- Labeling of containers used on site for hazardous materials; and
- Identification of any additional hazard communication training requirements.

Site Health and Safety Officer (SHSO): The SHSO shall be the main point of contact for this hazard communication program compliance during on-site phases of project operations. The SHSO shall have the following duties:

- Maintain current chemical inventories and MSDS files for the project;
- Ensure compliance with container labeling requirements; and
- Identify new chemicals brought on site that present new hazards requiring additional training then add information to chemical inventory and MSDS files.

1.3 HAZARD COMMUNICATION PROGRAM ELEMENTS

The hazard communication program elements include the following:

- Hazard determination;
- Hazardous chemical inventory;
- Container labeling;
- Material Safety Data Sheets;
- Employee training; and
- Subcontractors.

These elements are described below.

1.4 HAZARD DETERMINATION

In most cases, the determination of chemical hazards will be based on the information provided by the manufacturer. In situations where this is not possible, a hazard determination will be completed by QEA based on criteria established in Appendices A and B of the Hazard Communication Standard.

1.5 HAZARDOUS CHEMICAL INVENTORY

For each field project, the project manager will develop and maintain a current list of hazardous materials (hazardous chemical inventory) brought on site. This list will be contained within or attached to the HASP. The existence and location of these documents will be communicated to all employees and subcontractors prior to the start of the project.

Small quantities of hazardous chemicals may also be present at QEA offices and storage areas. For purposes of this program as required by the Hazard Communication Standard, chemicals and consumer products not used in the same manner, duration, or frequency intended by consumers shall be included on the hazardous chemical inventory. A list of chemicals present in each office or storage area will be maintained by the CHSO.

1.6 CONTAINER LABELING

When a chemical is received from a manufacturer or distributor, the employee responsible for its receipt will verify that the container is properly labeled with the following information:

- The contents;
- Appropriate hazard warning(s) (as listed on the MSDS); and
- Name and address of the chemical manufacturer.

All chemicals associated with a project should be stored, dispensed from, or otherwise used in their original containers with a proper label attached, except small quantities for immediate use by the employee that made the transfer. However, the use of secondary containers should be avoided. Container labeling is not required for secondary immediate uses. Any chemical left after work is completed must be returned to the original container or department supervisor for proper handling. No unmarked containers of any size are to be left in the work area unattended.

All original labels, warnings, and other printed information must be maintained intact and plainly visible at all times. Hazardous materials will not be allowed on a project site if they are not in the original or approved containers or if the containers are unlabeled or improperly labeled.

All subcontractors will be advised of and required to comply with these procedures.

1.7 MATERIAL SAFETY DATA SHEETS

All chemicals brought on or used at a project site must be accompanied by MSDS provided by the manufacturer. Whenever a chemical is purchased, the employee responsible for the purchase must obtain a current and complete MSDS as part of the order. A written request will be made for an MSDS if one is not received. If an MSDS is still not received after the original written request, a second request will be made in writing or by telephone. If the supplier refuses to provide an MSDS, the local OSHA office will be contacted for further assistance. If a supplier MSDS is not readily available, a generic MSDS can be used instead.

The MSDS will be reviewed and evaluated by the purchaser and the SHSO for completeness and to determine if the new chemical will pose any new or significant risks that require additional hazard communication training.

A copy of each MSDS will be maintained in the project file and included in the site-specific HASP and will be accessible at all times.

Prior to beginning work, subcontractors are required to provide the project manager with a list of all chemicals that they will use and an MSDS for each chemical. The CHSO or SHSO will evaluate the MSDSs and list of chemicals to determine if the chemicals used pose any new or significant risks to QEA employees. Additional training will be provided, if necessary.

Each MSDS shall contain, at a minimum, the following information:

- Name of the product on the label;
- Chemical and common names of each ingredient, if the product is a mixture;
- Physical and chemical characteristics of the chemical;
- Physical hazards of the chemical;
- Health hazards of the chemical;
- Primary routes of exposure;
- OSHA permissible exposure limits, American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values, and any other exposure limit used or recommended by the chemical manufacturer or importer;
- Whether the hazardous chemical is listed in the national toxicology program (NTP) Annual Report on Carcinogens or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs or by OSHA;
- Precautions for safe handling;
- Exposure control measures;
- Emergency and first aid procedures;
- Date of MSDS preparation or the date of the last revision; and
- The name, address, and telephone number of the chemical manufacturer or importer, or of someone who can provide additional information on the chemical and appropriate emergency procedures, if necessary.

If no information is available for any given category on the MSDS, the chemical manufacturer is required to mark the MSDS to indicate that no applicable information was found. Blanks are not allowed.

1.8 EMPLOYEE TRAINING

The CHSO, SHSO, or project manager will provide information and training to employees upon assignment to a job task involving the use of hazardous materials and whenever a new material posing new physical or health hazards is introduced.

General information and training will be provided in the 40-hour health and safety training class and annual refresher training classes as required under 29 CFR 1910.120. Employee training will include:

- Requirements of the hazard communication standard in 29 CFR 1910.1200;
- The types of operations or job tasks that involve hazardous materials;
- The location of this Hazard Communication Program, MSDSs, and the chemical inventory;
- Methods and observations that may be used to detect the presence or release of hazardous chemicals in the workplace;
- Recognition of signs and symptoms that may indicate exposure to hazards such as dizziness, nausea, skin rash, and other symptoms;
- Physical and health hazards associated with chemicals in the workplace;
- Protective measures, including specific procedures such as work practices, emergency procedures, and the use of personal protective equipment (PPE), that QEA has implemented to protect employees from exposure to hazardous materials; and
- How to read and use MSDSs.

1.9 SUBCONTRACTORS

QEA will provide subcontractors at a project site with a copy of the site-specific HASP. The HASP will include the following hazard communication information:

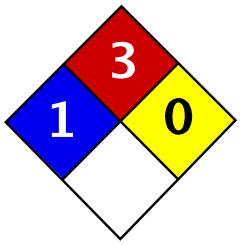
- Hazard analysis of work tasks;
- Chemical hazards anticipated at the site;
- Recommended PPE;
- Air monitoring instruments to be used for site hazards; and
- Information on the major chemical hazards in the form of MSDSs or a chemical hazard information table.

QEA will provide subcontractors with copies of MSDSs, by including them in the HASP, for each hazardous chemical brought on site by QEA that the subcontractor may be exposed to while working on the project site. Subcontractors will be informed of any precautionary measures that need to be taken to protect their employees using hazardous materials brought on site by QEA during the sites' normal operation conditions and during potential emergency situations.

QEA will inform subcontractors of the hazardous materials labeling system used on site. Each subcontractor will be required to have its own hazard communication program in accordance with 29 CFR 1910.1200 and applicable state and local regulations. An MSDS is also required for each hazardous material a subcontractor brings to the site.

APPENDIX D
Material Safety Data Sheets

Quantitative Environmental Analysis, LLC



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Acetone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetone

Catalog Codes: SLA3502, SLA1645, SLA3151, SLA3808

CAS#: 67-64-1

RTECS: AL3150000

TSCA: TSCA 8(b) inventory: Acetone

CI#: Not applicable.

Synonym: 2-propanone; Dimethyl Ketone; Dimethylformaldehyde; Pyroacetic Acid

Chemical Name: Acetone

Chemical Formula: C3-H6-O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetone	67-64-1	100

Toxicological Data on Ingredients: Acetone: ORAL (LD50): Acute: 5800 mg/kg [Rat]. 3000 mg/kg [Mouse]. 5340 mg/kg [Rabbit]. VAPOR (LC50): Acute: 50100 mg/m 8 hours [Rat]. 44000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED].
The substance is toxic to central nervous system (CNS).
The substance may be toxic to kidneys, the reproductive system, liver, skin.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 465°C (869°F)

Flash Points: CLOSED CUP: -20°C (-4°F). OPEN CUP: -9°C (15.8°F) (Cleveland).

Flammable Limits: LOWER: 2.6% UPPER: 12.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Slightly explosive in presence of open flames and sparks, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Forms explosive mixtures with hydrogen peroxide, acetic acid, nitric acid, nitric acid + sulfuric acid, chromic anydride, chromyl chloride, nitrosyl chloride, hexachloromelamine, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, thiodiglycol + hydrogen peroxide, potassium ter-butoxide, sulfur dichloride, 1-methyl-1,3-butadiene, bromoform, carbon, air, chloroform, thitriazylperchlorate.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis.

Storage:
Store in a segregated and approved area (flammables area) . Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Keep away from direct sunlight and heat and avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 500 STEL: 750 (ppm) from ACGIH (TLV) [United States]
TWA: 750 STEL: 1000 (ppm) from OSHA (PEL) [United States]
TWA: 500 STEL: 1000 [Austalia]
TWA: 1185 STEL: 2375 (mg/m3) [Australia]
TWA: 750 STEL: 1500 (ppm) [United Kingdom (UK)]
TWA: 1810 STEL: 3620 (mg/m3) [United Kingdom (UK)]
TWA: 1800 STEL: 2400 from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Fruity. Mint-like. Fragrant. Ethereal

Taste: Pungent, Sweetish

Molecular Weight: 58.08 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 56.2°C (133.2°F)

Melting Point: -95.35 (-139.6°F)

Critical Temperature: 235°C (455°F)

Specific Gravity: 0.79 (Water = 1)

Vapor Pressure: 24 kPa (@ 20°C)

Vapor Density: 2 (Air = 1)

Volatility: Not available.

Odor Threshold: 62 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, exposure to moisture, air, or water, incompatible materials.

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 3000 mg/kg [Mouse].
Acute toxicity of the vapor (LC50): 44000 mg/m3 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED].
Causes damage to the following organs: central nervous system (CNS).
May cause damage to the following organs: kidneys, the reproductive system, liver, skin.

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation.
Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May affect genetic material (mutagenicity) based on studies with yeast (S. cerevisiae), bacteria, and hamster fibroblast cells. May cause reproductive effects (fertility) based upon animal studies.
May contain trace amounts of benzene and formaldehyde which may cancer and birth defects. Human: passes the placental barrier.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: May cause skin irritation. May be harmful if absorbed through the skin.
Eyes: Causes eye irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury.
Inhalation: Inhalation at high concentrations affects the sense organs, brain and causes respiratory tract irritation. It also may affect the Central Nervous System (behavior) characterized by dizzness, drowsiness, confusion, headache, muscle weakeness, and possibly motor incoordination, speech abnormalities, narcotic effects and coma. Inhalation may also affect the gastrointestinal tract (nausea, vomiting).
Ingestion: May cause irritation of the digestive (gastrointestinal) tract (nausea, vomiting). It may also affect the Central Nevous System (behavior), characterized by depression, fatigue, excitement, stupor, coma, headache, altered sleep time, ataxia, tremors as well at the blood, liver, and urinary system (kidney, bladder, ureter) and endocrine system. May also have musculoskeletal effects.
Chronic Potential Health Effects:
Skin: May cause dermatitis.
Eyes: Eye irritation.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 5540 mg/l 96 hours [Trout]. 8300 mg/l 96 hours [Bluegill]. 7500 mg/l 96 hours [Fatthead Minnow]. 0.1 ppm any hours [Water flea].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Acetone UNNA: 1090 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Benzene
California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Benzene
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene, Formaldehyde
Connecticut hazardous material survey.: Acetone
Illinois toxic substances disclosure to employee act: Acetone
Illinois chemical safety act: Acetone
New York release reporting list: Acetone
Rhode Island RTK hazardous substances: Acetone
Pennsylvania RTK: Acetone
Florida: Acetone
Minnesota: Acetone
Massachusetts RTK: Acetone
Massachusetts spill list: Acetone
New Jersey: Acetone
New Jersey spill list: Acetone
Louisiana spill reporting: Acetone
California List of Hazardous Substances (8 CCR 339): Acetone
TSCA 8(b) inventory: Acetone
TSCA 4(a) final test rules: Acetone
TSCA 8(a) IUR: Acetone

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable.
R36- Irritating to eyes.
S9- Keep container in a well-ventilated place.
S16- Keep away from sources of ignition - No smoking.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References:
-Material safety data sheet issued by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
LOLI, RTECS, HSDB databases.
Other MSDSs

Other Special Considerations: Not available.

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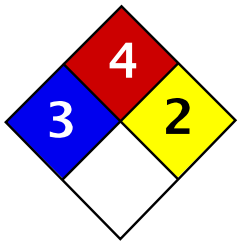

Material Safety Data Sheet
n-Butyllithium, 2.5M In Hexane MSDS

Section 1: Chemical Product and Company Identification

Product Name: n-Butyllithium, 2.5M In Hexane

Catalog Codes: SLB3712

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: n-Butyllithium; Hexane

CI#: Not applicable.

Synonym: N-Butyllithium, 2.5M in Hexane; Butyllithium solution; Butyllithium hexane; n-Butyllithium

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{n-}Butyllithium	109-72-8	9-12
Hexane	110-54-3	88-91

Toxicological Data on Ingredients: n-Butyllithium LD50: Not available. LC50: Not available. Hexane: ORAL (LD50): Acute: 25000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [Hexane].

TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to peripheral nervous system, skin, central nervous system (CNS).
Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 240°C (464°F)

Flash Points: CLOSED CUP: -21°C (-5.8°F).

Flammable Limits: LOWER: 1.2% UPPER: 7.4%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Extremely flammable in presence of open flames and sparks, of heat.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, insoluble in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Spontaneously flammable in air. Extremely flammable liquid and vapor.
Vapor may cause flash fire.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Corrosive liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, organic materials, metals, moisture.

Storage:
Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep from any possible contact with water. Do not allow water to get into container because of violent reaction. Do not store above 6°C (42.8°F). Refrigerate

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Hexane
TWA: 500 (ppm) from OSHA (PEL) [United States] Inhalation
TWA: 1800 (mg/m3) from OSHA (PEL) [United States] Inhalation
TWA: 176 (mg/m3) from ACGIH (TLV) [United States] SKIN

TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN
TWA: 500 STEL: 1000 (ppm) from ACGIH (TLV) [United States] Inhalation
TWA: 1760 STEL: 3500 (mg/m3) from ACGIH (TLV) [United States] Inhalation
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: Not applicable.

Color: Clear Colorless to light yellow.

pH (1% soln/water): Not applicable.

Boiling Point: 60° - 80 C (140°F)

Melting Point: -95°C (-139°F)

Critical Temperature: Not available.

Specific Gravity: 0.68(Water = 1)

Vapor Pressure: The highest known value is 17.3 kPa (@ 20°C) (Hexane).

Vapor Density: The highest known value is 2.97 (Air = 1) (Hexane). Weighted average: 2.77 (Air = 1)

Volatility: Not available.

Odor Threshold: The highest known value is 130 ppm (Hexane)

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available

Solubility: Reacts with water

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, moisture, water, air, dehydrating agents, incompatible materials

Incompatibility with various substances:
Reactive with oxidizing agents, organic materials, metals, moisture.
Slightly reactive to reactive with acids.
The product reacts violently with water to emit flammable but non toxic gases.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Hexane can react vigorously with strong oxidizers (e.g. chlorine, bromine, fluorine), and dinitrogen tetraoxide.

Lithium is incompatible with acetonitrile + sulfur dioxide, bromine pentafluoride, bromobenzene, carbon + LIthium tetrachloroaluminate + sulfunyl chloride, carbon + sulfunyl chloride, chlorine tri or pentafluoride, diazome;thane, diborane, ethylene, halocarbons, halogens, hydrogen, murcury, metal chlorides + nitrogen, metal oxides and chalocogenides, metals, nitric acid, nitryly fluoride, non-metal oxides, platinum, viton, sodium carbonate, sulfur, sulfinyl chloride, sulfur dioxide, trifluoromethyl hypofluorite, iron (II) sulfide, manganese telluride, arsenic, beryllium, maleic anhydride, carbides, carbon dioxide + water, chlorine, chromium, chromium trichloride, cobalt alloys, nickel alloys, nitrogen, organic matter, oxygen, phosphorus, rubber, silicats, sodium nitrite, tantalum (V) oxide, vanadium, zirconium tetrachloride, iodoform, nitrogen + metal chlorides, fluorine, magnesium perchlorate.
Butyl lithium above 20% in air can ignite spontaneously if the humidity exceeds 70%.
Concentrations above 25% are pyrophoric at any humidity.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 25000 mg/kg [Rat]. (Hexane).

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. [Hexane].
Contains material which may cause damage to the following organs: peripheral nervous system, skin, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, .
Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects based on animal data.
May be tumorigenic based on animal data.
Passes through the placental barrier in animal. (Hexane)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes severe irritation, burns, and ulceration.
Eyes: Causes severe irritation and burns. May cause irreversible eye injury.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by headache, dizziness, unconsciousness and coma. Causes severe irritation of the upper respiratory tract with coughing, burns, breathing difficulty, and possible coma. Irritation and/or aspiration may lead to chemical pneumonitis and pulmonary edema.
Ingestion: Causes digestive tract burns with immediate pain, swelling of the throat, convulsions, seizures, and possible coma. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 4.2: Spontaneously combustible substance.

Identification: : Lithium Alkyls (n-Butyllithium) UNNA: 2445 PG: I

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut carcinogen reporting list.: Hexane
Illinois toxic substances disclosure to employee act: Hexane
Illinois chemical safety act: Hexane
New York release reporting list: Hexane
Pennsylvania RTK: n-Butyllithium; Hexane
Florida: Hexane
Minnesota: Hexane
Massachusetts RTK: Hexane
New Jersey: n-Butyllithium; Hexane
New Jersey spill list: Hexane
Louisiana spill reporting: Hexane
TSCA 8(b) inventory: n-Butyllithium; Hexane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS B-6: Reactive and very flammable material.
CLASS E: Corrosive liquid.

DSCL (EEC):
R11- Highly flammable.
R14/15- Reacts violently with water, liberating extremely flammable gases.
R17- Spontaneously flammable in air.
R20- Harmful by inhalation.
R34- Causes burns.
R62- Possible risk of impaired fertility.
R67- Vapors may cause drowsiness and dizziness
S6- Keep under Nitrogen
S7/8- Keep container tightly closed and dry.
S16- Keep away from sources of ignition - No smoking.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S33- Take precautionary measures against static discharges.
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.
S43- In case of fire, never use water or carbon dioxide. Use dry chemical.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.
S7/9- Keep container tightly closed and in a well-ventilated place.
S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 3

Reactivity: 2

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 4

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves.
Full suit.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent.
Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 04:28 PM

Last Updated: 10/09/2005 04:28 PM

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades

MSDS No. 9950

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43^{o}C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Exposure Limits Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^{o}F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^{o}F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer	REL	Recommended Exposure Limit (NIOSH)
MSHA	Mine Safety and Health Administration	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
NFPA	National Fire Protection Association (617)770-3000	SCBA	Self-Contained Breathing Apparatus
NIOSH	National Institute of Occupational Safety and Health	SPCC	Spill Prevention, Control, and Countermeasures
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	STEL	Short-Term Exposure Limit (generally 15 minutes)
NTP	National Toxicology Program	TLV	Threshold Limit Value (ACGIH)
OPA	Oil Pollution Act of 1990	TSCA	Toxic Substances Control Act
OSHA	U.S. Occupational Safety & Health Administration	TWA	Time Weighted Average (8 hr.)
PEL	Permissible Exposure Limit (OSHA)	WEEL	Workplace Environmental Exposure Level (AIHA)
RCRA	Resource Conservation and Recovery Act	WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

APPENDIX B

STANDARD OPERATING PROCEDURES (SOP)

STANDARD OPERATING PROCEDURE FOR CENTRARCHID NEST CHARACTERISTICS

1.0 PURPOSE AND SCOPE

The purpose of this document is to define the SOP for centrarchid (bass and sunfish) nest characteristic sampling in Onondaga Lake. This SOP describes the necessary equipment, field procedures, materials, and documentation procedures necessary to conduct the nest characteristics sampling. A maximum of 30 nests per species (largemouth bass, smallmouth bass, bluegill sunfish, pumpkinseed sunfish) will be evaluated from locations around the lake to assess nest characteristics. Differences between the species will be noted and used to aid in the determination of the habitat layer depth. Centrarchid nesting typically occurs in early June when water temperatures are between 15 and 20^{o}C; therefore, sampling will occur during two weeks in early June. These procedures are to be followed and any substantive modifications to the procedures shall be approved by the Field Sampling Manager.

2.0 HEALTH AND SAFETY CONSIDERATIONS

A safety briefing will be held at the beginning of each day and as new activities are conducted. The designated safety officer shall be responsible for ensuring the safety of personnel and will be contacted immediately in the event of an emergency. The standard safety considerations for near-water and marine sampling include: caution deploying and retrieving heavy equipment; stepping in the sight of lines or cables; slips, trips, and falls; and the proper use of PFDs and PPE. Do not overload any vessel and load vessels evenly so they are not prone to capsizing. These safety considerations apply to the vessel and sampling crews whenever working on the water.

3.0 EQUIPMENT LIST

- sampling vessel;
- PFDs;
- DGPS;
- meter stick;
- 5 m tape measure with 10 pound weight tied on one end;
- 100 m tape measure;
- Digital camera;
- Field notebook; and
- polarized sunglasses.

4.0 PROCEDURES:

1. Prior to sampling, determine if conditions are suitable for a survey, including weather conditions (calm, sunny) and turbidity. Conditions should be suitable to see the

bottom in at least 2 m of water. Personnel should wear polarized sunglasses to allow better viewing through the water.

2. Select an area of the lake to begin the survey and slowly work around the lake perimeter to characterize nests.
3. Slowly approach the nest, identify the fish species, and record on the field log.
4. Record the nest location (center of depression) using DGPS.
5. Make the following measurements on and around the nest with the meter stick (for shallow areas) or 5 m tape measure and record on the field log:
   a. water depth in center of nest, on the nest rim, and approximately one foot outside the nest rim
      – nest depression depth will be calculated as the difference between the depth of the depression and the depth of the nest rim
      – depth of excavated area will be calculated as the difference between the water depth outside the nest and water depth in the depression
   b. nest width and length
   c. estimate substrate size of nest depression and nest rim based on modified Wentworth scale
      – boulder >256 mm (10 inches)
      – cobble 64-256 mm (2.5 – 10 inches)
      – pebble 16-64 mm (0.6 – 2.5 inches)
      – gravel 2-16 mm (0.08 – 0.6 inches)
      – sand 0.0625 – 2 mm (0.002 – 0.08 inches)
   d. record presence or absence of oncolites
   e. determine if substrate is embedded with finer substrates (e.g., silt)
   f. cover types present (e.g., logs, vegetation, large rocks) within 1.5 m of the nest
   g. shoreline slope at two scales (Saunders et al. 2002)
   h. General shoreline slope
      – measure depth at the deep rim of the nest (R)
         - measure distance from the deep rim to the shoreline/water interface using the 100 m tape measure (D)
         - calculate slope
            - general slope = R/D
   i. Nest site slope
      – measure the water depth 2 m from the nest both toward the shore (D1) and away from the shore (D2)
      – measure the distance between the two depths (L)

- calculate slope
    - (D2-D1)/L

6. Continue around the lake perimeter and repeat steps 3 through 5.

5.0 PERSONNEL

The Field Sampling Manager is responsible for assigning appropriate field personnel to be responsible for the various site activities. The Field Sampling Manager also is responsible for assuring that this and any other appropriate procedures are followed by field personnel. Field personnel assigned to the various site activities are responsible for completing their tasks according to this and other appropriate procedures. Field personnel are responsible for reporting deviations from the procedure or nonconformance to the Field Sampling Manager.

6.0 REFERENCES

Saunders, R., M.A. Bozek, C.J. Edwards, M.J. Jennings, and S.P. Newman. 2002. Habitat features affecting smallmouth bass *Micropterus dolomieu* nesting success in four northern Wisconsin Lakes. American Fisheries Society Symposium 31:123-134.

STANDARD OPERATING PROCEDURE FOR AQUATIC MACROPHYTE SAMPLING

1.0 PURPOSE AND SCOPE

The purpose of this document is to define the SOP for aquatic macrophyte sampling in Onondaga Lake. This SOP describes the necessary equipment, field procedures, materials, and documentation procedures necessary to conduct the macrophyte sampling.

Aquatic macrophyte distribution surveys will be conducted once a month from May through October in 2008. A total of 397 point intercepts evenly dispersed approximately every 2 acres around the perimeter of the lake (0-7 m water depth) will be sampled. Macrophyte species present on one rake toss will be identified at each point. The same transects will be sampled each month to allow for evaluation of changes in the size and shape of the macrophyte bed, as well as species composition, throughout the growing season. To estimate changes in whole lake biomass, 120 biomass samples will be taken each month, 40 samples each from dredge and cap; dredge only; and unremediated areas. Above and below ground aquatic macrophyte biomass samples will be taken using a 6 inch core sampler designed by Madsen et al. (2007). A crew of three people are needed for the surveys: a boat driver, a record keeper, and an observer who identifies the macrophyte species. These procedures are to be followed, and any substantive modifications to the procedures shall be approved by the Field Sampling Manager.

2.0 HEALTH AND SAFETY CONSIDERATIONS

A safety briefing will be held at the beginning of each day and as new activities are conducted. The designated safety officer shall be responsible for ensuring the safety of personnel and will be contacted immediately in the event of an emergency. The standard safety considerations for near-water and marine sampling include: caution deploying and retrieving heavy equipment; stepping in the sight of lines or cables; slips, trips, and falls; and the proper use of PFDs and PPE. Do not overload any vessel and load vessels evenly so they are not prone to capsizing. These safety considerations apply to the vessel and sampling crews whenever working on the water.

3.0 EQUIPMENT LIST

- flagging material;
- wooden stakes;
- core sampler device (PVC with 6 inch (15.25 cm) inside diameter, 12 inches (30.5 cm) length);
- plastic bucket with 0.25 inch (0.635 cm) mesh bottom;
- clam rake;
- 5 gal bucket ;
- sampling vessel;

- PFDs;
- sample containers;
- sample labels;
- DGPS;
- cooler with wet ice;
- resealable plastic bags;
- 100 m tape measure;
- laser rangefinder;
- digital camera;
- field notebook; and
- boat anchor with 10 m of line.

4.0 PROCEDURES

Macrophyte Survey Methods

1. During the first month of sampling, upload coordinates for the point transects (397) into the DGPS. Sampling each month will be conducted at each point.
2. Position the boat on the point using the DGPS.
3. When on point, the observer will identify macrophyte species collected on a rake tossed to the bottom. The record keeper will record the species present in the log book. The observer will measure the water depth using a tape measure with a weight at the end and visually describe the substrate composition to the record keeper.
4. If possible, the observer will measure and record keeper note the water depth if the point represented the outer edge of the macrophyte bed.
5. Repeat steps 2 – 4 for each transect.

Biomass Methods

1. During the macrophyte survey, 120 of the locations will be sampled to obtain a biomass sample with a core sampler. Points to be sampled should be identified prior to the first sampling event and the same point will be sampled each month.
2. Arrive at a point and record water depth. Anchor the boat at the station, if necessary.
3. Deploy the six inch inside diameter core sampler from the side of the boat and push the core sampler approximately 20 centimeters into the lake sediment.
4. Replace the removable quick cap on the handle, creating a vacuum which holds the core inside the sampler.
5. Remove the sample from the water and release over a 0.25 inch (0.635 cm) mesh bottomed plastic bucket held over the side of the boat.
6. Rinse the excess sediment out of the bucket by dipping the bucket into the water and retain the plant matter.

7. Sort the sample by species and place each plant sample into a resealable plastic bag labeled with unique sample number, date, station, position on transect, species, and sampler initials. Place the bag in a cooler on wet ice and transport to the laboratory (at SUNY ESF).
8. Repeat steps 2 through 7 until all 120 points are sampled.
9. At the laboratory, sort each sample into above ground and below ground samples.
10. Rinse off excess sediment or debris with tap water and shake off excess water.
11. Weigh each sample by species and tissue type and record to nearest 0.01 gram.
12. Place each sample on a tray labeled with sample number, station, date, tissue type, and species and place in the laboratory oven for 48 hours at 70 (+/- 1) °C.
13. Remove each sample at the end of 24 hours and place in a desiccator for approximately 45 minutes to confirm the complete removal of water from the sample and to allow for cooling of the sample to room temperature.
14. Record the mass of the sample to the nearest 0.01 g immediately after removal from the desiccator.
15. Return the samples to the oven for 1 hour, place in desiccator and record the mass for constant mass reading (within 5% of the previous measurement).
16. Repeat Step 15 until constant mass is reached.
17. Archive samples in a resealable plastic bag labeled with sample number, date, station, species, and sampler initials.

5.0 PERSONNEL

The Field Sampling Manager is responsible for assigning appropriate field personnel to be responsible for the various site activities. The Field Sampling Manager is also responsible for assuring that this and any other appropriate procedures are followed by field personnel. Field personnel assigned to the various site activities are responsible for completing their tasks according to this and other appropriate procedures. Field personnel are responsible for reporting deviations from the procedure or nonconformance to the Field Sampling Manager. Only qualified field personnel shall be allowed to perform this procedure. Qualifications will be based on previous experience and health and safety training. These considerations are discussed in more detail in the project PSP.

6.0 REFERENCES

Madsen, J.D. 1999. Point intercept and line intercept methods for aquatic plant management. US Army Engineer Waterways Experiment Station Aquatic Plant Control Research program. Technical Note MI—02. Vicksburg, MS.

Madsen, J.D., R.M. Wersal, T.E. Woolf. 2007. A New Core Sampler for Estimating Biomass of Submersed Aquatic Macrophytes. Journal of Aquatic Plant Management. 45:31-34.

STANDARD OPERATING PROCEDURES FOR COLONIZATION RATES OF BIOTA ON PROPOSED SUBSTRATES

1.0 PURPOSE AND SCOPE

The purpose of this document is to define the SOP for assessing colonization rates of biota on proposed substrates in Onondaga Lake. This SOP describes the necessary equipment, field procedures, materials, and documentation procedures necessary to conduct this sampling. This task is designed to evaluate the natural recolonization of different substrate types by macrophytes, macroinvertebrates, and fish. Rates of recolonization will be evaluated for three substrate types and three energy categories. Three substrate types will be evaluated during the study including sand (diameter between 0.0029 and 0.187 inches), sand and fine gravel (diameter between 0.0029 and 0.75 inches), and coarse gravel and cobble (diameter between 1.0 and 3.0 inches). Three locations will be selected. The study will be conducted from late July through September.

These procedures are to be followed and any substantive modifications to the procedures shall be approved by the Field Sampling Manager.

2.0 HEALTH AND SAFETY CONSIDERATIONS

A safety briefing will be held at the beginning of each day and as new activities are conducted. The designated safety officer shall be responsible for ensuring the safety of personnel and will be contacted immediately in the event of an emergency. The standard safety considerations for near-water and marine sampling include: caution deploying and retrieving heavy equipment; stepping in the sight of lines or cables; slips, trips, and falls; and the proper use of PFDs and PPE. Do not overload any vessel and load vessels evenly so they are not prone to capsizing. These safety considerations apply to the vessel and sampling crews whenever working on the water.

3.0 EQUIPMENT LIST

- sampling vessel;
- PFDs;
- DGPS;
- wading pools (36);
- gravel;
- sand;
- shovels;
- flagging;
- meter stick or measuring tape with 10 lb weight attached;
- 10% buffered formalin;

- rose bengal dye;
- 75% ethanol;
- minnow traps;
- petite ponar sampler;
- plastic bucket with 600 µm mesh bottom;
- 5 gallon bucket;
- sample jars;
- enamel pan;
- plexiglass divider for subsampling;
- forceps;
- spatula;
- 600 µm sieve;
- dissecting microscope;
- petri dish;
- sample vials
- digital camera; and
- field notebook.

4.0 PROCEDURES

1. At each station, identify the location for each pool and mark with a flag.
2. Record the water depth and DGPS coordinates on the field log.
   - nine pools should be located in 0 – 0.75 m water and nine pools in 0.75 to 1.5 m water depth.
3. Place nine wading pools (approximately 36 inches diameter, 8 inches deep) at each water depth and bury slightly in substrate to stabilize.
4. Fill three pools at each depth with sand substrate; fill three pools with sand and fine gravel; and fill the final three pools with coarse gravel and cobble.
5. Add additional substrate around the pools to create an approximately 2:1 slope to the top of the pool.
6. Leave pools in place through September to assess colonization rates over the summer months.
7. Every other week (bi-weekly) make observations on plant and fish communities. At the end of the study period evaluate invertebrate composition.
8. During the bi-weekly monitoring, conduct fish sampling by placing one minnow trap into each pool and let set overnight.

9. Check the trap in the morning and record the number and types of species captured, the site location, and pool number on the field log.
10. During bi-weekly monitoring conduct visual assessments of plant colonization at each pool. If plants are observed growing within a pool, record the species and estimate percent coverage using the Daubenmire class estimate on the field log. Note any plants growing adjacent to the pools and record species and Daubenmire class If possible, photograph the pool to estimate plant coverage using computer software in the laboratory (e.g., sigmascan).

    Daubenmire Class:

    1 0% coverage

    2 <5% coverage

    3 25-50% coverage

    4 50-75% coverage

    5 75-95% coverage

    6 >95% coverage

11. Following completion of the study, collect invertebrate samples from each pool using a petite ponar sampler.
12. In addition, collect a ponar sample approximately three feet outside of the pool to assess the source population available to colonize the pools.
13. Lower the sampler (petite ponar) over the side of the boat with a cable or rope and allow to freefall to the bottom. The closing mechanism is activated upon reaching the bottom.
14. Retrieve the sampler, once it breaks the water surface, place a bucket or tub beneath to catch any escaping materials.
15. Open the sampler, and sieve the contents in a plastic bucket with a 600 µm mesh bottom.
16. Place the contents of the sieve in a jar with 10% buffered formalin with rose bengal dye labeled with unique sample number, date, station, and sampler initials.
17. In the laboratory, rinse the sample with tap water in a U.S. No. 40 standard sieve to remove any fine particles left in the residues from field sieving.
18. Transfer the sample to an enamel pan and distribute homogeneously over the bottom of the pan.
19. Using a plexiglass divider split the sample into quarters.
20. Randomly select a single quarter and remove the sample with a spatula and forceps and place in a petri dish with water.
21. Examine this portion under a dissecting stereomicroscope and remove 100 organisms from the debris and plant material.

22. As they are removed, sort the invertebrates into major groups and place in vials containing 75 percent ethanol. If less than 100 organisms are encountered, randomly select another quarter from the enamel pan and continue removing organisms from the debris. Continue subsampling until at least 100 organisms are removed. After 100 organisms are encountered, complete the subsample so an abundance estimate can be calculated (number per m^2).
23. Identify the organisms to the lowest taxonomic level possible.
24. Record the number of individuals in each taxon and the total number of individuals in the sample on a data sheet.
25. Archive samples at SUNY ESF. Label sample vials with unique sample number, date, station, replicate number, sampler, and taxon.
26. Retain the remainder of the sample in 75 percent ethanol for up to one year.
27. Pools will be left in place over winter. Sample nine pools per location the following spring for invertebrates, plant composition, grain size, and total organic carbon following procedures described above.

6.0 REFERENCES

R.W. Bode et al. 2002. Quality Assurance Work Plan For Biological Stream Monitoring in New York State. New York State DEC Division of Water.