SITE HEALTH AND SAFETY PLAN FORMER MONARCH CHEMICALS FACILITY 61 GATES AVENUE, GENEVA, NEW YORK

September 21, 2007

Revision 1.0

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Site Health and Safety Plan (SHSP) ERD IRM Workplan

Former Monarch Chemical Facility 61 Gates Avenue Geneva, New York

September 21, 2007

This Site Health & Safety Plan (SHSP) has been prepared as a framework for accident prevention for ECOR Solutions, Inc.'s execution at the Geneva, NY project.

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TABLE OF CONTENTS

INTRODUCTION	1
IMPLEMENTATION BACKGROUND CHEMICAL AND PHYSICAL HAZARDS 3.1 Chemical Hazards 3.2 Physical Hazards	2 4
PERSONNEL RESPONSIBILITIES	5
HEALTH AND SAFETY PROGRAM MANAGER. HEALTH AND SAFETY COORDINATOR. SUBCONTRACTORS. SITE-SPECIFIC HAZARDS. GENERAL SITE HAZARDS. SUBSURFACE DRILLING, SOIL AND GROUNDWATER SAMPLING.	5 6 8
MEDICAL MONITORING AND PERSONNEL TRAINING REQUIREMENTS	17
MEDICAL MONITORING PERSONNEL TRAINING	
SITE MONITORING AND PERSONAL PROTECTIVE EQUIPMENT	21
PERSONAL PROTECTIVE EQUIPMENT PROGRAM PERSONAL PROTECTIVE EQUIPMENT SITE MONITORING 3.1 Site Monitoring Instruments 3.2 Site Monitoring Frequency 3.3 Action Levels. LEVELS OF PROTECTION 4.1 Groundwater and Soil Remediation Activities. RE-ASSESSMENT OF PROTECTION PROGRAM LOGS, REPORTS, AND RECORDKEEPING	
DECONTAMINATION	33
GENERAL PERSONNEL DECONTAMINATION PERSONNEL DECONTAMINATION PROCEDURES DECONTAMINATION PROCEDURES FOR PRESCRIBED LEVELS OF PROTECTION DECONTAMINATION WASTEWATER, PPE AND SAMPLING EQUIPMENT DISPOSAL PROCEDURES	33
SITE ACCESS AND CONTROL	38
SITE ACCESS SITE CONTROL WORK ZONES	38
EMERGENCY RESPONSE	
PRE-EMERGENCY PLANNING NOTIFICATION OF SITE EMERGENCIES RESPONSIBILITIES DECONTAMINATION PROCEDURES FOR EMERGENCY INCIDENTS EMERGENCY ESCAPE PROCEDURES, ROUTES, AND ROSTER POINT ACCIDENTS AND INJURIES SPILL CONTAINMENT PROGRAM	39 41 42 43
	IMPLEMENTATION BACKGROUND CHEMICAL AND PHYSICAL HAZARDS 3.1 Chemical Hazards 3.2 Physical Hazards 3.2 Physical Hazards PERSONNEL RESPONSIBILITIES HEALTH AND SAFETY PROGRAM MANAGER. HEALTH AND SAFETY COORDINATOR SUBCONTRACTORS SITE-SPECIFIC HAZARDS. SITE-SPECIFIC HAZARDS. GENERAL SITE HAZARDS. SUBSURFACE DRILLING, SOIL AND GROUNDWATER SAMPLING MEDICAL MONITORING AND PERSONNEL TRAINING REQUIREMENTS. MEDICAL MONITORING AND PERSONNEL TRAINING REQUIREMENTS. MEDICAL MONITORING AND PERSONAL PROTECTIVE EQUIPMENT PERSONNEL TRAINING. SITE MONITORING AND PERSONAL PROTECTIVE EQUIPMENT PERSONAL PROTECTIVE EQUIPMENT PROGRAM PERSONAL PROTECTIVE EQUIPMENT SITE MONITORING 3.1 Site Monitoring Instruments 3.2 Site Monitoring Instruments 3.3.2 Site Monitoring Frequency 3.3 Action Levels LEVELS OF PROTECTION 4.1 Groundwater and Soil Remediation Activities. RE-ASSESSMENT OF PROTECTION PROGRAM LOGS, REPORTS, AND RECORDREEPING DECONTAMINATION GENERAL PERSONNEL DECONTAMINATION PERSONNEL DECONTAMINATION PROCEDURES POR PRESCRIBED LEVELS OF PROTECTION DECONTAMINATION WASTEWATER, PPE AND SAMPLING EQUIPMENT DISPOSAL PROCEDURES SITE ACCESS AND CONTROL SITE

7.	7 SITE COMMUNICATIONS	44
7.3	8 SITE ACCESS AND SECURITY	45
8.0	SPECIAL PRECAUTIONS AND PROCEDURES	47
8.	1 POTENTIAL RISKS	47
8.2	2 MECHANICAL DEMOLITION	47
8		
8.4		
8.:		
8.3		
8.6 8.7		
8.8		
8.9		
-	8.9.1 Community Air Monitoring	
	8.9.2 Frequency of Monitoring	
	8.9.3 Vapor Emission Response Plan	52
	8.9.4 Major Vapor Emission Response Plan	
	10 STANDARD SAFETY OPERATING PROCEDURES	
8.	11 ACCIDENT PREVENTION PLAN	55
9.0	CONFINED SPACE ENTRY	57
Figu	are 1 – Site Location Map are 2 – Route to Hospital are 3 – Monitoring Well Location Map	
	LIST OF TABLES	
Tabl Tabl Tabl Tabl Tabl	le 1 – Exposure Limits and Physical Properties of Compounds of Potential Concern le 2 – Potential Health Hazards Associated with the Primary Chemicals of Concern le 3 – Potential Health Hazards Associated with Work Tasks le 4 – Emergency Contact/Notification System le 5 – Reference of Common Symptoms le 6 – Basic First Aid Procedures le 7 – Well Construction Table	
	LIST OF EXHIBITS	
1	Health and Safety Plan Review Record	
2	Daily Site Safety Log	
3	Employer Occupational Safety and Health Certification	
4	Training Acknowledgment Form	
5	Field Medical Data Sheet	
6	Exclusion Zone Sign-In Sheet	
7	Site Sign-In Sheet	
8	MSDSs for TCA and TCE	
o 9	MSDS for Newman Zone	
フ	MISDS IOI NEWHIAH ZOHE	

HEALTH AND SAFETY POLICY STATEMENT

ECOR Solutions Inc. (ECOR) considers the health, safety, and well being of its employees to be of unconditional importance. Reflecting that concern, it is the policy of management to support the implementation of the Health and Safety Program. The proper resources (financial and human resources) are provided to ensure operation of a comprehensive program. The following policies shall be employed:

- 1. Prevention of occupational illnesses and accidents and the resulting personal hardship and financial loss takes precedence in the conduct of our business. Objectives of the Health and Safety Program include the identification of and the elimination or control of all hazards to personnel, products, equipment, and facilities
- 2. The active participation and involvement of all levels of management are essential to the success of the program. The Health and Safety Program Manager (HSPM) directs, reviews, and evaluates Health and Safety Program activities.
- 3. All levels of supervision are responsible for maintaining safe working conditions, for properly instructing each subordinate in health and safety practices, and for enforcing heath and safety program requirements. In addition, each supervisor is responsible for discussing the requirements of the health and safety program with each employee and for verifying that each employee understands and complies with health and safety directives.
- 4. All employees have personal responsibility to conscientiously follow health and safety procedures and practices and to notify the project manager of potential or existing hazards to worker health or safety so that they may be corrected prior to initiation or continuation of work.

Safe conduct is a condition of employment. Disregard for company safety rules are a serious infraction, and disciplinary action will be taken as outlined in this section.

CRITERIA FOR INCLUSION IN HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE PROGRAM

The following personnel are required to comply with the personnel training and medical monitoring requirements of the hazardous waste operations and emergency response (HAZWOPER) program (29 CFR 1910.120).

- 1. All personnel who will be conducting fieldwork at a hazardous waste site or regularly conducting intrusive investigative activities are required to be in compliance with this Program. A joint decision will be made by the HSPM and the Project Manager at the time of hiring as to the work to be performed by the new employee and the need for the new employee to participate in this Program in accordance with this criteria.
- 2. Under no circumstances shall employees either engage in field work at hazardous waste sites or conduct intrusive investigative activities without being in compliance with both the training and medical monitoring requirements identified below.

The general requirements of the Program are provided below.

Medical Monitoring Requirements

The program participants must obtain baseline, annual, and exit physical examinations. The criteria for the program participants and the timing of such physical examinations are described below.

Baseline Examination

All Personnel - The baseline examination for new employees must be conducted prior to the first assignment involving fieldwork at a hazardous waste site or regular intrusive investigative activities. Although an exit examination from a previous employer may not be substituted for the ECOR baseline examination, the new employee's baseline examination may take place within the first three months of employment if the exit examination results from a previous employer are available. The costs for the medical monitoring will be covered either directly by ECOR or by ECOR medical insurance coverage. ECOR's insurance coverage goes into effect after one full calendar month of employment. All decisions regarding the need for, the schedule of, or the

exemption of, a new employee from the medical monitoring program must be made at the time of hiring in conjunction with the HSPM.

Should the SHSO or HSPM and the new employee's manager determine that the employee is likely to be involved in field work at hazardous waste sites or will regularly conduct intrusive investigations within the first two months of employment, the baseline examination should be scheduled immediately after the start of employment.

Should the SHSO or HSPM and the new employee's manager determine that the employee is likely to be involved in field work at hazardous waste sites or will regularly conduct intrusive investigations, but at some future date, it is recommended that the entry examination be performed after the ECOR medical insurance goes into effect (after one full calendar month of employment).

Should an employee who has not previously been involved in field work at hazardous waste sites or has not regularly conducted intrusive investigations subsequently become involved in work where such conditions exist, that employee will discuss the activities with the SHSO or HSPM and, as necessary, schedule a baseline examination prior to the start of such work.

Annual Examinations

Personnel in the Medical Monitoring Program shall, at a minimum, have a medical exam once every year, unless the attending physician believes a longer interval (not greater than biennially) is appropriate. For personnel conducting fieldwork at hazardous waste sites or regularly conducting intrusive investigative activities for a period of more than 30 days per year, the examination shall be conducted annually. It is the project managers responsibility to question team members about their past years experience to determine whether the workers medical monitoring is consistent with the requirements of this program. Questions concerning applicability shall be discussed with the SHSO or HSPM.

Exit Examination

All personnel who are included in the Medical Monitoring Program shall have an exit examination prior to their last day of employment with ECOR.

OSHA Training Requirements

All professional technical staff that have met the criteria described above for the Medical Monitoring Program shall participate in the OSHA training program. The type and frequency of the training is outlined below.

Hazardous Waste Operations and Emergency Response (HAZWOPER) Course (40-hour)

For program participants, the OSHA Training shall include a minimum of a Hazardous Waste Operations and Emergency Response (HAZWOPER) Course of 40 hours. This course must be attended prior to conducting any fieldwork at a hazardous waste site. Since OSHA only requires that this course be taken once, this requirement can be satisfied by attendance of such a course with a previous employer.

Annual 8-hour Refresher Course

All personnel who perform field work at hazardous waste sites or regularly conduct intrusive investigative activities, participate in the Medical Monitoring Program, and complete a HAZWOPER 40 hour course, shall on an annual basis, attend a minimum of an 8-hour HAZWOPER refresher course. It shall be the employee's responsibility to attend the regularly scheduled ECOR refresher training courses. Attendance of these refresher courses will be tracked by the HSPM to ensure that all employees are maintaining their training.

CERTIFICATION OF COMMITMENT TO WORKER HEALTH AND SAFETY AND HEALTH AND SAFETY OFFICER'S AUTHORITY

ECOR employees, subcontractors and other prime contractors may be exposed to risks from hazardous conditions. ECOR's policy is to minimize the possibility of work-related injury through aware and qualified supervision, health and safety training, medical monitoring, and the use of appropriate personal protective equipment. ECOR has established a guidance program to implement this corporate policy in a manner that protects personnel to the maximum reasonable extent.

This Site Health and Safety Plan (SHSP) applies to ECOR personnel and subcontractors at the Former Monarch Chemical Facility where operations involve actual or potential exposure to safety and health hazards. This SHSP describes emergency response procedures, and existing and potential physical/chemical hazards that have been identified to ECOR by others. ECOR's contractors are retained as independent contractors and, as such, are responsible for ensuring the safety of their employees.

1.0 INTRODUCTION

This SHSP has been developed by ECOR for the Former Monarch Chemical Facility (Site) located at 61 Gates Avenue in Geneva, New York. The scope of work includes the following activities:

- 1. Preparation of Interim Remedial Measure (IRM) Workplan;
- 2. Groundwater, surface water, soil vapor and indoor air monitoring and sampling
- 3. Injection of various amendments for reductive dechlorination via GeoProbe;
- 4. Potential installation of monitoring wells;
- 5. Site mobilization and general site monitoring and observation activities;

The procedures set forth in this SHSP are designed to reduce the risk of exposure to chemical substances and physical or other hazards that may be present. The procedures described herein were developed in accordance with the publications indicated below:

- 1. <u>Safety and Health Standards 29 CFR 1910 (General Industry)</u>, US Department of Labor, Occupational Safety and Health Administration (OSHA). Hereafter, referred as "29 CFR 1910."
- 2. <u>OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response</u>, U.S. Dept. of Labor, OSHA.
- 3. <u>OSHA Safety and Health Standards 29 CFR 1926 (Construction Industry)</u>, U.S. Department of Labor, OSHA.
- 4. <u>Standard Operating Safety Guides</u>, U.S. Environmental Protection Agency (EPA), Office of Emergency and Remedial Response.
- 5. <u>Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities</u>, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health (NIOSH).

The recommended health and safety guidelines within this SHSP may be modified if future information changes the activities to be performed or the characterization of the area in which work is to be performed. Future revisions of this document will be denoted in the footer of each page of the document (i.e., Rev_1.x)

1.1 Implementation

A copy of this SHSP will be made available to all employees prior to their site work. They will be required to review this plan before the start of any site activities. All other personnel involved with remediation activities will have received a pre-entry briefing.

1.2 Background

The Site is located on a parcel of property approximately 1.75-acres in size, located at 61 Gates Avenue in the city of Geneva, Ontario County, New York (Latitude 042° 52' 54" N, Longitude 076° 58' 52" W). The Site (Figure 1) is industrially developed with a manufacturing plant occupying approximately 33,700 ft², with accompanying loading and unloading areas, parking lots, and an above ground storage tank (AST) containment area. The Site is typical of the gently rolling glacial topography of the Finger Lakes region, the result of repeated glaciations, the most recent 14,400 years ago during the Wisconsonian Glacial Epoch (Mullings, 1996).

Access to the Site is via Gates Avenue, which is contiguous on the southern property boundary (Figure 1). The Site is located in an industrial area of Geneva, north of Seneca Lake. Properties bordering the Site include a furniture manufacturer to the north, the New York Central Railroad and an intermittent stream and adjacent vacant lots and residences to the east, and vacant manufacturing facilities are located to the south and west.

The property was developed around 1910 with the construction of part of the existing manufacturing plant, with construction additions and improvements noted in the 1930s and 1950s. A boiler and circuit board manufacturer operated on the property until it was purchased in 1979 by Monarch Chemical Company (Monarch), a former operating division of the H.B. Fuller Company (HB Fuller). Monarch used the Site to manufacture food grade cleaners and sanitizers used in the dairy and related industries. In 1996, HB Fuller sold the property and business to Haltrachem. Haltrachem continues to engage in similar production activities that were employed by Monarch. Information and aerial maps indicated that in 1967, a Sanborn map denoted the northeast portion of the Site was occupied by Magnetic Components, Inc., manufacturing circuit boards and impregnation of capacitors and associated board components.

In 1996, HB Fuller sold the property and business to HoltraChem Distribution Inc. HoltraChem continued to engage in similar production activities that were employed by Monarch. In the late 1990s, HoltraChem was acquired by Basic Chemical Solutions (BCS), and now occupies the Site. The Site currently consists of the approximately 33,700 ft² manufacturing plant, an exterior bulk liquid powder loading and unloading areas, parking and truck turnaround areas, and a railroad spur. The components of this operation include acids, caustics, sodium hypochloride and surfactants. Bulk liquids are delivered by tanker truck, connected to piping located outside the east portion of the plant within a concrete secondary containment area. Additional raw materials are delivered via truck in drums and totes and unloaded at a dock along the southeast corner of the manufacturing building. The mixing tanks are connected via piping to the bulk loading area along the northeast portion of the manufacturing plant.

A series of phased subsurface investigations began in May 1996, with a *Phase I Assessment*, and continued through March 2006, with the submittal of the *Supplemental Remedial Investigation* (SRI), continuing into June 2007, with the *Baseline Soil Vapor Intrusion Report*. Within these series of investigations, on March 4, 2002, a Voluntary Cleanup Agreement (VCA) between HB Fuller and the New York State Department of Environmental Conservation (NYSDEC), VCP No. V00119-8 was executed concerning remediation of VOCs detected in soil, groundwater and air at the Site.

These aforementioned investigations determined the presence of petroleum hydrocarbons and chlorinated volatile organics, including primary solvents tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane (111TCA), and the degradation products 1,1-dichloroethene (11DCE), 1,1-dichloroethane (11DCA), cis-1,2-dichloroethene (cDCE), trans-1,2-dichloroethene (tDCE), vinyl chloride (VC), chloroform, methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), benzene, toluene, ethyl benzene, and xylene (BTEX) compounds. These volatile organic compounds (VOCs), the primary compounds of concern, were not used by Haltrachem or by Monarch.

1.3 Chemical and Physical Hazards

1.3.1 Chemical Hazards

A summary of the exposure limits and physical properties of the organic chemicals of concern are provided in Table 1. The potential pathways of chemical exposure may be through inhalation, ingestion, injection, and skin contact. This information was used to develop action levels for onsite activities. Although the chemicals identified are a potential health concern, measures will be taken to minimize potential for exposure.

Because these contaminants were identified as potential constituents of groundwater, employees performing intrusive activities, such as drilling, subsurface injections involving soil and groundwater, and miscellaneous maintenance work, excavations, and equipment installations, should follow the specific health and safety procedures provided in Section 4.4. The potential acute and chronic affects of chlorinated solvents and VOC exposures are described in Table 2.

1.3.2 Physical Hazards

Table 3 contains a summary of potential work hazards that may be encountered during remediation activities. Potential hazards are described according to each specific job task. The two main physical tasks performed at this Site include drilling and injection activities into the shallow subsurface, groundwater monitoring and soil sampling, and risks associated with large construction equipment related to conducting site investigation and sampling (drilling rigs, forklifts, trucking, maintenance equipment, vehicle traffic). The requirements associated with these activities are described in Sections 8.3 and 8.4. Other physical activities performed at this Site, such as regular maintenance work and equipment installations, expose employees to potential hazards described in detail in Section 8.0.

2.0 PERSONNEL RESPONSIBILITIES

The following responsibilities and authorities have been assigned to personnel during remediation activities.

2.1 Health and Safety Program Manager

ECOR has designated an employee as its Health and Safety Program Manager (HSPM). This person has the authority to command sufficient resources to safely perform the Work. Mike Wisnewski, P.E., has been designated as the HSPM.

2.2 Health and Safety Coordinator

ECOR has designated a Site Health and Safety Coordinator (SHSC) for this project. Day-to-day industrial hygiene support, including air monitoring, training, site safety inspections, shall be provided by the SHSC. The SHSC has the authority to stop on-site operations whenever conditions threaten the health or safety of employees. The SHSC or his designee will remain on-site during all project operations.

ECOR has designated Jennifer Good as the SHSC. Ms. Good has a sound working knowledge of occupational safety and health regulations; experience on the type of project described in this SHSP; and training in air monitoring practices and techniques.

2.3 Subcontractors

ECOR may be supported in the remediation activities by subcontractors. All subcontractors involved with on-site operations will be provided a copy of this SHSP. Subcontractors involved with intrusive remediation activities will be informed of the health and safety concerns and will be responsible, at a minimum, for maintaining the health and safety requirements presented in this plan. Information, such as air monitoring and analytical results, will be shared with subcontractors to assist them in addressing the health and safety recommendations.

ECOR will ensure that subcontractors have met the training, respirator certification and medical examination requirements of the OSHA Hazardous Waste Operations and Emergency Response

Standard (29 CFR 1910.120). Subcontractors involved with intrusive activities will be required to provide to ECOR completed certification forms for this purpose.

2.4 Site-Specific Hazards

Tripping and falling

- Maintain areas clear of tripping hazards and debris
- Post caution signs in wet areas
- Be alert of your surroundings

Electrocution

- Lock high voltage boxes and 3-Phase Power panels
- Train employees and subcontractors on emergency shut down procedures
- Post "Danger-High Voltage" signs near panels
- Provide lock out\tag-out equipment and procedures

Tools & Hand-held Power Instruments

- Read the owner's manual
- Check for proper grounding, specially with extension cords
- Check cords for damage or worn insulation
- Wear safety glasses, gloves and safety shoes

Chemical Splash

- Wear proper eye protection during cleaning or sampling
- Use the "buddy" system whenever chemical hazards are likely
- Maintain eye washes and showers in good working order
- No employees are allowed to wear contact lenses whenever splash potential exists

Drilling & Heavy Equipment

- Maintain visual contact with the operator
- Keep all unnecessary personnel away from area
- Have a person on the ground to spot, especially while backing
- Maintain proper three-way support for equipment
- Inspect equipment and know where kill switches are

Severe Weather

 Evacuate outside work area and seek shelter at the discretion of Site Health & Safety Officer

Utilities

- Survey area for overhead and buried utilities before excavating and maintain proper distance
- Obtain clearance of underground utilities by an authorized representative of the utility company Inspect cables for wear and repair or replace prior to use

Cable Failure

- Inspect cables for wear and repair or replace prior to use
- Wear proper eye and head protection during use of winches

Snakes, Bees & Insects

- Inspect work areas before entry or before climbing on ladders to avoid disturbing snakes, bees and insects
- Wear appropriate clothing to prevent bites or stings
- Maintain a snake bite kit in the vehicle first aid kit

Motor Vehicles

- Drivers and passengers must wear seat belts and retain licensure in accordance with state law
- Use discretion while driving in areas with poor traction, very steep grades and loose gravel
- Secure loads properly to avoid injury

2.5 General Site Hazards

The principle hazard is exposure to VOCs, either through soil, vapor, or groundwater, and potentially adsorbed light non-aqueous phase liquids (LNAPL) or dense non-aqueous phase liquids (DNAPL) on the soil matrix. Proper ventilation and routine monitoring of the ambient air should be employed using a photoionization detector (PID) or flame ionization detector (FID), or equivalent with a minimum 11.0 eV lamp. Protective clothing and gloves are required when handling VOCs, NAPL, or equipment with NAPL fluids.

Lighting - Work areas must have adequate lighting for employees to see work and identify hazards; 5 foot candles minimum comparable to a single 75-100 watt bulb. Personnel should carry flashlights in normally dark areas for use in the event of a power failure. Applicable OSHA standards for lighting - 29 CFR 1910.120(m) - shall apply.

<u>Electrical Power</u> - All electrical power must have a ground fault circuit interrupter (GFCI) as part of the circuit. Applicable OSHA electrical standards - (See 29 CFR 1926) shall apply.

<u>High or Elevated Work</u> - All work over 4 feet in elevation or where a fall potential exists will be performed using appropriate ladders and/or fall protection (i.e., body harness and lifeline).

<u>Drum Handling</u> - The movement and opening of drums will be done in accordance with 29 CFR 1910.120(j).

<u>Cold Stress</u> - When the temperature falls below 40°F, cold stress protocol shall be followed. Employees must be supplied with adequate clothing to maintain core temperature. See ACGIH TLV for Cold Stress.

<u>Heat Stress</u> - When the temperature exceeds 70°F and personnel are wearing protective clothing, including respiratory protection, a heat stress monitoring program shall be implemented as appropriate. Employees shall have break periods and access to drinking water as necessary. See ACGIH TLV for Heat Stress.

Eve Wash Protection - All operations involving the potential for eye injury, splash, etc., must have approved eye wash units locally available as per 29 CFR 1910.151(c).

<u>Fire Protection/Fire Prevention</u> - Operations involving potential fire hazards shall be conducted in a manner as to minimize the risk. Non-sparking tools and fire extinguishers shall be available and used as appropriate. Sources of ignition shall be removed. When necessary, explosion-proof instruments and/or bonding and grounding will be utilized.

<u>Utilities</u> - Overhead and underground utility hazards shall be identified and/or inspected prior to conducting operations involving potential contact.

Lightning - All outside work will be suspended during electrical storms.

2.6 Subsurface Drilling, Soil and Groundwater Sampling

Soil Sampling for Physical Soil Characteristic Determinations - Soil samples will be collected for identification and testing of the physical soil characteristics. Information regarding the physical characteristics of the soil will be incorporated into the subsurface hydrogeologic investigation. Future sampling of subsurface soils via drilling or coring equipment (HSA, air or mud rotary, or direct push [Geoprobe] drilling techniques) may occur to further quantify site conditions. Ancillary equipment used in this project includes the following:

Equipment

- Notebook
- Boring logs
- Pocket knife
- Aluminum foil
- Sample bottles for soil sample analysis
- Photoionization Detector (hNu, OVM, or TIP)
- Extra 11.0 or 11.7 eV bulb, as necessary
- Neoprene or latex gloves
- 500 ml, wide mouth, glass container
- Trisodium phosphate
- Bucket
- Brush
- Spray bottle
- Distilled or de-ionized water

Drilling oversight is to be conducted by or under the supervision of a qualified and experienced geologist. Drilling operations for the monitoring wells are to be completed by using a single method or combination of methods, depending on the site conditions encountered at a particular well location. Air rotary, hollow stem auger (HSA), rock-core drilling methods, or direct push drilling technology will be implemented for borehole advancement prior to installing the wells. In areas or intervals where barrel coring is not conducted, or a lack of stratigraphic data exists, the

borehole may be drilled using NX-size wireline coring, and then overdrilled to appropriate borehole diameter using air rotary.

The unconsolidated sediments will likely be bored using 2.25-inch inside diameter HSA for locations where soil samples are collected for classification and contaminant characterization, or direct push drilling methods. HSA drilling or air rotary drilling may will be used to advance the boring until the bedrock surface is encountered or auger refusal. Prior to advancing the borehole into bedrock, steel surface casing may be installed to case off groundwater and/or contaminated soils that may be encountered.

A level of detail may be required for lithologic descriptions to determine if coring is required for a specific well location and depth interval. Coring is completed for areas where lithologic characteristics require more detail because coring has not been completed in the existing boreholes, or boreholes have not been advanced in that area. At the completion of coring, and if a well is to be installed, the boring may be overdrilled using air-rotary methods. When coring is not utilized, the boring may be advanced using air-rotary methods, HSA, or direct push technology. The borehole diameters will determined such that they were large enough to accommodate intermediate casing strings, well casing, and screen.

Surface and intermediate or outer casings may be necessary to prevent downward migration of fluids by sealing off heaving or caving soils, fractured areas, or dissolved groundwater contaminants. The length of the casing strings will be determined by the depth to bedrock (for surface casings); estimated depth of contaminants, fracture zones, or mine shafts; and depth of screened interval. The casing diameters are dependant upon the number of intermediate casings needed and the final diameter of the well or borehole.

Where LNAPL or DNAPL is encountered during the drilling of a deep boring, casing will have to be installed to prevent migration of the NAPL into the borehole prior to advancing the borehole to greater depths.

Soil Sampling - Soil samples may be collected in accordance with the following protocol during soil boring HSA or direct push advancement.

- Soil samples will be retrieved for identification of the physical characteristics of the sampling interval. The soil sample will be collected from the boring using a two inch outer diameter, split-barrel sampler, or continuous core with direct push technology. The core barrel sampler will be advanced to a depth of either 18, or 24-inches below the lead hollow stem auger, or within the core barrel with direct push technology.
- Following breakage of the steel split-barrel sampler, the undisturbed soil sample within the split-barrel will be removed and visually described. The descriptive classification should include a grain size (sand, silt, etc.) with note to minor constituents, grain size shape and gradation, sample color, moisture content, and any other descriptive characteristics (laminations, oxidation, etc.). The Unified Soil Classification should be used. The visual description should be recorded on the boring log and a portion of the sample should be saved in a soil sample jar for future physical testing such as falling head permeability or grain size testing.
- Soil for grain size analysis will be collected in a clean, wide mouth, glass bottle, at least 500 ml capacity.
- Sampling information and sample bottles will be labeled in accordance with appropriate protocol.
- To reduce the possibility of cross contamination, all sampling equipment and surfaces of
 measuring instruments will be thoroughly decontaminated between each use, using one or
 more of the following: isopropyl alcohol or trisodium phosphate wash, followed by
 distilled or de-ionized water rinse.

Soil Sampling - Soil samples may be collected for field identification and\or for chemical contaminant analysis. Soil sample stratigraphy and contaminant results will be incorporated with the other soil sample information to define the nature of the soil contaminant, and the extent and magnitude of contamination within the soil column. Equipment may include:

• Split barrel sampler

- Photoionization detector (hNu, OVM, or TIP)
- Latex or neoprene gloves
- VOC and semi-VOC soil sample vials (40 ml, or 1 liter jars)
- 500 ml, wide mouth, glass container
- Sample cooler
- Trisodium phosphate
- Distilled or de-ionized water
- Sample data sheets
- Chain of Custody documentation

After soil samples are exposed within the split-barrel sampler, the PID detector should immediately move up the soil column from one end of the split-barrel to the other. The PID should move slow enough to allow vapors to enter the nozzle to characterized separate areas of the sample. The maximum and minimum soil vapor reading should be recorded on the soil boring log, along with the sediment type or any physical characteristic or anomaly noted at the highest reading.

For soil headspace analysis, a minimum of 250 grams of soil will be collected into a standard, clear, soil sample jar, preferably 500 ml or larger. The soil jar is to be half to three-quarters filled with soil in the area with the highest vapor reading from the split-barrel sampler. The sample jar is to be sealed with aluminum foil and then sealed with the jar cap. Allow the headspace to develop at least 10 minutes (but not more than one-half day) and prior to removing the jar cap, shake the jar. Remove the jar cap and expose the aluminum foil and quickly puncture the foil with the PID nozzle with care not to insert the nozzle into the soil. Record the highest PID reading from the jar headspace on the soil boring log, as well as the depth of sample collected for laboratory analysis.

Using latex or neoprene gloves, soil from the zone of highest deflection indicated from the PID screening, will be hand packed as quickly as possible into sample bottles. These samples will represent a discrete zone within the sampling horizon. VOC samples will be collected in 40 ml

clear glass vials. Sample intervals will be recorded on soil boring logs and sample information data sheets to the nearest 0.5 foot.

VOC sample bottles will be labeled in accordance with protocol documented in the sampling plan. Sampling information will be documented at the time of sample collection and chain of custody initiated. Following collection of the soil sample for analysis of VOC concentrations, the remaining soil in a soil sample jar and seal for headspace analysis (described above) as needed and labeled as a composite soil sample from the interval sampled. Sample bottles for inorganic and semi-volatile organic compound analyses will be labeled. Sampling information will be documented at the time of sample collection, and chain of custody initiated.

All samples will be packed in a cooler maintained at 4° Celsius.

To reduce the possibility of cross contamination, the back of the drilling rig, all sampling equipment, and all drilling tools and equipment will be thoroughly cleaned between each boring location. Sampling equipment will be dedicated to individual sample collection and will not be reused unless thoroughly cleaned. At all boring locations, all drilling tools and equipment will be thoroughly decontaminated after each use. Decontamination procedures will include, at a minimum:

- 1. Trisodium phosphate rinse
- 2. Water rinse

All fluids collected from decontamination procedures will be containerized for proper disposal. All soil cuttings will be drummed or stockpiled prior composite sampling and off-site disposal. During each boring the soil will be separated based on the degree of VOC contamination detected on the PID. Soil from borings with levels of volatiles exceeding 10 ppm will be segregated and drummed with soil from borings with a similar degree of contamination.

<u>Groundwater Sampling</u> – Groundwater monitoring wells are divided into two categories; wells with dedicated downhole sampling systems, and those wells where downhole sampling systems have not been installed. As of September 2007, no site wells (Figure 3) have dedicated downhole

equipment and this sampling outline includes the procedures for sampling wells and locations without dedicated downhole equipment. Numerous studies have been completed on groundwater sampling methods involving low-flow rate purging. Studies by Barcelona, et. al., (1994) and Puls and Barcelona, (1996) discuss and compare conventional versus low-flow purging methods and show that low-flow rate sampling meets high data quality objectives. Low flow sampling techniques will be employed in the groundwater monitoring program for the Site.

Wells sampled without downhole equipment

- 1. Wells will be sampled in sequence from least contaminated to most contaminated which reduces the potential for cross contamination.
- 2. Weather conditions such as temperature and general atmospheric conditions will be observed and noted on the *Water Sampling Log* Form.
- 3. The well and immediate area will be inspected and the integrity of the well noted. Any maintenance requirements and problems will be noted on the *Water Sampling Log* Form.
- 4. The well will be unlocked and the well cap removed. The top and inside of the casing will be wiped off, if needed.
- 5. A photoionization detector may be used to check for any organic vapors emanating from the well. The readings will be recorded on the well *Water Sampling Log* Form.
- 6. The depth to all fluid phases (groundwater, LNAPL, and DNAPL) detected in the wells will be measured to the nearest 0.01 foot using either a steel tape with indicator paste, an acrylic bailer, or an electric or optical probe. All groundwater monitoring wells (Table 7), on-site and off-site, associated with the Facility have permanent datum etched into the top of casing (TOC), identified by a notch and permanent markings on the casing, or the north side of the well casing. All measurements of total depth, water elevation and immiscible phases will be measured and referenced from this point and recorded on the *Water Sampling Log* Form.
- 7. The total depth of the well to be sampled will be measured to the nearest 0.01-foot and the measurement recorded on the *Water Sampling Log* Form. The depth will be compared to the total depth recorded from initial construction. Wells will be redeveloped

- if the comparison of total depth (less well bottom sump) shows that 10 % of the well screen is occluded by sediment.
- 8. The required volume of water to be purged from each well just prior to sampling will be calculated and noted on the *Water Sampling Log*. The calculated purged volume necessary for representative groundwater samples will be determined just prior to sample collection. Purge volumes are calculated specifically for each well by multiplying the well casing volume determined in each well in gallons per foot of water by the feet of water in the well.
- 9. The wells without dedicated downhole pumps will be purged with a non-dedicated submersible pump such as a 2-inch Grundfos Redi-Flo², a low-flow bladder pump, or a peristaltic pump until at least three well volumes have been removed and the field parameters of pH, conductivity, and temperature of the water have stabilized within 10 percent of the last two measurements or the well is pumped dry in which case only one group of readings will be taken. Instances where the saturated thickness is insufficient to purge with a pump a dedicated bailer will be used to collect the sample. Field measurements will be measured according to equipment manufacturer's instructions and referenced EPA methods. Three readings will be taken unless the well goes dry in which case only one reading will be recorded. The readings will be recorded on the *Water Sampling Log* Form. All instruments will be calibrated before each days use according to manufacturer's instructions and referenced EPA methods. The manufacturer and model number of the instruments used at each sample location will be logged in the *Calibration Log Book* for that instrument.
- 10. The final measurements collected are the most representative of the water sampled and will be recorded on the *Water Sampling Log* Form. All purge volumes and calculations will be recorded on the *Water Sampling Log* Form.
- 11. The non-dedicated submersible or bladder pump will be fitted with polyethylene tubing for discharge. The pump and tubing will be lowered by hand to 5-feet below the water level or to bottom of the well minus 5 feet. The pump will be powered with a portable generator, situated down-wind and away from the well to avoid contamination from

exhaust fumes. Purge rates will be kept low (100 – 300 ml/min), with the intent of limiting drawdown to less than 0.3' during purging. If recharge can not keep pace with the pump rate and the pump breaks suction, the pump will be shut off immediately and the well will be considered dry. The pump will then be lowered by hand to the bottom of the well screen and all sampling containers placed nearby. The pump will then be turned on and the pumping rate reduced to 100 ml/min or less. When the sampling is complete, the pump and tubing will be withdrawn from the well. The pump and tubing will be decontaminated. Disposable equipment will be containerized. Water pumped from the wells will be contained and profiled prior to proper disposal.

- 12. Samples will be collected directly from the sampling port located at the discharge manifold or tubing. Samples will be preserved as appropriate in sample containers provided by the laboratory and submitted and analyzed before the required holding time has expired. Water samples for dissolved metals analyses will be filtered through a 0.45 micron filter to remove suspended particulate matter prior to filling sample bottles, or shipped next day for filtration at the appropriate analytical laboratory. Information on the sample location, analysis to be performed, date and time of sample collection, name of sampler, and preservatives used will be recorded on the sample container label.
- 13. The individual sample containers will be identified with the unique well ID, identical to the information recorded on the *Water Sampling Log* Form. Samples requiring refrigeration will be placed in a cooler immediately after sampling and cooled to 4° Celsius. Prior to shipment to the laboratory, the samples will remain chilled using ice packs or an on-site refrigerator and kept under constant chain-of-custody surveillance. When shipped to the laboratory, the shipping containers will include the completed Chain-of-Custody Records and laboratory instructions, and sealed with a custody seal. The shipping containers will be shipped to the appropriate laboratory via overnight or same-day courier service.

3.0 MEDICAL MONITORING AND PERSONNEL TRAINING REQUIREMENTS

The Occupational Safety and Health Administration (OSHA) has established requirements for a medical surveillance program designed to monitor and reduce health risks for employees who may potentially be exposed to hazardous materials. For the activities related to the remediation, this potential has been limited to on-site activities. This program has been designed to provide baseline medical data for each employee involved in hazardous waste operations. Each employee must undergo testing and training, and a determination of his/her ability to wear personal protective equipment. The medical examinations must be administered prior to employment, annually, at employment termination and as warranted for chemicals that the employee may have been exposed. These examinations shall be provided by employers without cost or loss of pay to the employee.

In accordance with 29 CFR 1910.120, ECOR will maintain all medical surveillance records for 30-years past employment and shall make these records available to the employee, owner or regulatory agencies, as required.

3.1 Medical Monitoring

Due to potential exposure to hazardous materials, all ECOR employees and subcontractors involved in intrusive on-site remediation activities must participate in a medical monitoring program meeting specifications of 29 CFR Part 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER). The examining licensed physician is required to provide a written report to the employer of any medical condition that would place employees at increased risk of wearing a respirator or other personal protective equipment. A physician will specify respiratory protection clearance, or the user's ability to wear a respirator of any type for a Work shift. Each subcontractor involved in remediation activities shall assume the responsibility of maintaining a medical surveillance program as well as maintaining Site personnel medical records as regulated by 29 CFR 1910.20, Medical and Exposure Records. Evidence of medical certification will be provided for all personnel, including subcontractors, who will be on-site. This documentation will be in the custody of the SHSC.

ECOR provides three types of medical exams. Examination types are designated as baseline (B), annual (A), or exit (E). The examinations generally include at least the following:

- Completion of medical and work history (as well as completion of standardized forms as required by OSHA for work with asbestos, hazardous waste sites or other specific hazardous materials) (B,A,E).
- Physical examination directed to the pulmonary, respiratory, circulatory and gastrointestinal system (B,A,E).
- Chest x-ray (B,E).
- Height/weight (B,A,E).
- Blood pressure (B,A,E)
- Vision screening (B,A,E).
- Pulmonary functions test including forced vital capacity (FVC) and forced expiratory volume (FEV) (B,A,E).
- Baseline blood chemistry and urinalysis (B,E).
- Electrocardiogram (B,E).
- Audiometric testing (B,A,E).
- Additional tests as determined by the examining physician.

A medical examination program is required for all those employees who wear or may wear respiratory protection as specified by 29 CFR 1910.134, Respiratory Protection and 29 CFR 1910.120 (HAZWOPER). Disposable dust type respirators are included under these regulations. This program must determine an individual's ability to wear respiratory protection while performing designated duties. All elements of 29 CFR 1910.134, Respiratory Protection, must be complied with, and will be verified by the SHSO. This verification includes review of the required written respiratory protection program regarding the selection, care, employee training requirements, use and maintenance of respirators.

3.2 Personnel Training

All personnel associated with remediation activities at the Site have participated in a health and safety training program that complies with OSHA 29 CFR 1910.120, HAZWOPER, prior to mobilization at the Site. This program instructs employees on the intent of the standard, health and safety principles and procedures, proper operation of monitoring instruments, use of personal

protective equipment, decontamination, and Site specific emergency plans. All personnel have an initial 40-hour training course. This course is supplemented by an annual 8-hour refresher course. Any chemical specific training that may be required will be based upon compliance with 29 CFR 1910.1200, Hazard Communication. Chemical substances, such as TCE and TCA, that are potential constituents of groundwater will be explained and reviewed during the HAZCOM training. The corresponding MSDSs for these chemicals are attached as Exhibit 8. Personnel responsible for supervision and on-site management relative to site operations receive an additional 8 hours of specialized training.

Additional training is given to those employees responsible for responding to site emergencies.

A copy of this SHSP will also be made available to all personnel for review. All employees will complete a Health and Safety Plan review form to verify they have reviewed this plan and a copy of the form is shown in Exhibit 1. All subcontractors involved with intrusive remediation activities are required to certify that their employees have received medical exams, training and are capable of respirator usage. The Contractor Occupational Safety and Health Certification form is attached as Exhibit 3. All employees and subcontractors will also be required to fill out a field medical data sheet (Exhibit 5) prior to starting activities at the Site.

All on-Site personnel involved with the remediation project will attend a pre-entry briefing on the chemical and physical hazards associated with the Site.

The initial health and safety briefing will consist of the following information:

- Names of personnel and alternates responsible for site safety and health.
- Injury, illness, and other hazards present on the site.
- Safe use of engineering controls and equipment on-site.
- Work practices by which the employee can minimize risks from hazards.
- Selection, use, care, and maintenance of Personal Protection Equipment (PPE).
- Site control procedures.
- Site decontamination procedures.
- Standard operation safety procedures.
- Review of Emergency Response Plan.

Documentation of all training, fit test and medical monitoring certificates will be maintained in the offices of ECOR in the custody of the SHSO.

A daily tailgate meeting will be conducted prior to the start of the day's activities daily during performance of intrusive activities. The topics covered will include a reminder of site hazards, target activities for the day's work, changes in observed exposure levels, staff changes (e.g., due to illness) and responsibilities.

4.0 SITE MONITORING AND PERSONAL PROTECTIVE EQUIPMENT

4.1 Personal Protective Equipment Program

The comprehensive PPE program addresses a number of specific factors in addition to selection of the appropriate level of protection. These factors are discussed below.

Personal Use Factors and Equipment Limitations

Certain personal features of workers may jeopardize safety during equipment use. Protective or precautionary measures will be taken as necessary for the following personal features:

- Facial hair and long hair that passes between the face and the sealing surface of the respirator is prohibited because it interferes with respirator fit and wearer vision, allowing excessive contaminant penetration. Long hair must be effectively contained within protective hair coverings.
- Eyeglasses with conventional temple pieces will interfere with the respirator-to-face seal of a full face-piece. A spectacle kit should be installed in the facemasks of workers requiring vision correction, providing a tight seal. Prescription eyeglasses worn on-site must meet ANSI Standard Z87.1. Contact lenses may trap contaminants and/or particulate between the lens and the eye, causing irritation. Wearing contact lenses with a respirator in a contaminated atmosphere is prohibited.
- Gum and chewing tobacco are prohibited during respirator use because they may cause the ingestion of contaminants and may compromise the respirator fit.

During equipment use, workers will be encouraged to report any perceived problems or difficulties to their supervisor(s). These malfunctions include, but are not limited to:

- degradation of the protective ensemble;
- perception of odors;
- skin irritation:
- unusual residues on PPE;
- discomfort;
- resistance to breathing;
- fatigue due to respirator use;
- interference with vision or communication;
- restriction of movement; and
- personal responses such as rapid pulse, nausea and chest pain.

If a supplied air respirator is being used, all hazards that might endanger the integrity of the airline should be removed from the working area prior to use. During use, other workers and vehicles should be excluded from the area.

Work Mission Duration

In selecting PPE, the anticipated duration of the work mission will be considered. Several factors may limit the mission length, including air supply, equipment effectiveness and temperature. The SHSO will make all decisions regarding selection of PPE and mission duration.

<u>Suit/Ensemble Permeation, Degradation and Penetration.</u> The possibility of chemical permeation, degradation, or penetration of protective ensembles during the work mission may limit mission duration. No single clothing material is an effective barrier to all chemicals or all combinations of chemicals, and no material is an effective barrier to prolonged chemical exposure.

Ambient Temperature. The ambient temperature may have a major influence on work mission duration as it affects both the worker and the protective integrity of the ensemble. Heat stress, which can occur even in relatively moderate temperatures, presents the greatest immediate danger to an ensemble-encapsulated worker. Hot and cold ambient temperatures also can effect:

- valve operation on suits and/or respirators:
- the durability and flexibility of suit material;
- the integrity of suit fasteners;
- the breakthrough time and penetration rates of chemicals; and
- the concentration of airborne contaminants.

All of these factors may decrease the duration of protection provided by a given piece of clothing or respiratory equipment.

Storage and Maintenance

Clothing and respirators will be stored properly to prevent damage or malfunction due to

exposure to dust, moisture, sunlight, damaging chemicals, extreme temperatures and impact.

Many equipment failures can be directly attributed to improper storage.

Different types and materials of clothing and gloves will be stored separately to prevent issuing

the wrong material by mistake. Protective clothing will be folded or hung in accordance with

manufacturers' recommendations. Contaminated clothing for reuse will remain in the contaminant

reduction zone.

SCBAs, supplied air respirators and air-purifying respirators, if required, will be dismantled,

washed and disinfected after each use. SCBAs will be stored in storage chests supplied by the

manufacturer. Air-purifying respirators should be stored individually in their original cartons or

carrying cases, or in heat sealed or re-sealable plastic bags.

The technical aspects of PPE maintenance procedures vary by manufacturer and type of

equipment. Manufacturers frequently restrict the sale of certain PPE parts only to individuals or

groups who are specially trained, equipped and authorized by the manufacturer to purchase them.

Training and Proper Fitting

Training. Employees have been trained in the proper use of protective equipment prior to using

any equipment on-site. The purpose of the training has been to: (1) become familiar with the

equipment in a non-hazardous situation; (2) instill confidence and awareness in the user of the

limitations and capabilities of the equipment; (3) increase the operating and protective efficiency

of PPE use; and (4) reduce maintenance expenses.

Respirator Fit Testing. The "fit" of the facepiece-to-face seal of a respirator will be tested on

each potential wearer to ensure a tight seal; every facepiece does not fit every wearer. Certain

features, such as scars, very prominent cheekbones, deep skin creases, dentures or missing teeth

and the chewing of gum and tobacco may interfere with the respirator-to-face seal. Under

-23-

conditions where these features may impede a good seal, a respirator must not be worn. All personnel who may wear a respirator will be qualitatively fit-tested with irritant smoke, isoamyl acetate, or equivalent methods according to 29 CFR 1915.1001, Appendix C at least semi-annually.

Donning and Doffing Procedures

The PPE program includes clearly defined donning and doffing procedures as indicated in the following sections.

<u>Donning</u>. A routine has been established for donning and evaluating all levels of protective clothing and equipment. If the clothing is too small, the likelihood of tearing the suit material and accelerating worker fatigue will increase. If the clothing is too large the possibility of snagging the material and compromising the dexterity and coordination of the worker is increased. In either case, better fitting clothing will be provided.

<u>Doffing</u>. Exact procedures for removing PPE have been established and will be followed to prevent contaminant migration from the work area and transfer of contaminants to the wearer's body, the doffing assistant, and others. These procedures will be performed only after decontamination of the suited worker. These procedures are described in detail in Section 5.3.

Inspection Procedures

An effective PPE inspection program features four different inspections:

- inspection and operational testing of equipment received from the factory or distributor;
- inspection of equipment as it is issued;
- inspection before and after use or training and prior to maintenance; and
- periodic inspection of stored equipment.

PPE Program Evaluation

At a minimum the PPE program is reviewed annually to evaluate the effectiveness of the following factors:

- the number of personnel-hours that are spent in various PPE ensembles;
- the degree to which the site complies with the HAZWOPER standards on PPE use, inspection, maintenance and recordkeeping;
- accident, injury and illness statistics and recorded levels of exposure;
- the adequacy of operating procedures to guide the selection of PPE;
- the degree of coordination with comprehensive and site-specific health and safety programs; and,
- recommendations for and results of program improvement and modification.

4.2 Personal Protective Equipment

The various types of personal protective equipment and levels of protection to be used during Site activities are discussed in this section. These levels are based upon OSHA guidelines presented in 29 CFR 1910.120. All equipment will carry applicable MSHA/NIOSH approvals.

The SHSC will determine the necessity to upgrade, downgrade or modify levels of protection. If there is a necessity for such a change in PPE, then the SHSC will notify the SHSO to discuss the appropriate action. When the SHSO decides to move forward with the changes, the SHSC will make entries in the Daily Site Safety Log, explaining the reason for the modification and describing the modification. Descriptions of Levels D, C, and B personal protective equipment follow:

Level D Protection

- Coveralls or work uniform affording protection for nuisance contamination.
- Steel-toe work boots.
- Safety glasses.
- Hard hat

Optional Equipment as required by the SHSC

- Chemical resistant outer gloves and inner latex surgical gloves;
- Rubber overboots;
- Hearing protection;
- Disposable dust masks;
- Disposable outer coveralls;
- Portable 2-way radios;
- Chemical splash goggles.

Level C Protection

- Full-face air purifying respirator (APR) equipped with a HEPA pre-filter and organic vapor cartridge (combination respirator). This type of respirator should be used when employees risk exposure to TCE, TCA, and/or particulate matter.
- Chemical-resistant coveralls (i.e., SARANEX coated Tyvek).
- Chemical resistant outer gloves (i.e., nitrile) and inner latex surgical gloves.
- Steel-toe work boots with rubber overboots.
- Chemical-resistant tape over seams in protective clothing (gloves and boots).
- Hard Hat.

Optional Equipment as Required by the SHSC

- Hearing protection.
- Splash shield (full-face coverage, eight-inch minimum) or splash hood.
- Portable 2-way radios.

<u>Level B Protection</u>

- Full-face SCBA in pressure demand mode or airline respirator with escape SCBA bottle in pressure demand mode.
- Chemical resistant coveralls (i.e., SARANEX coated Tyvek).
- Chemical resistant outer gloves (i.e., nitrile) and inner latex surgical gloves.
- Steel-toe work boots with rubber overboots.
- Chemical-resistant tape over seams in protective clothing (gloves and boots).
- Hard Hat.

Optional Equipment as Required by SHSC

- Hearing protection
- Splash shield (full-face coverage, eight-inch minimum) or splash hood
- Portable 2-way radios

Procedure for Donning Protective Clothing and Equipment

- Donning:
 - Inspect all equipment.
 - Adjust hard hat for proper fit.
 - While standing or sitting, step into legs of suit and gather suit around the waist.
 - Put on overboots and tape boot to suit seam.
 - Don respirator (Levels B and C) and perform positive (Levels B and C) and negative pressure (Level C) fit check.
 - Put sleeves of suit over arms.
 - Put on inner gloves.
 - Put on hard hat.
 - Secure the suit by closing all fasteners.
 - Put on outer gloves and tape glove to suit seam.
 - Have an assistant check to determine if all equipment is secure and functioning normally.

- Doffing:

• Doffing procedures are included in Section 5.3 under decontamination procedures.

Respiratory Protection

All personnel involved with Site activities for which a respirator might be required must participate in a Respiratory Protection Program meeting the specifications of 29 CFR 1910.134. This program includes medical surveillance, training and fit testing.

General provisions for respirator use include:

- Respiratory protection, if required, will be provided to each employee for the duration of activities.
- Respirators will be inspected, cleaned and disinfected before and after each usage.
 Malfunctioning respirators will be repaired prior to future use. Respirators will be stored in clean and dry locations when not in use.

- All employees required to wear respirators will be clean shaven to ensure a proper face-to-facepiece seal. Other situations that affect a proper seal will be avoided.
- Contact lenses are not permitted in designated exclusion zones. Prescription glasses worn with full-face respirators will be insert-type only meeting ANSI Standard Z87.1.
- All employees will conduct a positive (Levels B and C) and negative pressure (Level C) respirator fit check each time the respirator is donned.
- Respirator cartridges (Level C) will be changed on an as-needed basis (i.e. filter cartridges with restricted breathing and chemical cartridges with identified breakthrough), but at least daily.
- All equipment will carry applicable MSHA/NIOSH approvals.

4.3 Site Monitoring

Remediation activities at the Site may create potentially hazardous conditions, such as the release of hazardous substances into the breathing space or surrounding area. An evaluation of chemical hazards at the Site will be performed to ensure employee safety and selection of appropriate personal protective equipment. Air monitoring will be conducted using direct reading instruments.

The following section describes the monitoring parameters to be evaluated during remediation activities. Specific analytical instruments and air monitoring action levels are also discussed in the following section.

Atmospheric chemical concentrations at the Site will be monitored under the direction of the SHSC. Continuous air monitoring results will be compared to the action level criteria established by ECOR for upgrading or downgrading levels of protective equipment and implementing additional precautions or procedures. Contaminants found at the Site including PCE, TCE, 111TCA and possibly particulate matter and dust. TCE and 111TCA are VOCs detected in the groundwater, and particulate matter becomes airborne when the soil is disturbed. The VOCs can enter the body through inhalation, ingestion, and/or skin contact, while particulate matter may enter the body through inhalation or ingestion. Due to the anticipated low concentrations of constituents during remediation activities, personnel working within the exclusion zone will begin work operations with Level D PPE. Air monitoring will be utilized to determine if upgraded

levels of PPE are necessary based upon the exceedance of site specific action levels. Field personnel will first implement engineering controls (e.g. work upwind and apply basic hygiene principles) to reduce the risk of exposure. If further protection is necessary, then the PPE will be upgraded to Level C.

4.3.1 Site Monitoring Instruments

All air monitoring will be conducted with appropriate equipment to identify the contaminants of concern at the Site. The following instruments will be utilized, as necessary, to quantify the suspected materials at the Site:

- Volatile Organic Compounds (VOCs) Photoionization detector (PID) or Flame ionization detector (FID), such as the Photovac MicroTip MP-100 or Thermo Environmental Instruments Model 580B OVM/Datalogger. Because the ionization potential for TCA is the highest at 11.00 eV, the PID lamp energy must exceed 11.00 eV in order to detect this compound as well as TCE. The total VOC concentration will then be used to estimate concentrations of TCE and TCA. Since TCE has a more restrictive exposure limit than TCA, the action level for TCE will be used as an action trigger for respiratory protection and any other required PPE.
- Combustible Gas Meter O₂/LEL meter will be used to monitor potential flammable/combustible atmospheres. Since both TCA and TCE have LELs and UELs, these levels will be used as guidelines for implementing engineering controls (e.g. exhaust systems), terminating work activities, or evacuating the exclusion zone.
- *Dust or Particulate* A digital dust indicator such as the MIE personal DataRam (PDR) may be used to measure particulate levels in air if dust or particulates are noted.

Direct reading instruments will be used continuously during the remediation operations and as indicated in section 4.3.2. All instruments used during Site activities will be intrinsically safe for use in designated areas. Instruments will be calibrated prior to use and on an as-needed basis, thereafter consistent with the manufacturer's recommendations. Calibration information will be documented in a Daily Site Safety Log.

A calibration check will be performed on the PID and LEL/O2 meter on a daily basis. If the calibration check shows that the calibration is off by more that 5%, the unit will be recalibrated.

All Site monitoring will be conducted under the supervision of the SHSO. All on-Site readings will be recorded by the SHSC in the Daily Site Safety Log.

4.3.2 Site Monitoring Frequency

Site monitoring will be conducted to assess both the current conditions and changing status of airborne contaminant concentrations. The following air monitoring schedule will be performed at the Site:

- *Initial Background* Upon initial entry and prior to initiation of any Site activities, to identify IDLH conditions, exposures above OSHA-PELs and site specific action levels.
- *Daily Background* Prior to initiation of daily Site activities within the exclusion zone and at the conclusion of daily Site activities. Includes both upwind and downwind locations.
- Contaminant Migration Degree of contaminant migration will be evaluated by monitoring the perimeter of the site daily or as deemed necessary by the SHSO during intrusive activities.

Site monitoring will be conducted under the direction of the SHSO and may be revised based on previous sampling results and current Site conditions. Site monitoring results will be documented in the Daily Site Safety Log provided as Exhibit 2. Due to the short duration of the remediation event, no sampling will be performed for subsequent laboratory analysis to determine potential employee exposures.

4.3.3 Action Levels

The following action levels have been established for activity cessation, Site evacuation, emergency response, implementation of special procedures, and the upgrade or downgrade in the level of personal protective equipment. The action levels for the PID are based upon applicable exposure limits, and the action level for the combustible gas meter is set at 10% of LEL. The action levels are based upon OSHA Final Rule PELs promulgated by 29 CFR 1910 Subpart Z - Toxic and Hazardous Substances. Level D protection shall be used as a minimum for all Site activities that do not pose a potential threat of exposure to elevated toxic or hazardous substances. The requirements for upgrading or downgrading and optional protective equipment will be determined by the SHSO. Descriptions of personal protection are presented in Section 4.2.

TCE and 111TCA Action Levels

TCE and 111TCA vapor action levels have been established to evaluate both employee exposure and contaminant migration. TCE and TCA vapor action levels will be monitored during remediation. Action levels for TCE and TCA vapor are defined in Table 2.

Dust Action Levels

Not all OSHA regulated compounds have action levels. However, often times, 50% of the PEL or TLV is used as an informal action level, which indicates the need for further investigation, improved engineering controls and/or upgrading PPE. Informal action levels have been established for dust in order to evaluate employee exposures, contaminant migration and to protect the surrounding community. Dust action levels will be monitored during remediation.

4.4 Levels of Protection

4.4.1 Groundwater and Soil Remediation Activities

Of primary concern during on-site operations are intrusive remediation activities related to drilling, groundwater sampling, and soil sampling activities. These activities will be conducted initially utilizing Level D PPE and include the following:

• Groundwater sampling;

- Soil sampling; and,
- Drilling and injection activities.

An exclusion zone (EZ) will be set up which includes all areas of remediation activities. Entry to these areas will be restricted to necessary personnel required to perform the necessary activity. The contaminant reduction zone (CRZ) will be placed in an upwind direction utilizing the prevailing wind direction if located outside. Areas outside of the EZ and CRZ will make up the support zone (SZ). All the remediation activities will be initially performed in Level D PPE. Monitoring instruments will be utilized to indicate if action levels have been exceeded and additional protection is warranted for exclusion zone workers. Ambient air monitoring for total VOCs and particulate dust will be conducted in exclusion zone areas. The number of intrusive activities occurring at one time will be minimized to limit the potential for sources of vapors and dust. Readings will be taken from background areas and within the breathing zone of the work area. Action levels for VOCs are defined in Table 2. The SHSO will make the final decision regarding the level of protection for on-Site workers based upon the measurements indicated by direct reading instruments.

4.5 Re-Assessment of Protection Program

The levels of protection chosen for the remediation at the Site are based on information obtained from historical Site records and the results of investigations already completed at the Site. As additional work is conducted, additional information concerning the types and quantities of material present at the Site will be obtained. This additional information will be used to reevaluate the chosen levels of protection. Levels of protection for various work activities will be modified if this additional information warrants such an action.

4.6 Logs, Reports, and Recordkeeping

All logs, reports and records related to this project will be maintained in the custody of the Project Manager. Following project completion, it will be transferred to the ECOR corporate offices located at 1075 Andrew Drive, Suite I, West Chester, PA 19380.

5.0 DECONTAMINATION

5.1 General Personnel Decontamination

Personnel involved with the remediation activities may be exposed to contaminants in a number of ways, despite the most stringent protective procedures. While performing on-site duties, Site personnel may come in contact with hazardous substances. Site equipment and monitoring instruments may also be exposed to hazardous substances.

In general, decontamination involves scrubbing with a detergent/water solution followed by clean water rinses. All disposable items shall be disposed of in containers to be profiled and sent for off-Site disposal. Non-disposable equipment will be decontaminated each time it leaves the exclusion zone. Certain parts of equipment, such as respirator harness assemblies and cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be soaked for a period of time in a cleaning solution. Rubber components shall be soaked in detergent/water and scrubbed with a brush.

In addition to decontamination, all respirators, non-disposable protective clothing and personal articles soiled from exhalation or perspiration, must be sanitized before they can be used again. Each respirator user will be responsible for the proper maintenance, decontamination, and sanitizing of his/her own respirator and non-disposable personal protective equipment.

All contaminated PPE and groundwater purge water will be contained in 55-gallon drums for sampling and a determination will be made for appropriate disposal based on this profiling. Details of this procedure are provided in Section 5.4.

5.2 Personnel Decontamination Procedures

The following procedures have been established to provide Site personnel with minimum guidelines for proper decontamination. These minimum procedures must be followed by personnel leaving the exclusion zone (see Section 6.3). The decontamination process shall take place at a reasonable distance from any area of potential contamination.

Designated stations will be established within the decontamination area and include at least wash tubs, scrub brushes, detergent/water and rinse water when appropriate for non-disposable equipment. Non-disposable equipment will be cleaned and staged for the next use. Wash stations shall consist of a potable water supply, hand soap and clean towels. In most instances, employees will perform self decontamination. In cases where further assistance is necessary, such as Level B operations, employees will be designated to work the decontamination area. Modifications of the decontamination procedures may be necessary as determined by the SHSO. Decontamination water will be contained in 55-gallon drums, sampled and disposed of consistent with regulatory guidance and applicable regulations.

5.3 Decontamination Procedures for Prescribed Levels of Protection

The following decontamination procedures shall be implemented during Site activities for the appropriate level of protection.

Level D - Personal Protection Decontamination Procedure

Step 1 - Segregated Equipment Drop: Deposit contaminated equipment (tools, sampling devices, monitoring instruments, etc.) onto plastic drop cloths.

Step 2 - Boot, Outer Glove and Coverall Wash: Brush overboots (if used), outer gloves (if used) and coveralls (if used) free of residual materials. If necessary, wash with detergent/water solution and rinse with water.

Step 3 - Boot, Outer Glove and Coverall Removal: Remove overboots (if used), outer gloves (if used), and coveralls (if used) in that order. Place disposable overboots, outer gloves, and coveralls into a container with a plastic liner. Stage non-disposable equipment for future use.

Step 4 - Inner Glove Wash and Removal: Wash and remove inner gloves (if used) and place in lined container.

Step 5 - Field Wash: Wash hands and face thoroughly.

Level C - Personal Protection Decontamination Procedure

Step 1 - Segregated Equipment Drop: Previously described.

- Step 2 Overboot, Outer Glove and Coverall Wash: Overboots, outer gloves and coveralls shall be scrubbed with a detergent/water solution.
- Step 3 Overboot, Outer Glove and Coverall Rinse: Rinse overboots, outer gloves and coveralls using generous amounts of water.
- Step 4 Tape Removal Remove tape from around boots and gloves and place into container with a plastic liner.
- Step 5 Removal of Overboots and Outer Gloves: Remove overboots and outer gloves in that order. Non-disposable overboots and gloves will be staged for future use and disposable overboots and gloves will be placed into a container with a plastic liner.
- Step 6 Cartridge Change: This is the last step in the decontamination procedures for those workers wishing to change respirator cartridges and return to the exclusion zone. The workers cartridges are exchanged, new outer gloves and overboots are donned, and joints are taped. For workers moving to support zone, spent cartridges will be removed as part of step 9.
- Step 7 Removal of Chemical-Resistant Clothing: With care, remove chemical resistant suit. The exterior of the suit shall not come into contact with any inner layers of clothing. Place disposable clothing in container with plastic liner.
- Step 8 Inner Glove Wash and Rinse: Inner gloves shall be washed with a detergent/water solution and rinsed with water.
- Step 9 Remove Respirator: Remove respirator and place on plastic. Keep face/glove contact to a minimum.
- Step 10 Inner Glove Removal: Remove inner gloves and deposit in container with plastic liner.
- Step 11 Field Wash: Wash hands and face thoroughly.

Level B - Personal Protection Decontamination Procedure

- Step 1 Segregated Equipment Drop: Previously described.
- Step 2 Overboot, Outer Glove, Coverall and SCBA Wash: Previously described. Use caution in cleaning the SCBA system, especially the regulator.
- Step 3 Overboot, Outer Glove, Coverall and SCBA Rinse: Previously described.
- Step 4 Tape Removal: Previously Described.
- Step 5 Removal of Overboots and Outer Gloves: Previously described.

Step 6 - Tank Change: This is the last step in the decontamination procedure for those workers wishing to change air tanks and return to the exclusion zone. The worker's air tank is exchanged, new outer gloves and overboots are donned, and joints taped.

Step 7 - SCBA Backpack Removal: The SCBA shall be removed and placed on plastic. The face piece shall remain on the user and disconnected from the remaining SCBA unit before proceeding to the next station.

Step 8 - Chemical-Resistant Clothing Removal: Previously described.

Step 9 - Inner Glove Wash and Rinse previously described.

Step 10 - Remove Respirator: Previously described.

Step 11 - Inner Glove Removal: Previously described.

Step 12 - Field Wash: Wash hands and face thoroughly.

5.4 Decontamination Wastewater, PPE and Sampling Equipment Disposal Procedures

The remediation activities will generate small quantities of decontamination wastewater, spent PPE, and expended disposable sampling equipment that will be contained in 55-gallon drums for off-site disposal. ECOR intends to sample, characterize and dispose of the drums within a reasonable time period after sampling has been completed, as defined below. Drums will be placed adjacent to the decontamination zone for ease in placing waste materials in the drums, and for subsequent transportation and off-site disposal. All drums will be secured at the end of each day by placing the lid and securing the ring back on the drums and by tightening the drum bolts.

Drums containing spent PPE and disposable sampling equipment will be assumed to be a hazardous waste, labeled accordingly with commercially available labels, and disposed of at an appropriately permitted off-site facility. Waste characterization samples will be collected from the drums and analyzed prior to disposal. The PPE and sampling equipment drums as well as the drums containing decontamination wash water will remain on-site until the waste characterization data is available and arrangements for disposal have been finalized.

The drums containing decontamination wash water will also be sampled for waste characterization purposes so they may be profiled and accepted by an appropriate waste disposal facility. Waste

characterization samples of the decontamination wash water will be collected on the last day of fieldwork and shipped to an NYSDOH accredited laboratory for analysis. The drums containing decontamination wash waters will be appropriately labeled with commercially available drum labels indicating that the drums contain waste material that must be managed as "Hazardous" until classified otherwise in accordance with ongoing laboratory analysis. All spent PPE, disposable sampling equipment and decontamination wash water drum labels will contain the following information:

- the name and address of the generator,
- the contents of the drum,
- drum content classification (i.e. Hazardous, Non-Hazardous, PCBs etc.)
- appropriate warnings relative to the material classification
- the operation that generated the contents,
- the start accumulation date,
- the telephone number of the responsible contact, and
- any other appropriate information relative to the drum's classification.

Following receipt of the analytical results of the drum characterization samples, the waste decontamination wash water will be profiled as either "RCRA and/or Hazardous" or "Non-Hazardous" and appropriate arrangements will be made for transportation and off-site disposal of the drums. The labels on the drums will then be changed to reflect the appropriate classification prior to shipment for off-site disposal. In addition, the waste characterization data will be used to complete the appropriate hazardous waste classification and waste manifest forms for the spent PPE and the disposable sampling equipment.

It is anticipated that the drums of waste to be generated through the sampling work to be performed by ECOR will be removed from the site for disposal within 90-days after the termination of field activities. All activities related to drum storage and/or transportation for off-site disposal will be coordinated by ECOR with the USEPA or NYSDEC on-site representative. Copies of all waste disposal manifests and other documentation (i.e., Certificates of Disposal) will be provided by ECOR when it becomes available.

6.0 SITE ACCESS AND CONTROL

6.1 Site Access

Access to Site activity areas will be limited to authorized personnel only. Such personnel include ECOR staff, subcontractors and regulatory personnel. Access into the work areas will be limited to those authorized personnel with appropriate training, fit testing and medical surveillance, and wearing appropriate personal protective equipment. All active areas will be monitored by the SHSC to ensure unauthorized personnel do not enter.

6.2 Site Control

Certain procedures must be followed to ensure suitable control and limitation of access. For purposes of this plan, the "site" refers to all work areas of the project. All personnel entering the Site will report to the ECOR field staff prior to conducting any field activities. Entrance onto the Site will only be permitted for authorized personnel. Specific work areas will be delineated.

6.3 Work Zones

Both physical and chemical hazards can be minimized by the establishment and maintenance of work zones. No zones shall be delineated so as to block active roads.

Exclusion Zone

An exclusion zone (EZ) shall be established at the location of all remediation areas prior to initiating remediation activities. The EZ shall be delineated by the field personnel to take into account the limits of the operating area and the spatial requirements of equipment and personnel. The perimeter of the EZ shall be delineated with a temporary warning tape or equivalent to ensure no unauthorized entry. All persons within the EZ shall wear the required level of personal protection. A wind direction indicator (i.e., wind sock or surveyors tape) will be located in the EZ to continuously monitor wind direction if work is to be conducted outside. A work area shall remain an exclusion zone until sampling and remediation operations are completed.

7.0 EMERGENCY RESPONSE

An on-site emergency may be the result of chemical exposures, chemical spills, and/or physical exposures, such as fire. In order to ensure that all employees involved with Site activities are familiar with emergency procedures, an emergency action plan has been developed and implemented in accordance with 1910.120 (l) and 1910.38 (a). This plan includes, but is not limited to, the following:

- Pre-emergency planning
- Reporting systems
- Emergency evacuation procedures, routes, and Roster Point
- Employee alarm systems
- Rescue and medical duties for those employees trained to perform them

Less than 10 ECOR employees will be working at the Site, so this plan will be communicated orally to the employees, in accordance with 1910.38 (a)(5)(iii).

7.1 Pre-Emergency Planning

Pre-emergency planning is an integral part of any emergency response. Prior to the commencement of fieldwork, the project team will meet to discuss the projects' health and safety requirements. Personnel roles, lines of authority and communication will be addressed, so that when the fieldwork begins, the field team will be familiar with their responsibilities.

7.2 Notification of Site Emergencies

Appropriate authorities, as indicated in Table 4, will be immediately notified of the nature and extent of the emergency. Emergency procedures, under direction from the SHSC, will be initiated as indicated in Section 7.3. The SHSC will notify and coordinate activities with regulatory representatives.

7.3 Responsibilities

The SHSC will be responsible for responding to all emergencies, and will:

- Notify appropriate authorities and/or health care facilities of the activities and hazards of Site operations. Table 4 provides emergency telephone numbers that will be posted within the support zone.
- Ensure that the map (Figure 2) which details the most direct route to the nearest hospital and the list of emergency telephone numbers (Table 4) are posted on Site and in all site support vehicles. Both the route to the hospital and emergency contacts will also be posted in the SZ where remediation activities are being conducted. The SHSC will require all drivers of the support vehicles to become familiar with the emergency route and the travel time required at the beginning of project operations.

All employees who may come to observe an incident first have had sufficient awareness training to recognize that an emergency response situation exists, and they have been instructed to call the designated outside emergency response team for assistance, in accordance with 1910.120 (p)(8)(iii)(A). The emergency response activities will be coordinated by the SHSC.

First Aid

However, workers shall be trained and available to provide first aid in situations where adequate response times cannot be met by outside medical personnel. In areas where work-related accidents resulting in suffocation, severe bleeding or other immediately life-threatening injury or illness can be expected, a 3 to 4 minute response time is medically required (OSHA Interpretation Letter, 1993). In other circumstances, where immediately life-threatening injuries are not foreseen, OSHA has usually accepted a 15-minute response time (OSHA Interpretation Letter, 1993). The level of training for on Site first-aid providers will be based on the workplace hazard assessment. At a minimum, personnel will be trained in basic first aid (e.g., the American Red Cross four-hour course) and CPR. The hazards of the site or its remoteness from advanced medical care may dictate a need for further training (OSHA Interpretation Letter, 1993). In this instance, medical procedures, such as Cardiopulmonary Resuscitation (CPR), bandaging, treating strokes, and splinting broken bones, will only be administered by employees meeting the training requirements.

An emergency first aid facility shall be maintained at the Site for the duration of the project. Table 5 lists basic first-aid procedures for assisting an injured person.

Personnel will be informed of any changes in location of the Emergency First Aid Facility each morning during the daily health and safety meetings. If the location is changed mid-day, personnel will be informed individually. The facility will be managed under the direction of the SHSC.

Eye Wash/Safety Showers

Additionally, where the eyes or body of any person may be exposed to injurious corrosive or irritant materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the decontamination area for immediate emergency use. This equipment is made available to employees, so that they may on their own or with the help of another individual, flush the affected area with water. Depending on the severity of the contamination, a first-aid responder and/or outside medical responder should be notified.

7.4 Decontamination Procedures for Emergency Incidents

Should an injured person have an excessive exposure to contaminated soils, groundwater, or other materials, they will be decontaminated, if appropriate, and brought immediately to the hospital. The SHSC will decide whether or not to decontaminate an affected employee, and the decision will be based upon the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving treatment. If decontamination does not interfere with essential treatment, it may be performed by any employee trained in the appropriate decontamination procedures, including respiratory protection and personal protective clothing.

While performing the decontamination procedures, the protective clothing of the affected employee will be washed, rinsed and/or cut off. If decontamination cannot be performed, then the victim will be wrapped in blankets, plastic or rubber to reduce contamination of other personnel. Emergency and offsite personnel will be alerted to potential contamination, and they will be

instructed in specific decontamination procedures if necessary. At least one person familiar with the incident will be sent along with the victim during emergency treatment.

7.5 Emergency Escape Procedures, Routes, and Roster Point

Before implementing the emergency action plan, the employer shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees. In the event of an emergency, Site personnel shall be evacuated to a safe distance as identified by the SHSC. A number of factors will go into the determination of a safe distance, they include:

- the toxicological properties of the substance;
- the physical state of the substance;
- the quantity and route of the release;
- the method of release;
- the vapor pressure of the substance;
- the vapor density relative to air;
- wind speed and direction;
- atmospheric stability;
- the height of the release;
- air temperature and temperature change with altitude;
- local topography;
- fires; and
- machinery failures.

Evacuation will proceed in an upwind direction if possible.

The evacuation routes, safe distances, and places of refuge are described in Map 7-2, according to potential emergencies. There is one main evacuation route, which leads to the main Roster Point. However, if the main evacuation route can not be used, then alternative routes will be used instead. In addition, the Roster Point will be identified each day during the pre-entry safety meetings. In general, the evacuation plan is for all employees, in the event of an emergency to evacuate the work area and move to the Roster Point. The Roster Point will be designated each day, but generally will on the south side of the Site at the Gates Avenue entrance.

7.6 Accidents and Injuries

In the event of an accident or injury at the Site, appropriate emergency measures must be taken immediately to assist those who have been injured or exposed, and to protect others from hazards. The SHSC shall be immediately notified and will respond according to the seriousness of the injury.

If the emergency involves personnel injuries, local Emergency Services will be contacted immediately. The SHSC, or a person designated by the SHSC, should be prepared to provide the following information:

- exact location of the emergency;
- phone number he/she is calling from;
- type of injury(ies);
- how many persons have been injured; and
- what assistance or first aid is being given to the injured person(s).

Do NOT hang up unless told to do so. In most cases, the EMS dispatcher will require the caller to *stay on the phone*.

When emergency services arrive, Site personnel shall immediately inform them of the details of the situation and what type of chemicals and hazards may be encountered on the Site. If available, Material Safety Data Sheets should be given to the responders.

If warranted by the severity of the incident, emergency response personnel may enter the exclusion zone dependent upon monitoring data. If appropriate, emergency personnel will exit the exclusion zone through the contaminant reduction zone utilizing the same decontamination procedures as are applicable to remediation workers.

The SHSC will observe and document any and all recognized symptoms of injury or illness. A reference of common symptoms is provided as Table 6.

All occupational injuries and illnesses will be documented by the SHSC on an OSHA 300 form. This form is available in all ECOR offices. Completed forms will be faxed immediately to the SHSO for appropriate action.

7.7 Spill Containment Program

During the performance of the work at this site there will be no large volumes of hazardous substances present on the site. Only small volumes of hazardous materials such as fuels will be present.

Where hazardous substances may be released by spilling contaminated soil or other hazardous substances, such that employees may be exposed to these hazards, ECOR requires HAZMAT trained employees to perform the appropriate spill containment procedures. The spill containment procedures include the following:

- Diking
- Ditching
- Absorbents, e.g. vermiculite
- Neutralizers

Employees performing these procedures are required to wear the proper protective clothing and equipment for the materials present, and to follow ECOR's established standard operating procedures for spill control. Employees performing these procedures are required to wear the proper protective clothing and equipment for the materials present, and to follow ECOR's established standard operating procedures for spill control.

7.7 Site Communications

Telephones will be used as the primary off-Site communication network. Telephone services will be made available on-Site by mobile phones during the remediation activities.

On-Site communications will be maintained via verbal communication and hand signals. Site communication systems will be set up by the SHSC. When verbal communication is ineffective, hand signals will be utilized.

Hand grips throat - Can't breathe!

Grip partner's wrist - Evacuate area immediately!

Hands on top of head - Need Assistance.

Thumbs up - O.K., No problem.

Thumbs down - No, Negative.

Since the communication system also serves as the employee alarm system, all emergency messages shall have priority over all non-emergency messages. ECOR shall assure that a test of the reliability and adequacy of non-supervised employee alarm systems is made every two months, in accordance with 1910.165(d)(2).

7.8 Site Access and Security

In an emergency the SHSC must know who is on the site and must be able to control the entry of personnel into the exclusion zone areas to prevent additional injury and exposure. Therefore, access to Site activity areas will be limited to authorized personnel with appropriate training and medical surveillance, and wearing appropriate personal protective equipment. Such personnel may include authorized Owner representatives, subcontractors, and regulatory personnel. All active areas will be monitored by the SHSC to ensure unauthorized personnel do not enter.

Sign-in procedures will be implemented to ensure that only authorized personnel participate in exclusion zone activities. The SHSC will coordinate this effort and maintain documentation accordingly. An Exclusion Zone Sign-In Sheet is presented as Exhibit 6 and a Site Sign-In Sheet is presented as Exhibit 7.

Route to Hospital

From: Former Monarch Chemical Facility

61 Gates Ave Geneva, NY 14456

Drive time: 0.7 mi – about 2 mins

1. Head west on Gates Ave toward Lehigh Ave 0.1 mi

2. Turn left at N Genesee St 0.4 mi

3. Turn right at North St 0.2 mi

Arrive: Geneva General Hospital

196 North St Geneva, NY 14456 (315) 787-4000



8.0 SPECIAL PRECAUTIONS AND PROCEDURES

8.1 Potential Risks

The remediation activities at the Site pose potential exposure risks from both chemical and physical hazards. The potential for chemical exposure to hazardous substances is significantly reduced through the use of personal protective clothing, engineering controls and implementation of safe work practices including air monitoring.

Physical hazards associated with the activities can also be encountered. Physical hazards may be encountered during activities involving sampling, heavy equipment, temperature extremes, traffic and overhead or underground utilities. This plan establishes precautionary measures to reduce the risks of these hazards. The hazards are addressed below.

8.2 Mechanical Demolition

Employees performing mechanical demolition are required to follow guidelines established by OSHA in 1926.859. According to this standard, employees must implement the following:

- Only workers performing balling or clamming procedures are allowed in the work area;
- The weight of the demolition ball should not be > 50% of the crane's rated load, or it should not be > 25% of the nominal breaking strength of the line by which it is suspended, whichever is a lesser value:
- The crane boom and loadline should be as short as possible;
- A swivel-type connection should be used to attach the ball to the loadline, such that twisting is prevented and the weight cannot become accidentally disconnected;
- When pulling over walls or portions thereof, all steel members affected shall have been previously cut free; and
- Prior to moving, all roof cornices or other ornamental structures should be removed.

8.3 Excavation Procedures

Employees performing excavation activities are required to follow guidelines established by OSHA in 1926.651. According to this standard, employees must implement the following:

- All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees;
- Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. When ramps or runways are constructed of two or more structural members of uniform thickness, they will be connected together to prevent displacement;
- A safe means of egress shall be located in trench excavations that are 4 feet or more in depth, so as to require no more than 25 feet of lateral travel for employees;
- Since potentially hazardous atmospheres may exist in the excavations at the Site, excavations 4 feet or greater in depth should be monitored using a PID and LEL/O₂ meter prior to entering the confined space;
- Emergency rescue equipment, such as breathing apparatus and a safety harness and line, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation;
- Employees will not work in excavations in which there is accumulated water;
- If excavation work disrupts the natural drainage of surface water, diversion ditches or dikes will be used to prevent the surface water from entering the excavation;
- Daily inspections of excavations will be made by a competent person as needed; and
- Walkways will be provided where employees or equipment are required to cross over excavations. Guardrails which comply with 1926.502 (b) shall be provided where walkways are 6 feet or more above lower levels.

8.4 Heavy Machinery/Equipment

All Site personnel must remain aware of those Site activities that involve the use of heavy equipment and machinery. Since respiratory protection and eyewear often reduces peripheral vision of the wearer, it is essential that all personnel at the Site exercise extreme caution during operation of equipment and machinery to avoid physical injury to themselves or others. Personnel will always work under the assumption that the operator is not aware of their presence.

When mobile equipment is used next to an excavation and the operator does not have a direct view of the edge of the excavation, a warning system consisting of barricades, hand and/or mechanical signals will be used.

Machinery and equipment will be equipped with all appropriate safety and warning devices. Operators will inspect all machinery and equipment prior to operations. All unsafe or damaged equipment shall be identified by a "Danger - Do Not Operate" tag or equivalent.

8.5 Maintenance Work

Employees may be potentially exposed to hazardous materials while performing any type of maintenance work on groundwater conveyance or treatment equipment (after such equipment has been contaminated by site groundwater), such as well pumps used in the recovery system, or work on the interior of the air stripper. Employees performing such work will take special precautions for potential exposures to PCE, TCE, 111TCA and the VOC degradation products present in the groundwater. The PID and LEL/O₂ meter will be used when maintenance work results in a potential exposure to the site contaminants, to ensure that the most appropriate PPE is used, and for detecting any potential leaks. Electrical shock hazards will also be present when working on this equipment during or after the system startup. Lock-out/tag-out procedures will be implemented whenever maintenance activities are performed after the equipment is energized.

8.5 Heat Stress

The timing of these activities may be such that heat stress may pose a threat to the health and safety of Site personnel. Acclimation periods and work/rest regimens will be implemented as necessary so that personnel do not suffer adverse effects from heat stress. Heat stress, if necessary, will be monitored in accordance with the American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) for Heat Stress or equivalent when the temperature is greater than 80°F.

The following work/rest regimen will be utilized:

<u>Temp °F</u>	<u>Work-Rest Regimen</u>
80	Work Break Every 2 hours.
82	75% Work - 25% Rest, each hour.
85	50% Work - 50% Rest, each hour.
88	25% Work - 75% Rest, each hour.
90	Delay work until cooler temperatures
	prevail.

Special clothing and an appropriate diet and fluid intake will be recommended for all Site personnel to further reduce these temperature-related hazards. A good rule of thumb to prevent dehydration from heat stress is that fluid intake should equal fluid loss from the body, which can be accomplished through frequent small intakes of water. Potable water and/or a drink substitute (i.e., Gatorade) will be available for employee consumption.

8.6 Cold Stress

The timing of remediation activities may be such that cold stress may also present a threat to the health and safety of Site employees. Work/rest schedules, with rest in a warming shelter, will be implemented as necessary to reduce adverse effects from cold exposure. Cold stress, if necessary, will be monitored in accordance with the ACGIH TLV for Cold Stress or equivalent. The addition of wind speed and the resulting wind chill will be considered when determining an appropriate work/rest schedule and appropriate clothing. Wind direction will be measured using a hand-held meter. A wind sock will be located on-site to monitor wind direction.

Site personnel will be encouraged to consume water to avoid dehydration. Potable water and/or a drink substitute (i.e., Gatorade) shall be available for employee consumption. Workers will wear adequately insulated clothing to limit exposure to cold.

8.7 Traffic

Areas of operation located along active thoroughfares will utilize traffic cones, flagmen, warning signs or other applicable measures to divert motorists safely around the Site activities. All employees involved in these activities will wear orange reflector safety vests.

8.8 Underground/Overhead Utilities

Overhead utilities, such as electrical wires, may also be encountered at the Site. Site personnel will ensure that equipment and machinery is kept clear of all overhead utilities. At least 10 feet of clearance will be maintained between equipment and overhead utilities for 50kv electric lines or less. For lines over 50kv, the minimum clearance shall be 10 feet plus 4 inches for each additional 10 KV. In transit, with the boom lowered, equipment clearance shall be 4 feet for voltages less than 50kv, and for voltages from 50kv up to 345kv, the clearance shall be increased 4 inches for every 10kv over that voltage.

All underground/overhead utilities will be marked out prior to the commencement of any work that could potentially impact the utilities (such as excavation). This will be achieved through contacting the appropriate organization (i.e. One Call, Dig Safe, No Cuts etc.), which will notify all utilities in the area of what and where work is to be conducted. The call must be made 2-10 days before any drilling begins. When utility companies or owners cannot respond to a request to locate underground utility installations within the time alloted, or cannot establish the exact location of these installations, ECOR may proceed, provided that the proper detection equipment is available to locate utility installations.

8.9 Air Monitoring Plan

8.9.1 Community Air Monitoring

Real-time air monitoring for volatile compounds and, if appropriate, particulate levels, at the perimeter of the exclusion zone is necessary during soil intrusive activities to determine that the health and safety of on-site workers and the Community is protected.

8.9.2 Frequency of Monitoring

VOCs must be monitored at the downwind perimeter of the exclusion zone daily at 2-hour intervals. If total organic vapor levels exceed 5 ppm above background, drilling/excavation activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan described below. All readings must be recorded and be available for NYSDEC and NYSDOH personnel to review.

Particulates should be continuously monitored upwind, downwind, and within the exclusion zone with portable particulate monitors that have an alarm set at $150 \,\mu\text{g/m}^3$. If downwind particulate levels, averaged over a period of 15 minutes, are greater than $150 \,\mu\text{g/m}^3$ over the particulate levels at the upwind location, then drilling/excavation activities must be stopped and corrective action taken. All readings must be recorded and be available for NYSDEC and NYSDOH personnel to review.

8.9.3 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the Exclusion Zone, drilling/excavation activities will be temporarily halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, drilling/excavation activities can resume but more frequent intervals of monitoring, as directed by the SHSO, must be conducted. The conditions will be discussed with the ECOR Project Manager and appropriate vapor suppression techniques will be employed if deemed necessary. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the Exclusion Zone, drilling/excavation activities can resume provided:

- the organic vapor level 200 ft. downwind of the Exclusion Zone or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background; and,
- more frequent intervals of monitoring, as directed by the SHSO, are conducted.

If the organic vapor level is above 25 ppm at the perimeter of the Exclusion Zone, work activities must be shutdown. When work shutdown occurs, downwind air monitoring, as directed by the SHSO, will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section below.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 ft. downwind from the Exclusion Zone or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following cessation of work activities, or as the result of an emergency, VOC levels persist greater than 5 ppm above background 200 ft. downwind, or half the distance to the nearest residential or commercial property from the Exclusion Zone, air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20-Foot Zone, then the Major Vapor Emission Response Plan shall be automatically implemented:

- Organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes.
- Organic vapor levels greater than 10 ppm above background for any time period.

8.9.4 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

- All Emergency contacts as listed in the Site Health and Safety Plan will be notified as appropriate.
- The local police authorities will immediately be contacted by the SHSO and advised of the situation

Frequent air monitoring will be conducted at 30-minute intervals within the 20-Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the SHSO.

8.10 Standard Safety Operating Procedures

The following are additional safety precautions for Site activities:

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the exclusion, decontamination and other designated work areas.
- Hands and face will be thoroughly washed upon leaving the work area and before eating, drinking, or any other activity.
- Contact with potentially contaminated surfaces will be avoided. Personnel, wherever possible, will not walk through puddles, mud, or other discolored surfaces; kneel on ground; lean, sit or place equipment on drums, containers, vehicles or the ground.
- Medicine and alcohol can increase the effect of exposure to toxic chemicals. Therefore:
 - 1. Personnel using prescription drugs shall inform the doctor who prescribed them of their potential contact with toxic materials;
 - 2. Personnel who take over-the-counter drugs within a day before work on-site must inform the SHSC of the warnings listed on the drug's container (the part of the label that says, for example, "Do not take this medication if you are operating a motor vehicle");
 - 3. Alcoholic beverage intake will be prohibited during project operations. Personnel under the influence of alcohol or recreational or illegal drugs will not be allowed on-site.
- Personnel and equipment in the work areas will be minimized and consistent with effective Site operations.
- Hearing protection may be required for Site personnel working around heavy equipment. This requirement will be at the discretion of the SHSC.

- Any work operations conducted on hazardous energy sources will be performed in accordance with 29 CFR 1910.147 Control of Hazardous Energy Sources.
- Employees will always utilize the buddy system.
- Material Safety Data Sheets (MSDSs) will be provided for all materials brought on-Site.
 MSDSs will be stored in a labeled binder inside the main trailer unit. Compliance with
 1910.1200 Hazard Communication standard will be achieved by the SHSC during training
 sessions, as needed. MSDSs for the primary VOCs on-site, TCE and 111TCA are
 included in Exhibit 8.
- All on-Site electrical systems will be maintained in accordance with 29 CFR 1926 Subpart
 K Electrical and will meet applicable 1993 National Electric Code specifications.
 Outdated-updated every 3 years.
- General trash and waste material will be deposited in designated receptacles. Whenever decontamination procedures for protective clothing are in effect, the entire body shall be thoroughly washed as soon as possible after the protective clothing is removed.

8.11 Accident Prevention Plan

An accident prevention plan (APP) has been incorporated into this SHSP as indicated below and as referenced in the appropriate sections.

Safety Meetings

Safety meetings will be performed each week. Pre-entry briefings will also be performed prior to the initiation of any new activity. Additional information is provided in Section 3.2.

Fire Prevention and Protection

A fire-fighting program will be followed throughout all phases of REMEDIATION. All fires, regardless of size or stage, will require the immediate notification of the Fire Department. This program also provides for effective firefighting equipment to be available without delay and will be designed to effectively meet all incipient stage fires as they occur as required by 29 CFR 1926.151. Should the fire be past the initial or beginning stage and can no longer be controlled or extinguished by portable fire extinguishers, evacuation of the area will be implemented.

Firefighting equipment will be conspicuously located and readily accessible at all times and will be periodically inspected and be maintained in operating condition in accordance with 29 CFR 1920.150.

Site Housekeeping

Form and scrap lumber with protruding nails and all other debris will be kept clear from all work areas in accordance with 29 CFR 1926.25. Combustible scrap and debris will also be removed at regular intervals. Containers will be provided for collection and separation of all refuse. Covers will be provided on containers used for flammable or harmful substances. Wastes will be disposed of at frequent intervals.

Mechanical Equipment Inspection

All vehicles in use will be checked at the beginning of each shift to ensure that all parts, equipment, and accessories that affect safe operation are in proper operating condition and free from defects. All defects will be corrected before the vehicle is placed in service in accordance with 29 CFR 1926.601.

9.0 CONFINED SPACE ENTRY

Confined space means a space that: (1) is large enough and so configured that an employee can bodily enter and perform assigned work; and (2) has limited or restricted means or entry or exit (for example, tanks, vessels, silos, storage binds, hoppers, vaults, and pits are spaces that may have limited means of entry; and (3) is not designed for continuous employee occupancy. A permit-required confined space (permit space) means a confined space that has one or more of the following characteristics: (1) contains or has a potential to contain a hazardous atmosphere; (2) contains a material that has the potential for engulfing an entrant; (3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) contains any other recognized serious safety or health hazard.

Also as defined under 1926.21(6)(ii), a "confined or enclosed space" means any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 feet in depth such as pits, tubs, vaults, and vessels. All confined spaces will be treated as permit confined spaces until monitoring and evaluation has indicated that it is appropriate to downgrade as designated by the Site Safety Officer.

For purposes of this plan, confined space and permit required confined space is used interchangeably. Entry into permit confined spaces pose potential health and safety risks due to: a flammable or explosive atmosphere; lack of oxygen to support life; toxic materials; or general safety hazards. The elements of a confined space entry plan have been developed based on the Confined Space Standards at 29 CFR § 1910.146 and guidance provided in EPA's <u>Standard</u> Operating Safety Guides.

General Provisions

- The Site Safety Officer will be responsible to identify on-site permit required and non-permit required confined spaces.
- If any activities by subcontractors require a confined space entry, it will be the responsibility of that subcontractor to appoint a responsible person who will coordinate and monitor the permit confined space entry.
- The Site Safety Officer will be designated as the entry supervisor and has the responsibility to issue the Confined Space Entry Permit (CSEP), to evaluate and monitor work performed within a confined space for possible hazards, and to determine the safety procedures, personal protective equipment and rescue equipment required.
- When possible, confined spaces should be identified with a posted sign which reads: "Caution Confined Space Do Not Enter Unless Authorized".
- Only personnel trained and knowledgeable of the requirements of these Confined Space Entry procedures will be authorized to enter a confined space or be a confined space attendant.
- A CSEP must be issued prior to the performance of any work within a confined space. The CSEP will become part of the permanent and official record of the Site.
- Natural ventilation shall be provided for the confined space prior to initial entry and for the duration of the CSEP. Positive/forced mechanical ventilation may be required to dissipate accumulated gases.
- If flammable liquids may be contained within the confined space, explosion proof equipment will be used. All equipment shall be positively grounded. Technically competent personnel trained in testing methods using an explosive gas detector will test the atmosphere within the confined space. If combustible gases are present, entry will not be allowed until the source has been isolated and the space flushed or purged so that the test indicates less than 10 percent of the lower explosive limit (LEL).
- The contents of any confined space will, where necessary, be removed prior to entry. All sources of ignition will also be removed prior to entry.
- Hand tools used in confined spaces shall be in good repair, explosion proof and spark proof, and selected according to intended use. Where possible, pneumatic power tools will be used.
- Hand-held lights and other illumination utilized in permit required confined spaces shall be equipped with guards to prevent contact with the bulb and will be explosion-proof.
- Compressed gas cylinders, except cylinders used for self-contained breathing apparatus, shall not be taken into confined spaces. Gas hoses shall be removed from the space and the supply turned off at the cylinder valve when personnel exit from the confined space.
- If a permit required confined space requires respiratory equipment or where rescue may be difficult, safety belts, body harnesses, and lifelines will be used. The outside attendant will be provided with the same equipment as those working within the confined space.

- A ladder is required in all confined spaces deeper than the employee's shoulders. The ladder will be secured and not removed until all employees have exited the space.
- Technically competent personnel (entry supervisor) will use approved oxygen testing equipment to test the atmosphere within the permit required confined space to determine whether the air is respirable and contains sufficient oxygen to support normal consciousness. If the air is found to be oxygen deficient (less than 19.5 percent by volume), positive ventilation techniques, including fans and blowers, will be used to increase the oxygen content. If, after further testing, the oxygen concentration is still deficient, SCBA or another proven air supply will be provided and used.
- Only Mine Safety and Health Administration (MSHA)/National Institute of Occupational Safety and Health (NIOSH)-approved self contained breathing apparatus or airline respirators equipped with a five-minute emergency air supply (egress bottle) will be used in untested confined spaces or in any confined space with conditions determined immediately dangerous to life and health.
- When toxic or chemical materials that could result in injury by contact or inhalation by persons entering the confined space are detected or suspected, several actions will be taken by on-Site personnel. First, any piping that conveys hazardous materials to the confined space will be isolated. Second, the space will be emptied of the hazardous substance until safe limits are reached. Third, adequate ventilation equipment, as well as all other appropriate protective equipment for protection of the eyes, face, and arms will be provided if the work to be done in the confined space includes welding, burning, or heating, which may generate toxic fumes and gases. Finally, all employees entering a confined space that has contained corrosive materials will wear eye and other appropriate protective equipment to prevent possible contact with any remaining corrosive material.
- Where air-moving equipment is used to provide ventilation, chemicals will be removed from the vicinity to prevent introduction into the confined space.
- Vehicles will not be left running near confined space work or near air-moving equipment being used for confined space ventilation.
- Smoking, chewing or eating in confined spaces will be prohibited at all times.
- Any deviation from these confined space entry procedures requires the prior permission of the Site Safety Officer.

Procedure for Permit Required Confined Space Entry

A hazard evaluation will be conducted before any work in a confined space is started, to identify existing or potential work area hazards that have the potential to cause injuries, illness or property damage. Examples of work area hazard control items include unguarded openings, high or low temperatures, poor illumination, sharp edges, steam, compressed gases and liquids, flammable or combustible materials, and mechanical or electrical exposures. When dealing with hazards that cannot be eliminated or controlled, adequate PPE will be used. The atmosphere of permit

required confined space entry will be monitored for oxygen content, flammability, and toxic gases as indicated in the CSEP (table below).

Prior to entry into a confined space, consideration will be given to how life support systems would function in the event of a power failure. For example, in the event of electrical failure, lights, warning systems, and other electrically powered devices would be inoperative. Site personnel will have an emergency plan of action that provides alternate illumination and a means of manual escape from the confined space. No life support systems which are dependent on electrical power will be utilized. The Site Safety Officer will have communicated alternate sources of light to all employees engaged in work in confined spaces.

Each employee entering a permit required confined space will wear a safety belt equipped with a life-line for evacuation purposes in case of an emergency. If the entry is through a top opening, the safety belt will be of the harness type that will suspend a person in an upright position. Emergency equipment such as life-lines, safety harnesses, fire extinguishers, breathing equipment and other devices appropriate to the situation will be ready and immediately available. All personnel engaged in the activity will be trained in the use of the life support system, rescue system, and emergency equipment. In keeping with the buddy system, at least one person, trained in first aid and CPR, will be immediately available outside the confined space to provide assistance if needed, utilizing a planned and immediately available communications means.

The Site Safety Officer will complete the Confined Space Entry Checklist (table below) prior to a confined space entry.

Confined Space Attendant

While personnel are inside the confined space, a confined space attendant will monitor the activities and provide external assistance to those in the space. The attendant will have no other duties which may take his/her attention away from the work or require him/her to leave the vicinity of the confined space at any time while personnel are in the space. The confined space attendant will maintain at least voice contact with all personnel in the confined space. Visual

contact is preferred, if possible. The attendant will have the means available to contact rescue personnel in the event of an emergency. The attendant has the authority to command entrants to leave the confined space.

CONFINED SPACE ENTRY CHECKLIST

Task Site Safety Officer Task	
Completed	
	Evaluate the job to be done and identify the potential hazards before the confined space entry job is scheduled. Ensure all planned entry procedures are consistent with the requirements of 29 CFR 1910 and 1926.
	Ensure that all process piping, mechanical and electrical equipment, etc., have been disconnected, purged, blanked-off or locked and tagged as necessary.
	If possible, ensure removal of any standing fluids that may produce toxic or air displacing gases, vapors, or dust.
	Initiate a Confined Space Entry Permit (CSEP).
	Ensure that any hot work (welding, burning, open flames, or spark producing operation) to be performed in the confined space is indicated on the CSEP.
	Ensure that the space is ventilated before starting work in the confined space and for the duration of the time that the work is to be performed in the space.
	Ensure that the personnel who enter the confined space and the confined space attendant are familiar with the contents and requirements of the confined space entry procedure.
	Ensure remote atmospheric testing of the confined space prior to employee entry and before validation/revalidation of a CSEP to ensure the following: • oxygen content between 19.5% and 23.5%
	 no concentration of combustible gases in the space. Sampling throughout the confined space and specifically at the lowest point in the space. the absence of other atmospheric contaminants, if the space has contained toxic, corrosive, or irritant material. if remote testing is not possible, Level A PPE is required.
	Designate whether hot or cold work will be allowed
	Ensure that a copy of the CSEP is posted at the work site
	Cancel the permit upon completion of the task.

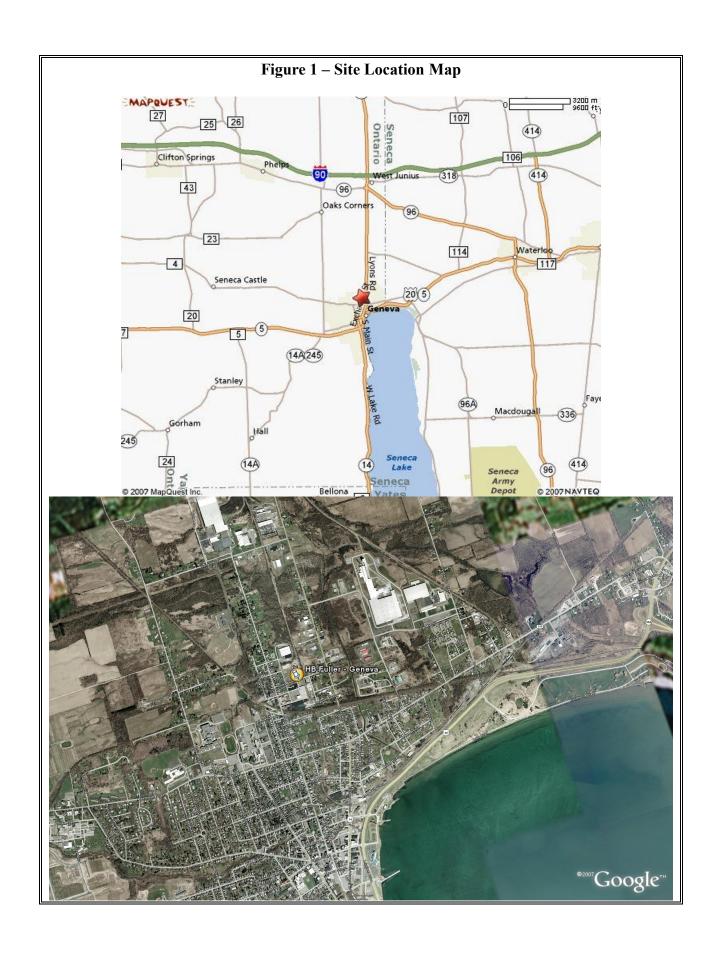


Figure 2 – Route to Hospital



Route to Hospital

From: Former Monarch Chemical Facility

61 Gates Ave Geneva, NY 14456

Drive time: 0.7 mi – about 2 mins

1. Head west on Gates Ave toward Lehigh Ave 0.1 mi

2. Turn left at N Genesee St 0.4 mi

3. Turn right at North St 0.2 mi

Arrive: Geneva General Hospital

196 North St

Geneva, NY 14456 (315) 787-4000

Figure 3 – Well Location Map CCN International Soli Boring Location - AGT Containm Driveway Drainage Dich Contrele Pad - Builed Culvent Figure OR 1075 Andrew Drive, Suite I West Chester, PA 19380 Sample Location Map 61 Gates Ave Geneva, NY

Table 1 Exposure Limits and Physical Properties of Compounds of Potential Concern

Compound	Exposure Limits	Revised IDHL Level ¹	Physical Description	Chemical Properties &	Physical Properties
tetrachloroethen e (PCE)	PEL: 100 ppm TWA	ca 150 ppm	non-combustible liquid	MW: 165.8 BP: 250F Sol: 0.02% I.P. 9.32 eV	FL.P.: NA UEL: NA LEL: NA
Trichloroethene (TCE)	PEL: 100 ppm, C 200 ppm, 300 ppm* REL: 25 ppm TLV: 50 ppm 100 ppm STEL	1,000 ppm	Colorless liquid (combustible) with a chloroform-like odor. Odor threshold is 1.36 ppm.	MW: 131.4 BP: 189F Sol: 0.1% I.P. 9.45 eV	FL.P.: NA UEL: 10.5% LEL: 8%
1,1,1 Trichloroethane (111TCA or methyl chloroform)	PEL: 350 ppm REL: NA TLV: 350 ppm 450 ppm STEL	700 ppm	Colorless liquid (combustible) with a mild chloroform-like odor. Odor threshold is 22.4 ppm.	MW: 133.4 BP: 165F Sol: 0.4% I.P. 11.0 eV	FL.P.: NA UEL: 12.5% LEL: 7.5%
1,1- dichloroethane (11DCA)	PEL: 100 ppm TWA	3000 ppm	colorless oily liquid	MW: 99.0 BP: 135F Sol: 0.06% I.P. 11.06 eV	FL.P.: 2°F UEL: 11.4% LEL: 5.4%
vinyl chloride	1 ppm	Ca	colorless gas or liquid	MW: 62.5 BP: 7F Sol: 0.1% I.P. 9.99 eV	FL.P.: NA UEL: 33.0% LEL: 3.6%
Total PNOC, Particulate Not Otherwise Classified	PEL:15 mg/m ³ REL: NA TLV: 10 mg/m ³	NA	Inhalable solid particulate suspended in air.	Median particle size is 100 micrometers.	
Respirable PNOC, Particulate Not Otherwise Classified	PEL: 5 mg/m ³ REL: NA TLV: 3 mg/m ³	NA	Respirable solid particulate suspended in air.	Median particle size is 4 micrometers.	

Notes:

PEL - OSHA Permissible Exposure Limit, 1992 Transitional limits in 29 CFR 1910.100.

REL - NIOSH Recommended Exposure Limit

TLV - ACGIH Threshold Limit Value (Listed only when it is more restrictive than the PEL or REL)

C – Ceiling Limit

STEL – Short-term exposure limit (15-minutes)

ppm - parts per million

mg/m³ - milligrams per cubic meter

NA - Not Available

1 – "Documentation for Immediately Dangerous to Health or Life Concentrations", NIOSH. These values were revised as of 3/1/95, but they are not enforced by OSHA. To date, OSHA has decided to continue enforcing the 1990 IDLH values, until such time that research supports the proposed changes. The only contaminant affected by the change is TCA.

Table 2 Potential Health Hazards Associated with the Primary Chemicals of Concern

Compound	Codings	Health Hazard Description	Acute Effects	Chronic Effects
Trichloroethylene (TCE)	IARC: 2A ACGIH: A5 NIOSH: CA	A5-refers to a substance that is not suspected as a human carcinogen. Ca-Potential occupational carcinogen, with no further categorization. 2A-Probably carcinogenic to humans.	Skin/eye-irritant Inhalation/ingestion- Anesthetic or narcotic effect causing headache, dizziness, and possibly nausea. A cardiac sensitizer that may elicit cardiac failure at extremely high concentrations.	Skin/eye-irritation Inhalation-Adversely effect the liver and kidneys. Increased risks of developing liver cancer.
1,1,1 Trichloroethane (111TCA or methyl chloroform)	IARC: NA ACGIH: A4 NIOSH: NA	3-Unclassifiable as to carcinogenicity in humans. A4-refers to a substance that may be carcinogenic but can not be classified as a human carcinogen because of insufficient data.	Skin/eye-irritant Inhalation/ingestion — irritation, nausea, vomiting, headache, drowsiness, kidney damage, liver damage, convulsions	Skin/eye-irritation, burning, and eye damage Inhalation-same as short-term effects

Compounds	Monitoring	Action Level (2)	Respiratory Protection ⁽³⁾
I. Vapors ⁽¹⁾			
Total VOCs (TCE and 111TCA)	General Screening: PID Specific screening: colorimetric detector tubes	Background to 25 ppm 25 ppm to 700 ppm >= 700 ppm IDLH = 700 ppm or about 1% (Action Level=25 ppm)	None Required Full-Face with combination HEPA/OV cartridge PDSCBA or PDSAR with escape
Total VOCs (TCE and 111TCA)	LEL/O ₂ meter	0.75% TCA or 7500 ppm 0.8% TCE or 8000 ppm	Evacuate area-PDSCBA with escape bottle
II. Particulates			
Total Dust	General screening: real time particulate monitor	Background to 5 mg/m ³ 5 mg/m ³ to 250 mg/m ³ >=500 mg/m ³ (Action Level=5 mg/m ³)	None Required Full-Face with combination HEPA/OV cartridge PDSCBA or PDSAR with escape
Respirable Dust	General screening: real time particulate monitor	Background to 1.5 mg/m ³ 1.5 mg/m ³ to 75 mg/m ³ >=75 mg/m ³ (Action Level=1.5 mg/m ³)	None Required Full-Face with combination HEPA/OV cartridge PDSCBA or PDSAR with escape

Notes:

MSDSs for the above referenced chemicals are attached as Exhibit 8.

PDSAR -Pressure Demand Supplied Air Respirator OV - Organic Vapor

HEPA - High Efficiency Particulate Air filter NA – Not Available SCBA - Self-Contained Breathing Apparatus ppm - parts per million

PID - Photo-Ionization Detector mg/m³- milligrams per cubic meter

- (1) The OV cartridges used must meet the requirements of 29 CFR 1910.134. In order to prevent potential overexposure within the respirator facepiece, new OV cartridges will be installed at the beginning of the shift. Combination cartridges will be used in order to satisfy the protection requirements VOCs as well as particulate matter.
- (2) Action levels are based on 50% of the TLV, which is the most conservative applicable exposure limit.
- (3) Half-mask respirators have an assigned protection factor (APR) of 10 X TLV, and full-facepiece respirators have an APR of 50 X TLV.

Changes to the action levels (for vapors or particulates) and use of any personal protective equipment are allowed according to the professional discretion of the Site Health and Safety Officer based upon the nature of the field operations, observations, and their previous experience during other similar activities at other similar site.

Table 3
Potential Health Hazards Associated with Work Tasks

TASK	POTENTIAL	HAZARD CONTROL MEASURES
	HAZARDS	
Injection Program Drilling and soil borings	Heavy equipment and vehicles	Personnel maintain eye contact with operators; hard hats, safety shoes and safety glasses worn during equipment operation when required. Restricted access to authorized personnel, who should wear high-visibility garments, such as reflectors.
Soil Excavation	Underground Utilities	Have utilities marked out.
	Falling or rolling loose rock and soil into the excavation.	Scaling to remove loose material; installing protective barricades at intervals, as necessary, on the face to stop and contain the falling material; and all materials and equipment should be at least 2 feet from the edge of the excavation.
	Heavy Equipment	Same as above.
	Engulfment	Sidewalls of excavation to be sloped.
	Employees falling into excavations	Fence off excavation.
Soil Sampling	Excavations Hazards listed above	Refer to previous controls. Buddy system.
Installation of well pumps and ancillary controls	VOCs in groundwater	The PID will be used to determine if there is a potential exposure. Level D PPE is required.
Installation of underground piping	Excavations Hazards listed above	Refer to previous controls. Buddy system.
Backfilling of excavations	Heavy equipment and vehicles	Employees are required to stand away to prevent being struck by any spillage; operators may remain in the cabs of vehicles being unloaded if adequate protection, in accordance with 1926.601 (b)(6) is provided.
Demolition of maintenance building (if required)	Falling materials and swinging equipment	Continuing inspections shall be made as the work progresses to detect potential hazards. Shoring, bracing, or other methods will be used to prevent hazards resulting from loosened material or deteriorated floors.

Table 4 – Emergency Contact/Notification System

	ley contact/10tification by	
Emergency Contacts	Name	Telephone
Health and Safety Program Manager	Mike Wisniewski	(610) 431-8731
, ,		
Health and Safety Officer	Keith Rapp	(612) 382-3763
	11	
Site Health and Safety Coordinator	Jennifer Good	(484) 887-7510 #203
Project Manger	Keith Rapp	(612) 382-3763
		/
BCS Production & Maint. Supervisor	Rob Bailey	(315) 789-3054
•		
Hospital – Genesee Memorial Hosp.		(315) 787-4000
Police Department		911
Fire Department		911
•		
NY Poison Information System		(800) 962-1253
-		
NYSDOH		(518) 458-6310
EPA Emergency Response Team		(732) 321-6660
		, , ,
National Response Center		(800) 424-8802
Center for Disease Control		(404) 639-3311
Chem-Trec		(800) 424-9555

DIRECTIONS TO PRIMARY HOSPITAL (see Figure 2)

From: Former Monarch Chemical Facility

61 Gates Ave Geneva, NY 14456

Drive time: 0.7 mi – about 2 mins

1. Head west on Gates Ave toward Lehigh Ave 0.1 mi

2. Turn left at N Genesee St 0.4 mi

3. Turn right at North St 0.2 mi

Arrive: Geneva General Hospital

196 North St Geneva, NY 14456 (315) 787-4000 **Table 5 - Reference of Common Symptoms**

Type of Injury of 1			Symptom Symptom		
Chemical Exposure,		or	Symptoms of chemical exposure, ingestion or inhalation		
Inhalation	8-2		may include one or more of the following:		
			,		
			Abnormal pulse		
			Behavioral changes		
			Breathing difficulties or abnormal breathing		
			Changes in complexion or skin color		
			Convulsions		
			Coordination difficulties		
			Coughing		
			Dizziness or drowsiness		
			Drooling		
			Diarrhea		
			Fatigue and/or weakness		
			Irritation of eyes, nose, respiratory tract, skin, throat,		
			mouth, or lips		
			Headache		
			Itching		
			Light-headedness		
			Nausea/vomiting		
			Skin irritation or rash		
			Sneezing		
			Sweating		
			Tearing		
			Tightness in the chest		
XX G 1			Unconsciousness		
Heat Stroke			Signs and symptoms of heat stroke are hot, red skin; very		
			small pupils; and very high body temperatures-sometimes		
			as high as 105 degrees. If the victim was sweating from		
			heavy work or exercise, his or her skin may be wet;		
II4 F1			otherwise, it will feel dry.		
Heat Exhaustion			The usual signs and symptoms of heat exhaustion are		
			cool, pale, and moist skin, heavy sweating; dilated pupils,		
			headache, nausea; dizziness; and vomiting. Body temperature will be nearly normal.		
Hypothermia			Signs and symptoms of hypothermia are: shivering; a		
птурошенна			decreased and sometimes irregular heart rate; a weak		
			pulse; cool skins; decreased blood pressure; decreasing		
			core temperature and slow, irregular breathing.		
Frostbite			Signs and symptoms of frostbite area: a sensation of cold		
11000000			followed by numbness; tingling, stinging and aching may		
			be felt initially. The skin may appear white, reddish-		
			purple and finally black; blisters may also be present.		
			purple and many cases, ensured may also be present.		

Table 6 – Basic First Aid Procedures

Chemical Exposure: Ingestion or inhalation

- 1. Contact Emergency Services.
- 2. If possible move chemical hazards away from the area of the injured person or the injured person away from the area of chemical hazards and decontaminate.
- 3. If appropriate, remove personal protective equipment.
- 4. Await Emergency Services.

First Aid:

- 1. Be calm and quickly evaluate the emergency. Contact Emergency Services.
- 3. Do not move the injured person unless necessary or instructed to do so.
- 4. If possible, move physical and chemical hazards away from the area of the injured person.
- 5. Attend to most serious injuries first breathing restored, bleeding must be stopped, etc.
- 6. Cover injured person to keep warm and monitor for shock.

Heat Related Injuries: Heat Stroke

- 1. Contact Emergency Services.
- 2. Remove person from heat to cool location.
- 3. Lie victim on back.
- 4. Remove personal protective equipment and loosen up clothing.
- 5. Cool victim fast (i.e. immerse in cool bath, ice packs, wrap with wet sheets or towels).
- 6. Care for shock and monitor breathing.
- 7. Await Emergency Services.

Heat Related Injuries: Heat Exhaustion

- 1. Remove person from heat to cool location.
- 2. Lie victim on back with feet up.
- 3. Remove personal protection equipment and loosen up clothing.
- 4. Cool victim (i.e. fanning, ice packs, wrap with wet sheets or towels).
- 5. Care for shock and monitor breathing.
- 6. If conscious and can tolerate it, provide a half-glass of water every 15 minutes.
- 7. Should see improvements within 30 minutes. (If not, contact Emergency Services).

Cold Related Injuries: Hypothermia

- 1. Contact Emergency Services.
- 2. Remove person from cold to warm location.
- 3. Remove any wet clothing. Warm body slowly.
- 5. Care for shock and monitor breathing.
- 6. Await Emergency Services.

Cold Related Injuries: Frostbite

- 1. Remove person from cold to warm location.
- 2. Remove personal protective equipment and clothing covering effected areas.
- 3. Place affected area in warm water to re-warm.
- 4. After re-warming, loosely bandage affected area.
- 5. Seek medical attention.

Table 7
Well Construction Table

	Top of Casing Elevation (ft AMSL)	Depth of Borehole (ft below TOC)	Well Dia. (in)	Casing	Screen Length (ft)	Total Well Depth (ft below TOC)	Depth to Top of Screen (ft below TOC)	Depth to Bottom of Screen (ft below TOC)
MW-114	462.03	16	2	PVC	10	14.0	4.0	14.0
MW-115	462.25	16	2	PVC	10	14.0	4.0	14.0
MW-116	462.44	16	2	PVC	10	13.9	3.9	13.9
MW-117	463.44	16	2	PVC	10	13.7	3.7	13.7
MW-118	462.40	16	2	PVC	10	14.0	4.0	14.0
MW-119	462.68	16	2	PVC	10	14.0	4.0	14.0
MW-120	462.12	16	2	PVC	10	14.0	4.0	14.0
MW-121	461.77	16	2	PVC	10	14.0	4.0	14.0
MW-122	461.65	16	2	PVC	10	14.0	4.0	14.0
MW-123	456.42	16	2	PVC	10	16.5	6.5	16.5

EXHIBIT 1

HEALTH AND SAFETY PLAN REVIEW RECORD

Geneva, New York Site and have be	and Safety Plan for the Former Monarch Chemical Facility, en briefed on the nature, level, and degree of exposure likely ject. I agree to conform to all the requirements of the Health
Employee Signature	-
Name	Date
Project Manager Signature	-
Name	- Date

EXHIBIT 2 DAILY SITE SAFETY LOG

Project:	ERD II	RM Woi	kplan Time off:	Facility, Gene			
Wind Direction	:						
Site Safety Talk	Κ:	Yes		No			
Topics:							
Daily Safety Ins	spection						
Time:	Initials:		Time:	Initials:			
Comments:							
Instrument Cali	bration	:					
Instrument					Conc.	Actual Conc.	
Comments:							
						afety glasses and	work boots.
Task 1:		T	ask 2:		Task 3:		

A : N (: 4 :				Date:	
Air Monitoring:					
		Conc	entration		
Time/Location:	Inst:	Settings:	Inst:	Settings:	
			_		
			_		
			_		
			_		
Comments (includ	ing upgrade	e, non-compliance	e, etc.):		
		a:			
Site Safety Officer	ſ: <u></u>	_Signature:		Date:	

EXHIBIT 3

CONTRACTOR OCCUPATIONAL HEALTH AND SAFETY

CERTIFICATION

	Project:	Former Monarch Che	mical Facility, Geneva,	New York Site	
	Contractor				
1.	remediation	n activities have met the Standard (29 CFR 19	ne following requiremen	to be employed during onts of the OSHA Hazardous Vicable OSHA standards. (Inc.)	Waste
Contra Person		Medical Examination	Training Certification	Respirator	
2.			received a copy of the	Health and Safety Plan and with its requirements.	d will
3.		further certifies that of its contractual agre		erstands and will comply wi	ith all
Signe	1 :				
Date:					

EXHIBIT 4 TRAINING ACKNOWLEDGMENT FORM

	ME: SIAL SECURITY: PLOYER:		
		d training for work to be of Site, including the follow	conducted at the Former Monarch Chemical ing topics:
	Work Rules and Safe Personal Protection Potentially Hazardou Emergency Equipme Reporting Injuries ar Emergency Procedur Job Assignments; Personal Hygiene; Medical Tests; Motor Tests; and Standard Operating Pet a respirator of the sar	Equipment; s Chemicals; nt; d Illnesses; es; Procedures. irator fit test was conducte	ed within the past year and that I have been
	•	ic type.	
Emp	loyee:		
Signa	ature:		Date:
	tify that this employee he Health and Safety Pla	-	y training and understands the requirements
Site I	Safety Officer:		
Signa	ature:		Date:

EXHIBIT 5 FIELD MEDICAL DATA SHEET

Name:		Phone:	
Address:			
Date of Birth:	Height:	Weight:	
Allergies:			
Particular sensitivities:			
Do you wear contact lenses:	Note: Contact l	lenses are not permitted on-site	
List exposures to hazardous	chemicals, if any, a	and resultant illness or symptoms.	
List medications you present	ly use:		
List any medical restrictions:			
Special medical or incident re	esponse training:		
Name, address and phone nu	ımber of personal p	physician:	
Nearest Relative:		Phone:	
Employee Signature		Date	

EXHIBIT 6 EXCLUSION ZONE SIGN-IN SHEET

Site:	Former Monarch Chemical Facility, Geneva, New York Site
Date:	

Employee	Company	Level of Protection	Time In	Time Out

EXHIBIT 7 SITE SIGN-IN SHEET

Site:	Former Monarch Chemical Facility,	Geneva, New York Site

Employee	Company	Time In	Time Out

EXHIBIT 8 MSDS for TCE and 111TCA

MSDS Number: **T4940** * * * * * Effective Date: **08/01/05** * * * * * Supercedes: **05/08/03**



TRICHLOROETHYLENE

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride

CAS No.: 79-01-6

Molecular Weight: 131.39 Chemical Formula: C2HCl3

Product Codes:

J.T. Baker: 5376, 9454, 9458, 9464, 9473

Mallinckrodt: 8600, 8633

2. Composition/Information on Ingredients

Ingredient Hazardous	CAS No	Percent
Trichloroethylene	79-01-6	100%
Yes		

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

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

Health Rating: 2 - Moderate (Poison)

Flammability Rating: 1 - Slight Reactivity Rating: 1 - Slight Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD;

PROPER GLOVES

Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

Ingestion:

Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

Skin Contact:

Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

Eye Contact:

Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

Chronic Exposure:

Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

5. Fire Fighting Measures

Fire:

Autoignition temperature: 420C (788F) Flammable limits in air % by volume:

lel: 8; uel: 12.5

Explosion: A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.

Fire Extinguishing Media:

Use water spray to keep fire exposed containers cool. If substance does ignite, use CO2, dry chemical or foam.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible

materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Trichloroethylene:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (Ceiling),

300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):

50 ppm (TWA) 100 ppm (STEL);

listed as A5, not suspected as a human carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation*, *A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

Eve Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Chloroform-like odor.

Solubility:

Practically insoluble in water. Readily miscible in organic solvents.

Specific Gravity:

1.47 @ 20C/4C

pH:

No information found.

% Volatiles by volume @ 21C (70F): 100

Boiling Point:

87C (189F)

Melting Point:

-73C (-99F)

Vapor Density (Air=1):

4.5

Vapor Pressure (mm Hg):

57.8 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.

Hazardous Decomposition Products:

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.

Conditions to Avoid:

Heat, flame, ignition sources, light, moisture, incompatibles

11. Toxicological Information

Toxicological Data:

Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

This material has been linked to mutagenic effects in humans.

\Cancer Lists\			
	NTP	Carcinogen	
Ingredient	Known	Anticipated	IARC Category
Trichloroethylene (79-01-6)	No	Yes	2A

12. Ecological Information

Environmental Fate:

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information Domestic (Land, D.O.T.)

Proper Shipping Name: TRICHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1710

Packing Group: III

Information reported for product/size: 4L

International (Water, I.M.O.)

Proper Shipping Name: TRICHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1710

Packing Group: III

Information reported for product/size: 4L

Corea D Corea D Yes Y Sos Par	Canac DSL N Yes N rt 1\	da NDSL Phil NO Yes
Korea D Yes Y ns - Par	Canad DSL N Yes N rt 1\	da NDSL Phil NO Yes
Korea D Yes Y ns - Par	OSL N Yes N rt 1\	NDSL Phil NO Yes
Yes Y ns - Par 302-	Yes N rt 1\	No Yes
PQ.	List	Chemical
10	Yes	No
ıs - Par	rt 2\	
261	1.33	8 (d)
)	263 U22 CI	-RCRA- 261.33 U228 CDTA:

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: None allocated.

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 1 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing. Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat and flame.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

Product Use:

Laboratory Reagent.

Revision Information:

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

Disclaimer:

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

Material Safety Data Sheet

Revision Issued: 4/21/93 Supercedes: 6/23/92 First Issued: 2/11/87

Section I - Chemical Product And Company Identification

Product Name: 1,1,1-Trichloroethane

CAS Number: 71-55-6 HBCC MSDS No. CT03000 1675 No. Main Street, Orange, California 92867

Telephone No: 714-998-8800 | Outside Calif: 800-821-7234 | Chemtrec: 800-424-9300

Section II - Composition/Information On Ingredients

Exposure Limits (TWAs) in Air

Chemical Name CAS Number % ACGIH TLV OSHA PEL STEL

1,1,1-Trichloroethane 71-55-6 96 350 ppm 350 ppm N/A

Cyclic Ether N/A 3 25 ppm 25 ppm N/A

Section III - Hazard Identification

Routes of Exposure: Inhalation of vapor, absorption through the skin, ingestion, and skin and eye contact.

Summary of Acute Health Hazards

Ingestion: May cause irritation of the gastrointestinal tract, with vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through the gastrointestinal tract may produce symptoms of central nervous system depression, ranging from light-headedness to unconsciousness.

Inhalation: Excessive inhalation may produce symptoms of central nervous system depression, ranging from lightheadedness, nausea and vomiting, to unconsciousness and death.

Skin: Mildly irritating to skin. Skin contact may produce a burning sensation. Prolonged or repeated contact may cause the Skin to become reddened, rough, and dry due to the removal of natural oils, and may result in dermatitis.

Eves: An irritant to the eye, causing pain, lacrimation, and general inflammation.

Summary of Chronic Health Hazards: N/A

Effects of Overexposure: Can cause headache, mental confusion, depression, fatigue, loss of appetite, nausea, vomiting, cough, loss of sense of balance, and visual disturbances. Acts as a narcotic and depresses the central nervous system.

Medical Conditions Generally Aggravated by Exposure: N/A

Note to Physicians: Caution: Epinephrine or other stimulant may cause ventricular arrhythmia due to potentiation of endogenous epinephrine.

Section IV - First Aid Measures

Ingestion: NEVER give anything by mouth to an unconscious person. If conscious, have victim drink several glasses of water, then induce vomiting by having patient tickle the back of the throat with a finger or by giving syrup of ipecac as directed. If unconscious, keep victim warm, and take immediately to a hospital. GET MEDICAL ATTENTION.

Inhalation: Remove to fresh air immediately. If not breathing, perform artificial respiration and administer oxygen. GET MEDICAL ATTENTION.

Skin: Wash contaminated areas with plenty of soap and water. If 1,1,1 Trichloroethane soaks through the clothing, remove the clothing promptly and wash the skin with soap and water. If irritation persists after washing. GET MEDICAL ATTENTION.

Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes, holding the lids apart to ensure flushing of the entire eye surface. If irritation is present after washing. GET MEDICAL ATTENTION.

Section V - Fire Fighting Measures

Flash Point: N/A Autoignition Temperature: 485°C; (905°F)

Lower Explosive Limit: 7.5 @ 25°C; 77°F **Upper Explosive Limit:** 15.0 @ 25°C; 77°F **Unusual Fire and Explosion Hazards:** Nonflammable and non-explosive under normal conditions of use. Vapors concentrated in a confined or poorly ventilated area can be ignited upon contact with a high energy spark, flame, or high intensity source of heat. This can occur at concentrations ranging between 7-15% by volume.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or protein foam. **Special Firefighting Procedures:** Use water spray to keep fire-exposed containers cool. Pressure demand self-contained breathing apparatus should be provided for firefighters in buildings or confined areas where 1,1,1-Trichloroethane is stored.

Section VI - Accidental Release Measures

Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should be restricted from areas of spills or leaks until cleanup has been completed. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover spilled material on adsorbents, such as sawdust and vermiculite, and sweep into closed containers for disposal.

Section VII - Handling and Storage

Do not use in poorly ventilated or confined areas without proper respiratory protection. Vapors are heavier than air and will collect in low areas. Store only in closed, properly labeled containers. 1,1,1-Trichloroethane attacks natural rubber; therefore, protective clothing of leather, polyvinyl alcohol, or neoprene is recommended. Wash thoroughly after handling.

Section VIII - Exposure Controls/Personal Protection

Respiratory Protection: Use a half or full facepiece organic vapor chemical cartridge or canister respirator when concentrations exceed permissible limits. Use self-contained breathing apparatus (SCBA) or full facepiece airline respirator with auxiliary SCBA operated in the pressure-demand mode for emergencies and for all work performed in storage vessels, poorly ventilated rooms, and other confined areas. Respirators must be approved by NIOSH or MSHA.

Ventilation: Use local exhaust or dilution ventilation as appropriate to control exposures to below permissible limits.

Protective Clothing: Protective clothing of leather, polyvinyl alcohol, or neoprene is recommended.

Eye Protection: Splashproof goggles.

Work/Hygienic Practices: Avoid contact with the eyes, skin, and mucous membranes, and avoid inhalation of the vapors.

Section IX - Physical and Chemical Properties

Physical State: Liquid pH: 6.0 to 7.5

Melting Point/Range: -45°C; -49°F Boiling Point/Range: 74.1°C; 165°F Appearance/Color/Odor: Colorless liquid with a mild odor, like chloroform Solubility in Water: Negligible Vapor Pressure(mmHg): 100 @ 20°C Specific Gravity(Water=1): 1.32 @ 68°F Molecular Weight: 133.4

Vapor Density(Air=1): 4.54 % Volatiles: 100%

How to detect this compound : Determination in water by inert gas purge followed by gas chromatography with halide specific detection (EPA Method 601) or gas chromatography plus mass spectrometry (EPA Method 624).

Section X - Stability and Reactivity

Stability: Stable Hazardous Polymerization: Will Not Occur

Conditions to Avoid: Do not use cutting or welding torches on empty drums that contained 1,1,1- Trichloroethane unless properly cleaned.

Materials to Avoid: Liquid oxygen or other strong oxidants may form explosive mixtures with 1,1,1 - Trichloroethane. Contact with aluminum may cause possible solvent decomposition.

Hazardous Decomposition Products: Contact with flames or hot surfaces may cause decomposition to form hydrogen chloride and possible traces of phosgene.

Section XI - Toxicological Information

1,1,1 Trichloroethane vapor is a narcotic. A number of human fatalities related to industrial exposure in closed spaces have been reported. A 5-minute exposure to 5000 ppm can be expected to produce marked incoordination and anesthesia. Prolonged exposure at this exposure may cause coma and death. Exposure to concentrations in excess of 1000 ppm for 15 minutes, or 2000 ppm for 5 minutes, can be expected to produce a disturbance of equilibrium in the majority of adults. In controlled human exposures to 500 ppm no effects other than slight, transient eye irritation were noted; at 1000 ppm and above, mild eye irritation is usually experienced, with possible dizziness. Following exposure, most of the compound is eliminated unchanged via the lungs within 48 hours.

Section XII - Ecological Information

WARNING: Contains methyl chloroform (1,1,1-Trichloroethane) a substance which harms public health and the environment by destroying ozone in the upper atmosphere.

Section XIII - Disposal Considerations

Contaminated sawdust, vermiculite, or porous surfaces must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed, incinerated, or treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination.

Section XIV - Transport Information

DOT Proper Shipping Name: 1,1,1-Trichloroethane **DOT Hazard Class/ I.D. No.:** 6.1, UN2831, III

Section XV - Regulatory Information

Reportable Quantity: 1000 Pounds (454 Kilograms) (134 Gal.)

NFPA Rating: Health - 2; Fire - 1; Reactivity - 0

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

Carcinogenicity Lists: No NTP: No IARC Monograph: No OSHA Regulated: No Section 313 Supplier Notification: This product contains the following toxic chemical(s) subject to the reporting requirements of SARA TITLE III Section 313 of the Emergency Planning and Community Right-To Know Act of 1986 and of 40 CFR 372:

CAS # Chemical Name % By Weight

71-55-6 1,1,1-Trichloroethane 96%

Section XVI - Other Information

Synonyms/Common Names: Methyl Chloroform; Chlorothen; Aerothene

Chemical Family/Type: Halogenated Hydrocarbons

IMPORTANT! Read this MSDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure. This MSDS has been prepared according to the OSHA Hazard Communication Standard [29 CFR 1910.1200]. The MSDS information is based on sources believed to be reliable. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, **Hill Brothers Chemical Company** makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user's responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

EXHIBIT 9

MSDS for Newman Zone

MODIFIED MATERIAL SAFETY DATA SHEET: USA

Remediation and Natural Attenuation Services Incorporated 6712 West River Road Brooklyn Center, MN 55430

Product Information: 763-585-6191 Issue Date: March 28, 2002

Section 1: IDENTIFICATION

1.1 Product Name: Newman Zone

1.2 Product Type: Inedible Industrial Nutrient for Microbial Organisms

1.3 Hazard Rating: Health: 1 Fire: 1 Reactivity: 1

1.4 Formula: Proprietary

Substances Subject to SARA 313 Reporting Are Indicated by "#"

It is our opinion that the above named product does not meet the definition of "hazardous Chemical" as defined in the OSHA "Hazard Communication Standard" regulation 29 CFR 1910.1200. This material Safety Data Sheet is provided as general information for health and safety guidelines.

Section 2: INGREDIENTS/COMPOSITION

 (mg/m_3)

CAS No. % PEL TWA

Soybean Oil (food grade) 8001-22-7 45 15(Mist) 10(Mist)

Sodium-L-Lactate 867-56-1 4

Food Additives/Emulsifiers/Preservatives (Proprietary) <10

Water <45

EMERGENCY ONLY, 24-HOUR SERVICE: CHEMTREC: 1-800-424-9300

Section 3: PHYSICAL AND CHEMICAL CHARACTERISTICS

This section completed per formulation ingredient data unless stated.

•

Solubility: Dispersible in water (product)

- PH: 6 (product)
- Specific Gravity: 0.98 (product)
- Boiling Point: NA
- Vapor Pressure: NA
- Vapor Density: NA
- Percent Volatile By Volume (%): NA
- Evaporation Rate: NA
- Viscosity: 23.6 cps @ 68₀F (Brookfield)(product)
- Product Appearance and Odor: Light yellow-cream colored liquid, vegetable oil odor.

Section 4: FIRE AND EXPLOSION HAZARDS

This section completed per formulation ingredient data unless stated.

4.1 Special Fire Hazards: Product - none, does not support combustion. Flash Point: >540 degrees F (Pure Soybean Oil Closed Cup). Flammable Limits

LEL ND

UEL ND

- 4.2 Fire Fighting Methods: Use method appropriate for surrounding fire.
- 4.3 Extinguishing Media: Dry Chemical or CO₂ Preferable; water may cause spattering or spreading.

Section 5: HEALTH HAZARD DATA

5.1 THIS PRODUCT IS NEITHER INTENDED NOR MANUFACTURED FOR HUMAN OR ANIMAL

CONSUMPTION AND SHOULD NOT BE USED FOR FOOD OR FEEDSTUFFS.

- 5.2 Effects of Overexposure: NA
- 5.3 Emergency and First Aid Procedures: If inhaled, remove from contaminated atmosphere. For eye contact immediately flush eyes with large amounts of water. Ensure rinsing entire surface of eye & under lid. For skin contact wash affected areas thoroughly with soap and water. Seek medical help for persistent irritation.
- 5.4 Hydrolyzed soy protein has been identified by the United States Food and Drug Administration as a food allergen. Symptoms include swelling of the lips, stomach cramps, vomiting, diarrhea, skin hives, rashes, eczema and breathing problems.
- 5.5 Occupational Exposure Limits [8-hour time weighted averages (TWA)]: mg/m $_3$ CAS No. OSHA PEL/ACGIH TLV

Soybean Oil (food grade) 8001-22-7 15(Mist)/10(Mist)

Section 6: REACTIVITY DATA

This section completed per formulation ingredient data unless stated.

- 6.1 Stability: Stable under normal conditions.
- 6.2 Conditions to Avoid: NA
- 6.3 Incompatibilities: None known
- 6.4 Hazardous Decomposition Products: Product None identified. Ingredients Carbon oxides. Biological decomposition (spoilage) may result in offensive odors.
- 6.5 Hazardous Polymerization; None known

Section 7: SPILL OR LEAK PROCEDURES

This section completed per formulation ingredient data unless stated.

- 7.1 Spill Response: Water dispersible. Same as for vegetable oil spills: isolate spill, prevent from entering waterways, and sewer systems. Sorb or remove spilled materials as soon as possible. Oils and specific quantities of oils may be reportable under federal, state, or local regulations.
- 7.2 Waste Disposal Method: This product is not hazardous, however, wastes must be disposed in accordance with local, state or federal regulations. Consult with local sewer authority, or solid waste facility prior to disposition.

Section 8: SPECIAL PRECAUTIONS

No protective equipment is necessary under normal use conditions.

- 8.1 Eyes: If splashing may occur, eye protection recommended.
- 8.3 Skin: Wear impervious gloves for prolonged or repeated exposure.
- 8.4 Respiratory: Avoid breathing mists of this product

Section 9: TRANSPORTATION PRECAUTIONS

This section completed per formulation ingredient data unless stated.

9.1 Transportation Considerations: This product is not classified as dangerous in the meaning of transport regulations. Shippers and transporters may need to meet packaging and transportation requirements for certain oils and respective quantities under CFR 49 Part 130.

The above information is believed to be correct with respect to the formula used to manufacture the product in the country of origin. As data, standards, and regulations change, and conditions of use and handling are beyond our control, NO WARRANTY, EXPRESS OR IMPLIED, IS MADE AS TO THE COMPLETENESS OR CONTINUING ACCURACY OF THIS INFORMATION.