

# **SITE SAFETY AND HEALTH PLAN**

## **INTERIM REMOVAL ACTION TNT PIPELINE AND CHEMICAL WASTE SEWER LINES FORMER LAKE ONTARIO ORDNANCE WORKS LEWISTON/PORTER, NEW YORK**

PREPARED FOR



**UNITED STATES ARMY CORPS OF ENGINEERS  
BALTIMORE DISTRICT**

PREPARED BY



**RADIAN INTERNATIONAL**

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**BETHESDA, MARYLAND**

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## 1.0 INTRODUCTION

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### 1.1 General

The Baltimore District U.S. Army Corps of Engineers (USACE) has selected Radian International (Radian) to provide all the required supervision, labor, and materials for Interim Removal Actions (IRA) involving the TNT Pipeline and the Chemical Waste Sewer at the former Lake Ontario Ordnance Works (LOOW) in the towns of Lewiston and Porter in Niagara County, New York. These tasks are performed under delivery orders issued as part of Contract No. DACA31-96-D-0026.

### 1.2 Site Description

The former LOOW is located within the Town of Lewiston and the Town of Porter in Niagara County, New York (Figure 1-1). The site is located approximately 10 miles north of the City of Niagara Falls, New York.

The original site encompassed approximately 7,500 acres with actual US Department of Defense (DOD) site activities having occurred on 2,500 acres. During the early 1940s, the LOOW site was used as a manufacturing plant producing TNT for use in World War II. Once completed, the complex contained a power plant, hospital, fire department, a water supply system adequate for a population of 100,000, and water supply and wastewater treatment system of underground water, sewage, acid, and TNT pipelines.

The manufacturing portion of the plant was situated in the central southwestern section of the LOOW site, south of Balmer Road (Figure 1-1). Wastewater from the TNT manufacturing operation, as well as stormwater and sanitary sewage, was transferred through an underground sewer network to a wastewater treatment plant located in the western portion of the TNT plant. The TNT pipelines ran as one pair of east-west trending lines across the TNT production area before being routed south to the wastewater treatment plant at the west end of the production line.

An overestimation by the Army of the need for TNT during World War II resulted in the closure of the TNT plant in July 1943, after only 9 months of operation. Following the decommissioning of the TNT plant, the majority of the LOOW facility was sold to private citizens with the government retaining the former active 2,500-acre portion of the site.

Portions of the LOOW site have since been used by several branches of the DOD and the US Department of Energy (DOE) for various manufacturing and storage activities, including the pilot production of high-energy fuels. In 1955, the Navy and Air Force acquired 360 and 200 acres, respectively, of the former TNT plant. The acquisition of the properties by the Navy and the Air Force was for the joint development of a boron- and lithium-based high-energy rocket fuel production plant. The Air Force subsequently assumed responsibility for the project, which was identified as Air Force Plant 68 (AFP-68). Part of the construction of AFP-68 involved tying in the AFP-68 sanitary, stormwater, and chemical waste sewer systems into the former TNT wastewater treatment plant located approximately 1,000 feet southwest of AFP-68. AFP-68 was decommissioned while still in pilot-plant status.

The Chemical Waste Sewer system has been determined to contain numerous contaminants at substantial concentrations. Based on past observations of liquid levels within the lift stations, it appears that the liquid levels are constant and do not represent groundwater levels. This would imply that the contaminants may be confined within the sewer system.

Based on available site drawings and field observations, the sewer lines range in size from 4 to 6 inches in diameter. The following materials are identified for remediation:

- Contaminated liquid and sludge within the chemical waste lift stations estimated at 29,000 gallons of sewage and 2 cubic yards (yd<sup>3</sup>) of sludge.
- Contaminated liquid and sludge within the interconnecting sewer lines estimated at 1,000 gallons of sewage and 2 yd<sup>3</sup> of sludge.

Test pit excavations have indicated that the TNT Pipeline Waste Sewer system is concrete encased with approximate outside dimensions of 2 feet wide by 3 feet high, including the concrete encasement. According to drawings and site observations, the pipelines encased within the concrete are vitreous clay pipe and range in diameter from 10 to 18 inches. The following materials are identified for remediation:

- An estimated 100 yd<sup>3</sup> of sediment within the pipeline.
- An estimated 65,000 gallons of water within the pipeline.
- An estimated 50 yd<sup>3</sup> of possible soil contamination at locations of possible breaks in the pipes and concrete casing.
- Approximately 10,000 linear feet of pipeline and associated construction materials.

TNT and explosive compounds (including TNT intermediates) were found at varying concentrations throughout the length of the pipeline. Testing by the Army has indicated that soils containing secondary explosives at greater than 10% by weight warrant special precautions



during handling to minimize the potential for detonation and propagation. Although reported and verified results of investigations to date indicate that potentially detonable explosives levels were not encountered in the TNT pipeline, isolated samples have shown explosives levels approaching these criteria. This, along with the inability to characterize certain sections of the pipeline, suggests that a conservative approach is still warranted.

Figure 1-1 Site Location Map

## **2.0 SITE SAFETY AND HEALTH PLAN OBJECTIVES**

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This Site Safety and Health Plan (SSHP) has been developed in accordance with requirements set forth in:

- 29 CFR 1910.120 - the OSHA Hazardous Waste and Emergency Response (HAZWOPER) Standard;
- 29 CFR 1926 - the OSHA Safety and Health Regulations for Construction;
- Radian's Corporate Health and Safety Program;
- USACE Safety and Health Requirements Manual EM 385-1-1; and
- ER 385-1-92 - the USACE Safety and Occupational Health Document Requirements for HTRW and OEW Activities (Appendix B).

This SSHP has been prepared in order to provide safe procedures and practices for Radian personnel performing site work on USACE Contract No. DACA31-96-D-0026 at the former LOOW. This SSHP was developed using contract information provided by the Baltimore District USACE and will refer to the requirements discussed in OSHA regulations, USACE EM 385-1-1, Radian's Corporate Health and Safety Program, and work plans prepared for each specific project site. All of these documents will be kept on-site (or will be readily available), and are incorporated into the SSHP by reference.

## **3.0 PROJECT PERSONNEL**

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### **3.1 General**

The following paragraphs briefly describe the health and safety responsibilities of personnel assigned to the LOOW projects. All on-site personnel will be responsible for complying with the requirements of this SSHP and the applicable addendum. The Program Manager and Remedial Construction Manager/On-site Project Manager (RCM/PjM) will be responsible for implementing the SSHP and applicable addendum, and ensuring that its requirements are enforced. These personnel will be assisted in this effort by the Health and Safety Officer (HSO). The organization of site-specific personnel will be outlined in each site-specific addendum to the SSHP.

### **3.2 Program Manager: Mr. Mark Sylvester**

The Program Manager will be responsible for the overall direction, implementation, and enforcement of health and safety requirements. Other responsibilities include:

- Ensure that the project is being performed in a manner consistent with the Radian Corporate Health and Safety Program.
- Ensure that a SSHP and site-specific addendums are prepared and approved.
- Provide the HSO with project information related to health and safety matters and the development of the SSHP and all site-specific addendums.
- Monitor compliance with the SSHP and applicable site-specific addendum by Radian and subcontractor personnel.
- Ensure adequate resources are provided to the health and safety staff, so that they may carry out their duties.
- Ensure that all Radian and subcontractor personnel designated to work at the LOOW are qualified according to Radian medical surveillance and training requirements.
- Maintain communication with the USACE Authorized Representative.

### **3.3 Remedial Construction Manager/On-site Project Manager: Mr. Dave Wilder**

Daily implementation and enforcement of the SSHP and applicable site-specific addendum during site activities will be directed by the Remedial Construction Manager/On-site Project Manager (RCM/PjM), who will be technically assisted by the HSO. Other responsibilities include:

- Ensure that site activities are scheduled with adequate personnel and equipment resources to perform the project safely.
- Ensure adequate communication is available between field personnel and emergency response personnel.

The RCM/PjM will have the authority to take the following actions:

- Determine personnel assignments on the project.
- Stop site activities if an "imminently dangerous" situation exists. The emergency situation will be immediately reviewed with the RCM/PjM, HSO, RHSM, and USACE Authorized Representative.

### **3.4 Regional Health and Safety Manager: Mr. Millard Griffin, CIH, CSP**

The Regional Health and Safety Manager (RHSM) will be a Certified Industrial Hygienist (CIH) with experience in hazardous waste site operations. The RHSM will have the following responsibilities:

- Interface with the Program Manager and RCM/PjM about project health and safety-related issues.
- Approve the SSHP.
- Approve revised or new health and safety protocols for site activities.
- Monitor compliance with the SSHP.
- Determine and implement personnel disciplinary actions for safety violations.
- Approve the appointment of the HSO and any replacement HSOs. The USACE Authorized Representative will be notified if there is a change in the HSO.

The RHSM will have the authority to take the following actions:

- Stop site activities if an "imminently dangerous" situation exists. The emergency situation will be immediately reviewed with the Program Manager, RCM/PjM, and HSO.
- Direct personnel to change a work practice if it is determined to be hazardous to the health and safety of site personnel.
- Remove personnel from the project if their actions endanger their health and safety, or the health and safety of co-workers.

### **3.5 Health and Safety Officer**

The HSO will serve as an advisor to the RCM/PjM in matters regarding health and safety. The HSO will be primarily responsible for the technical and administrative functions relative to health and safety during site activities. The HSO will report to the RHSM about health and safety-related issues, and will have the following responsibilities:

- In conjunction with the RCM/PjM, ensure all site activities are performed in a manner consistent with the Radian Corporate Health and Safety Program and the SSHP.
- Interface with the RHSM about on-site implementation of the SSHP.
- Direct daily health and safety activities on-site.
- In conjunction with the RCM/PjM, ensure that all Radian personnel and subcontractors designated to work at the LOOW are qualified according to Radian medical surveillance and training requirements.
- Report all incidents, accidents, and near misses to the Program Manager RCM/PjM, RHSM, and to the USACE Authorized Representative.
- Maintain health and safety equipment on-site.
- Inspect ongoing activities, and report any health and safety deficiencies to the RCM/PjM and the RHSM.
- Maintain communication with each work crew.
- Perform site monitoring to assure that site personnel are adequately protected.
- Conduct initial site-specific safety training and regular safety briefings for site personnel.

The HSO will have the authority to take the following actions:

- Stop site activities if an "imminently dangerous" situation exists. The emergency situation will be immediately reviewed with the RCM/PjM and RHSM.
- Direct personnel to change a work practice if it is determined to be hazardous to the health and safety of site personnel.
- Temporarily suspend an individual from site activities for infractions of the SSHP or applicable addendum, pending discussion with the RHSM.

### **3.6 Construction Foreman: Vince Barber**

The Construction Foreman will have the following responsibilities:

- Immediately report any unsafe condition to the HSO and RCM/PjM.
- Report all accidents, incidents, and near misses, no matter how minor they may seem, immediately to the HSO.

- Maintain knowledge of the information, instructions, and emergency response procedures contained in this SSHP.
- Comply with the requirements and procedures set forth in this SSHP.
- Immediately comply with a stop work order.

### **3.7 Work Crew Personnel**

The work crew will have the following responsibilities:

- Immediately report any unsafe condition to the HSO or RCM/PjM.
- Report all accidents, incidents, and near misses, no matter how minor they may seem, immediately to the HSO.
- Maintain knowledge of the information, instructions, and emergency response procedures contained in this SSHP and applicable addendum.
- Comply with the requirements and procedures set forth in this SSHP and with the applicable addendum.

### **3.8 Explosives Personnel**

Due to the potential presence of detonable quantities of TNT and explosive compounds (including TNT intermediates) along the TNT pipeline, an explosives expert will accompany Radian personnel during site activities at potential/known explosives hazard locations. The general responsibilities of the explosives personnel are outlined in the Explosives Safety Plan (Appendix H).

## 4.0 TRAINING REQUIREMENTS

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### 4.1 General Health and Safety Training

Radian personnel who will be performing work on-site at the LOOW must comply with the training requirements outlined in OSHA Standard 29 CFR 1910.120(e), USACE Safety and Health Requirements Manual EM 385-1-1, and the Radian Corporate Health and Safety Program. The RCM/PjM and HSO will verify and document that all personnel meet the applicable OSHA training requirements prior to the start of site work. The form used for OSHA Medical and Training Documentation is located in Attachment A. Documentation regarding training certification will be kept in the site health and safety files.

### 4.2 40-Hour Initial Training

Employees must have received, at the time of project assignment, a minimum of 40 hours of initial OSHA health and safety training for hazardous waste site operations. Personnel who have not met the requirements for initial training will not be allowed in the Exclusion Zone or Contamination Reduction Zone. **A copy of each subcontractor site worker's 40-hour training certificate must be sent to the RCM/PjM for review prior to the start of site work.**

In addition to the 40 hours of initial training, each new employee will receive three days of directly supervised on-the-job training. This training will address the duties the employee is expected to perform. Radian recognizes that there may be site personnel who fall under OSHA's 24-hour training program, and any decision regarding the applicability of this training will be made by the RHSM and the USACE Authorized Representative.

### 4.3 Supervisory Training

In accordance with 29 CFR 1910.120(e)(3), all on-site management and supervisors directly responsible for site workers, or who supervise employees engaged in hazardous waste operations, will have received training as required by Section 4.1 of this SSHP. Additionally, supervisory personnel will receive at least eight additional hours of specialized training on managing hazardous waste operations at the time of job assignment.

### 4.4 Eight-Hour Annual Refresher Training

Eight-hour refresher training courses will be taken at a minimum of once per year. At the time of job assignment, all site workers must have received eight hours of refresher training within the



past year. This course is required of all field personnel to maintain their qualification for hazardous waste fieldwork. The following topics will be reviewed: toxicology, respiratory protection (air-purifying and air-supplying devices), medical surveillance, decontamination procedures, and personal protective equipment (PPE). In addition, any topics deemed relevant by the RHSM may be added to this list. **A copy of each subcontractor site worker's most recent eight-hour refresher training certificate must be sent to the RCM/PjM for review prior to the start of site work.**

#### **4.5 Initial Site-Specific Safety Training**

Prior to the commencement of each project at the LOOW, all assigned personnel will attend initial site-specific safety training. The HSO or his designee will conduct the training, which will specifically address the activities, procedures, and equipment applicable to the site's operation. The training will include the site layout, potential hazards, monitoring protocols, safety procedures, and emergency response services, as outlined in this SSHP and the applicable addendum to the SSHP. The explosives expert will conduct an initial site-specific safety briefing for all site personnel and visitors working with the TNT pipeline. The training session will allow site personnel to clarify any issues they do not understand, and will reinforce individual responsibilities regarding health and safety during site work.

Site workers will also fill out a Site-Specific Safety and Health Plan Compliance Agreement (Section 15.0) and a Medical Data Sheet during this training session. The Medical Data Sheet will be kept in the site health and safety file, and will be referenced in an emergency to assist with the treatment of the victim. A copy of the Medical Data Sheet is located in Attachment A. **No one will be permitted on-site until they have received initial site-specific safety training.**

#### **4.6 Daily On-Site Safety Briefings**

Daily on-site safety briefings (i.e., daily "tailgate" meetings) will be given by the HSO, RCM/PjM, and/or explosives expert to assist personnel in safely conducting the scheduled work activities. The briefings will include weather-related information, instructions for new operations to be conducted and their safe work practices, and any new explosives safety information. The briefings may also provide an opportunity to identify safety-related performance deficiencies noted during daily activities or during a safety audit. The HSO will also be responsible for conducting weekly "toolbox" safety training to address site-specific safety issues, and "visitor" briefings. The form used for recording meeting topics and attendance is shown in Attachment A.

#### **4.7 First Aid and Cardiopulmonary Resuscitation (CPR) Training**

The RHSM will identify those individuals requiring first aid and CPR training to ensure that emergency medical treatment is available during site activities. There will always be at least two individuals trained in first aid and CPR available during site activities. First aid and CPR training will be consistent with the requirements of the American Red Cross Association.

#### **4.8 Visitor Training**

Visitors must immediately report to the Command Post for site admittance. Visitors who intend to visit the Exclusion Zone or Contamination Reduction Zone must present certification of initial 40-hour training, 8-hour refresher training and medical surveillance. The HSO will provide visitors with site-specific training, which will address the activities, hazards, and emergency procedures applicable to current site activities. The explosives expert will conduct an initial site-specific explosives safety briefing for all visitors who may perform work related to the TNT pipeline. Visitors entering areas of activity will be required to comply with the provisions of this SSHP and the applicable addendum to the SSHP.

#### **4.9 Additional Training**

The explosives expert will conduct additional site-specific safety briefings for all site personnel and visitors performing work related to the TNT pipeline on the topic of explosive materials present on the site, as necessary.

## **5.0 MEDICAL SURVEILLANCE REQUIREMENTS**

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### **5.1 General Medical Surveillance Requirements**

All personnel who will be performing site work in the Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), or any other area where potential exposure to hazardous material exists must comply with medical surveillance requirements outlined in:

- OSHA Standard 29 CFR 1910.120(f),
- USACE Safety and Health Requirements Manual EM 385-1-1, and
- The Radian Corporate Health and Safety Program.

Radian requirements meet all OSHA and USACE criteria. All personnel who will be performing site work in the EZ or CRZ will be required to have passed the Radian medical surveillance examination, or equivalent, within one year prior to reporting to the site. The requirements of the Radian Medical Surveillance Program are outlined in Table 5-1. The RCM/PjM and HSO will verify that all site personnel meet applicable OSHA medical surveillance requirements prior to the start of site work. The form used for OSHA Medical and Training Documentation is located in Attachment A.

### **5.2 Radian Medical Consultant**

The RHSM, in consultation with the Radian Medical Consultant (MC), will administer the medical surveillance program for the LOOW project. The Radian MC is Dr. Peter Greaney of GMG WorkCare. The MC will be available for consultation, particularly when questions arise regarding program applicability, additional testing measures, and frequency of examinations. The MC may also confer with local emergency medical facilities as part of the Radian Emergency Physician Access Plan. The Emergency Physician Access Plan is designed specifically to obtain the MC's expertise during emergencies related to site activities. Both Radian employees and local emergency facilities can access the MC using this plan (Table 12-2 in Section 12.0).

### **5.3 Subcontractor Medical Surveillance Requirements**

Subcontractor personnel performing work in the EZ or CRZ must participate in a medical surveillance program that meets or exceeds the requirements outlined in Table 5-1. All subcontractor medical surveillance programs will be reviewed by the HSO, in conjunction with the RCM/PjM to ensure compliance with project requirements. At the time of job assignment, all subcontractor site workers must have received a medical surveillance examination within the

past year. **A copy of each subcontractor site worker's most recent medical surveillance examination results must be sent to the RCM/PjM for review prior to the start of site work.**

#### **5.4 Medical Surveillance Documentation**

Documentation regarding medical surveillance clearance will be maintained in the site health and safety files. This documentation will include a signed letter stating that each employee is certified by an occupational physician as capable of wearing respiratory protection and working on a hazardous waste site (in accordance with 29 CFR 1910.120[f]). The HSO is responsible for ensuring the required documentation is present on-site.

#### **5.5 Accident/Incident Medical Surveillance**

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled and encouraged to seek medical attention. All accidents and potential exposures must be reported immediately and encouraged to seek medical attention. Depending on the type of exposure, it may be critical to perform tests within 24 to 48 hours. The MC will advise the RHSM or HSO on the type(s) of test(s) required to accurately assess exposure effects.

**TABLE 5-1  
RADIAN INTERNATIONAL LLC  
MEDICAL SURVEILLANCE EXAMINATION PROTOCOLS**

Module	History & Physical w/Dipstick Urinalysis, Vision Vital Signs	Spirometry	Audiogram	EKG	Chest X-ray	Bio Chem	Drug Screen
<b>BASELINE</b>							
HazWaste	!	!	!	*	!+	!	!
Combo	!	!	!	*	!#	!	!
Non-Haz Prof.	!					!	!
Executives	!	!	!	*	!+	!	!
<b>ANNUAL/PERIODIC</b>							
HazWaste	!	!	!	*	5Y+	!	!
Combo	!	!	!	*	5Y#	!	!
Non-Haz Prof.	2Y					2Y	!
Executives	!	!	!	*	6Y+	!	!
<b>EXIT</b>							
HazWaste	!	!	!		(1Y+)	!	
Combo	!	!	!		(1Y+)	!	
Non-Haz Prof.	!					!	

Legend

- \* >40 years of age or for medical indications (pre-approved by WorkCare)
- # X-ray film sent to WorkCare for ILO reading
- + X-ray film sent to WorkCare
- ! Required for the indicated module
- 1Y-6Y Yearly frequency
- () If not done within

<b>BIOCHEM AND DRUG SCREENS</b>	
<b>BIOCHEM</b>	
Complete Blood Count: White Cells Red Cells Hemoglobin Hematocrit	Chemical Analysis: Liver Functions Kidney Functions Lipid Metabolism Carbohydrate Metabolism
<b>DRUG SCREEN</b>	
Marijuana Amphetamines PCP	Cocaine Opiates

## 6.0 HAZARD ASSESSMENT

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### 6.1 General

The potential hazards associated with the TNT Pipeline and Chemical Waste Sewer IRAs at the LOOW include chemical, physical, explosive, and biological hazards. The potential for encountering chemical hazards will depend on the types and quantities of chemicals present and the type of work being performed. The potential for encountering physical and biological hazards will depend on the location and type of work being performed. The potential for encountering explosive hazards will depend on the buildup of TNT and other explosive compounds in the pipeline of concern. The hazard assessment in this section is intended to communicate to site personnel the chemical, physical, explosive, and biological hazards and risks associated with site work at the LOOW.

### 6.2 Contaminant Characterization and Potential Routes of Exposure

The general contaminants of concern at the LOOW sites include volatile organic compounds (VOCs), semivolatile organics compounds (SVOCs, including polynuclear aromatic hydrocarbons[PAHs]), TNT, 2,6-dinitrotoluene, nitrobenzene, and polychlorinated biphenyls (PCBs). The main routes of exposure for field personnel include:

- Inhalation of contaminant vapors;
- Inhalation of contaminated particulate matter;
- Ingestion of contaminated material; or
- Dermal absorption of contaminated material.

Due to the nature of the contaminants, local features, and type of site activities planned:

- There is a moderate potential for inhalation of contaminant vapors or contaminated particulate matter,
- There is a low to moderate potential for ingestion of contaminated material; and
- There is a moderate potential for dermal contact with contaminated material.

Site personnel can reduce their exposure potential by:

- Using the proper PPE;
- Practicing contamination avoidance;
- Following proper decontamination procedures; and
- Observing good personnel hygiene.

### **6.3 General Chemical Data**

In order to protect site personnel from the hazards associated with potential contaminants, a personnel protection and monitoring program will be implemented to control potential exposures. Information tables on the physical properties of those site-specific substances believed to present are provided in Tables 6-1 through 6-7. These tables provide information on each chemical's characteristics such as routes of exposure, health hazards, warning properties, ionization potentials, and permissible exposure limits.

Attachment B of this SSHP contains Material Safety Data Sheets (MSDSs) which provide information on characteristics of generally used hazardous substances brought on-site by Radian personnel and subcontractors.

#### **6.3.1 Volatile/Semivolatile Organic Compounds**

VOCs and SVOCs present the greatest exposure potential to site workers. Due to the high vapor pressure of many of these compounds, inhalation is the primary route of exposure. Skin absorption is also a possible route of exposure, leading to the same symptoms as inhalation overexposure. Aromatic hydrocarbons are generally local irritants and blood vessel dilators. These compounds may be potent narcotics, and may cause central nervous system (CNS), lung, and blood vessel damage. Polynuclear aromatic hydrocarbons (PAHs) may cause cancers, affecting a variety of tissues. Petroleum products may cause irritation to the eyes, upper respiratory system, or skin after prolonged or repeated exposure. Overexposure to petroleum products may cause weakness, headache, nausea, confusion, blurred vision, drowsiness, and other nervous system effects. Halogenated hydrocarbon compounds generally have a depressant effect on the CNS. The substitution of a chlorine (or other halogen) atom for a hydrogen atom greatly increases the anesthetic action and increases the range of their systemic effects. These compounds have a synergistic effect when combined with alcohol.

#### **6.3.2 TNT**

TNT is a member of the nitro explosives family, consisting of nitrated organics and inorganics known for their explosive characteristics. It appears as a colorless to pale-yellow odorless solid or crushed flakes. Exposure to TNT may produce sneezing, sore throat, muscular pain, dermatitis, cyanosis, gastritis, liver atrophy, somnolence, tremors, convulsions, and anemia. The

OSHA PEL is 1.5 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) with a skin notation, indicating a potential contribution to overall exposure via skin absorption.

### **6.3.3 2,6-Dinitrotoluene**

2,6-Dinitrotoluene appears as an orange-yellow crystalline solid. It is a questionable carcinogen that can act as a poison when ingested. Exposure can produce skin irritation, anoxia, cyanosis, anemia, and jaundice. Target organs include the liver, the cardiovascular system, the hemopoetic system, and the reproductive system. The OSHA PEL is  $1.5 \text{ mg}/\text{m}^3$  with a skin notation.

### **6.3.4 Nitrobenzene**

Nitrobenzene is a yellow oily liquid with a pungent odor similar to shoe polish. Exposure can produce irritation of the eyes and skin, anoxia, dermatitis, anemia, and liver and kidney damage. Target organs include the liver, kidneys, hemopoetic system, cardiovascular system, and reproductive systems. The OSHA PEL is 1 part per million (ppm) with a skin notation.

### **6.3.5 PCBs**

PCBs, in the form of Aroclor 1242®, have been identified in sludge materials in pipelines. Aroclor 1242® typically appears as a colorless to light-colored viscous liquid with a mild hydrocarbon odor. PCBs pose a significant health risk through dermal exposure. Exposure via this route can cause chloracne, a severe skin disorder. Eye contact with PCBs can cause irritation and discharge. Overexposure via inhalation of PCB-contaminated particulate matter may lead to irritation of the respiratory tract, vomiting, jaundice, and abdominal pain. PCBs are persistent lipophilic substances that have a tendency to bioaccumulate. The OSHA PEL is  $1 \text{ mg}/\text{m}^3$  with a skin notation.



**TABLE 6-1**

**CHEMICAL AND PHYSICAL PROPERTIES OF KNOWN/SUSPECTED SITE CONTAMINANTS**

Contaminant (CAS No.)	OSHA PELs NIOSH RELs ACGIH TLVs IDLH Value	Routes of Exposure	Warning Property Rating and Proper Air-Purifying Cartridge	Appearance and Odor	Relative Response Ratios and Recommended Probe/Scan Settings	Description of Acute and Chronic Health Effects and Carcinogen Listing	Physical Properties
Aliphatic Hydrocarbons (Varies)	Varies by compound	Inhalation Absorption Ingestion Contact	Varies by compound  Full-face organic vapor cartridge	Short-chain hydrocarbons are typically colorless gases with no or limited odors; longer chain hydrocarbons (greater than 4 or 5 carbon atoms in primary chain) are usually colorless liquids and may exhibit typical hydrocarbon odors (similar to solvents or gasoline)	Varies by compound	Toxicities of aliphatic hydrocarbons are very low. Gaseous compounds are nontoxic and act as simple asphyxiants. Liquid compounds are also of low toxicity, typically producing anesthetic effects only at high doses. Short-chain gaseous hydrocarbons are highly flammable. Intermediate chain liquids are flammable. Long chain liquids are combustible.  Carcinogenicity is limited; however, some aliphatic hydrocarbons have been found to be cancer-causing (e.g., 1,3- butadiene).	Varies by compound       A Comprehensive Guide to the Hazardous Properties of Chemical Substances; 1992

**TABLE 6-2**

**CHEMICAL AND PHYSICAL PROPERTIES OF KNOWN/SUSPECTED SITE CONTAMINANTS**

Contaminant (CAS No.)	OSHA PELs NIOSH RELs ACGIH TLVs IDLH Value	Routes of Exposure	Warning Property Rating and Proper Air-Purifying Cartridge	Appearance and Odor	Relative Response Ratios and Recommended Probe/Scan Settings	Description of Acute and Chronic Health Effects and Carcinogen Listing	Physical Properties
Aromatic Hydrocarbons (Varies)	Varies by compound	Inhalation Absorption Ingestion Contact	Varies by compound  Full-face organic vapor-HEPA cartridge	Colorless to slightly yellow liquids with a pronounced aromatic odor	Varies by compound	Acute toxicity of mononuclear aromatic hydrocarbons is low. Inhalation at high concentrations may cause narcosis with symptoms of hallucination, excitement, euphoria, distorted perception, and headache.  Benzene is the only mononuclear aromatic hydrocarbon with possible human carcinogenicity.	Varies by compound  A Comprehensive Guide to the Hazardous Properties of Chemical Substances, 1992

**TABLE 6-3**

**CHEMICAL AND PHYSICAL PROPERTIES OF KNOWN/SUSPECTED SITE CONTAMINANTS**

Contaminant (CAS No.)	OSHA PELs NIOSH RELs ACGIH TLVs IDLH Value	Routes of Exposure	Warning Property Rating and Proper Air-Purifying Cartridge	Appearance and Odor	Relative Response Ratios and Recommended Probe/Scan Settings	Description of Acute and Chronic Health Effects and Carcinogen Listing	Physical Properties
Polynuclear Aromatic Hydrocarbons (PAHs)  (Varies)	Varies by compound	Inhalation Absorption Ingestion Contact	Varies by compound  Full-face organic vapor-HEPA cartridge with a high efficiency filter	White to yellowish solid in the form of flakes, needles, prisms, or plates	Varies by compound	Oral toxicities to PAHs are low. Simple PAHs, such as naphthalene, may cause irritation of the eyes, skin, and respiratory system, and may affect the eyes, liver, kidneys, blood, skin, and central nervous system. Many of the more complex PAHs (e.g, benzo(a)pyrene) are listed as known or suspect carcinogens, although the information on toxicity is very limited.	Varies by compound  A Comprehensive Guide to the Hazardous Properties of Chemical Substances, 1992

**TABLE 6-4**

**CHEMICAL AND PHYSICAL PROPERTIES OF KNOWN/SUSPECTED SITE CONTAMINANTS**

Contaminant (CAS No.)	OSHA PELs NIOSH RELs ACGIH TLVs IDLH Value	Routes of Exposure	Warning Property Rating and Proper Air-Purifying Cartridge	Appearance and Odor	Relative Response Ratios and Recommended Probe/Scan Settings	Description of Acute and Chronic Health Effects and Carcinogen Listing	Physical Properties
TNT (118-96-7)	<u>NIOSH</u> 0.5 mg/m <sup>3</sup> (skin)  <u>OSHA</u> 1.5 mg/m <sup>3</sup> (skin)  <u>ACGIH</u> 0.1 mg/m <sup>3</sup> (skin)  <u>IDLH</u> 500 mg/m <sup>3</sup>	Inhalation Absorption Ingestion Contact	NA  Full-face organic vapor-HEPA cartridge	Colorless to pale- yellow odorless solid or crushed flakes	Not Available	Irritation of the skin and mucous membrane; jaundice; cyanosis; sneezing; coughing and sore throat; muscular pain; kidney damage; cataract; anemia; cardiac irregularity  Suspected carcinogen	MW: 227.1 BP: 464 °F Sol: 0.01% (77 °F) Fl. P: ? (Explodes) IP: 10.59 eV VP: 0.0002 mm Sp. Gr.: 1.65 UEL: ? LEL: ?  NIOSH Pocket Guide; June 1997

**TABLE 6-5**

**CHEMICAL AND PHYSICAL PROPERTIES OF KNOWN/SUSPECTED SITE CONTAMINANTS**

Contaminant (CAS No.)	OSHA PELs NIOSH RELs ACGIH TLVs IDLH Value	Routes of Exposure	Warning Property Rating and Proper Air-Purifying Cartridge	Appearance and Odor	Relative Response Ratios and Recommended Probe/Scan Settings	Description of Acute and Chronic Health Effects and Carcinogen Listing	Physical Properties
Dinitrotoluene (25321-14-6)	<u>NIOSH and OSHA</u> 1.5 mg/m <sup>3</sup> (skin)  <u>ACGIH</u> 1.0 mg/m <sup>3</sup> (skin)  <u>IDLH</u> 50 mg/m <sup>3</sup>	Inhalation Absorption Ingestion Contact	NA  Full-face organic vapor-HEPA cartridge	Orange-yellow crystalline solid with a characteristic odor	Not Available	Anoxia, cyanosis, anemia, jaundice, reproductive effects  Potential Carcinogen	MW: 182.2 BP: 572 °F Sol: Insoluble Fl. P: 404 °F IP:? VP: 1 mm Sp. Gr: 1.32 UEL:? LEL:?  NIOSH Pocket Guide; June 1997

**TABLE 6-6**

**CHEMICAL AND PHYSICAL PROPERTIES OF KNOWN/SUSPECTED SITE CONTAMINANTS**

Contaminant (CAS No.)	OSHA PELs NIOSH RELs ACGIH TLVs IDLH Value	Routes of Exposure	Warning Property Rating and Proper Air-Purifying Cartridge	Appearance and Odor	Relative Response Ratios and Recommended Probe/Scan Settings	Description of Acute and Chronic Health Effects and Carcinogen Listing	Physical Properties
Nitrobenzene (98-95-3)	<u>NIOSH/OSHA/</u> <u>ACGIH</u>  1 ppm (skin)  <u>IDLH</u> 200 mg/m <sup>3</sup>	Inhalation Absorption Ingestion Contact	NA  Full-face organic vapor	Yellow oily liquid with a pungent odor like paste shoe polish	Not Available	Irritation of the eyes and skin; dermatitis; anemia; liver and kidney damage; testicular effects	MW: 123.1 BP: 411 °F Sol.: 0.2% Fl. P: 190 °F IP: 9.92 eV VP: 0.3 mm (77 °F) Sp. Gr: 1.2 UEL:? LEL: 1.8%  NIOSH Pocket Guide, June 1997

**TABLE 6-7**

**CHEMICAL AND PHYSICAL PROPERTIES OF KNOWN/SUSPECTED SITE CONTAMINANTS**

Contaminant (CAS No.)	OSHA PELs NIOSH RELs ACGIH TLVs IDLH Value	Routes of Exposure	Warning Property Rating and Proper Air-Purifying Cartridge	Appearance and Odor	Relative Response Ratios and Recommended Probe/Scan Settings	Description of Acute and Chronic Health Effects and Carcinogen Listing	Physical Properties
PCBs Chlorodiphenyl (42% chlorine)  (53469-21-9)	<u>NIOSH</u> 0.001 mg/m <sup>3</sup> <u>OSHA/ACGIH</u> 1 mg/m <sup>3</sup> (skin) <u>IDLH</u> 5 mg/m <sup>3</sup>	Inhalation Absorption Ingestion Contact	NA  Full-face organic vapor-HEPA cartridge with a high efficiency filter	Colorless to light- colored viscous liquid with a mild hydrocarbon odor	Not Available	Irritation of the eyes; chloracne; liver damage; reproductive effects  NIOSH-listed carcinogen	MW: 258 BP: 617 to 691 °F Sol: Insoluble Fl. P: NA IP: ? VP: 0.001 mm Sp. Gr: 1.39  NIOSH Pocket Guide; June 1997

## **6.4 Explosive Hazards**

Based on historical use, the presence of TNT and other explosive compounds (including TNT intermediates) is possible. Refer to the Explosives Safety Plan, located in Attachment H of this SSHP for detailed information on the support role of explosives personnel, including the following information:

- Search and removal methods
- Determining explosives material locations
- Invasive operation procedures
- Personnel responsibilities
- Monitoring equipment

Also refer to Attachment H for detailed information on potential explosives hazard emergency procedures.

## **6.5 Radiological Hazards**

Based on available site historical information, there are no radiological contaminants of concern at the LOOW site. If site-specific potential radiological information becomes available, the hazards will be addressed in a site-specific addendum to the SSHP.

## **6.6 Physical Hazards: Identification and Standard Operating Procedures**

A variety of physical hazards may be present during the TNT Pipeline and Chemical Waste Sewer IRAs at the LOOW. These hazards are similar to those associated with any construction-type project, and are generally familiar to most site workers. Task-specific hazards will be covered during site safety briefings.

### **6.6.1 Slipping/Tripping Hazards**

Uneven work surfaces and other slipping or tripping hazards may be present on projects involving clearing and work around heavy equipment. At sites where demolition will be occurring, holes or divots may be present in addition to debris. Preventive measures would include grading to fill in any holes or cavities produced by demolition activities. Proper site housekeeping, removal of trash and debris, and orderly stacking and removal of materials will



reduce slipping and tripping hazards. Proper site housekeeping will be the responsibility of all site personnel, and the HSO will make regular entries into the health and safety logbook at the end of each shift, indicating the work area is adequately clean prior to employee dismissal.

### **6.6.2 Contact with Energized Sources**

During any site activities that involve work around live utilities, a potential exists for personnel, heavy equipment, or motor vehicles to come in contact with energized sources. Additionally, personnel could come in contact with energized parts of machinery or power tools. Contact with energized sources may result in fire, explosion and/or electrocution. All work performed near electrical sources must be performed consistent with the electrical safety requirements found in 29 CFR 1926.400 through 1926.449, and Section 11 of EM-385-1-1.

Control efforts for this hazard include requirements that all equipment and power tools used on site be properly maintained, positioned, guarded, and operated by competent personnel. Equipment will not be permitted within a 20-ft radius of energized sources with nominal voltage less than 300 kV. For energy systems with nominal voltage greater than 300 kV, the required distance for any equipment positioning will be in accordance with EM 385-1-1, Table 11-3. The possibility of the presence of underground pipelines, electric wires, conduits, or vessels containing material under pressure will be investigated prior to the start of any subsurface work. The RCM/PjM will coordinate with USACE/LOOW representatives to locate existing utilities.

### **6.6.3 Electrical Work**

A qualified electrician must perform site work involving electrical installation or energized equipment. All electrical work will be performed in accordance with the OSHA electrical safety requirements found in 29 CFR 1926.400 through 1926.449, and Section 11 of EM-385-1-1. Workers are not permitted to work near electrical power circuits unless the worker is protected against electric shock by de-energizing and grounding the circuit or by guarding or barricading the circuit and providing proper PPE. All electrical installations must comply with NEC regulations. A nationally recognized testing laboratory must list all electrical wiring and equipment used.

All electrical circuits and equipment must be grounded in accordance with the NEC regulations. The path to ground from circuits, equipment, and enclosures will be permanent and continuous. A ground will be provided for non-current carrying metallic parts of energized equipment. Refer

to Section 11.C.03 of the USACE EM 385-1-1 for proper bonding and grounding procedures for energized stationary and portable equipment. Ground fault circuit interrupters (GFCIs) are required on all 120-volt, single phase, 15- and 20-amp outlets in work areas that are not part of the permanent wiring of the building or structure. A GFCI is required when using an extension cord. GFCIs must be tested regularly with a GFCI tester.

Heavy-duty extension cords will be used; flat-type extension cords are not allowed. All extension cords must be the three-wire type, and designed for hard/extra hard usage. Electrical wire or cords passing through work areas must be protected from water and damage. Worn, frayed, or damaged cords and cables will not be used. Walkways and workspaces will be kept clear of cords and cables to prevent a tripping hazard. Extension cords and cables may not be secured with staples, hung from nails, or otherwise temporarily secured. Bushings or fittings must protect cords or cables passing through holes in covers, outlet boxes, etc..

In existing installations, changes in the circuit protection (in order to increase the load in excess of the load rating of the circuit wiring) are not allowed. All circuits will be protected against an overload, in accordance with Section 11.B of USACE 385-1-1.

All lamps used in temporary lighting will be protected from accidental contact and breakage. The bulbs will be protected either by guards or deeply recessed in a reflector. Metal shell and paper-lined lamp holders are not permitted. Fixtures, lamp holders, lamps, receptacles, etc. are not permitted to have live parts, and the lights will be grounded. Workers must not have wet hands while plugging/unplugging energized equipment. Plugs and receptacles will be kept out of water (unless they are approved for submersion).

#### **6.6.4 Noise**

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps, or generators. High noise operations will be evaluated by the HSO. Employees with an exposure exceeding 85dBA (A-scale, slow response) will be required to wear hearing protection. As a general practice, hearing protection will be worn when operating heavy equipment, power tools, and generators. Attachment C includes a project-specific Hearing Conservation Program.

### 6.6.5 Ladders

One-third of worker deaths in construction result from falls. Many falls occur because ladders are not placed or used safely. Ladders with non-conductive side rails must be used when working near electrical conductors, equipment, or other sources. Ladders will not be used horizontally for platforms, runways, or scaffolds. Ladder use will comply with OSHA 1926.1053 through 1926.1060 and USACE EM-385-1-1 (Section 21D), including the following safety requirements:

STEP	ACTION
1	Choose the right ladder for the task--the proper type and size, with a sufficient rating for the task.
2	Check the condition of the ladder before climbing. <ul style="list-style-type: none"> <li>• Do not use a ladder with broken, loose, or cracked rails or rungs.</li> <li>• Do not use a ladder with oil, grease, or dirt on its rungs.</li> <li>• The ladder should have safety feet.</li> </ul>
3	Place the ladder on firm footing, with a four-to-one pitch.
4	Support the ladder by: <ul style="list-style-type: none"> <li>• Tying it off;</li> <li>• Using ladder outrigger stabilizers; or</li> <li>• Have another worker hold the ladder at the bottom.</li> </ul> If another worker holds the ladder, they must: <ul style="list-style-type: none"> <li>• Wear a hard hat;</li> <li>• Hold the ladder with both hands;</li> <li>• Brace the ladder with their feet; and</li> <li>• Not look up.</li> </ul>
5	Keep the areas around the top and bottom of the ladder clear.
6	Extend the top of the ladder at least 36 inches (3 feet) above the landing.
7	Climb the ladder carefully - facing it - and use both hands. <ul style="list-style-type: none"> <li>• Use a tool belt or hand-line to carry material to the top or bottom of the ladder.</li> <li>• Wear shoes in good repair with clean soles.</li> </ul>
8	Inspect the ladder every day, prior to use, for the following problems: <ul style="list-style-type: none"> <li>• Rail or rung damage</li> <li>• Broken feet</li> <li>• Rope or pulley damage</li> <li>• Rung lock defects or damage</li> <li>• Excessive dirt, oil, or grease</li> </ul> If the ladder fails inspection, it must be removed from service and tagged with a "Do Not Use" sign.

### **6.6.6 Hand and Power Tools**

All hand and power tools will be maintained in a safe condition and in good repair. Hand and power tools will be used in accordance with 29 CFR 1926, Subpart I (1926.300 through 1926.307) and EM 385-1-1, Section 13. Radian will not issue unsafe tools, and workers will not be permitted to bring unsafe tools on-site. All tools will be used, inspected, and maintained in accordance with the manufacturer's instructions. Throwing tools or dropping tools to lower levels will be prohibited. Hand and power tools will be inspected, tested, and determined to be in safe operating condition prior to each use. Periodic safety inspections of all tools will be conducted to assure that the tools are in good condition and are being properly maintained. Any tool that fails an inspection will be immediately removed from service and tagged with a "DO NOT USE" sign.

Workers using hand and power tools who are exposed to falling, flying, abrasive, or splashing hazards will be required to wear PPE. Eye protection must always be worn when working on-site. Additional eye and face protection, such as safety goggles or face shields, may also be required when working with specific hand and power tools. Workers using tools in areas where there is a head injury hazard must wear hard hats. Hearing protection will always be worn when working on-site, and additional hearing protection may be required when working with certain power tools. Workers using tools which may subject their hands to an injury, such as cuts, abrasions, punctures, or burns, will wear protective gloves. Loose or frayed clothing, dangling jewelry, or loose long hair will not be worn when working with power tools.

Electric power-operated tools will be double insulated or grounded, and equipped with an on/off switch. A multi-conductor cord that has an identified grounding conductor will be used to ground power tools, along with a multi-contact polarized plug-in receptacle. Tools protected by an approved system of double insulation do not need to be grounded. Guards must be provided to protect the operator and other nearby workers from hazards such as in-going nip points, rotating parts, flying chips, and sparks. All reciprocating, rotating, and moving parts of tools will be guarded if contact is possible. Removing machine guards is prohibited.

Chain saws may be used to clear brush and cut down selected trees. The use of chain saws for tree removal and site clearing will be performed in accordance with Sections 13F and 31 of USACE EM 385-1-1 and OSHA Standard 29 CFR 1926.604. The two main causes of chain saw accidents are unsafe handling of the saw and making incorrect cuts that result in unexpected falling trees.

The following safety precautions will be implemented when using a chain saw:

- Review the operation manual prior to use.
- Understand how to use the safety devices on the saw. All chain saws will be equipped with an automatic chain brake or kickback device.
- Pay attention to your work area every minute the chain saw is running. Even one little slip could cause serious injury. Hold the saw with both hands during cutting operations.
- Adjust the idle speed so that the chain saw does not move when the engine is idling.
- The chain saw operator will wear the appropriate PPE: goggles or safety glasses and a face shield, heavy work gloves, steel-toe/steel-shank work boots, and leg protection.
- The chain saw must never be used to cut above the operator’s shoulder height.
- The operator assigned to felling trees will be knowledgeable in the proper use of a chain saw and the correct tree cutting procedures to prevent unexpected falling trees.

### 6.6.7 Manual Lifting

Back injuries are among the leading occupational injuries reported by industrial workers. Back injuries such as pulls and disc impairments can be reduced by using proper manual lifting techniques. Leg muscles are stronger than back muscles, so workers should lift with their legs and not with their back. Proper manual lifting techniques include the following steps:

STEP	ACTION
1	Plan the lift before lifting the load. Take into consideration the weight, size, and shape of the load.
2	Preview the intended path of travel and the destination to ensure there are no tripping hazards along the path.
3	Wear heavy-duty work gloves to protect hands and fingers from rough edges, sharp corners, and metal straps. Also, keep hands away from potential pinch points between the load and other objects.
4	Get the load close to your ankles, and spread your feet apart. Keep your back straight and do not bend your back too far; instead bend at your knees.
5	Feel the weight; test it.
6	Lift the load smoothly, and let your legs do the lifting. If you must pivot, do not swing just the load; instead, move your feet and body with the load.

If the load is too heavy, then do not lift it alone. Lifting is always easier when performed with another person. Assistance should always be used when it is available.

### **6.6.8 Fall Hazards**

The site activities currently scheduled for the LOOW projects do not include work at elevated locations. If work at elevated locations is required, a description of the tasks will be outlined in the site-specific addendum to the SSHP. All fall protection equipment will comply with 29 CFR 1926.104, 1926.105, and 1926.556, and Sections 5F and 21C of USACE EM 385-1-1.

### **6.6.9 Weather-Related Hazards**

Weather-related hazards include the potential for heat or cold stress, electrical storms, treacherous weather-related working conditions, or limited visibility. These hazards correlate with the season in which site activities occur. Outside work will be suspended during electrical storms. In the event of other adverse weather conditions, the HSO will determine if work can continue without endangering the health and safety of site personnel (refer to Section 12.14).

### **6.6.10 Heat Stress / Cold Stress**

Heat stress is a significant potential hazard during the warmer months. Heat stress manifests itself as one of three conditions: heat cramps, heat exhaustion, or heat stroke. Heat cramps are brought about by a prolonged exposure to heat. As an individual sweats, water and salts are lost by the body, eventually triggering painful muscle cramps. The signs and symptoms of heat cramps include:

- Severe muscle cramps, usually in the legs and abdomen
- Exhaustion, often to the point of collapse
- Dizziness or periods of faintness

First aid treatment includes shade, rest, and fluid replacement. If available, the individual should drink electrolyte-replacement fluids (e.g., Gatorade, Squincher, 10-K). The individual should recover within half an hour. When employees are required to work in temperatures exceeding 75 °F, an electrolyte supplement will be added to the drinking water. Sunscreen will be made available when employees are exposed to strong sunlight for extended periods of time.

Heat exhaustion usually occurs in a healthy individual who has been exposed to excessive heat while working or exercising. Blood collects near the skin in an effort to rid the body of excess heat. The signs and symptoms of heat exhaustion include:

- Rapid and shallow breathing
- Weak pulse
- Cold and clammy skin, with heavy perspiration
- Skin appears pale
- Fatigue, weakness, and/or dizziness
- Elevated body temperature

First aid treatment includes cooling the victim, elevating the feet, and replacing fluids. If the individual has not recovered within half an hour, then transport to the hospital for medical attention.

Heat stroke occurs when an individual is exposed to excessive heat and their body systems become overwhelmed by heat and begin to stop functioning. This condition is a ***medical emergency***, requiring the immediate cooling of the victim and transport to the hospital immediately. The signs and symptoms of heat stroke include:

- Victim has stopped sweating
- Dry, hot, red skin
- Body temperature approaching or above 105 °F
- Dilated (large) pupils
- Loss of consciousness; victim may lapse into a coma

Local weather conditions may produce an environment that will require restricted work schedules in order to protect employees. The HSO will be observing workers for any potential symptoms of heat stress. Adaptation of work schedules and training on recognition of heat stress conditions should help prevent heat-related illnesses from occurring. Heat stress prevention controls include:

- Allow workers to become acclimatized to the heat (three to six days).
- Provide shaded or air-conditioned break areas.
- Provide sunscreen to prevent sunburn.
- Provide drinking water and electrolyte-replenishing fluids.
- Monitor all workers wearing PPE for heat stress with periodic heart rate and/or oral temperature checks in accordance with of the Corporate Health and Safety Program when the ambient air temperature exceeds 70 °F in the work area (see Section 10.4).

Cold stress is a danger at low temperatures and when the wind chill factor is low. Cold stress is generally described as a local cooling (frost nip, frostbite, and freezing) or a general cooling (hypothermia). Personnel working outdoors in temperatures at or below freezing may be subject to local cooling. Areas of the body that have a high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible. The three categories of local cooling include:

- Frost nip - characterized by a blanching or whitening of the skin.
- Frostbite - skin has a waxy or white appearance and is firm to the touch, but the tissue beneath is resilient.
- Freezing - skin tissue is cold, pale, and solid.

Frost nip and frostbite first aid includes covering the affected area with warmth and retreating to a warm area. Frozen tissue is a *medical emergency* and the victim must be transported to the hospital immediately.

General cooling (hypothermia) occurs when exposure to cold reduces body temperature. With prolonged exposure, the body becomes unable to maintain its proper internal temperature. Without treatment, hypothermia will lead to stupor, collapse, and death.

First aid for severe hypothermia includes handling the victim very gently; rough handling may set off an irregular heartbeat. **DO NOT** attempt to re-warm the severely hypothermic victim; re-warming may cause the development of an irregular heartbeat. Severe hypothermia is a *medical emergency*, and the victim must be transported to the hospital immediately.

Prevention of cold stress is a function of whole body protection. Adequate insulated clothing will be worn when the air temperature drops below 40 °F. Reduced work periods may be necessary in extreme conditions to allow adequate rest periods in a warm area. Other cold stress prevention controls include:

- Changing clothes when work clothes become wet with sweat.
- Avoiding caffeine (which has diuretic and circulatory effects).
- Ensuring workers drink warm, sweet drinks or soups to increase their caloric intake and reduce the possibility of cold weather dehydration.

The potential for developing heat stress or cold stress is dependent upon a variety of factors, such as weather (i.e. humidity, wind chill), type and amount of activity being performed, and acclimatization of the worker. The Radian Corporate Health and Safety Program provides information on controlling heat stress and cold stress hazards.



### **6.6.11 Confined Space Entry**

A confined space includes the following definitions:

- An area that has a limited means of entry or exit;
- An area that is unsuitable for continuous human occupancy;
- An area that contains (or may possibly contain) an accumulation of toxic or flammable contaminants;
- An area that contains (or may possibly contain) an oxygen-deficient atmosphere; or
- An area that contains a material that has the potential for engulfment of a worker.

Trenches excavated deeper than 4 feet are also considered to be a confined space.

The site activities currently scheduled for the LOOW sites include confined space entry tasks. A confined space entry program will be implemented in accordance with 29 CFR 1910.146, Section 6I of USACE EM 385-1-1, and the Radian Corporate Health and Safety Program. A confined space entry program includes:

- An entry permit (Attachment A);
- Confined space training for entrants and stand-by rescue personnel;
- Additional PPE; and
- Air monitoring.

A copy of Radian's Construction and Remediation Division Confined Space Entry Program is included in Attachment G. Workers involved in the confined space entry must be familiar with all hazards, equipment, procedures, and safeguards used during their entry task.

### **6.6.12 Excavation and Trenching**

An excavation is any man-made cavity or depression. Depending on its depth, width, and the presence of a hazardous atmosphere, an excavation may also be considered to be a confined space. Excavations are defined to include trenching. A trench is a narrow excavation in which the depth is greater than the width, and the width is not greater than 15 feet. Trenches excavated deeper than 4 feet are also considered to be a confined space.

The site activities currently scheduled for the LOOW project sites may include excavation or trenching activities. All excavations will be performed in accordance with 29 CFR 1926 Subpart P, EM 385-1-1 Section 25, and the Corporate Health and Safety Program.

Prior to starting any excavation, the possibility of the presence of underground pipelines, electric wires, conduits, or vessels containing material under pressure will be investigated. The RCM/PjM will coordinate with USACE/LOOW representatives to locate and shut-off existing utilities. All surface encumbrances that will create a hazard to workers will be removed or supported.

Excavations, adjacent areas, and protective systems will be inspected by a competent person on the following schedule:

- Daily and prior to work in or around the excavation
- After every rain storm or other hazard-increasing occurrence
- As needed throughout the work as conditions change

If the inspector notes a hazardous condition, all endangered workers must be immediately removed from the hazard, and all work in the excavation stopped until the necessary corrections have been made. The Excavation Safety Checklist (#1 and #2) is located in Attachment A.

The following safety controls will be implemented if excavation activities proceed beyond 4 feet in depth:

- An Excavation Work Plan will be required.
- Excavations that may contain toxic or oxygen-deficient atmospheres will be monitored by the HSO prior to the start of each shift and at periodic intervals during the shift. Results of air monitoring will be documented in the HSO's logbook. Additional safeguards may be necessary when excavating areas that may contain a hazardous atmosphere. Refer to the OSHA and USACE excavation standards if a hazardous atmosphere is suspected.
- The sides of all excavations in which workers may be exposed to danger from shifting soil will be guarded by a protective system. Appendices B and C of 29 CFR 1926 Subpart P provide information on proper sloping, shoring, and benching protective systems. Excavations less than 5 feet, which do not have a potential for a cave-in, do not require a protective system.
- If the excavation endangers the stability of adjacent structures, then support systems such as shoring, bracing, or underpinning will be provided.

- Personnel will not work in excavations in which there is accumulated water, or water is accumulating, unless adequate precautions have been taken to protect workers against the hazards caused by water accumulation.
- Workers will be protected from loose rock or soil which could fall from an excavation face.
- Excavated soil will be placed at least 2 feet from the edge of the excavation.
- Workers exposed to public vehicular traffic will wear warning vests.
- When mobile equipment is operated near an excavation, or required to approach the edge of an excavation, a warning system (e.g., barricades, hand signals, mechanical signals, stop logs) will be used.
- A stairway, ladder, ramp, or other safe means of exit will be located in trench excavations that are greater than 4 feet in depth. The means of exit will require no more than 25 feet of lateral travel for each person in the excavation.
- Workers are not permitted underneath loads handled by lifting or excavating equipment.

At the end of each workday, the RCM/PjM and/or HSO will ensure that flagging or barriers are set up at the excavation area to prevent unauthorized personnel from falling into the excavation during non-working hours. The barriers will remain in place until the excavation has been backfilled when the excavation is unsupervised.

### **6.6.13 Heavy Equipment and Motor Vehicle Operation**

Only qualified personnel will operate heavy equipment and motor vehicles. Equipment will not be operated in a manner that will endanger persons or property. All heavy equipment and motor vehicles will be operated in accordance with the manufacturer's instructions, 29 CFR 1926 Subpart O, and EM-385-1-1 Sections 11.E, 16, and 18. The following inspection and repair controls will also be implemented during this project:

- The operator will inspect equipment and vehicles daily prior to starting work. Records of tests and inspections will be maintained on-site by the inspector.
- Heavy equipment/motor vehicle operation will not start until a survey has been made to ensure the safe clearance from energized overhead power lines.
- Any unsafe equipment or vehicles will be removed from service until safety defects can be corrected. Defective equipment will be tagged with a "DO NOT OPERATE" sign.
- Equipment will be shut down and locked out before maintenance or repairs are made.
- Any cracked or broken window, windshield, or door glass will be replaced.

Operators will follow these rules:

- Seat belts will be worn when operating moving equipment.
- Motor vehicles and heavy equipment will be shut down during re-fueling operations.
- The on-site speed limit is 15 mph for all vehicles.
- Operators will not leave their equipment unattended while it is running.
- Whenever equipment is parked, the parking brake will be set. If the equipment is parked on an incline, in addition to setting the parking brake, the wheels will also be chocked.
- Operators will be trained and experienced in the use of their equipment.
- Vehicles or equipment will not be operated in a careless or unsafe manner.
- Personnel will wear appropriate PPE when working with heavy equipment. Dermal protection must fit properly and be taped to prevent "caught on" or "caught between" hazards.

Required equipment features include:

- All bulldozers, tractors, or similar equipment used in clearing operations will be provided with guards, canopies, or grills to protect the operator from falling or flying debris.
- All equipment and vehicles will have an audible backup alarm and an audible warning device (i.e., a horn).
- Each vehicle and piece of equipment will have a portable fire extinguisher rated not less than 10-B:C.
- Equipment will be properly guarded. Refer to Section 16.B.03 of the USACE EM 385-1-1 for detailed information on guarding of machinery and mechanized equipment.

When working with moving equipment:

- One designated person will give signals to the operators of both equipment and vehicles in any work area.
- All personnel will stay clear of the operational area of the equipment. Workers are not permitted to stand directly underneath any load or piece of equipment (i.e., man-lift, backhoe bucket, crane load, etc.).
- Work areas will be adequately illuminated.
- Workers are prohibited from riding in equipment buckets and booms.

#### **6.6.14 Flammable and Combustible Liquids**

Outdoor storage of small flammable/combustible liquid containers (not more than 60 gallons each) will not exceed 1,100 gallons in any one area. All flammable and combustible liquids will

be stored outdoors, in a well-ventilated area, and away from excessive heat or direct sunlight. These liquids will not be stored in areas used for exits, stairways, or aisles. Water-reactive materials will not be stored near flammable or combustible liquids. All sources of ignition are prohibited in this area, including smoking, cutting and welding, hot surfaces, open flames, sparks (static, electrical, and mechanical), and frictional heat. "Flammable Liquids" and "No Smoking or Open Flames" signs will be posted in the storage area. At least one portable fire extinguisher rated not less than 20-B will be located within 10 feet from the entrance to the storage area, and at least one similar fire extinguisher will be located between 25 and 75 feet outside the storage area.

Each fueling area will have at least one portable fire extinguisher rated not less than 20-B:C within 75 feet of each pump and dispenser. Smoking and open flames are prohibited in fueling areas. Motors will be turned off before equipment is re-fueled. At least one portable fire extinguisher rated 20-B:C will be located on all vehicles transporting or dispensing flammable or combustible liquids. Fuel cells will not be allowed on trucks with plastic bed liners unless the cell is electrically bonded to the truck body.

Flammable and combustible liquids should only be handled in areas that have adequate ventilation. Workers are not permitted to use liquids having a flash point less than 100 °F as a cleaning/degreasing fluid. Workers should change as soon as possible if flammable or combustible liquid is spilled on their clothing.

Dispensing areas (for transfer of more than 5 gallons) will be separated from other work areas by at least 25 feet. Drainage, diking, or absorbent material will be used to control spills in these areas. Flammable liquids will only be transferred when the two containers are electrically interconnected (i.e., bonded). When dispensing flammable and combustible liquids into smaller portable containers, only approved safety containers equipped with backflash arresters will be used.

Handling, storage, and use of flammable and combustible liquids will be in compliance with 29 CFR 1926.152 and EM-385-1-1 Section 9B. Material Safety Data Sheets (MSDSs) for hazardous materials brought on-site are located in Attachment B of this SSHP.

### **6.6.15 Hot Work**

The activities currently scheduled for the LOOW projects will include hot work. Where hot work becomes necessary, it will be performed in accordance with OSHA 29 CFR 1926.350

through 1926.354, EM-385-1-1 Section 10, and the Corporate Health and Safety Program. Hot work includes oxygen-acetylene welding and cutting, arc welding and cutting, gas metal welding, propane torches, and grinding. The HSO must perform the following tasks prior to the start of any hot work:

- Complete and post a Radian Hot Work Permit;
- Conduct a hot work safety briefing;
- Visually inspect the work area for flammable and combustible materials;
- Ensure that hot work equipment is inspected, and
- Designate a fire watch and appropriate equipment.

#### **6.6.16 Illumination**

Site activities will only be conducted during day light hours unless adequate lighting is available. Refer to Table 7-1 in USACE EM-385-1-1 for minimum lighting requirements. Any lighting used will be weatherproof and intrinsically safe for work in a hazardous environment.

### **6.7 Biological Hazards**

#### **6.7.1 Snakes**

Much of the work on this project will be performed in low-lying or subterranean areas and around long abandoned mechanical equipment. The possibility of poisonous snakes will be communicated to site personnel during the initial site-specific safety training. Site personnel will be warned to avoid snakes, and will be required to wear sturdy steel-toe/steel-shank work boots. If there is a snakebite emergency, the victim will be transported to the hospital for emergency treatment (see Section 12.15, Snakebite, Spider Bite, or Insect Bite/Sting First Aid).

#### **6.7.2 Insects**

Site personnel may encounter a number of insects, such as the brown recluse spider, ticks, bees, and wasps, during the site activities. The brown recluse spider is approximately 3/8-inch in size, with a dark, violin-shaped mark on its back. The brown recluse spider weaves a sticky, irregular web. Within a few hours of being bitten, the victim's skin around the bite becomes red and swollen. In time, most of the surrounding tissue dies, leaving a deep sore that may take months to heal, and may leave a scar. A few persons suffer an allergic reaction to its poison that could

result in death. Outdoors, the brown recluse lives under rocks.

Deer tick bites may result in the transmission of Lyme Disease. A characteristic rash may develop a few days to a few weeks after the bite of an infected tick. The rash generally looks like an expanding red ring with a clear center, but it can vary from a blotchy appearance to red throughout the rash, however, it is important to note that some victims never exhibit a rash. Lyme Disease symptoms include flu-like symptoms such as headache, stiff neck, fever, muscle aches, and/or general malaise. If Lyme Disease is not treated early with antibiotics, the early symptoms may disappear, but more serious problems may follow. Long-term effects of Lyme Disease may include arthritis of the large joints, meningitis, neurological complications (numbness, tingling in extremities, loss of concentration and memory retention, Bell's Palsy), withdrawal, lethargy, or cardiac symptoms. Personnel should use the following prevention tactics:

- Avoid walking through brush, woods, or grassy areas; try and avoid contact with plants if you must walk through these areas.
- Dress in light-colored clothing to make adhering ticks more visible. Wear long sleeve shirts and tuck pants into socks.
- Use a tick repellent containing permethrin or dimethyl-m-toluamide (DEET). However, you should never use tick repellent containing more than 30 percent DEET, and all tick repellent should be sprayed on clothing (and allowed to dry) and not directly on your skin.
- Perform self-searches each day to check for ticks.

If an insect bite or sting occurs, personnel trained in first aid procedures will administer first aid (see Section 12.16). If there is an insect bite/sting emergency, the victim will be transported to the hospital for treatment.

### **6.7.3 Plants**

Poison ivy, oak, and sumac may be present on-site. Poison ivy can be found as vines on tree trunks or as upright bushes. Poison oak is another name for the bush form of poison ivy. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of a stalk, the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the spring. Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, velvety dark green on top and pale underneath. The branches of immature sumac have a velvety "down." Poison sumac also has "hairy" berry clusters.

Contact with poison ivy, oak, or sumac may lead to a skin rash, characterized by reddened, itchy, blistering skin which needs first aid treatment. If you believe you have contacted one of these plants, immediately wash your skin thoroughly with soap and water, taking care not to touch your face or other parts of your body prior to washing.



## 7.0 ACTIVITY-HAZARD ANALYSES

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Tables 7-1 through 7-16 are a series of Activity-Hazard Analyses (AHAs) for the TNT Pipeline and Chemical Waste Sewer Interim Removal Actions at the Former Lake Ontario Ordnance Works. Each AHA will be reviewed and discussed by all site workers involved in the specific task. If a task is planned for which there is no AHA, an analysis will be prepared and reviewed by site personnel. This review will be completed prior to initiating the site-specific task unless an emergency situation arises that requires immediate response. When additional site-specific tasks are planned for a specific project, additional AHAs will be developed and included in the site-specific addendum to the SSHP.

The AHAs will typically be reviewed at the initial site-specific safety training, a daily site safety briefing, or a weekly “toolbox” meeting. Workers will be encouraged to discuss hazards and identify ways in which they suspect an accident could occur. The site workers will discuss accident scenarios and will be encouraged to suggest appropriate control measures. The meeting and topics discussed will be documented by the HSO, using a Meeting Attendance Form (Attachment A).

The interim removal actions, which may be performed at the LOOW, include:

- 7-1 Mobilization, Decontamination Pad Setup, Site Restoration, and Demobilization
- 7-2 Clearing and Grubbing
- 7-3 Confined Space Entry
- 7-4 Removal of Liquids and Sludges from Sewer Lift Stations
- 7-5 Excavation of Access Points or Pipeline Segments
- 7-6 Investigation of Pipe line Integrity
- 7-7 Power Washing of Sewer Lift Stations, Sewer Lines, and TNT Pipelines
- 7-8 Demolish and Remove Structures in and adjacent to the WWTP
- 7-9 Demolish WWTP
- 7-10 Collect Water Samples
- 7-11 Collect Soil Samples
- 7-12 Collect Wipe Samples
- 7-13 Sealing of Pipeline Tie-Ins and Placement of Pipeline Plugs
- 7-14 Sealing of Chemical Waste Sewer System
- 7-15 Backfill and Compaction of Excavations
- 7-16 Decontaminate Sampling and Heavy Equipment

**TABLE 7-1  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Mobilization, Decontamination Pad Setup,  
Site Restoration, and Demobilization

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<u>Mobilization and Pad Setup</u> 1. Establish storage area for equipment, supplies, and flammable liquids. 2. Establish office area for administrative support. 3. Accept equipment/supply delivery. 4. Secure materials in storage. 5. Determine requirements for personnel and vehicles access to the site, including needs for security. 6. Coordinate with USACE representatives to identify existing utility locations. 7. Lay out heavy reinforced plastic material for the decontamination pad. 8. Berm plastic perimeter with abutting straw bales/oil adsorbent booms. Secure berm with wire/stakes.	1. Muscle strain from improper lifting. 2. Physical impacts/injury from heavy equipment or moving loads. 3. Physical injury from use of hand or power tools. 4. Slips, trips, falls. 5. Vehicular accidents/collisions. 6. Excessive noise exposure due to heavy equipment or power tool use.	1. Wear Level D PPE. 2. Monitor work for good housekeeping practices. 3. Provide hearing protection. 4. Arrange traffic flow to prevent foot traffic cross the routes of heavy equipment and moving loads. 5. Keep walking surfaces free from slip/trip hazards. 6. Keep unnecessary personnel away from the work area. 7. Follow proper lifting techniques. 8. Be aware of and keep hands out of potential pinch/nip points. Wear heavy work gloves. 9. Separate flammable/combustible materials from other materials. Post "No Smoking" or "Open Flames" signs. Fire extinguishers must be nearby and readily available. 10. Proper hazardous material labeling is required. 11. Equipment operators should look in the direction of travel; look before backing up. 12. Personnel will not stand, walk, or work beneath loads being handled by heavy equipment.
<u>Demobilization/Site Restoration</u> 1. Grade each disturbed area. 2. Remove structures/supplies. 3. Load unused material for transport. 4. Seed/sod, as necessary.		
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
1. Power tools and hand tools 2. Hazard communication signs/labels 3. Heavy equipment, motor vehicles 4. Plastic liner 5. Straw bales or absorbent booms	1. Heavy equipment operation 2. Hearing Conservation Program 3. Hazard Communication Program	1. Inspect heavy equipment daily for function of safety features (e.g., horn, back-up alarm, etc.) and general assembly (e.g., missing bolts, loose hoses, etc.). 2. Inspect power tools for function of safety features (e.g., shut-off, GFCI, etc.) and general assembly (e.g., frayed wires, loose connections, etc.) 3. Inspect hand tools for excessive wear and loose parts. 4. Ensure that stored flammable and combustible materials do not present a fire hazard.

**TABLE 7-2  
ACTIVITY-HAZARD ANALYSIS**

**Activity: Clearing and Grubbing**

**Analyzed By/Date:  
Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98  
Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Obtain overhead and underground utility clearance.</li> <li>2. Set-up location barriers, as necessary.</li> <li>3. Mobilize heavy equipment, hand, and power tools.</li> <li>4. Clear unnecessary personnel from area.</li> <li>5. Cut down larger trees with a chain saw.</li> <li>6. Push down/remove smaller trees and brush with a bulldozer.</li> <li>7. Stockpile debris in a central location.</li> <li>8. If required, grade cleared area.</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact with overhead and underground utilities.</li> <li>2. Disturbance of local wildlife.</li> <li>3. Struck by heavy equipment/moving vehicles.</li> <li>4. Physical injury during hand/power tool use.</li> <li>5. Excessive noise exposure during power tool and heavy equipment operation.</li> <li>6. Muscle strain from improper lifting.</li> <li>7. Slips, trips, and falls.</li> <li>8. Struck by falling trees.</li> <li>9. Eye injury from flying debris.</li> </ol>	<ol style="list-style-type: none"> <li>1. Utility clearance must be performed prior to start of work.</li> <li>2. Arrange traffic flow to avoid personnel having to cross the route of moving equipment.</li> <li>3. Equipment operators should look in the direction of travel; look before backing up.</li> <li>4. Wear Level D PPE and heavy work gloves.</li> <li>5. Power tools will be equipped with a shut-off switch.</li> <li>6. All rotating parts will be properly guarded.</li> <li>7. Wear hearing protection.</li> <li>8. Follow proper lifting techniques; no manual lifting of heavy loads.</li> <li>9. Keep walking and working surface free from slipping and tripping hazards.</li> <li>10. Keep unnecessary personnel away from the area during clearing and grubbing activities.</li> <li>11. Clear immediate area of all personnel prior to cutting down a tree. Plan the direction of the tree's fall.</li> <li>12. Wear a face shield in addition to safety glasses when using tools that may cause flying debris.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Hand tools</li> <li>2. Power tools, chain saw</li> <li>3. Site barriers (tape, fencing)</li> <li>4. Bulldozer</li> </ol>	<ol style="list-style-type: none"> <li>1. PPE Program</li> <li>2. Hearing Conservation Program</li> <li>3. Heavy equipment operation</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect hand tools for excessive wear and loose parts.</li> <li>2. Inspect heavy equipment and power tools for function of safety features and general assembly.</li> <li>3. Coordinate with USACE representatives to identify existing utilities prior to the start of work.</li> </ol>

**TABLE 7-3  
ACTIVITY-HAZARD ANALYSIS**

**Activity:            Confined Space Entry**

**Analyzed By/Date:  
Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98  
Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Prepare a confined space entry permit.</li> <li>2. Open lift station or provide ladder access to excavation.</li> <li>3. Perform confined space monitoring for organic vapors, combustible gases, and oxygen levels.</li> <li>4. If needed, turn on portable ventilation system and allow venting to &lt;10% LEL, 20.8% oxygen, and &lt;10 ppm VOCs.</li> <li>5. Setup protection around confined space entrance if needed (e.g., manhole entrances).</li> <li>6. Entry personnel access confined space for sampling, cleaning, plugging, or video work.</li> <li>7. Continue confined space monitoring throughout entry work.</li> </ol>	<ol style="list-style-type: none"> <li>1. Splash potential; contact with contaminated materials or liquids.</li> <li>2. Oxygen-deficient atmospheres.</li> <li>3. Build-up of combustible gases.</li> <li>4. Exposure to contaminant build-up.</li> <li>5. Physical injury from the use of hand tools.</li> <li>6. Electric shock from energized equipment.</li> <li>7. Slips, trips, falls.</li> <li>8. Muscle strain from improper lifting.</li> </ol>	<ol style="list-style-type: none"> <li>1. Air monitoring for VOCs, combustible gases, and oxygen levels must be performed prior to and during confined space entry.</li> <li>2. PPE to be worn during confined space entry will be chosen based on the results of initial monitoring.</li> <li>3. Personnel will not enter a confined space unless appropriate entry procedures have been followed. Implement Division Confined Space Entry Program.</li> <li>4. If a confined space contains standing water, electricity must be turned off prior to entering.</li> <li>5. All artificial lights, motor, extension cords, switches, etc. must meet the requirements of NFPA 70.</li> <li>6. Follow proper lifting techniques.</li> <li>7. Keep walking surfaces free from tripping and slipping hazards.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. OVM</li> <li>2. CGI/Oxygen Level Meter</li> <li>3. Portable ventilation system</li> <li>4. Intrinsically safe/waterproof lighting, extension cords, etc.</li> <li>5. Hand tools</li> <li>6. Manhole protection gate</li> <li>7. Ladders</li> <li>8. Radios (if needed)</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Monitoring equipment operation</li> <li>3. PPE Program</li> <li>4. Hearing Conservation Program</li> <li>5. Respiratory Protection Program</li> <li>6. Confined Space Entry Program</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect hand tools for excessive wear and loose parts.</li> <li>3. Perform confined space entry procedures in accordance with Division program.</li> </ol>

**TABLE 7-4  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Removal of Liquids and Sludges from Sewer Lift Stations

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>7.1 PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Open covers to lift stations.</li> <li>2. Monitor atmospheric conditions within lift stations.</li> <li>3. Don appropriate PPE.</li> <li>4. If entry is required, follow confined space entry (CSE) procedures (Table 7-3).</li> <li>5. Pump standing liquid out of the lift stations into a temporary storage vessel. Do not completely remove liquids so as to avoid mixing of liquid and sludge.</li> <li>6. Use a vacuum truck to remove sediment/sludge from lift stations and transport to a temporary container.</li> <li>7. Sample and characterize liquid and solid wastes.</li> <li>8. Stabilize wastes, as necessary.</li> <li>9. Transport characterized wastes off-site for disposal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to volatilizing site contaminants or explosive atmospheres, or oxygen-deficient atmospheres (if CSE is performed).</li> <li>2. Slips, trips, falls.</li> <li>3. Contact with contaminated materials.</li> <li>4. Electric shock from pumps or generators.</li> <li>5. Vehicular accidents/collisions.</li> <li>6. Excessive noise exposure due to vacuum truck use.</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform air monitoring for VOCs; combustible gases and oxygen deficiency (if CSE is performed).</li> <li>2. Wear Modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry.</li> <li>3. Avoid contact with potentially contaminated materials.</li> <li>4. Monitor work for good housekeeping practices.</li> <li>5. Provide hearing protection.</li> <li>6. Keep walking surfaces free from tripping and slipping hazards.</li> <li>7. Do not plug/unplug energized equipment with wet hands.</li> <li>8. Keep plugs, receptacles, or other energized equipment out of water unless they are approved for submersion.</li> <li>9. Use intrinsically safe equipment if atmospheric measurements indicate the presence of flammable or combustible gases.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. OVM</li> <li>2. CGI</li> <li>3. Pump and generator</li> <li>4. Drums and/or storage tanks</li> <li>5. Ladders</li> <li>6. Lights</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Monitoring equipment operation</li> <li>3. PPE Program</li> <li>4. Hearing Conservation Program</li> <li>5. Respiratory Protection Program</li> <li>6. Confined Space Entry Program</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect power tools for function of safety features (e.g., shut-off, GFCI, etc.) and general assembly (e.g., frayed wires, loose connections, etc.)</li> <li>3. Inspect electrical equipment for approved use in a wet environment.</li> </ol>

**TABLE 7-5  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Excavation of Access Points Or Pipeline  
Segments along TNT Pipelines and Sewer Lines

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Identify access point via historical diagrams or from video analysis of piping system.</li> <li>2. Excavate trench to specified depth. (Note: Excavations greater than 4 feet will require confined space entry (CSE) per Table 7-3.)</li> <li>3. Stage spoil pile away from work area.</li> <li>4. Avoid contact with pipeline and sewer lines to the extent possible.</li> <li>5. Inspect excavation upon completion.</li> <li>6. Install erosion and sediment controls.</li> </ol>	<ol style="list-style-type: none"> <li>1. Slips, trips, falls.</li> <li>2. Vehicle accidents or collisions.</li> <li>3. Physical impact/injury from heavy equipment or hand tools.</li> <li>4. Contact with overhead or underground utilities.</li> <li>5. Exposure to site contaminants, explosive, or oxygen-deficient atmospheres.</li> <li>6. Heavy equipment slides/falls into excavation.</li> <li>7. Personnel fall into excavation.</li> <li>8. Excavation cave-in.</li> <li>9. Muscle strain from improper lifting.</li> <li>10. Excessive noise exposure.</li> <li>11. Exposure to explosive residues.</li> </ol>	<ol style="list-style-type: none"> <li>1. Survey work area for slip/trip/fall hazards.</li> <li>2. Monitor work area for good housekeeping.</li> <li>3. Ensure that equipment operator acknowledges a pedestrian's presence before walking near heavy equipment in operation.</li> <li>4. Equipment operators should look in the direction of travel; look before backing up.</li> <li>5. Survey work area for overhead and underground utilities prior to start of work.</li> <li>6. Work upwind and perform air monitoring for VOCs, oxygen levels, and combustible gases.</li> <li>7. Wear modified Level D PPE. Upgrade as necessary.</li> <li>8. Provide hearing protection.</li> <li>9. A competent person must supervise the excavation and inspect it daily prior to work. Check excavation for signs of instability.</li> <li>10. Do not stand, work, or travel beneath loads.</li> <li>11. Utilize a warning system if equipment is operated in or adjacent an excavation.</li> <li>12. Any trench deeper than 4 feet will also be considered a confined space.</li> <li>13. Cease work upon discovery of crystalline material. Work area will be subsequently clean by subcontracted explosives expert.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. OVM</li> <li>2. CGI/Oxygen Level Meter</li> <li>3. Excavator</li> <li>4. Silt fence</li> <li>5. Hay bales</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Heavy equipment operation</li> <li>3. Monitoring equipment operation</li> <li>4. Excavation safety</li> <li>5. PPE Program</li> <li>6. Hearing Conservation Program</li> <li>7. Respiratory Protection Program</li> <li>8. Confined Space Entry Program</li> <li>9. Explosive Safety Program</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect heavy equipment for function of safety features and general assembly.</li> <li>3. Inspect excavation each day in accordance with OSHA 1926, Part P.</li> <li>4. If required, perform confined space entry in accordance with OSHA 1910.146 and Division Confined Space Entry Program.</li> </ol>

**TABLE 7-6  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Investigation of Pipeline Integrity  
Using Video Cameras

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Open covers to lift stations.</li> <li>2. Monitor atmospheric conditions within lift stations.</li> <li>3. Don appropriate PPE.</li> <li>4. If entry is required, follow confined space entry procedures (Table 7-3).</li> <li>5. Insert video camera into pipeline.</li> <li>6. Feed camera into main trunk line to identify potential openings that could lead to a release of contaminants during system flushing activities.</li> <li>7. Mark potential openings on a site diagram.</li> <li>8. Remove camera from trunk line.</li> <li>9. Decontaminate video equipment (Table 7-6).</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to volatilizing site contaminants or explosive atmospheres.</li> <li>2. Slips, trips, falls.</li> <li>3. Contact with contaminated materials.</li> <li>4. Electric shock from video or associated equipment.</li> <li>5. Explosion from crystallized TNT or other explosive materials.</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform air monitoring for VOCs and combustible gases.</li> <li>2. Wear Modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry.</li> <li>3. Avoid contact with potentially contaminated materials.</li> <li>4. Monitor work for good housekeeping practices.</li> <li>5. Keep walking surfaces free from tripping and slipping hazards.</li> <li>6. Do not plug/unplug energized equipment with wet hands.</li> <li>7. Keep plugs, receptacles, or other energized equipment out of water unless they are approved for submersion.</li> <li>8. Use intrinsically safe equipment if atmospheric measurements indicate the presence of flammable or combustible gases.</li> <li>9. Cease examination of piping upon discovery of crystalline materials. Await recommendation of explosives expert prior to further actions.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. OVM</li> <li>2. CGI</li> <li>3. Video camera assembly</li> <li>4. Generator</li> <li>5. Ladders</li> <li>6. Lights</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Monitoring equipment operation</li> <li>3. PPE Program</li> <li>4. Hearing Conservation Program</li> <li>5. Respiratory Protection Program</li> <li>6. Confined Space Entry Program</li> <li>7. Explosives Safety Program</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect tools for function of safety features (e.g., shut-off, GFCI, etc.) and general assembly (e.g., frayed wires, loose connections, etc.)</li> <li>3. Inspect electrical equipment for approved use in a wet environment.</li> </ol>

**TABLE 7-7  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Power Washing of Sewer Lift Stations,  
Sewer Lines, and TNT Pipelines

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Open covers to lift stations or access pipelines via excavated openings.</li> <li>2. Monitor atmospheric conditions within openings.</li> <li>3. Don appropriate PPE.</li> <li>4. If entry is required, follow confined space entry procedures.</li> <li>5. Power wash interior of lift stations and trunk lines with a high-pressure water system capable of removing sediments from the line without damaging the walls of the lift station or pipeline. Perform washing at preset intervals to maximize effectiveness of power wash system.</li> <li>6. Use bottom of lift stations as a sump to trap wash water, or create a lined sump where excavation is necessary.</li> <li>7. Pump accumulated wash water into a temporary truck or tank.</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to volatilizing site contaminants or explosive atmospheres.</li> <li>2. Slips, trips, falls.</li> <li>3. Contact with contaminated materials.</li> <li>4. Electric shock from pumps or generators.</li> <li>5. Vehicular accidents/collisions.</li> <li>6. Excessive noise exposure due to pump/generator use.</li> <li>7. Cutting hazards from use of high-pressure wand.</li> </ol>	<ol style="list-style-type: none"> <li>1. Perform air monitoring for VOCs and combustible gases.</li> <li>2. Wear Modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry.</li> <li>3. Avoid contact with potentially contaminated materials.</li> <li>4. Monitor work for good housekeeping practices.</li> <li>5. Provide hearing protection.</li> <li>6. Keep walking surfaces free from tripping and slipping hazards.</li> <li>7. Avoid contact with high-pressure water stream.</li> <li>8. Do not plug/unplug energized equipment with wet hands.</li> <li>9. Keep plugs, receptacles, or other energized equipment out of water unless they are approved for submersion.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. OVM</li> <li>2. CGI</li> <li>3. Pump and generator</li> <li>4. Pressure washer</li> <li>5. Storage tanks</li> <li>6. Ladders</li> <li>7. Lights</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Monitoring equipment operation</li> <li>3. PPE Program</li> <li>4. Hearing Conservation Program</li> <li>5. Respiratory Protection Program</li> <li>6. Confined Space Entry Program</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect power tools for function of safety features (e.g., shut-off, GFCI, etc.) and general assembly (e.g., frayed wires, loose connections, etc.)</li> <li>3. Inspect electrical equipment for approved use in a wet environment.</li> </ol>



**TABLE 7-8  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Demolish and Removal of Concrete Structures in/and Adjacent to WWTP      **Analyzed By/Date:** Millard P. Griffin, Jr., CIH, CSP – 12/98  
**Reviewed By/Date:** Margaret Mikulich – 12/98

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Ensure all water and wastewater has been pumped out of the structures and into a holding tank</li> <li>2. Ensure structures have been cleaned.</li> <li>3. Using a trackhoe equipped with a breaker, demolish the bottom of each concrete structure, rendering them incapable of retaining liquids.</li> <li>4. Load the pieces of debris into roll-off boxes.</li> <li>5. Dispose of off-site as construction debris.</li> <li>6. If entry is required and the structures meet the criteria of a confined space, follow confined space entry procedures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to site contaminants.</li> <li>2. Slips, trips, falls.</li> <li>3. Physical impact/struck by heavy equipment, moving vehicles, and flying debris.</li> <li>4. Muscle strain from improper lifting.</li> <li>5. Physical injury due to hand or power tool use.</li> <li>6. Vehicular accidents/collisions.</li> <li>7. Excessive noise exposure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Arrange traffic to avoid personnel having to cross the route of heavy equipment or moving loads.</li> <li>2. Equipment operators should look in the direction of travel; look before backing up.</li> <li>3. Personnel are not permitted to walk, work, or travel beneath loads.</li> <li>4. Wear Level D PPE and heavy work gloves.</li> <li>5. Wear a face shield when operating the pavement breaker.</li> <li>6. Provide hearing protection and sound level monitoring.</li> <li>7. Follow proper lifting techniques; no manual lifting of heavy loads.</li> <li>8. Power tools must have a shut-off switch.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Pavement breaker, trackhoe</li> <li>2. Hand and power tools</li> <li>3. Roll-off boxes</li> <li>4. SLM</li> </ol>	<ol style="list-style-type: none"> <li>1. Monitoring equipment operation</li> <li>2. PPE Program</li> <li>3. Hearing Conservation Program</li> <li>4. Heavy equipment operation</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect heavy equipment and power tools for function of safety features and general assembly.</li> <li>3. Inspect hand tools for excessive wear and loose parts.</li> </ol>

**TABLE 7-9  
ACTIVITY-HAZARD ANALYSIS**

**Activity: Demolish WWTP**

**Analyzed By/Date:  
Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98  
Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Establish an exclusion zone.</li> <li>2. Verify all utilities to building have been shut off, capped, or otherwise controlled outside the building.</li> <li>3. Verify building is clear of all personnel.</li> <li>4. Demolish building using a trackhoe or loader with a grapppler bucket.</li> <li>5. Break up any concrete walls, floors, or foundations with a ram attachment.</li> <li>6. Segregate building materials for characterization and disposal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Slips, trips, falls.</li> <li>2. Struck by falling/flying debris.</li> <li>3. Physical impact due to building collapse.</li> <li>4. Physical impact/struck by heavy equipment or moving vehicles.</li> <li>5. Muscle strain from improper lifting.</li> <li>6. Contact with utilities (active in building, overhead, or underground).</li> <li>7. Physical injury due to hand or power tool use.</li> <li>8. Vehicular accidents/collisions.</li> <li>9. Excessive noise exposure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Arrange traffic to avoid personnel having to cross the route of heavy equipment or moving loads.</li> <li>2. Equipment operators should look in the direction of travel; look before backing up.</li> <li>3. Personnel are not permitted to walk, work, or travel beneath loads.</li> <li>4. Wear Level D PPE and heavy work gloves.</li> <li>5. Wear a face shield when operating the pavement breaker.</li> <li>6. Provide hearing protection and sound level monitoring.</li> <li>7. Follow proper lifting techniques; no manual lifting of heavy loads.</li> <li>8. Follow good housekeeping procedures; keep walking and working surfaces free of slip/trip/fall hazards.</li> <li>9. Evaluate location and condition of utilities prior to mobilizing heavy equipment.</li> <li>10. Confirm disconnection of all utilities prior top start of demolition.</li> <li>11. Do not climb on piles of debris.</li> <li>12. No one is permitted in the building during any portion of the demolition activities.</li> <li>13. Keep unnecessary personnel away from the work area during demolition activities.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Pavement breaker, trackhoe</li> <li>2. Loader</li> <li>3. Hand and power tools</li> <li>4. Roll-off boxes</li> <li>5. SLM</li> </ol>	<ol style="list-style-type: none"> <li>1. Monitoring equipment operation</li> <li>2. PPE Program</li> <li>3. Hearing Conservation Program</li> <li>4. Heavy equipment operation</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect heavy equipment and power tools for function of safety features and general assembly.</li> <li>3. Inspect hand tools for excessive wear and loose parts.</li> <li>4. Confirm utility clearance and disconnection prior to demolition.</li> </ol>

**TABLE 7-10  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Collect Water Samples

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Mobilize sampling equipment and containers.</li> <li>2. Extract sample from holding tank.</li> <li>3. Transfer to laboratory container.</li> <li>4. Package for transport to lab.</li> <li>5. Decontaminate or dispose of sampling equipment (Table 7-16).</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to volatilizing site contaminants.</li> <li>2. Slips, trips, falls.</li> <li>3. Dermal contact with contaminated materials.</li> <li>4. Muscle strain when extracting sampling equipment or lifting loaded coolers.</li> <li>5. Impacts or lacerations from tools or glassware.</li> </ol>	<ol style="list-style-type: none"> <li>1. Keep walking surfaces free from tripping and slipping hazards.</li> <li>2. Check load weights and use correct lifting procedures.</li> <li>3. Wear Level D PPE and chemical resistant gloves. If contact with contaminated material is likely, also wear latex overboots and tyvek.</li> <li>4. Perform air monitoring with OVM.</li> <li>5. Use vermiculite inside cooler to secure containers and contain spills.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Sample bottles</li> <li>2. OVM</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Monitoring equipment operation</li> <li>3. PPE Program</li> <li>4. US DOT training for shipment of environmental samples</li> <li>5. Hazard communication program</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect hand tools, sampling containers, and container storage.</li> </ol>

**TABLE 7-11  
ACTIVITY-HAZARD ANALYSIS**

**Activity:**           **Collect Soil Samples**

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Obtain an underground utility clearance.</li> <li>2. Using hand tools, shovels, or hand auger, dig hole to appropriate sample depth.</li> <li>3. Collect soil sample.</li> <li>4. Field screen each sample using OVM.</li> <li>5. Record soil characteristics.</li> <li>6. Fill appropriate sampling bottles.</li> <li>7. Decontaminate or dispose of sampling equipment (Table 7-16).</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to volatilizing site contaminants.</li> <li>2. Slips, trips, falls.</li> <li>3. Dermal contact with contaminated materials.</li> <li>4. Muscle strain during digging activities.</li> <li>5. Contact with underground utilities.</li> </ol>	<ol style="list-style-type: none"> <li>1. Keep walking surfaces free from tripping and slipping hazards.</li> <li>2. Work upwind; perform monitoring for VOCs.</li> <li>3. Wear Level D PPE and chemical resistant gloves. If contact with contaminated material is likely, also wear latex overboots and tyvek.</li> <li>4. Use hand tools and hand auger properly; avoid twisting your back and overexertion. Take turns digging.</li> <li>5. Underground utility clearance must be confirmed prior to start of sampling activities.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Hand auger, shovels, trowels</li> <li>2. Sample bottles</li> <li>3. OVM</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Monitoring equipment operation</li> <li>3. PPE Program</li> <li>4. US DOT training for shipment of environmental samples</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect hand tools for excessive wear and loose parts</li> </ol>

**TABLE 7-12  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Collect Wipe Samples

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Mobilize sampling equipment and containers.</li> <li>2. Where entry into a confined space is required, implement confined space entry procedures (Table 7-3).</li> <li>3. Don appropriate PPE.</li> <li>4. Place template upon desired sampling location.</li> <li>5. Use methanol-moistened gauze pad and wipe a 10-cm x 10-cm area.</li> <li>6. Transfer gauze pad to a clean container.</li> <li>7. Package sample containers for transport to lab.</li> <li>8. Decontaminate sampling template.</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to volatilizing site contaminants.</li> <li>2. Slips, trips, falls.</li> <li>3. Dermal contact with contaminated materials.</li> <li>4. Muscle strain during sampling activities.</li> <li>5. Struck by falling objects.</li> <li>6. Impacts or lacerations from tools.</li> </ol>	<ol style="list-style-type: none"> <li>1. Keep walking surfaces free from tripping and slipping hazards.</li> <li>2. Air monitoring for VOCs, combustible gases, and oxygen levels must be performed prior to and during confined space entry.</li> <li>3. Wear modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry.</li> <li>4. Check load weights and use correct lifting procedures.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Sample containers</li> <li>2. Clean gauze pads</li> <li>3. Methanol</li> <li>4. Phthalate-free gloves</li> <li>5. OVM</li> <li>6. Stainless steel or aluminum template</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Monitoring equipment operation</li> <li>3. PPE Program</li> <li>4. US DOT training for shipment of environmental samples</li> <li>5. Confined space entry program</li> <li>6. Hazard communication program</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect tools, sampling containers, and storage containers.</li> </ol>

**TABLE 7-13  
ACTIVITY-HAZARD ANALYSIS**

**Activity:**           **Sealing of Pipeline Tie-Ins and Placement  
Of Pipeline Plugs**

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Identify access point via historical diagrams or from video analysis of piping system.</li> <li>2. Excavate to point of tie-in or plug placement (Table 7-5).</li> <li>3. Open pipeline at site of tie-in or plug placement.</li> <li>4. Install a plug of cement grout at the required point.</li> <li>5. Where applicable, install a bentonite grout collar around the pipeline to prevent contaminant transmission along the exterior of the pipeline.</li> </ol>	<ol style="list-style-type: none"> <li>1. Slips, trips, falls.</li> <li>2. Physical impact/injury from heavy equipment or hand tools.</li> <li>3. Exposure to site contaminants, explosive, or oxygen-deficient atmospheres.</li> <li>4. Equipment slides/falls into excavation.</li> <li>5. Personnel fall into excavation.</li> <li>6. Excavation cave-in.</li> <li>7. Muscle strain from improper lifting.</li> <li>8. Exposure to sealant/plug materials.</li> </ol>	<ol style="list-style-type: none"> <li>1. Survey work area for slip/trip/fall hazards.</li> <li>2. Monitor work area for good housekeeping.</li> <li>3. Wear modified Level D PPE. Upgrade as necessary.</li> <li>4. A competent person must supervise the excavation and inspect it daily prior to work. Check excavation for signs of instability.</li> <li>5. Any trench deeper than 4 feet will also be considered a confined space. Implement Confined Space Entry Procedures (Table 7-3).</li> <li>6. Practice safe lifting techniques.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. OVM</li> <li>2. CGI/Oxygen Level Meter</li> <li>3. Sealant/plug materials.</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Monitoring equipment operation</li> <li>3. Excavation safety</li> <li>4. PPE Program</li> <li>5. Confined Space Entry Program</li> <li>6. Explosive Safety Program</li> <li>7. Hazard communication</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect equipment for function of safety features and general assembly.</li> <li>3. Inspect excavation each day in accordance with OSHA 1926, Part P.</li> <li>4. If required, perform confined space entry in accordance with OSHA 1910.146 and Division Confined Space Entry Program.</li> </ol>

**TABLE 7-14  
ACTIVITY-HAZARD ANALYSIS**

**Activity:**           **Sealing of Chemical Waste Sewer System**

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Identify manholes at chemical lift stations along chemical waste sewer pipeline.</li> <li>2. Replace manhole covers at each chemical lift station.</li> <li>3. Inspect covers to be welded.</li> <li>4. Prepare a Radian Hot Work Permit.</li> <li>5. Don appropriate hot work PPE.</li> <li>6. Light torch or power to weld source.</li> <li>7. Weld manhole cover seams.</li> <li>8. Grind welds</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact burns from flame or weld source.</li> <li>2. Ignition of fuel lines or gas cylinders.</li> <li>3. Knock over gas cylinders.</li> <li>4. Inhalation of welding fumes or fuels.</li> <li>5. Inhalation of grinding dusts.</li> <li>6. Physical injury/impact from grinding or power tools.</li> <li>7. Slips, trips, falls.</li> <li>8. Fires.</li> </ol>	<ol style="list-style-type: none"> <li>1. Survey work area for slip/trip/fall hazards.</li> <li>2. Wear hot work PPE (welder’s coveralls, gloves, and welder’s goggles with correct filters).</li> <li>3. Ensure that gas cylinders are secured and supply lines are untangled and out of the way.</li> <li>4. A minimum of two 10-B:C fire extinguishers will be available.</li> <li>5. Wear respiratory protection recommended by the manufacturer of the welding rods, as necessary.</li> <li>6. Perform hot work in accordance with Division program.</li> <li>7. Provide air monitoring.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Welding torch and rods.</li> <li>2. Acetylene-oxygen or high voltage power source.</li> <li>3. Welding goggles, hot work PPE</li> <li>4. Fire extinguishers</li> <li>5. Grinding tool</li> <li>6. Gas generator</li> <li>7. GFCI</li> </ol>	<ol style="list-style-type: none"> <li>1. Hot Work Program</li> <li>2. Hazard communication program</li> <li>3. PPE Program</li> <li>4. Respiratory Protection Program</li> <li>5. Fire watch; use of fire extinguishers</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect welding equipment including gas cylinders, hoses, power source, and torch.</li> <li>2. Inspect work area for fire watch and presence of flammable materials.</li> <li>3. Inspect hand tools for excessive wear and loose parts.</li> <li>4. If high voltage used, inspect GFCI for proper functioning.</li> </ol>

**TABLE 7-15  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Backfill and Compaction of Excavations

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Ensure that fill material has been tested and is adequate to meet site-specific requirements.</li> <li>2. Have dump truck leave fill material in or near excavation.</li> <li>3. Place or distribute backfill in excavation in 8 to 10 inch lifts.</li> <li>4. Compact lifts as required by project specifications.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inhalation of nuisance dust.</li> <li>2. Exposure to site contaminants.</li> <li>3. Slips, trips, falls.</li> <li>4. Struck by falling loads.</li> <li>5. Physical impact/struck by heavy equipment or moving vehicles.</li> <li>6. Muscle strain from improper use of compaction equipment.</li> <li>7. Vehicular accidents/collisions.</li> <li>8. Excessive noise exposure.</li> <li>9. Metatarsal foot protectors to prevent injuries to feet during compaction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Arrange traffic to avoid personnel having to cross the route of heavy equipment or moving loads.</li> <li>2. Equipment operators should look in the direction of travel; look before backing up.</li> <li>3. Personnel are not permitted to walk, work, or travel beneath loads.</li> <li>4. Wear Level D PPE.</li> <li>5. Provide hearing protection and sound level monitoring.</li> <li>6. Monitoring for dust levels; utilize dust suppression or modify work practices if action levels are exceeded.</li> <li>7. Personnel shall wear high visibility vests when working adjacent to moving equipment.</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Dump trucks</li> <li>2. Heavy equipment</li> <li>3. Vibrating or hand operated rolling compactors</li> <li>4. Dust monitor</li> <li>5. SLM</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. Hazard communication</li> <li>3. Monitoring equipment operation</li> <li>4. PPE Program</li> <li>5. Hearing Conservation Program</li> <li>6. Heavy equipment operation</li> <li>7. CDL for dump truck drivers</li> </ol>	<ol style="list-style-type: none"> <li>1. Calibrate monitoring equipment.</li> <li>2. Inspect heavy equipment and compactors for function of safety features and general assembly.</li> </ol>



**TABLE 7-16  
ACTIVITY-HAZARD ANALYSIS**

**Activity:** Decontaminate Sampling and Heavy Equipment

**Analyzed By/Date:**  
**Reviewed By/Date:**

**Millard P. Griffin, Jr., CIH, CSP – 12/98**  
**Margaret Mikulich – 12/98**

<b>PRINCIPLE STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED CONTROLS</b>
<ol style="list-style-type: none"> <li>1. Move equipment to be washed onto decontamination pad.</li> <li>2. Wash affected areas of heavy equipment (e.g., tires) with pressurized steam spray; brush off loose debris.</li> <li>3. Hand wash sampling equipment with non-phosphate soap solution and scrub brush; rinse with tap water and deionized water.</li> <li>4. Allow equipment to dry. Wrap sampling equipment and store in clean location.</li> <li>5. Shovel collected sediments into 55-gallon drum.</li> <li>6. Pump wastewater into holding tank.</li> </ol>	<ol style="list-style-type: none"> <li>1. Exposure to site contaminants or contaminated water.</li> <li>2. Slips, trips, falls.</li> <li>3. Muscle strains from lifting/cleaning.</li> <li>4. Heat burns from contact with high-pressure steam.</li> <li>5. Excessive noise exposure due to generator use.</li> </ol>	<ol style="list-style-type: none"> <li>1. <u>Heavy Equipment</u>: Wear modified Level D PPE (including poly-coated tyvek or PVC rain suit, chemical resistant over-boots and gloves) and a face shield.</li> <li>2. <u>Sampling equipment</u>: Wear Level D PPE and chemical resistant gloves. If contact with contaminated material is likely, also wear a poly-coated tyvek.</li> <li>3. If equipment is excessively contaminated, Level C respiratory protection may be required.</li> <li>4. Site workers designated to perform decontamination of equipment will be knowledgeable of proper steam cleaning methods.</li> <li>5. Monitor work for good housekeeping practices.</li> <li>6. Provide hearing protection.</li> <li>7. Follow proper lifting techniques.</li> <li>8. As much as possible, keep decontamination pad free from slipping hazards (e.g., mud, and water).</li> </ol>
<b>EQUIPMENT TO BE USED</b>	<b>TRAINING REQUIREMENTS</b>	<b>INSPECTION REQUIREMENTS</b>
<ol style="list-style-type: none"> <li>1. Pressurized steam cleaner</li> <li>2. Hand tools, scrub brushes</li> <li>3. Drums and/or holding tanks</li> <li>4. Non-phosphate soap</li> </ol>	<ol style="list-style-type: none"> <li>1. HAZWOPER</li> <li>2. PPE Program</li> <li>3. Hearing Conservation Program</li> <li>4. Hazard Communication Program</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect integrity of decontamination pad liner and berm.</li> <li>2. Inspect steam cleaner for loose connections, frayed parts, etc.</li> <li>3. Ensure that stored flammable materials do not present a fire hazard.</li> </ol>

## 8.0 SITE CONTROL MEASURES

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### 8.1 Site Zones

The interim removal actions at the LOOW will be set up based on a modified site zone system to control the potential spread of contamination. The Exclusion Zone and Contamination Reduction Zone will be identified prior to the start of each task. These zones will be removed once the task is finished, and established at the next work area. The Support Zone will be considered to be all non-contaminated areas outside the operations.

#### 8.1.1 Support Zone

Figure 8-1 shows the Support Zone (SZ), which is the non-contaminated area, and will be separated from the Contamination Reduction Zone. A portion of the SZ may be established at each individual task. The main SZ contains the Command Post, which provides a center for team communications and emergency response. Appropriate sanitary, safety, and support equipment is also located in this zone. Site operations will be controlled from this location, and the Command Post may also function as an evacuation point. A log will be kept in the SZ of all personnel entering and exiting the site. Potentially contaminated personnel, equipment, or material are not allowed in the SZ except in the form of appropriately packaged, decontaminated, and labeled samples. Meteorological conditions should be observed from this zone, including those factors pertinent to heat and cold stress.

#### 8.1.2 Contamination Reduction Zone

A Contamination Reduction Zone (CRZ) will be established between the Exclusion Zone and the SZ, as shown in Figure 8-1. The CRZ provides for personnel, portable equipment, and sampling equipment decontamination. The CRZ will be used for general site entry and exit, donning and removing PPE, and as an access point for heavy equipment. The CRZ may also contain safety and emergency equipment, such as an emergency eyewash, fire extinguisher, and first aid kit. If required, the heavy equipment decontamination pad will also be constructed in this area.

Figure 8-1 Typical Configuration of Work Zones

### **8.1.3 Exclusion Zone/Safety Exclusion Area**

The area(s) that contain, or are suspected to contain hazardous material, including OE will be considered the Exclusion Zone (EZ). Prior to the start of each task, the EZ “hot line” will be clearly identified using caution flagging tape or traffic cones. The size of the EZ will depend on the task. The HSO may establish more than one restricted area within an EZ if different levels of protection are being used or if different hazards exist. All areas where invasive work activities occur will be considered to be an EZ. Personnel are not allowed in the EZ without:

- A buddy;
- Appropriate PPE;
- Current OSHA medical authorization;
- Current OSHA training certification; and
- Applicable explosives training (if necessary).

## **8.2 Communications**

### **8.2.1 Telephone**

Successful communication between site personnel in the EZ/CRZ and the SZ, and between site personnel and local emergency response agencies is essential. A telephone will be available on-site for emergency use. Emergency numbers will be posted by the telephone (Table 12-1 in Section 12.0 lists the site emergency telephone numbers). Work will not be conducted on-site without access to a telephone, and site personnel will be informed of the nearest available telephone.

### **8.2.2 Air Horns**

An air horn will be kept at the Command Post and with each team for emergency alerting purposes. Refer to Section 12.17 for detailed emergency air horn communication procedures.

### **8.2.3 Hand Signals**

Site workers may use hand signals as part of the buddy system. If verbal communication between site workers is impeded by background noise or the use of PPE, then hand signals can

be used to communicate a problem. Site workers will be instructed on the correct use of hand signals as part of the initial site-specific safety training.

HAND SIGNAL	MEANING
Hand gripping throat	Out of air; cannot breathe
Grip buddy’s wrist or place both hands around buddy’s arm	Leave area <u>immediately</u>
Hands on top of head	Need assistance
Thumbs up	Yes; OK; I am all right
Thumbs down	No; negative; I have a problem

### 8.3 Site Access and Security

Entry and exit from the site will only be permitted through designated access points, except during an emergency, or when authorized by the HSO. Site entry will be limited to authorized personnel. The need for additional security measures will be determined during project mobilization, based on an evaluation of the security measures already in place at the LOOW. “Hazardous Work Area - Keep Out/No Trespassing” signs will be posted on the perimeter fence. The signs will be posted at least every 300 feet on all fenced sides of the project site.

## 9.0 PERSONAL PROTECTIVE EQUIPMENT

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### 9.1 General

PPE will be worn to minimize personnel exposure to site contaminants. Decision-making criteria for PPE requirements include:

- Site historical information;
- Type of contaminants suspected or known;
- Work location;
- Duration of activities;
- Type of task to be performed; and
- OSHA, USACE, or Radian requirements.

The level of protection worn by site personnel will be enforced by the HSO. Levels of protection may be upgraded or downgraded at the discretion of the HSO, based on real-time air monitoring data and prior site experience. Any changes in the level of protection will be recorded in the HSO's log book. Initial levels of protection assigned for each site-specific project task will be outlined in the site-specific addendum to the SSHP. Levels of protection less than those designated in the SSHP or site-specific addendum to the SSHP must first be approved by the RHSM.

### 9.2 Level D Protection

Level D PPE provides minimal protection against chemical hazards, and should not be worn in any area with respiratory or skin hazards. A respirator is not required. Level D PPE includes the following items:

- Cotton coveralls or long pants and a shirt with sleeves;
- Hard hat;
- Safety glasses;
- Steel-toe/steel-shank work boots;
- Work gloves, as required; and
- Hearing protection, as required.

### 9.3 Modified Level D Protection

Modified Level D PPE includes all items listed in Section 9.2 above, and a selection of one or more of the following items:

- Regular (white) or poly-coated tyvek (yellow) or PVC rain suit;
- Goggles or face shield;
- Chemical resistant over-boots *or* chemical resistant steel-toe/steel-shank boots;
- Inner latex (i.e., surgical) gloves;
- Chemical resistant outer gloves (Teflon® preferred); and/or
- Seal arm and leg joints with tape, as required.

#### **9.4 Level C Protection**

Level C PPE provides a higher level of respiratory and skin protection against chemical hazards.

Level C PPE includes the items listed in Section 9.2 above, and the following items:

- Regular (white) or poly-coated tyvek (yellow) or PVC rain suit;
- Chemical resistant over boots or chemical resistant steel-toe/steel-shank boots;
- Inner latex (i.e., surgical) gloves;
- Chemical resistant outer gloves (Teflon® preferred);
- Seal arm and leg joints with tape, as required; and
- Full-face, air-purifying respirator; the type of respirator cartridges to be used will be determined based on the site-specific contaminants of concern.

#### **9.5 Level B Protection**

Level B PPE should be worn when the highest level of respiratory protection is required, but a lesser level of skin protection is needed. Level B includes the items listed in Section 9.4, as well as a pressure-demand self-contained breathing apparatus (SCBA).

#### **9.6 Level A Protection**

Level A PPE should be worn when the highest level of respiratory and skin protection is needed, or the contaminants of concern are unknown. The interim removal activities at the LOOW should not require the use of Level A PPE. If the use of Level A is required, PPE requirements will be outlined in an addendum to the SSHP.

## 10.0 EXPOSURE MONITORING AND AIR SAMPLING PROGRAM

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### 10.1 General

This section describes the elements of the exposure monitoring program for the interim removal activities at the LOOW. The monitoring program includes suspected contaminants of concern to be monitored, the type of equipment required, and action levels to be used.

Based on general site historical information, the following types of monitoring may be required:

- Volatile organic compound (VOC) levels (real-time and/or personnel);
- Combustible gas levels (real-time);
- Dust monitoring (real-time and/or personnel);
- Noise (real-time and/or personnel); and
- Contaminant monitoring (personnel).

### 10.2 Real-Time Monitoring

Organic Vapor Meter (OVM): Real-time monitoring for VOCs will be conducted using an OVM equipped with a photoionization detector (PID). The OVM will be used to monitor employee breathing zones during all invasive activities, including (but not limited to):

- Soil/sludge/water sampling
- Excavation/trenching
- Confined space entry

Monitoring the employee's breathing zone will be conducted at least every 15 minutes until the HSO determines a more applicable schedule. The OVM will also be used to monitor local and area VOC readings during invasive work activities. VOCs will be monitored using a Thermo-Environmental Instruments, Inc. Model 580S OVM, or its equivalent. The lamp type will be evaluated for each site based on the suspected VOC contaminants of concern. The lamp type will be provided in each site-specific addendum to the SSHP. The 580S OVM has a detection limit of 0.1 ppm as isobutylene.

Combustible Gas Indicator (CGI)/Oxygen Level Meter: Real-time monitoring for combustible gases and oxygen levels will be conducted using a CGI/Oxygen Level Meter. The CGI will test for the presence of combustible gases by monitoring the lower explosive limit (LEL) of organic vapors. Real-time monitoring will be conducted prior to, and during, the following types of work activities:



- Confined space entry
- Work in an excavation/trench
- Local areas surrounding these work activities

The Oxygen Level Meter will be used to monitor for oxygen-deficient and oxygen-enriched atmospheres prior to any confined space entry and continuously during any confined space work.

The LEL and oxygen level will be monitored using a Mine Safety Appliance (MSA) CGI/Oxygen Level Meter, or its equivalent. The MSA CGI/Oxygen Level Meter has a detection limit of one percent (1%) LEL.

Respirable Dust Monitor: A respirable dust monitor will be used to periodically monitor the employee's breathing zone during any visibly dusty activities. A Mini-Ram PDM-3, or its equivalent, will be used to monitor respirable dust levels. The Mini-Ram can also be used to measure eight-hour Time-Weighted Average (TWA) exposures to respirable dust. The Mini-Ram has a detection limit of 0.001 mg/M<sup>3</sup>.

Sound Level Meter (SLM): At the discretion of the HSO, an SLM will be used to monitor employee noise levels during heavy equipment and power tool operation, and during other potentially noisy site activities. Hearing protection will be required for employees exposed to 85 decibels (dBA). A Metrosonics dB-307 SLM, or its equivalent, will be used on the A-scale/slow response, to monitor for noise levels.

Calibration of Real-Time Monitoring Equipment: Monitoring and calibration protocols will be performed in accordance with the manufacturer's guidelines. Calibration will be performed, at a minimum, prior to each day's use. A copy of each instrument's manual will be kept in the SZ. The following calibration methods will be used:

- The OVM will be calibrated using either a 100 ppm or a 250 ppm isobutylene span gas concentration.
- The CGI will be calibrated using a gas mixture which represents 50 percent (50%) LEL.
- The dust monitor will be zeroed using a "zero air" (dust-free) bag. It is not possible to field calibrate the dust monitor.
- The SLM will be calibrated using an acoustical calibrator with a known decibel level output.

### 10.3 Action Levels

Tables 10-1 through 10-4 list the action levels and action requirements for the OVM, CGI, dust monitor, and the SLM. Upgrading respiratory protection is based on maintaining the upper limit of the action level for approximately 1 to 5 minutes (i.e., a non-transient reading), or at the discretion of the HSO.

<b>TABLE 10-1 OVM ACTION LEVELS</b>	
<b>Meter Response</b>	<b>Action</b>
OVM response < 10 ppm above background	Level D respiratory protection (i.e., no respiratory protection is required)
OVM response > 10 ppm and < 100 ppm above background	Upgrade to Level C respiratory protection with organic vapor cartridges; add mechanical ventilation and allow to vent if working in a vault or lift station
OVM response > 100 ppm above background	Retreat from work area; add mechanical ventilation and allow to vent if working in a vault or lift station; consider upgrade to Level B respiratory protection if mechanical ventilation is unsuccessful

<b>TABLE 10-2 CGI ACTION LEVELS</b>	
<b>Meter Response</b>	<b>Action</b>
CGI response <10% LEL	Continue normal operations
CGI response >10% and <20% LEL	Eliminate all sources of ignition from work area; implement continuous monitoring
CGI response >20% LEL	Discontinue operations; allow to vent
Oxygen level < 19.5%	Retreat from work area; upgrade to Level B respiratory protection
Oxygen level > 23.5%	Retreat from work area; upgrade to Level B respiratory protection

<b>TABLE 10-3 NUISANCE DUST ACTION LEVELS</b>	
<b>Monitor Response</b>	<b>Action</b>
Dust Monitor response <1 mg/M <sup>3</sup>	No respiratory protection required (i.e., Level D)
Dust Monitor response >1 mg/M <sup>3</sup> and <5 mg/ M <sup>3</sup>	Implement dust control measures
Dust Monitor response >5 mg/M <sup>3</sup>	Level C respiratory protection with HEPA cartridges; improve dust control measures

<b>TABLE 10-4 SLM ACTION LEVELS</b>	
<b>Meter Response</b>	<b>Action</b>
SLM response <85 dBA	Proceed with periodic monitoring
SLM response >85 dBA	Hearing protection is required

#### **10.4 Heat/Cold Stress Monitoring**

Whenever the air temperature falls below 40 °F, the temperature and wind speed will be measured and recorded at least every 4 hours to assess conditions which may cause cold stress in site workers. The work-warning regimen located in the Radian Corporate Health and Safety Program will be used to prevent cold stress injuries. Refer to Section 12.15 for cold stress first aid procedures.

Whenever the air temperature exceeds 70 °F, the HSO will assess the conditions that may cause heat stress in site workers. Work-rest schedules for activities conducted in permeable clothing will be based on published American Conference of Governmental Industrial Hygienist (ACGIH) standards. Work-rest schedules for operations conducted in impermeable clothing, including poly-coated tyvek and saran-coated tyvek, will be conducted in accordance with the Corporate Health and Safety Program.

All site workers entering a controlled area of the site will be monitored for heat stress using one or more of the following techniques:

- Heart Rate - Take the radial pulse during a 30-second period as soon as possible during the rest period. If the heart rate exceeds 110 beats per minute, the following work cycle will be

shortened by one-third while the rest period remains constant. If a site worker experiences two consecutive heart rate readings above 110 bpm after the work/rest regimens, the worker will not be permitted to enter a controlled area until examined by the occupational physician.

- Oral Temperature - Measure at the beginning of the rest period. If the oral temperature exceeds 99.6 °F, the following work cycle will be shortened by one-third while the rest period remains constant. The employee will not be permitted to enter a controlled area if their oral temperature exceeds 100.4 °F.

### 10.5 Personnel Exposure Monitoring

At the discretion of the HSO, personnel exposure monitoring may be conducted depending on site conditions. This may include exposure monitoring for a variety of volatile and semivolatile organic compounds, TNT, 2,6-dinitrotoluene, nitrobenzene, and PCBs.

If collected, personnel exposure samples will be collected using the approved sampling methods and appropriate sampling media. Table 10-5 outlines sampling and analytical methods which may be used on this project.

<b>TABLE 10-5 PERSONNEL EXPOSURE MONITORING METHODS</b>		
<b>Contaminant</b>	<b>Sampling Media</b>	<b>Analytical Method</b>
Aliphatic Hydrocarbons	Charcoal tubes	NIOSH 1500
Aromatic Hydrocarbons	Charcoal tubes	NIOSH 1501
Halogenated Hydrocarbons	Charcoal tubes	NIOSH 1003
Polynuclear Aromatic Hydrocarbons	Teflon filters and XAD-2 sorbent tubes	NIOSH 5506
TNT/2,6-dinitrotoluene	Glass fiber filters and Tenax sorbent tubes	OSHA 44
Nitrobenzene	Silica gel tubes	NIOSH 2005
Polychlorinated biphenyls (PCBs)	Glass fiber filters and Florisil sorbent tubes	NIOSH 5503

Samples will be collected within the employees' breathing zone (4 to 6 feet above ground level). Air will be drawn through the sampling media via a battery-operated pump system calibrated to the airflow required by the individual sampling and analytical method. Pumps will be calibrated

before and after use with a primary calibration standard (e.g., bubble tube or calibrated precision manometer) with a representative sampling train in place. Calibration data, along with information regarding the sample, will be recorded on an Employee Exposure Monitoring Form (Attachment A).

The results of analysis will be compared with applicable OSHA PELs. Decisions on upgrades of PPE or changes in work practice will be made by the HSO, with input from the RCM/PjM and the RHSM. The results of analysis will be posted for employee review within 15 days of monitoring.

## **11.0 PERSONNEL HYGIENE AND DECONTAMINATION**

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### **11.1 Contamination Prevention**

One of the most important aspects of decontamination is the prevention of contamination. Good contamination prevention should minimize worker exposure and help ensure valid sample results by preventing cross-contamination. Procedures for personnel contamination prevention include:

- Do not walk through areas of obvious or known contamination.
- Do not handle or touch contaminated materials directly.
- Make sure all PPE is free of cuts or tears prior to donning.
- Fasten all closure on suits, covering with tape if necessary.
- Particular care should be taken to protect any skin injuries. If open wounds exist on hands or forearms, handling contaminated materials or samples should be restricted.
- Stay upwind of airborne contaminants.
- Do not carry cigarettes, gum, chewing tobacco, cosmetics, etc. into potentially contaminated areas.

Procedures for prevention of contamination of equipment include:

- Take care to limit the amount of contamination that comes in contact with heavy equipment.
- If contaminated tools are to be placed on non-contaminated equipment for transport, use plastic to keep non-contaminated surfaces clean.

### **11.2 Personnel Decontamination**

A personnel decontamination station will be set-up at the entrance of the CRZ. All site personnel exiting the EZ will pass through the CRZ decontamination station to remove any used PPE, wash outer boots and gloves (if worn), and clean respirators (if worn).

To reduce the volume of decontamination water generated, most PPE will be discarded, instead of cleaned and reused. Generation of decontamination water should be minimized whenever possible. The following nine steps will be taken for personnel decontamination when site personnel exit the EZ through the CRZ. The decontamination set-up is subject to modification by the HSO.

STEP	PERSONNEL DECONTAMINATION PROCEDURE
1	Deposit all equipment and tools used in the EZ onto plastic sheeting or into plastic-lined containers
2	Scrub outer boots, any soiled PPE (i.e., outer gloves, tyvek) thoroughly with a soapy wash solution and a scrub brush. Rinse off boots and PPE.
3	Remove tape from around boots and sleeves and dispose of into a plastic-lined drum.
4	Remove tyvek (inside out) and dispose of into a plastic-lined drum.
5	Remove outer over-boots and dispose of into a plastic-lined drum.
6	Remove outer gloves and dispose of into a plastic-lined drum.
7	Remove respirator, remove and discard respirator cartridges, and place in a bucket of respirator sanitizer/cleaner solution. Gently clean with a soft bristle brush, and rinse respirator in warm water.  Allow respirator to dry in the SZ.
8	Remove inner gloves (inside out) and dispose of into a plastic-lined drum.
9	Proceed to SZ to thoroughly wash face, neck, hands, and forearms prior to eating, drinking, smoking, or using the rest room.

Equipment and supplies needed for the personnel decontamination station:

1. Plastic buckets for glove wash and rinse
2. Plastic drum liners
3. Plastic sheeting
4. Wash tubs for boot wash and rinse
5. Detergent/water solution (non-phosphate detergent)
6. Respirator sanitizer/cleaner
7. Plastic tubs for respirator wash and rinse
8. Long-handled soft bristle scrub brushes for boot wash
9. Small, soft-bristle scrub brush for respirator wash
10. 55-gallon drums or trash cans

Personnel decontamination procedures to be used in the event of an emergency are outlined in Section 12.9 of this SSHP.

### 11.3 Equipment Decontamination

All equipment and tools will be cleaned prior to site entry to remove grease, oil, dirt, or any other

off-site materials. An inspection of the equipment will be made by the RCM/PjM or HSO prior to approving the items for use on-site. The RCM/PjM or HSO will also be responsible for inspecting all items for adequacy of decontamination prior to removal off-site.

**11.3.1 Decontamination Pad**

Equipment and vehicles will be driven onto the decontamination pad and the proper wash and rinse steps will be followed. Features of the decontamination pad include:

- Water used in decontamination pad will drain to a collection basin.
- The upper sections of the decontamination pad will be enclosed with plastic sheeting, if necessary, to control the dispersion spray from the pressurized steam generator.
- Decontamination water will be stored in accumulation tanks or drums pending disposal.
- *All* equipment used in the EZ or CRZ will be decontaminated prior to leaving the site.

**11.3.2 Small Equipment Decontamination**

The following steps will be taken when decontaminating small equipment:

STEP	SMALL EQUIPMENT DECONTAMINATION PROCEDURE
1	Wrap small equipment such as shovels, picks, chisels, hammers, drill augers, etc. in plastic sheeting.
2	Transport the small equipment from the EZ or CRZ to the decontamination pad.
3	Wash small equipment with pressurized water spray (i.e., "steam cleaner").
4	Scrub small equipment with soapy water, using brushes and a phosphate-free soap.
5	Rinse small equipment with potable water.
6	Place small equipment on clean plastic sheeting and allow to dry.

**11.3.3 Heavy Equipment Decontamination**

The following steps will be taken when decontaminating large equipment:



STEP	LARGE EQUIPMENT DECONTAMINATION PROCEDURE
1	Drive large equipment such as trackhoe and backhoe, from the EZ or CRZ to the decontamination pad.
2	Wash the heavy equipment with the pressurized water spray (i.e., "steam cleaner").
3	Scrub large equipment with soapy water, using brushes and a phosphate-free soap.
4	Rinse large equipment with water.
5	Move heavy equipment onto clean plastic sheeting and allow it to air dry.

#### **11.3.4 Sampling Equipment Decontamination**

Refer to the site-specific Chemical Data Acquisition Plan for sampling equipment decontamination procedures.

#### **11.4 Disposition of Decontamination Waste**

Used PPE will be collected in plastic trash bags and placed in 55-gallon drums for on-site storage. All decontamination water will be collected and placed in 55-gallon drums. All decontamination waste will be disposed along with the general site waste. Radian personnel and subcontractors will take precautions to prevent contaminated water from leaving the EZ.

## **12.0 EMERGENCY RESPONSE PLAN**

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### **12.1 General**

This section provides information regarding the actions to be taken in the event an emergency situation develops. In the event of an emergency, the HSO or RCM/PjM are authorized to stop work. The Emergency Coordinator (EC) will implement the Emergency Response Plan whenever conditions at the site warrant an emergency response. The RCM/PjM has overall authority for the implementation of this Emergency Response Plan, and will serve as the EC on this project. This authority can be delegated to the HSO, who will be present on-site during all site activities.

### **12.2 Pre-Emergency Planning**

When an emergency occurs, decisive action is required. Decisions must often be made immediately and personnel must be ready to immediately respond to an emergency. For this purpose, pre-emergency planning is an essential part of each project's Emergency Response Plan. Pre-emergency planning tasks will be developed and established prior to the start of site work. Pre-emergency planning for the interim removal actions at the LOOW includes the following tasks:

- Development and approval of this Emergency Response Plan;
- Coordination of the Emergency Response Plan with local health and emergency response personnel;
- Training of site personnel in appropriate emergency procedures;
- Maintaining emergency response equipment on-site, such as fire extinguishers, first aid supplies, and spill response equipment;
- Conducting an emergency response training during site mobilization and before site activities begin; and
- Modification of the Emergency Response Plan, if necessary, as work progresses.

### **12.3 Types of Emergencies**

On a day-to-day basis, all site personnel should be constantly alert for indicators of potentially hazardous or emergency situations. Rapid recognition of a dangerous situation may avert an emergency. Rapid response during an emergency may mitigate or contain the incident. Several types of emergency situations that could occur during site activities at the LOOW include:

- Fire or explosion;
- Personnel injury or illness;

- Hazardous substance spill or release; and
- Adverse weather conditions (e.g., tornado, electrical storm, snow storm).

The remaining sections of the Emergency Response Plan provide information and procedures to be followed in the event any of these emergencies occur.

#### **12.4 Response Priorities and Procedures**

The following outline provides guidance in prioritizing emergency response actions, and provides general emergency response procedures to be followed. It is expected that Radian personnel would only provide minimal or first line response to all emergencies.

***First Priority:*** Prevent further injury/illness by:

- Protecting response personnel;
- Isolating the scene to authorized personnel only;
- Notifying emergency response personnel; and
- If possible, rescuing any injured parties.

***Second Priority:*** Provide first aid to those persons with life-threatening injuries or illnesses.

***Third Priority:*** Alleviate the immediate hazards by:

- Extinguishing a small or incipient stage fire;
- Reducing chemical releases; and/or
- Containing any spill.

#### **12.5 Evacuation Routes and Procedures**

In a severe emergency, such as a large fire, explosion, or large chemical release, site evacuation may become necessary. The HSO will be responsible for informing site personnel of the anticipated routes of evacuation during the daily safety briefings. The evacuation route and assembly area will correlate to the wind direction, topography, and the nature of the incident. Personnel will be advised to move to an upwind location at least 100 yards from any fires and/or releases, and will be advised to continually monitor wind direction for changes. If moving upwind is not possible without encountering the incident, personnel will be advised to move cross wind or downwind to a distance necessary to be out of the path of vapor releases, smoke, odors, or spills. In the event that a site evacuation becomes necessary, the following procedure will be used:

STEP	EVACUATION PROCEDURE
1	Site personnel are notified of an emergency evacuation via an air horn signal or verbal command. All site personnel will <i>immediately</i> stop work.
2	All site personnel will evacuate the work area as quickly as possible, and assemble at a location at least 100 yards upwind of the incident, or as instructed during the daily safety briefing.
3	The Emergency Coordinator will be responsible for roll call.
4	The Emergency Coordinator will contact emergency response personnel once all site personnel have been accounted for during roll call.
5	The HSO will ensure that emergency apparatus have adequate site access.
6	The HSO will ensure that all combustion equipment has been shut down.
7	All site personnel assembled at the designated safe evacuation area will wait for further instructions from emergency response personnel.

## 12.6 Emergency Medical Treatment and First Aid

All emergency medical treatment, other than first aid, will be administered by local paramedics. Table 12-1 lists site-specific emergency telephone numbers for the LOOW site. All first aid will be administered on-site by the HSO who shall be certified in CPR and first aid. Physician-approved first-aid supplies will be kept in the SZ/CRZ. All vehicles used to transport injured persons to the off-site medical facility will be provided with directions and a map to the medical facility. Additionally, the HSO will accompany the victim to the medical facility.

Site personnel will complete a Medical Data Sheet during the initial site-specific safety training. Medical Data Sheets will be kept in the on-site health and safety file, and will be referenced in an emergency to assist with the treatment of the victim. The HSO will supply the victim's Medical Data Sheet to emergency response personnel, and will accompany the victim to the hospital. Prior to returning to work after a disabling injury/illness or loss of consciousness, the employee must present a medical release from the attending physician to the HSO.

The Corporate Health and Safety Program contains information on bloodborne pathogens. A bloodborne pathogen kit will be kept on-site to protect employees from bloodborne diseases.

**TABLE 12-1  
EMERGENCY TELEPHONE NUMBERS**

Ambulance	911
Mount Saint Mary's Hospital 5300 Military Road, Lewiston, New York 14092	(716) 297-4800
Police	Emergency - 911 Non-emergency (716) 754 8477
Fire Department	Emergency - 911 Non-emergency (716) 754 4639
Poison Control Center	(800) 492-2414
Federal OSHA Hot Line	(800) 321-6742
Radian Regional Health and Safety Manager (RHSM): Millard P. Griffin, Jr., CIH, CSP	Work: (770) 724-1049 Home: <i>Redacted-Privacy</i> Pager: (888) 487-8062
Radian Rockville Office Environmental Health and Safety Coordinator: Margaret Mikulich	Work: (301) 548-1711 Home: <i>Redacted-Privacy</i>
Radian Medical Consultant: Dr. Peter Greaney; GMG WorkCare	(800) 455-6155
Radian Program Manager: Mark Sylvester	Work: (301) 548-1678 Home: <i>Redacted-Privacy</i>
USACE Contracting Officer's Representative (COR): David G. Bingert USACE Project Engineers:	(716) 879 4302 (716) 879 4146

The kit contains the PPE needed to minimize contact with body fluids (latex gloves, mask, face shield, CPR mouth shield, apron, "red" waste disposal bag, and disinfectant wipes). This PPE will be used to protect the first aid responder. Hepatitis B vaccinations will be made available to any employee who may have been exposed to body fluid. Vaccinations should be performed as soon as possible after a potential exposure incident.

### 12.7 Route to Local Hospital

(Site-specific route to the hospital; Figure 12-1)

The Radian Emergency Physician Access Plan, as shown in Table 12-2, may be instituted by the EC and/or the medical facility.

### 12.8 Chemical Exposure

In case of accidental overexposure to a hazardous material, the following guidelines will be used:

TYPE OF OVEREXPOSURE	FIRST AID GUIDELINES
Skin Contact	<u>Skin</u> : Wash/rinse the affected area thoroughly with copious amounts of soap and water.
	<u>Eyes</u> : Eyes should be rinsed for at least 15 minutes following chemical contamination.
	Contact emergency response personnel if required, or transport victim to the hospital.
Inhalation	Move the victim to fresh air.
	Contact emergency response personnel if required, or transport victim to the hospital.
Ingestion	Contact Poison Control Center.
	Contact emergency response personnel, or transport victim to the hospital.

**TABLE 12-2**  
**EMERGENCY PHYSICIAN ACCESS PLAN**

In the event that any medical emergency arises due to work-related injuries/illnesses, a 24-hour Emergency Physician Access Plan has been established to enable any Radian employee to communicate with our Medical Consultant (MC), Dr. Peter Greaney. The following procedure outlines how the plan can be accessed during business hours:

<b>STEP</b>	<b>MONDAY THROUGH FRIDAY, 9:30 A.M. - 8:00 P.M., EST</b>
1	Contact the Medical Consultant at (800) 455-6155.
2	Give the receptionist the following information: <ul style="list-style-type: none"> <li>• You are calling for Radian International LLC;</li> <li>• This is an emergency call.</li> </ul>

The medical consultant's staff have been informed how to contact the Medical Consultant designated to provide emergency coverage on that day. *Collect calls will be accepted.*

The following procedure outlines how the plan can be accessed during evenings, weekends, and holidays (non-business hours).

<b>STEP</b>	<b>WEEKENDS, HOLIDAYS, AND EVENINGS (After 8:00 A.M. - Until 9:30 A.M. E.S.T.)</b>
1	Contact the Medical Consultant at (800) 455-6155. An operator from the answering service will answer the telephone.
2	Give the answering service operator the following information: <ul style="list-style-type: none"> <li>• You are calling for Radian International LLC;</li> <li>• This is an emergency call;</li> <li>• Give the operator your name; and</li> <li>• Give the operator the telephone number where the Medical Consultant can contact you (including your area code).</li> </ul>
3	Verify the operator has written the correct telephone number; do not hang up first.
4	If you do not receive a call back from the Medical Consultant within 15 minutes, place a second call to (800) 455-6155.

Figure 12-1 Map Route to Local Hospital

**Directions to Mount Saint Mary's Hospital:**

**From Balmer Road or from Pletcher Road, turn left onto Route 18.**

**Route 18 turns into Lewiston Road.**

**Take Lewiston Road to the first traffic light and turn left onto Military Road.**

**Mount Saint Mary's Hospital is at: 5300 Military Road**



## **12.9 Decontamination During a Medical Emergency**

For minor medical problems or injuries, regular decontamination procedures will be followed. If emergency, life-saving first aid and/or medical treatment is required, regular decontamination procedures may need to be abbreviated or omitted:

- Do not attempt to wash or rinse the victim, unless the victim has been contaminated with an extremely toxic or corrosive chemical that may cause injury or loss of life to emergency response personnel.
- Outer garments can be removed if it does not cause a delay, interfere with treatment, or aggravate the problem.
- PPE can be cut away, and respiratory protective equipment must always be removed.
- If contaminated clothing cannot be safely removed, then the victim should be wrapped in a blanket or plastic sheeting to prevent the contamination of the inside of the ambulance and/or emergency response personnel.

The HSO will accompany the contaminated victim to the hospital to advise the medical staff of the type of contamination.

## **12.10 Small or Incipient Fire**

A small fire is defined as a fire that can be extinguished with an available 20-pound type ABC fire extinguisher. An incipient fire is a fire that is small because it has just started. In the event of a small or incipient fire, the following minimum actions will be taken:

- Evacuate nearby personnel from the area, if possible, to an upwind location or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible.
- Attempt to extinguish fire using portable fire extinguisher or by smothering.
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products.
- After the fire has been extinguished, or emergency response personnel have been contacted, notify the following project personnel:
  - Program Manager
  - Regional Health and Safety Manager
  - USACE Authorized Representative
  - Environmental Health and Safety Coordinator

### **12.11 Large Fire or Explosion**

An explosion, large fire, or a small fire which cannot be extinguished is beyond the first line capabilities of Radian personnel. Professional emergency response personnel would be needed to provide emergency assistance for these types of incidents. In the event of a large fire, explosion, or a small fire which cannot be extinguished, the following minimum actions will be taken:

- Evacuate all personnel from the site, if possible, to an upwind location, or to an area not affected by smoke or hazardous decomposition products if an upwind location is not feasible.
- Perform a quick roll call to account for all site personnel.
- Contact the fire department.
- Contact emergency response personnel, as needed, for any injuries or exposures to hazardous decomposition products.
- After emergency response personnel have been contacted, notify the following project personnel:
  - - Program Manager
  - - Regional Health and Safety Manager
  - - USACE Authorized Representative
  - - Environmental Health and Safety Coordinator

### **12.12 Hazardous Substance Spill or Release**

Hazardous substance spill or release situations may all be different due to the way the incident occurred, how hazardous the substance may be, and how much has been spilled or released. If a hazardous substance spill or release occurs, the following steps will be taken:

- Evacuate site personnel, if necessary. Follow the evacuation sequence outlined in Section 12.5.
- Determine the source of leak or release.
- Determine the approximate volume of the leaked or released substance and identify the contaminants involved.
- Contact emergency response personnel to inform them of the possible need for assistance.
- Don appropriate PPE, if indicated.
- Secure the spread of the spill, if possible, using one of the following methods of containment:
  - Patch and plug
  - Sorbent materials such as clay, saw dust, absorbent pillows, sheets, or rolls
  - Diking
- Damming with soil straw bales, or sand bags

- After the spill/release has been contained, or emergency response personnel have been contacted, notify the following project personnel:
  - Radian Project Manager
  - Radian Construction and Remediation Services Division Health and Safety Manager
  - USACE Authorized Representative
  - Environmental Health and Safety Coordinator
  - National Response Center, if above Regulated Quantity

### **12.13 Adverse Weather Conditions**

In the event of adverse weather conditions, the HSO will determine if work can continue without sacrificing the health and safety of site personnel. Some of the conditions to be considered by the HSO include:

- Potential for heat or cold stress
- Limited visibility
- Electrical storms
- Treacherous weather-related working conditions (i.e., heavy rainfall, wet conditions causing slippery footing hazards, etc.)

### **12.14 First Aid for Heat Stress and Cold Stress**

First aid treatment for **heat cramps** includes shade, rest, and fluid replacement. If available, the individual should drink electrolyte replacement fluids (e.g., Gatorade, Squincher, 10-K). The individual should recover within half an hour.

First aid treatment for **heat exhaustion** includes cooling the victim, elevating the feet, and fluid replacement. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

**Heat stroke** is a **medical emergency**, requiring the immediate cooling of the victim, and transport to the hospital for medical treatment immediately.

First aid treatment for **frost nip** and **frostbite** includes covering the affected area with warmth and retreating to a warm area. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

**Frozen tissue** is a *medical emergency* and the victim must receive medical attention immediately. Contact emergency response personnel immediately, or transport the victim to the hospital.

First aid treatment for **mild hypothermia** includes using heat to raise the individual's body temperature. Heat may be applied to the victim in the form of heat packs, hot water bottles, and blankets. If the individual has not recovered within half an hour, then transport the victim to the hospital for medical attention.

**Severe hypothermia** is a *medical emergency*, and the victim must be transported to the hospital immediately. First aid treatment for severe hypothermia includes handling the victim very gently; rough handling may set off an irregular heartbeat. **DO NOT** attempt to re-warm the severely hypothermic victim; re-warming may cause the development of an irregular heartbeat.

### 12.15 Snake Bite, Spider Bite, or Insect Sting

In the event of a snake bite emergency, the HSO will take the following actions:

STEP	FIRST AID PROCEDURES FOR A SNAKE BITE
1	Try and keep the victim calm.
2	Contact emergency response personnel immediately.
3	Wash the bite wound.
4	If the snake bite is on the victim's arm or leg: <ul style="list-style-type: none"><li>• Keep the bitten area below the level of the victim's heart.</li><li>• Splint the appendage to keep it immobile.</li></ul>
5	If necessary, carry the victim to emergency transportation, or have the victim walk slowly.

**DO NOT** apply ice, cut the bite wound, or apply a tourniquet.

Signs of spider bites are similar to those of other sudden illnesses. The signs include:

- Nausea or vomiting;
- Difficulty breathing; and/or
- Sweating or salivating more than usual.

A spider bite may also be suspected when there is also severe pain in the bite area, a mark indicating a possible bite, or swelling of an area. In the event of a spider bite emergency:

<b>STEP</b>	<b>FIRST AID PROCEDURES FOR A SPIDER BITE</b>
1	Wash the wound/swelling area with soap and water.
2	Cover the wound area to keep it clean.
3	Apply an ice pack to the wound/swelling to reduce any pain and swelling.
4	Contact emergency response personnel immediately.

If a site worker is bitten or stung by an insect:

<b>STEP</b>	<b>FIRST AID PROCEDURES FOR AN INSECT BITE/STING</b>
1	Remove the stinger. Scrape the stinger away from the skin with a fingernail, or use tweezers. If tweezers are used, be sure to grasp the stinger and not the venom sac.
2	Wash the bite/sting area with soap and water.
3	Cover the bite/sting area to keep it clean.
4	Apply an ice pack to the bite/sting area to reduce any pain and swelling.
5	Watch the victim for signals of an allergic reaction.

Emergency response personnel should be contacted in the event of an insect bite or sting:

- If the individual does not know what bit or stung them;
- If the individual has a history of allergic reactions to insect bites or stings;
- If the individual is bitten or stung on the face or neck; or
- If the individual begins to have difficulty breathing.

## **12.16 Site Security and Control**

Site security will be the responsibility of the EC and includes the control of entry or exit of personnel and equipment to the site of the emergency. The EC will coordinate the arrival of any outside emergency response personnel. Unauthorized persons will not be permitted to enter the site during emergency incidents.

## **12.17 Emergency Communications**

Communications during site emergencies will include the following options:

- On-site communication using air horns and verbal messages;
- Off-site communication with emergency response personnel, USACE Authorized Representative, and Radian project personnel using the telephone.

An air-horn will be kept at the Command Post, with each work crew, and on any piece of heavy equipment that does not have an audible horn. Horns can be used to alert site personnel of an emergency situation.

AIR HORN SIGNAL	MEANING
One long blast for at least 10 seconds	Immediately evacuate the site and assemble at the safe evacuation location identified by the HSO at the daily safety briefing.
Three short blasts	There is an emergency on-site that requires first aid assistance.

### 12.18 Emergency Equipment and First Aid Requirements

A supply of emergency PPE and equipment will be maintained on-site in sufficient quantities and locations to ensure an adequate supply for all emergency response personnel. All emergency equipment will be fully stocked and readily accessible. The following emergency supplies will be stored on-site:

- Industrial first aid kit (one 16-unit kit that complies with ANSI Z308.a for every 25 persons or less) – located in the site trailer
- Bloodborne pathogen kit - located in the SZ/CRZ
- CPR mouth shield - located in the SZ/CRZ
- Instant cold packs - located in the SZ/CRZ
- Eye wash - located in the SZ and in the CRZ
- Fire extinguishers – placed in the following locations:
  - In each site trailer (2-A:10-B, maximum travel distance of 75 feet to the extinguisher)
  - In each piece of heavy equipment (10-B:C)
  - In each motor vehicle (5-B:C)
  - Next to any flammable/combustible liquid and compressed gas storage area (20-B, one extinguisher located within 10 feet from the entrance, and one located 25-75 feet outside the storage area)
  - Next to any fueling area (20-B:C), maximum travel distance of 75 feet to the extinguisher)
- Face-shields
- PVC coveralls
- Regular and poly-coated tyvek
- Chemical resistant boot covers (latex)
- Chemical resistant outer gloves

- Back-up self-contained breathing apparatus (SCBA)
- Solvent- and oil-absorbent pads and booms
- Air horns
- Soap or waterless hand cleaner and towels
- American Red Cross First Aid and CPR Instruction Manuals

## **13.0 STANDARD OPERATING SAFETY PROCEDURES, ENGINEERING CONTROLS, AND WORK PRACTICES**

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### **13.1 Work Permits**

Any required site-specific work permits will be outlined in the site-specific addendum to the SSHP. As a minimum, permits will be required for confined space entry and for hot work.

### **13.2 General Site Rules**

The following general site rules apply to all personnel while on the site:

1. All site personnel will wear a hard hat, safety glasses, and steel-toe/shank safety shoes.
2. The buddy system will be observed at all times.
3. Entry into and exit from the site, EZ, and CRZ will only be permitted through designated access points, except during an emergency, or as authorized by the HSO.
4. Personnel entering the EZ must wear the required PPE and must exit through the personnel decontamination station.
5. No eating, drinking, smoking, or any other activity involving hand-to-mouth contact will be allowed in the EZ, CRZ, or prior to completing the personnel decontamination sequence (refer to Section 11.3).
6. Facial hair that interferes with a respirator-to-face seal will not be permitted on personnel required to wear respirator while working in the EZ or CRZ.
7. Never enter a confined space (including an excavation or trench) until the HSO confirms the atmosphere is safe. A confined space entry permit is required for each confined space entry.
8. All site personnel who wear corrective lenses will provide their own prescription safety glasses and respirator optical inserts.
9. No horseplay will be tolerated.
10. Matches and lighters are not permitted in the EZ or CRZ.

### **13.3 Drum/Container Handling**

All drums and containers used during site activities will meet the appropriate DOT, OSHA, and EPA regulations for the waste they will contain. Employees participating in activities involving drum or container use will be trained in the hazards associated with the drum activities. Drums and containers will be inspected and their integrity will be verified prior to being moved. Drums or containers that cannot be inspected prior to movement because of storage conditions will be positioned in an accessible location and inspected prior to further handling. Activities on-site



will be organized to minimize the amount of drum or container movement. Drums or containers that cannot be moved without failure will be emptied into a second container.

Where spills, leaks, or ruptures may occur, adequate quantities of spill containment supplies will be stationed in the immediate area. The spill containment supplies must be sufficient to contain and isolate the entire volume of hazardous substance in the drum or container. Refer to Section 12.13 for details on emergency spill response procedures.

#### **13.4 Sanitation**

Sanitation facilities will be set up in accordance with 29 CFR 1926.51 and Section 2 of USACE EM 385-1-1, including the following items:

- Drinking/potable water
- Toilets
- Washing facilities and change rooms
- Food service/eating and drinking areas
- Waste disposal
- Vermin control

#### **13.5 Process Safety Management**

In accordance with OSHA Standard 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals, each Delivery Order Scope of Work will be evaluated to identify any activities involving a highly hazardous chemical. If it is determined that a highly hazardous chemical is used, stored, manufactured, handled, or moved on-site at or above specified threshold quantities, then a process hazard analysis will be completed prior to the start of site work. The analysis will be included in the site-specific addendum to the SSHP.

#### **13.6 Additional Standard Operating Safety Procedures**

Standard operating safety procedures for general project activities have been incorporated throughout Section 6.6, Physical Hazards: Identification and Standard Operating Procedures.

## **14.0 ON-SITE RECORDKEEPING AND REPORTING**

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### **14.1 Required References**

The HSO will be responsible for ensuring the required reference material is either on-site or available for immediate reference. Following is a list of required references:

- Radian International Corporate Health and Safety Program
- Site Safety and Health Plan (SSHP) for TNT Pipeline and Chemical Waste Sewer Interim Removal Actions at the Former Lake Ontario Ordnance Works, Niagara County, New York
- OSHA Poster
- OSHA 29 CFR 1910 (two volumes)
- OSHA 29 CFR 1926
- USACE Safety and Health Requirements Manual EM 385-1-1
- Current ACGIH TLV booklet
- Current NIOSH Pocket Guide to Chemical Hazards
- Instruction manuals for all monitoring equipment
- NIOSH/OSHA/USCG/EPA “Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities”
- American Red Cross First Aid and CPR Instruction Manuals
- Safety equipment catalogs

### **14.2 Required Recordkeeping Documentation**

The following documentation must be kept on-site (or readily accessible):

- OSHA Form 200 (Log and Summary of Occupational Injuries and Illnesses).
- Material Safety Data Sheets (MSDSs) for all site-specific hazardous chemicals brought on-site by Radian and its subcontractors.
- A project-specific Hearing Conservation Program which meets the requirements of 29 CFR 1910.95 (Attachment C).
- A project-specific Personal Protective Equipment Program which meets the requirements of 29 CFR 1910.120 (Attachment D).
- A project-specific Hazard Communication Program, which includes site-specific Hazardous Material Inventories, and meets the requirements of 29 CFR 1910.1200 (Attachment E).
- A project-specific Respiratory Protection Program which meets the requirements of 29 CFR 1910.134 (Attachment F).
- Employee fit test records
- OSHA-required training records for site workers

- OSHA-required medical surveillance examination clearance records for site workers
- Calibration records for all monitoring equipment
- Health and safety logbook
- Copies of any Employee Notification of Exposure forms
- Copies of any Incident/Injury Reports
- Copies of Daily Health and Safety Reports
- Signed statements of the Site Safety and Health Plan Compliance Agreement
- Exclusion Zone Sign In/Sign Out sheet

### **14.3 Training Logs**

Training log(s) will include initial site-specific safety training, weekly “toolbox” topic training, and visitor training. A record of the training will be documented on the Daily Health and Safety Report, which will be submitted to the USACE Authorized Representative. A copy of the Meeting Attendance form is located in Attachment A. The training log will include the following information:

- Date
- Employee’s name and social security number (attendance check)
- Time allocation in training session
- Training topic(s)
- Trainer(s) signature

### **14.4 Daily Health and Safety Reports**

Radian will submit a copy of the Daily Health and Safety Reports to the USACE Authorized Representative by noon the following day. Daily Health and Safety Reports will be available for review by the USACE Authorized Representative or their designated representative at any time. The form used for the Daily Health and Safety Report is located in Attachment A. These reports will include:

- Date
- Work areas checked
- Employees present and their job assignment
- PPE worn by employees
- Accidents, incidents, near misses, or breaches of procedure
- Equipment Inspection/Maintenance Reports
- Record of training
- Environmental and personnel exposure monitoring and sampling results

- Employee and visitor register
- HSO signature

The HSO has the option to incorporate completed logs/reports by reference into the Daily Health and Safety Report.

#### **14.5 Health and Safety Field Logbooks**

The HSO will maintain a logbook on-site in accordance with standard Radian procedures. Complete and detailed documentation of site activities will be very important. The original logbook will be kept in the LOOW project files. The following information will be recorded on a daily basis:

- Site conditions (e.g., weather)
- Activities being performed
- Personnel on-site and working in the EZ
- Site visitors
- Incidents, accident, and near misses
- Violations of health and safety procedures
- Other significant events

Site monitoring will also be documented in the health and safety logbook, including the following information:

- Monitoring equipment condition
- Calibration records
- Employees and work areas monitored
- Monitoring results

#### **14.6 OSHA 200 and 101 Forms**

An OSHA 200 Form (Log and Summary of Occupational Injuries and Illnesses) will be kept in the on-site health and safety files. All recordable work-related injuries and illnesses will be recorded on this form within six days. At the end of the project, the OSHA 200 Form will be placed in the project files, and a copy will be sent to the Corporate Director of Health and Safety. Subcontractors must also meet the requirements of maintaining an OSHA 200 Form. The Radian Employee Injury/Illness Report meets the requirements of OSHA Form 101 (Supplemental Record), and will be completed with the OSHA 200 Form for all recordable injuries or illnesses.

## **14.7 Incident Reports**

Upon receiving a report of an on-site incident, the HSO will investigate the circumstances surrounding the incident. The accident/incident reporting procedure includes the steps as shown in Table 14-1. Attachment A contains the Incident Report form, OSHA 200 Form, and USACE ENG Form 3394.

**TABLE 14-1**

**INCIDENT REPORT PROCESS**

<b>STEP</b>	Incidents, accidents, and near misses will be reported verbally and in writing using the Radian Incident Report form.		
<b>1</b>	<b>If the incident or accident results in:</b>	<b>Then the HSO will verbally report:</b>	<b>And submit a written report:</b>
2	<ul style="list-style-type: none"> <li>• Fatality(s);</li> <li>• Hospitalization of three or more persons; or</li> <li>• Property damage greater than \$50,000</li> </ul>	<i>Immediately to:</i> <ul style="list-style-type: none"> <li>• Federal OSHA (within 8 hours except for property damage);</li> <li>• USACE Authorized Representative;</li> <li>• Radian RCM/PjM;</li> <li>• RHSM; and</li> <li>• Radian EHSC.</li> </ul>	<i>Within 48 hours to:</i> <ul style="list-style-type: none"> <li>• USACE Authorized Representative;</li> <li>• Radian RCM/PjM;</li> <li>• RHSM; and</li> <li>• Radian EHSC.</li> </ul>
	<ul style="list-style-type: none"> <li>• A near miss;</li> <li>• Hospitalization of 1-2 persons; or</li> <li>• Property damage less than \$50,000.</li> </ul>	<i>Within 24 hours to:</i> <ul style="list-style-type: none"> <li>• USACE Authorized Representative;</li> <li>• Radian RCM/PjM;</li> <li>• RHSM; and</li> <li>• Radian EHSC.</li> </ul>	<i>Within four days to:</i> <ul style="list-style-type: none"> <li>• USACE Authorized Representative;</li> <li>• Radian RCM/PjM;</li> <li>• RHSM; and</li> <li>• Radian EHSC.</li> </ul>
3	If the incident or accident results in an OSHA-recordable injury or illness or property damage: <ul style="list-style-type: none"> <li>• The HSO will complete a USACE Accident Report (ENG Form 3394), and forward the form to the USACE Authorized Representative within two days.</li> <li>• The HSO will record the injury or illness on their project OSHA 200 Form within six days of the accident or incident.</li> </ul>		
4	If the incident or accident results in medical attention (beyond on-site first aid) and/or includes lost time from work, the HSO will contact the RHSM for assistance in obtaining and filing workman's compensation claim forms.		

**15.0 SITE SAFETY AND HEALTH PLAN COMPLIANCE AGREEMENT**

---

**15.1 General**

All project personnel, including visitors, must follow the requirements of this SSHP. In order to document individual agreement with this requirement, all personnel must complete a “Site Safety and Health Plan Compliance Agreement”. These agreements will be kept on file at the site and will become part of the permanent project record upon completion of site activities.

**15.2 Statement of Agreement**

I have read the Site Safety and Health Plan (SSHP) for the TNT Pipeline and Chemical Waste Sewer Interim Removal Actions at the Former Lake Ontario Ordnance Works, Niagara County, New York, Radian Project No. 80003626, or I have been verbally advised of its contents. I understand, and I agree to comply with all of its provisions. I understand that I could be prohibited from working on the project, and I may be subject to disciplinary actions for violating any of the health and safety requirements specified in the SSHP.

---

Name (Print)

---

Signature

---

Date

**16.0 APPROVALS**

---

By their signature, the undersigned certify this Site Safety and Health Plan (SSHP) will be used for the protection of the health and safety of Radian International personnel, subcontractors, and visitors during the TNT Pipeline and Chemical Waste Sewer Interim Removal Actions at the Former Lake Ontario Ordnance Works, Niagara County, New York.

**Signature**

**Date**

\_\_\_\_\_  
Ms. Margaret Mikulich  
Environmental Health and Safety Coordinator  
Rockville, Maryland Office

\_\_\_\_\_

\_\_\_\_\_  
Mr. Millard P. Griffin, Jr., CIH, CSP  
Eastern Regional Health and Safety Manager

\_\_\_\_\_

\_\_\_\_\_  
Mr. Dave Wilder  
Remedial Construction Manager/  
On-Site Project Manager

\_\_\_\_\_

\_\_\_\_\_  
Mr. Mark Sylvester  
Program Manager

\_\_\_\_\_



**Attachment A**  
**Radian Site Forms**

# WEEKLY SAFETY REPORT

**Week Ending:**

SUMMARY OF ANY VIOLATIONS OF PROCEDURES OCCURRING THAT WEEK:

SUMMARY OF ANY JOB RELATED INJURIES OR ILLNESSES THAT WEEK:

SUMMARY OF AIR MONITORING DATA THAT WEEK (Include any sample analyses, action levels exceeded, and actions taken):

COMMENTS:

ATTACH METEOROLOGICAL STATION DATA.

_____	_____
Name	Title
Signature: _____	

# VIOLATION OF SAFETY RULES REPORT

<b>Project Name:</b>		
<b>Project Number:</b>		
<b>Job Superintendent:</b>		
<b>Date of this Report:</b>		
<b>Nature of Violation: (Explain)</b>		
<b>Action Taken:</b>		
<b>Warning Given:</b>		
<b>Sent Home:</b>		
<b>Discharged:</b>		
<b>Witness:</b>	_____ (If refusal so state)	<b>Date:</b>
<b>Offending Company:</b>	_____ (If refusal so state)	<b>Date:</b>
<b>Offending Person:</b>	_____ (If refusal so state)	<b>Date:</b>
<b>Report By:</b>	_____ (Position or Title)	<b>Date:</b>

## 16.0 APPROVALS

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By their signature, the undersigned certify this Site Safety and Health Plan (SSHP) will be used for the protection of the health and safety of Severson Environmental Services, Inc. personnel, subcontractors, and visitors during the TNT Site Walkover Removal Actions at the Former Lake Ontario Ordnance Works, Niagara County, New York.

**Signature**

**Date**



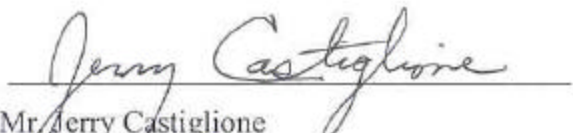
10-8-02

Paul J. Hitcho, PhD, CIH  
Corporate Health and Safety Manager



10/7/02

Mr. Dana Draper  
Health and Safety Officer



10-3-02

Mr. Jerry Castiglione  
Remedial Construction Manager/  
On-Site Project Manager



10/8/02

Mr. Alfred LaGreca  
Corporate Sponsor




\* Please send copy to Paul Hitcho - Main Office

HM:HEALTH\CORP\FORMS\DAILY

**DAILY SAFETY MEETING**

**DATE:** \_\_/\_\_/\_\_

**TOPIC:**

**DISCUSSION POINTS:**

- 
- 
- 
- 
- 

**PERSONNEL:**

# DAILY SAFETY LOG

DATE: \_\_\_/\_\_\_/\_\_\_

WORK PERIOD COVERED:

WEATHER CONDITIONS:

SUMMARY OF DAY'S WORK ACTIVITY:

EQUIPMENT UTILIZED BY SAFETY MONITORS:

PROTECTIVE CLOTHING AND EQUIPMENT BEING USED BY TASK:

PHYSICAL CONDITION OF WORKERS (any heat or cold stress or other medical problems):

ACCIDENTS OR BREACH OF PROCEDURES:

DESCRIPTION OF MONITORING AND AIR SAMPLES TAKEN:

MISCELLANEOUS:

NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_



## DAILY SAFETY CHECK

DAY:	DATE:	START INSPECTION:	COMPLETE INSPECTION:
------	-------	-------------------	----------------------

QUESTION <small>(Please check one of the following boxes):</small>	YES	NO	N/A
1. Are all fire hazard areas properly posted?			
2. Are safety cans being used for gasoline?			
3. Do all scaffolds have rails and toeboards properly secured?			
4. Do all runways have guardrails?			
5. Are all wall openings adjacent to a drop exceeding 4' properly railed off?			
6. Do all floor openings have rails and toeboards properly secured?			
7. Do all ladder-way floor openings have gate or offset?			
8. Do all ladders provide safe access to all elevations?			
9. Are excavations properly sloped?			
10. Are all employees provided with hard hats?			
11. Do all saws have safety guards?			
12. Are all trades doing adequate housekeeping?			
13. Are all open excavations properly barricaded, etc.?			
14. Are backup alarms working on the machines that are running today?			
15. Are fire extinguishers provided where required?			

If you have answered no to any of the above items, explain on the reverse side.

	YES	NO
Were there any employee complaints today?		

I have checked the total project. To the best of my knowledge all safety measures have been completed.

\_\_\_\_\_ Responsible for Safety

**THIS FORM IS TO BE RETURNED TO THE OFFICE AT THE END OF EACH DAY**

# SEVENSON CONFINED SPACE ENTRY PERMIT

Date \_\_\_\_\_ Time of Issue \_\_\_\_\_ Length of Permit \_\_\_\_\_  
 Location \_\_\_\_\_ Equipment ID \_\_\_\_\_  
 Purpose of Entry & Description of Work \_\_\_\_\_

Authorized Entrant(s) \_\_\_\_\_  
 Will "HOT" Work be authorized for this Entry? \_\_\_ No \_\_\_ Yes (describe:) \_\_\_\_\_

## HAZARD IDENTIFICATION

Indicate ALL potential Hazards of this Permit Space: YES    NO    N/A

a. Contains or may contain a hazardous atmosphere \_\_\_\_\_

b. Contains a material for potential engulfment \_\_\_\_\_

c. Has an internal configuration for potential entrapment \_\_\_\_\_  
 If "Yes", describe

d. Contains the following recognized serious safety or health hazards:

## PRE-ENTRY PREPARATION

	YES	N/A	Done			Removed		
			Date	Time	By	Date	Time	By
1. Lines broken and/or blanked:								
Line Contents								
Location								
a.								
b.								
c.								
2. Drain or at a workable level								
3. Purge - flush and vent								
4. Force air to bottom & vent								
5. Lock out power feeds:								
Equip/Location of Lock out								
a.								
b.								
c.								
6. Shut-off heating systems								
7. Other:								

## TEST TO BE TAKEN

	P.E.L.	Time		Results	Results	Results
		Tester				
		Yes	N/A			
% of Oxygen	19.5% to 21%					
Temperature	110EF/43EC					
% of LEL:	Any % over 10					

Hydrogen Sulfide	10 ppm				
Other:					
<b>PREVENTION OF UNAUTHORIZED ENTRY</b>					
1. Have Worker(s) to enter been trained for this specific entry? 2. Have Attendants been trained for this specific space? 3. Post "WORKER IN CONFINED SPACE" Sign 4. Set-up the following additional barriers:			YES		
<b>MANDATORY SAFETY EQUIPMENT REQUIRED</b>					
1. Fire Extinguisher 2. Retrieval Lines 3. Respirator 4. Goggles 5. Hearing Protection 6. Protective Clothing 7. Special Boots or Shoes 8. Gloves 9. Other Safety Equipment Required _____ _____			YES — — — — — — — —	N/A	
<b>COMMUNICATION PROCEDURES AND EQUIPMENT TO BE USED FOR THIS ENTRY</b>					
(Verify that chosen equipment is in place and operation.)  1. _____ 2. _____			Verified by:		
<b>RESCUE EQUIPMENT TO BE PROVIDED ON-SITE</b>					
a. Two chest harnesses or two wristlets b. Two five minute supplied air escape respirators c. One 30 minute S.C.B.A. d. One emergency siren e. Other necessary Rescue Equipment			YES — — — — —	N/A	
<b>IN CASE OF EMERGENCY</b>					
Rescue Service 1. _____ 2. _____ 3. _____			Phone Number or Ext.		

**Authorizer** must sign below AFTER all the above actions are fully understood and conditions necessary for SAFE entry have been met.

**Authorizer of Entry** \_\_\_\_\_  
 Signature Date Time

Upon completion of the entry covered by this Permit, and after all entrants have exited the Permit space, **Authorizer** must sign below.

**Canceled by** \_\_\_\_\_  
 Signature Date Time



Job No. \_\_\_\_\_  
 Job Address \_\_\_\_\_  
 \_\_\_\_\_



**Sevenson  
 Environmental  
 Services, Inc.**

## Report of Accident, Injury, or Illness

Instructions: Please print. Fill in all blanks. When completed, return this form to Sharon Lee at the main office.

Name \_\_\_\_\_ Sex: \_\_\_\_\_ Age: \_\_\_\_\_

Social Security Number \_\_\_\_\_ Birth Date: \_\_\_\_\_

Address \_\_\_\_\_ Phone Number \_\_\_\_\_

Marital Status  Single  Married  Separated  Divorced  Widowed

# of Dependents \_\_\_\_\_ Date of Accident \_\_\_\_\_ Time \_\_\_\_\_ AM/PM

Date Employee notified employer: \_\_\_\_\_ Who was notified: \_\_\_\_\_

Employment Start Date:	Wage Rate:
Occupation:	Average Hours Worked:
Date Last Worked:	Average Days Per Week:
Time Shift Began:	Was worker paid for day of injury?
Name of Witness:	Did salary continue?
Describe how the accident happened:	
What was employee doing when injured?	
Describe the injury in detail and indicate part of body affected:	
Name of object or substance which directly injured the employee:	

Date & Time medical attention was sought:
Name, address and phone number of hospital or doctor:
Was employee involved in any other incidents/accidents. If yes, describe:
Any history of work accidents, absenteeism, and/or disciplinary problems:
Substance abuse test administered: _____ Yes, _____ No - If no, why not?
Medical release obtained:
Corrective action(s) and when implemented:

Supervisor \_\_\_\_\_ Date \_\_\_\_\_

Safety Officer \_\_\_\_\_ Date \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





**Attachment B**  
**Material Safety Data Sheets (MSDSs)**

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\* \* \* \* \*  
\* C H E M I N F O \*  
\* \* \* \* \*  
\* Canadian Centre for Occupational Health and Safety \*  
\* \* \* \* \* Issue : 2000-2 (May, 2000) \*  
\* \* \* \* \*

\*\*\* SECTION 1. CHEMICAL IDENTIFICATION \*\*\*

CHEMINFO RECORD NUMBER : 3356  
CCOHS CHEMICAL NAME : Chlorodiphenyl (42% chlorine)  
SYNONYMS :  
\* Aroclor - 1242  
\* PCB - 1242  
\* PCB 1242  
\* Polychlorinated biphenyl 1242  
CAS REGISTRY NUMBER : 53469-21-9  
UN/NA NUMBER(S) : 2315  
RTECS NUMBER(S) : TQ1356000  
EU EINECS/ELINCS NUMBER : 215-648-1  
CHEMICAL FAMILY : Polychlorinated biphenyl  
MOLECULAR FORMULA : C12-H7-Cl3 (approximately)

STATUS :  
This CHEMINFO record for this chemical is not complete. It only contains readily available information at this time.

\*\*\* SECTION 2. DESCRIPTION \*\*\*

APPEARANCE AND ODOUR :  
Colourless to light-coloured viscous liquid with a mild hydrocarbon odour  
(1)  
ODOUR THRESHOLD :  
Not available

\*\*\* SECTION 3. HAZARDS IDENTIFICATION \*\*\*

\*\* POTENTIAL HEALTH EFFECTS \*\*

CARCINOGENICITY :  
Overall IARC evaluation of carcinogenic risk: Group 2A (probably carcinogenic to humans). NTP has listed other polychlorinated biphenyls as substances which may reasonably be anticipated to be carcinogens. (5)  
Consult NTP report for further information.

\*\*\* SECTION 5. FIRE FIGHTING MEASURES \*\*\*

FLASH POINT :  
176-180 deg C (349-356 deg F) (open cup) (2)  
LOWER FLAMMABLE (EXPLOSIVE) LIMIT (LFL/LEL) :  
Not available  
UPPER FLAMMABLE (EXPLOSIVE) LIMIT (UFL/UEL) :  
Not available  
AUTOIGNITION (IGNITION) TEMPERATURE :  
Not available  
COMBUSTION AND THERMAL DECOMPOSITION PRODUCTS :  
Exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans, and chlorinated dibenzo-p-dioxins.  
FIRE HAZARD COMMENTS :  
During a fire, toxic PCBs, polychlorinated dibenzofurans and chlorinated dibenzo-p-dioxins may be generated.  
EXTINGUISHING MEDIA :  
Dry chemical, carbon dioxide, water spray or foam (2)

\*\*\* SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION \*\*\*

NOTE : Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations.

SAMPLING AND ANALYSIS :

NIOSH METHOD 5503 - NIOSH Manual of Analytical Methods. 4th ed. Vol. 3. Partially evaluated method. Collection on glass fibre membrane filter, and Florisil sorbent tube. Desorption with hexane. Analysis by gas chromatography using electron capture detector (ECD). Estimated detection limited: 0.03 ug.

Use appropriate instrumentation and sampling strategy (location, timing, duration, frequency, and number of samples). Interpretation of the sampling results is related to these variables and the analytical method. Sampling should be carried out by trained personnel.

PERSONAL PROTECTIVE EQUIPMENT :

If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protection equipment including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire.

If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Refer to the CSA Standard Z94.4-93, "Selection, Care, and Use of Respirators", available from the Canadian Standards Association, Rexdale, Ontario, M9W 1R3.

RESPIRATORY PROTECTION GUIDELINES :

NIOSH RECOMMENDATIONS FOR CHLORODIPHENYL (42% CHLORINE) CONCENTRATIONS IN AIR (1):

AT CONCENTRATIONS ABOVE THE NIOSH REL, OR WHERE THERE IS NO REL, AT ANY DETECTABLE CONCENTRATION: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

ESCAPE: Gas mask with organic vapour canister and high-efficiency particulate filter; or escape-type SCBA.

NOTE: The NIOSH Recommended Exposure Limit (REL) for chlorodiphenyl (42% chlorine) is 0.001 mg/m<sup>3</sup> (time-weighted average concentration).

NOTE: NIOSH has classified this material as a potential occupational carcinogen, according to specific NIOSH criteria. This classification is reflected in these recommendations for respiratory protection, which specify that only the most reliable and protective respirators be worn. The requirements in Canadian jurisdictions may vary.

The respirator use limitations specified by the approving agency and the manufacturer must be observed.

Recommendations apply only to NIOSH approved respirators.

ABBREVIATIONS: SAR = supplied-air respirator; SCBA = self-contained breathing apparatus; IDLH = immediately dangerous to life or health.

RESISTANCE OF MATERIALS FOR PROTECTIVE CLOTHING :

Guidelines for polychlorinated biphenyls (PCB) (4):

RECOMMENDED (resistance to breakthrough longer than 8 hours): butyl rubber, neoprene, Teflon(TM), Viton(TM), Saranex(TM), Barricade(TM), Responder(TM).

RECOMMENDED (resistance to breakthrough longer than 4 hours):

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4H(TM) (polyethylene/ethylene vinyl alcohol).

CAUTION, use for short periods only (resistance to breakthrough within 1 to 4 hours): nitrile rubber.

NOT RECOMMENDED for use (resistance to breakthrough less than 1 hour): natural rubber, polyethylene.

This material is a recognized skin absorption hazard (ACGIH or OSHA).

Recommendations are NOT valid for very thin natural rubber, neoprene, nitrile and pvc gloves (0.3 mm or less).

Recommendations are valid for permeation rates reaching 0.1 ug/cm<sup>2</sup>/min or 1 mg/m<sup>2</sup>/min and over. Resistance of specific materials can vary from product to product. Breakthrough times are obtained under conditions of continuous contact, generally at room temperature. Evaluate resistance under conditions of use and maintain clothing carefully.

**\*\* EXPOSURE GUIDELINES \*\***

**\* THRESHOLD LIMIT VALUES (TLVs) / AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) / 1999 \***

TIME-WEIGHTED AVERAGE (TLV-TWA) : 1 mg/m<sup>3</sup>, skin  
TLV BASIS - CRITICAL EFFECT(S) : Irritation  
Chloracne (acne caused by chlorine compounds)  
Liver

**TLV COMMENTS :**

"SKIN" NOTATION: Contact with skin, eyes, and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

NOTE: In many jurisdictions, exposure limits are similar to the ACGIH TLVs. Since the manner in which exposure limits are established, interpreted, and implemented can vary, obtain detailed information from the appropriate government agency in each jurisdiction.

**\* PERMISSIBLE EXPOSURE LIMITS (PELs) / FINAL RULE LIMITS / U. S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) \***

TIME WEIGHTED AVERAGE (PEL-TWA) : 1 mg/m<sup>3</sup>, skin  
FINAL RULE LIMIT PEL COMMENTS :

"SKIN" DESIGNATION: Skin contact can contribute to the overall exposure to this chemical. Prevent or reduce skin absorption through the use of gloves, coveralls, goggles or other appropriate personal protective equipment, engineering controls or work practices.

NOTE: The OSHA PEL Final Rule Limits are currently non-enforceable due to a court decision. The OSHA PEL Transitional Limits are now in force.

**\* PERMISSIBLE EXPOSURE LIMITS (PELs) / TRANSITIONAL LIMITS / U. S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) \***

TIME WEIGHTED AVERAGE (PEL-TWA) : 1 mg/m<sup>3</sup>, skin  
TRANSITIONAL LIMIT PEL COMMENTS :

"SKIN" DESIGNATION: Skin contact can contribute to the overall exposure to this chemical. Prevent or reduce skin absorption through the use of gloves, coveralls, goggles or other appropriate personal protective equipment, engineering controls or work practices.

**\*\*\* SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES \*\*\***

MOLECULAR WEIGHT : 258 (approximately)  
CONVERSION FACTOR :  
1 ppm = 10.53 mg/m<sup>3</sup>; 1 mg/m<sup>3</sup> = 0.095 ppm at 25 deg C (calculated)  
MELTING POINT : -19 deg C (-2 deg F) (1)  
BOILING POINT : 325-366 deg C (617-691 deg F) (1, 2)

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RELATIVE DENSITY (SPECIFIC GRAVITY) :

1.31 at 25 deg C (water=1) (1)

SOLUBILITY IN WATER :

Slightly soluble; 0.10 mg/100 mL at 24 deg C (3)

SOLUBILITY IN OTHER LIQUIDS :

Not available

VAPOUR DENSITY : 8.9 (air=1)

VAPOUR PRESSURE : 1.33x10<sup>(-4)</sup> kPa (0.001 mmHg) at 20 deg C (1)

SATURATION VAPOUR CONCENTRATION : 1.3 ppm (0.0001%) at 20 deg C (calculated)

EVAPORATION RATE : Not available

pH VALUE : Not available

CRITICAL TEMPERATURE : Not available

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT) :

Log P(oct) = 4.11 (2)

\*\*\* SECTION 10. STABILITY AND REACTIVITY \*\*\*

STABILITY :

Normally stable

HAZARDOUS POLYMERIZATION :

Does not occur

CONDITIONS TO AVOID :

Temperatures above 176-180 deg C

\*\*\* SECTION 12. ECOLOGICAL INFORMATION \*\*\*

NOTE : This section is subject to future development.

\*\*\* SECTION 14. TRANSPORT INFORMATION \*\*\*

\*\* CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG)  
SHIPPING INFORMATION \*\*

SHIPPING NAME AND DESCRIPTION: polychlorinated biphenyls or articles

containing polychlorinated biphenyls (PCB)

PRODUCT IDENTIFICATION NUMBER (PIN): 2315

CLASSIFICATION: 9.1, 9.2

SPECIAL PROVISIONS: ---

PACKING GROUP: II

REGULATED LIMIT: ---

NOTE: This information incorporates Schedule No. 21 amendments to the Transportation of Dangerous Goods Act, 1992, effective December 13, 1995.

\*\* U. S. DEPARTMENT OF TRANSPORT (DOT) HAZARDOUS  
MATERIALS SHIPPING INFORMATION (49 CFR) \*\*

HAZARDOUS MATERIAL DESCRIPTION AND PROPER SHIPPING NAME: Polychlorinated biphenyls

HAZARD CLASS OR DIVISION: 9

IDENTIFICATION NUMBER: UN2315

PACKING GROUP: II

NOTE : This information was taken from the U. S. Code of Federal Regulations Title 49 - Transportation and is effective October 1, 1997.

\*\*\* SECTION 15. REGULATORY INFORMATION \*\*\*

\*\* CANADIAN WORKPLACE HAZARDOUS MATERIALS  
INFORMATION SYSTEM (WHMIS) \*\*

WHMIS INGREDIENT DISCLOSURE LIST :

Included for disclosure at 0.1% or greater

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\*\* EUROPEAN UNION (EU)  
CLASSIFICATION AND LABELLING INFORMATION \*\*

EU CLASSIFICATION :  
Danger of cumulative effects; Dangerous for the Environment. [R: 33;N]  
EU RISK PHRASES :  
Danger of cumulative effects. Very toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment. [R: 33-50/53]  
EU SAFETY PHRASES :  
Keep out of reach of children.\* This material and its container must be disposed of in a safe way.  
This material and/or its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheet. [S: (2-)\*35-60-61]  
\*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.  
The product label must indicate if the substance is a specific isomer or a mixture of isomers.  
EU COMMENTS :  
CONCENTRATION GREATER THAN OR EQUAL TO 0.005%: Harmful. Danger of cumulative effects. [Xn; R: 33]

\*\*\* SECTION 16. OTHER INFORMATION \*\*\*

SELECTED BIBLIOGRAPHY :  
(1) NIOSH pocket guide to chemical hazards. NIOSH, June 1994. p. 64  
(2) HSDB record for Aroclor 1242. Last updated 9501  
(3) Verschueren, K. Handbook of environmental data on organic chemicals. 2nd ed. Van Nostrand Reinhold, 1983. p. 216  
(4) Forsberg, K., et al. Quick selection guide to chemical protective clothing. 3rd ed. Van Nostrand Reinhold, 1997  
(5) Eighth Report on Carcinogens, 1998 Summary. U.S. Department of Health and Human Services, National Toxicology Program, 1998

Information on chemicals reviewed in the CHEMINFO database is drawn from a number of publicly available sources. A list of general references used to compile CHEMINFO records is available in the database Help.

REVIEW/PREPARATION DATE :  
1995-12-27  
REVISION INDICATORS :  
US transport; 1998-03  
Resistance of materials; 1998-06  
TLV comments; 1998-08  
Bibliography; 1999-02  
Carcinogenicity; 1999-02

\*\*\* END OF RECORD \*\*\*

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\* \* \* \* \*  
\* C H E M I N F O \*  
\* \* \* \* \*  
\* Canadian Centre for Occupational Health and Safety \*  
\* \* \* \* \* Issue : 2000-2 (May, 2000) \*

\*\*\* SECTION 1. CHEMICAL IDENTIFICATION \*\*\*

CHEMINFO RECORD NUMBER : 2022  
CCOHS CHEMICAL NAME : 2, 4, 6- Trinitrotoluene  
SYNONYMS :  
\* 1-Methyl-2, 4, 6- Trinitrobenzene  
\* alpha-TNT  
\* s-Trinitrotoluene  
\* s-Trinitrotoluol  
\* sym-Trinitrotoluene  
\* TNT  
\* Trinitrotoluene  
CAS REGISTRY NUMBER : 118-96-7  
UN/NA NUMBER(S) : 1356 0209  
RTECS NUMBER(S) : XU0175000  
EU EINECS/ELINCS NUMBER : 204-289-6  
CHEMICAL FAMILY : Aromatic nitro compound  
MOLECULAR FORMULA : C7-H5-N3-O6

STATUS :

This CHEMINFO record for this chemical is not complete. It only contains readily available information at this time.

\*\*\* SECTION 2. DESCRIPTION \*\*\*

APPEARANCE AND ODOUR :  
Yellow solid, odourless (1)  
ODOUR THRESHOLD :  
Not applicable

\*\*\* SECTION 3. HAZARDS IDENTIFICATION \*\*\*

\*\* POTENTIAL HEALTH EFFECTS \*\*

CARCINOGENICITY :

IARC has determined that there is inadequate evidence in humans for the carcinogenicity of 2, 4, 6-trinitrotoluene. There is inadequate evidence in experimental animals for the carcinogenicity of 2, 4, 6-trinitrotoluene. Overall IARC evaluation: 2, 4, 6-Trinitrotoluene is not classifiable as to its carcinogenicity to humans (Group 3). (7)

\*\*\* SECTION 5. FIRE FIGHTING MEASURES \*\*\*

FLASH POINT :  
Explodes  
LOWER FLAMMABLE (EXPLOSIVE) LIMIT (LFL/LEL) :  
Not available  
UPPER FLAMMABLE (EXPLOSIVE) LIMIT (UFL/UEL) :  
Not available  
AUTOIGNITION (IGNITION) TEMPERATURE :  
Not available  
COMBUSTION AND THERMAL DECOMPOSITION PRODUCTS :  
Nitrous oxide (5)  
FIRE HAZARD COMMENTS :  
Explodes at 240 deg C; sensitive to physical shock  
EXTINGUISHING MEDIA :

Water can be used to keep containers cool

\*\*\* SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION \*\*\*

NOTE : Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations.

SAMPLING AND ANALYSIS :

OSHA METHOD 44. OSHA Analytical Methods Manual. 2nd ed. Part 1. Vol. 2. U.S. Dept. of Labour, January 1990. Validated method. Collection on Tenax sorbent tube. Desorption with acetone. Analysis by gas chromatography using thermal energy analyzer (TEA). Estimated detection limit: 0.37 ug. Use appropriate instrumentation and sampling strategy (location, timing, duration, frequency, and number of samples). Interpretation of the sampling results is related to these variables and the analytical method. Sampling should be carried out by trained personnel.

PERSONAL PROTECTIVE EQUIPMENT :

If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protection equipment including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire.

If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Refer to the CSA Standard Z94.4-93, "Selection, Care, and Use of Respirators", available from the Canadian Standards Association, Rexdale, Ontario, M9W 1R3.

RESPIRATORY PROTECTION GUIDELINES :

NIOSH RECOMMENDATIONS FOR 2, 4, 6-TRINITROTOLUENE CONCENTRATIONS IN AIR (1):  
UP TO 5 mg/m<sup>3</sup>: SAR\*.  
UP TO 12.5 mg/m<sup>3</sup>: SAR operated in a continuous-flow mode\*.  
UP TO 25 mg/m<sup>3</sup>: Full-facepiece SCBA; or full-facepiece SAR.  
UP TO 500 mg/m<sup>3</sup>: Positive pressure, full-facepiece SAR.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:  
Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

ESCAPE: Gas mask with organic vapour canister and high-efficiency particulate filter; or escape-type SCBA.

\*This substance is reported to cause eye irritation or damage; may require eye protection

NOTE: The IDLH concentration for 2, 4, 6-Trinitrotoluene is 500 mg/m<sup>3</sup>.  
NOTE: The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory protection equipment. In the event of failure of respiratory protective equipment every effort should be made to exit immediately.

The respirator use limitations specified by the approving agency and the manufacturer must be observed.

Recommendations apply only to NIOSH approved respirators.

ABBREVIATIONS: SAR = supplied-air respirator; SCBA = self-contained breathing apparatus; IDLH = immediately dangerous to life or health.



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**RESISTANCE OF MATERIALS FOR PROTECTIVE CLOTHING :**

No specific guidelines are available. Contact chemical manufacturer/supplier for advice.

**\*\* EXPOSURE GUIDELINES \*\***

**\* THRESHOLD LIMIT VALUES (TLVs) / AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) / 1999 \***

TIME-WEIGHTED AVERAGE (TLV-TWA) : 0.1 mg/m<sup>3</sup> - Skin  
TLV BASIS - CRITICAL EFFECT(S) : Irritation  
Liver  
Blood

**TLV COMMENTS :**

"SKIN" NOTATION: Contact with skin, eyes, and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

BIOLOGICAL EXPOSURE INDICES (BEIs): The ACGIH has proposed a BEI for this chemical. BEIs provide an indication of worker exposure by measuring the chemical or its breakdown products in the body or by measuring biochemical changes resulting from exposure to the chemical. Consult the BEI documentation for further information.

NOTE: In many jurisdictions, exposure limits are similar to the ACGIH TLVs. Since the manner in which exposure limits are established, interpreted, and implemented can vary, obtain detailed information from the appropriate government agency in each jurisdiction.

**\* PERMISSIBLE EXPOSURE LIMITS (PELs) / FINAL RULE LIMITS / U. S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) \***

TIME WEIGHTED AVERAGE (PEL-TWA) : 0.5 mg/m<sup>3</sup>

**FINAL RULE LIMIT PEL COMMENTS :**

"SKIN" DESIGNATION: Skin contact can contribute to the overall exposure to this chemical. Prevent or reduce skin absorption through the use of gloves, coveralls, goggles or other appropriate personal protective equipment, engineering controls or work practices.

NOTE: The OSHA PEL Final Rule Limits are currently non-enforceable due to a court decision. The OSHA PEL Transitional Limits are now in force.

**\* PERMISSIBLE EXPOSURE LIMITS (PELs) / TRANSITIONAL LIMITS / U. S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) \***

TIME WEIGHTED AVERAGE (PEL-TWA) : 1.5 mg/m<sup>3</sup>

**TRANSITIONAL LIMIT PEL COMMENTS :**

"SKIN" DESIGNATION: Skin contact can contribute to the overall exposure to this chemical. Prevent or reduce skin absorption through the use of gloves, coveralls, goggles or other appropriate personal protective equipment, engineering controls or work practices.

**\*\*\* SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES \*\*\***

MOLECULAR WEIGHT : 227.13

**CONVERSION FACTOR :**

1 ppm = 9.44 mg/m<sup>3</sup>; 1 mg/m<sup>3</sup> = 0.11 ppm at 25 deg C (calculated)

MELTING POINT : 80.9 deg C (178 deg F) (2)

BOILING POINT : explodes at 240 deg C (464 deg F) (3)

**RELATIVE DENSITY (SPECIFIC GRAVITY) :**

1.654 @ 20 deg C (water = 1) (3)

**SOLUBILITY IN WATER :**

cie10042

Practically insoluble 0.02 g/100 mL at 15 deg C (3)

**SOLUBILITY IN OTHER LIQUIDS :**

Ethanol, acetone, diethyl ether, benzene (4)

VAPOUR DENSITY : 7.83 (air = 1)

VAPOUR PRESSURE : 2.7 x 10<sup>(-5)</sup> kPa (2.0 x 10<sup>(-4)</sup> mmHg) at 20 deg C

(1)

SATURATION VAPOUR CONCENTRATION : 0.26 ppm (.00003%) at 20 deg C (calculated)

EVAPORATION RATE : Not available

pH VALUE : Not applicable

CRITICAL TEMPERATURE : Not available

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT) :

Log P(oct) = 1.60 (5)

\*\*\* SECTION 10. STABILITY AND REACTIVITY \*\*\*

**STABILITY :**

Normally stable; sensitive to physical shock. TNT is normally wetted to reduce the chance of detonation (explosion).

**HAZARDOUS POLYMERIZATION :**

Does not occur

\*\*\* SECTION 12. ECOLOGICAL INFORMATION \*\*\*

NOTE : This section is subject to future development.

\*\*\* SECTION 14. TRANSPORT INFORMATION \*\*\*

\*\* CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG)  
SHIPPING INFORMATION \*\*

SHIPPING NAME AND DESCRIPTION: Trinitrotoluene, wetted with not less than 30 percent, by mass

PRODUCT IDENTIFICATION NUMBER (PIN): 1356

CLASSIFICATION: 4.1

SPECIAL PROVISIONS: 10, 58

PACKING GROUP: I

REGULATED LIMIT: ---

NOTE: This information incorporates Schedule No. 21 amendments to the Transportation of Dangerous Goods Act, 1992, effective December 13, 1995.

\*\* U. S. DEPARTMENT OF TRANSPORT (DOT) HAZARDOUS  
MATERIALS SHIPPING INFORMATION (49 CFR) \*\*

HAZARDOUS MATERIAL DESCRIPTION AND PROPER SHIPPING NAME: Trinitrotoluene, wetted with not less than 30 percent water, by mass

HAZARD CLASS OR DIVISION: 4.1

IDENTIFICATION NUMBER: UN1356

PACKING GROUP: I

HAZARDOUS MATERIAL DESCRIPTION AND PROPER SHIPPING NAME: Trinitrotoluene or TNT dry or wetted with less than 30 percent water, by mass

HAZARD CLASS OR DIVISION: 1.1D

IDENTIFICATION NUMBER: UN0209

PACKING GROUP: II

NOTE : This information was taken from the U. S. Code of Federal Regulations Title 49 - Transportation and is effective October 1, 1997.

\*\*\* SECTION 15. REGULATORY INFORMATION \*\*\*

\*\* CANADIAN WORKPLACE HAZARDOUS MATERIALS  
INFORMATION SYSTEM (WHMIS) \*\*

ci e10042

**WHMIS INGREDIENT DISCLOSURE LIST :**

Included for disclosure at 1% or greater

**\*\* EUROPEAN UNION (EU)  
CLASSIFICATION AND LABELLING INFORMATION \*\***

**EU CLASSIFICATION :**

Explosive; Toxic; Danger of cumulative effects. [E;T;R: 33] (6)

**EU RISK PHRASES :**

Risk of explosion by shock, friction, fire or other sources of ignition.  
Toxic by inhalation, in contact with skin and if swallowed. Danger of  
cumulative effects. [R: 2- 23/24/25- 33]

**EU SAFETY PHRASES :**

Keep locked up and out of the reach of children.\* This material and its  
container must be disposed of in a safe way. In case of accident or if you  
feel unwell, seek medical advice immediately (show label where possible).  
[S: 1/2-)\*35- 45]

\*This safety phrase can be omitted from the label when the substance or  
preparation is sold for industrial use only.

**\*\*\* SECTION 16. OTHER INFORMATION \*\*\***

**SELECTED BIBLIOGRAPHY :**

- (1) NIOSH pocket guide to chemical hazards. NIOSH, June 1994. p. 322
- (2) Hawley's condensed chemical dictionary. 12th ed. Van Nostrand  
Reinhold, 1993. p. 1185
- (3) Verschueren, K. Handbook of environmental data on organic chemicals.  
2nd ed. Van Nostrand Reinhold, 1983. p. 1169
- (4) Compendium of safety data sheets for research and industrial  
chemicals. Part III. VCH Publishers, 1985. p. 1702
- (5) HSDB record for 2, 4, 6-Trinitrotoluene. Last updated 9501
- (6) European Economic Community. Commission Directive 93/72/EEC.  
September 1, 1993
- (7) 2, 4, 6-Trinitrotoluene. In: IARC monographs on the evaluation of  
carcinogenic risks to humans. Vol. 65 - Printing processes and printing  
inks, carbon black and some nitro compounds. World Health Organization,  
1996. p. 449-475

Information on chemicals reviewed in the CHEMINFO database is  
drawn from a number of publicly available sources. A list of  
general references used to compile CHEMINFO records is  
available in the database Help.

**REVIEW/PREPARATION DATE :**

1995- 10- 11

**REVISION INDICATORS :**

TLV-TWA; 1997- 09  
TLV comments; 1997- 09  
Carcinogenicity; 1996- 10  
Bibliography; 1996- 10  
US transport; 1998- 03  
TLV comments; 1998- 08

**\*\*\* END OF RECORD \*\*\***

**Attachment C**  
**Project-Specific Hearing Conservation Program**

**ATTACHMENT C**  
**PROJECT-SPECIFIC HEARING CONSERVATION PROGRAM**  
**at**  
**FORMER LAKE ONTARIO ORDNANCE WORKS**  
**NIAGARA COUNTY, NEW YORK**

**1.0 MONITORING**

In accordance with OSHA Standard 29 CFR 1910.95, noise monitoring will be conducted by the Health and Safety Officer (HSO). Noise monitoring will consist of sound level meter surveying.

The specific instrumentation to be used is a Metrosonics dB-307 Sound Level Meter (SLM), or its equivalent. This instrument will be used on the A-scale, slow response, to monitor noise levels. Monitoring and calibration of the SLM will be performed in accordance with the manufacturer's guidelines. A copy of the SLM instruction manual will be kept in the site office. Calibration will be performed, at a minimum, prior to each day's use. The calibration of the SLM will be recorded by the HSO on the Daily Calibration Form (located in Attachment A) or in the health and safety logbook.

The noise monitoring strategy will consist of recording sound level measurements every 15 minutes, along with peak sound levels observed, during high noise operations. The sound level measurements will be recorded in the HSO's logbook to document actual exposures. Anticipated high noise sources include heavy equipment used for trenching and demolition, high-pressure sprayer washing equipment, other power tools, and generators.

All noise monitoring results will be documented using standard logbook recordkeeping practices. These results will be maintained in accordance with Section 7.0 of the program.

Monitoring frequency will initially be every 15 minutes during potentially noisy site activities. If the results of the sound level survey are below 85 dBA, noise monitoring frequency will be reduced to periodic spot checks. If the results are greater than 85 dBA, personnel will be required to wear hearing protection at all times during the high noise operation. If site operating procedures or equipment changes occur, the noise levels will be re-evaluated by the HSO.

## **2.0 EMPLOYEE NOTIFICATION**

All site employees exposed above the OSHA action level of 85 dBA as an 8-hour time-weighted average (TWA) will be notified of the monitoring results by the HSO at an interval not to exceed 5 days after completion of the noise monitoring. Both verbal and written notification will be provided. Documentation of employee notifications and corresponding signatures of notified employees will be kept in the project health and safety files.

## **3.0 OBSERVATION OF MONITORING**

All employees affected by the monitoring or a designated employee representative will be given the opportunity to observe noise monitoring procedures. A demonstration of noise monitoring instrumentation will be presented during the initial site-specific safety training.

## **4.0 AUDIOMETRIC TESTING PROGRAM AND REQUIREMENTS**

Sevenson personnel who perform site activities are required to participate in the Sevenson medical monitoring program, which includes audiometric testing meeting the requirements of OSHA Standard 29 CFR 1910.95. Additionally, any subcontractors performing work on Radian projects where noise levels may exceed 85 dBA will be required to provide documentation that they participate in an audiometric testing program which meets the requirements of 29 CFR 1910.95. Documentation of participation in the testing program will be given to the HSO, maintained by each subcontractor employer, and located in the subcontractor's office.

## **5.0 HEARING PROTECTORS AND ESTIMATED ATTENUATION**

A selection of suitable hearing protectors will be made available to all employees who are expected to have 8-hour TWA noise exposures above 85 dBA. The types of hearing protectors anticipated to be available include:

- |  |              |               |
|--|--------------|---------------|
| • E-A-R Disposable Ear Plugs           | Attenuation: | NRR of 29 dBA |
| • Moldex Pura-fit Disposable Ear Plugs | Attenuation: | NRR of 31 dBA |
| • Slip-On Ear Muffs                    | Attenuation: | NRR of 27 dBA |

(NRR = Noise Reduction Rating)

Hearing protector attenuation will be evaluated by the HSO for specific noise environments. The sound level measurements will be compared to the NRR of hearing protectors to ensure that the adjusted exposure is less than the 85 dBA.

The following site personnel will be required to wear hearing protectors during specific activities as determined in accordance with OSHA Standard 29 CFR 1910.95 and the results of site-specific noise monitoring conducted according to Section 1.0 of this program. (This section can be completed after monitoring, if necessary.)

NAME	ACTIVITY	REQUIRED PROTECTION

Hearing protectors will be properly fitted by the HSO upon initial distribution to site workers. Size and type of protector for each employee fitted will be recorded above.

## **6.0 ACCESS TO INFORMATION AND TRAINING MATERIALS**

All information required by 29 CFR 1910.95 to be made available to the employees will be posted by the HSO at the site office. A copy of the OSHA Standard will also be kept on-site.

## **7.0 RECORDKEEPING**

Records required by 29 CFR 1910.95 will be completed by the HSO and maintained in the Former Lake Ontario Ordnance Works project files, then placed in permanent file at Severson's Niagara Falls, New York office for the minimum duration required by the standard. Employees can access their individual records by contacting Ms. Sharon Lee Sheelar, PjM, at (716) 284-0431. All records required by this section will be transferred to any employee's successive employer if Severson ceases to do business.

**Attachment D**  
**Project-Specific Personal Protective Equipment Program**



**ATTACHMENT D**  
**PROJECT-SPECIFIC PERSONAL PROTECTIVE EQUIPMENT PROGRAM**  
**at**  
**FORMER LAKE ONTARIO ORDNANCE WORKS**  
**NIAGARA COUNTY, NEW YORK**

**1.0 PERSONAL PROTECTIVE EQUIPMENT SELECTION**

Personal protective equipment (PPE) selection will be based upon exposure potential (i.e., chemical hazards, physical agents, physical hazards, biological hazards, etc.) which directly correspond to the site involved and the task being performed. PPE requirements are outlined in the SSHP developed for the TNT Site Walkover project. The Activity-Hazard Analyses in the SSHP and this program must be used in tandem. Hazards to consider and recommended controls include, but are not limited to, the following categories:

<b>HAZARDS TO CONSIDER</b>	<b>PPE AND CONTROLS</b>
Moving, falling, or flying objects	Hard hats, safety glasses, safety goggles, face shields
Work above ground level/in a confined space	Fall protection; retrieval system
Pinch points, nip points, contact with rotating parts; handling sharp objects; hot surfaces	Heavy duty work gloves
Noise sources	Hearing protection
Contact with energized sources	Lockout/tagout supplies
Lifting heavy objects	Steel-toe/steel-shank work boots
Uneven, unstable, or slippery walking surfaces	Chemical-resistant outer boots and gloves
Struck by vehicular traffic or heavy equipment	Orange vests and flags; look before backing up
Falling; elevated perimeter readings	Limit the size of the excavation
Heat stress, cold stress	Work-rest/warm-up regimen, electrolyte drinks
Fire or explosion; oxygen deficiency; confined space entry	Real-time monitoring instruments
Exposure to site contaminants (inhalation, dermal contact, ingestion)	Level C or Level B respiratory protection; regular, poly-coated, or Saranex tyvek

**TABLE D-1**

<b>Activity</b>	<b>PPE/Control Measures</b>
Mobilization, Decontamination Pad Setup, Site Restoration, and Demobilization	<ol style="list-style-type: none"><li>1. Wear Level D PPE.</li><li>2. Provide hearing protection.</li><li>3. Be aware of and keep hands out of potential pinch/nip points. Wear heavy work gloves.</li></ol>
Clearing and Grubbing	<ol style="list-style-type: none"><li>1. Wear Level D PPE and heavy work gloves.</li><li>2. Wear hearing protection.</li><li>3. Wear a face shield in addition to safety glasses when using tools that may cause flying debris.</li></ol>
Confined Space Entry	<ol style="list-style-type: none"><li>1. Air monitoring for VOCs, combustible gases, and oxygen levels must be performed prior to and during confined space entry.</li><li>2. PPE to be worn during confined space entry will be chosen based on the results of initial monitoring.</li><li>3. Personnel will not enter a confined space unless appropriate entry procedures have been followed. Implement Confined Space Entry Program.</li></ol>
Removal of Liquids and Sludges from Sewer Lift Stations	<ol style="list-style-type: none"><li>1. Perform air monitoring for VOCs, combustible gases, and oxygen deficiency (if CSE is performed).</li><li>2. Wear Modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry.</li><li>3. Avoid contact with potentially contaminated materials.</li><li>4. Provide hearing protection.</li></ol>
Excavation of Access Points or Pipeline Segments	<ol style="list-style-type: none"><li>1. Work upwind and perform air monitoring for VOCs, oxygen levels, and combustible gases.</li><li>2. Wear modified Level D PPE. Upgrade as necessary.</li><li>3. Provide hearing protection.</li><li>4. Any trench deeper than 4 feet will also be considered a confined space.</li></ol>
Investigation of Pipeline Integrity	<ol style="list-style-type: none"><li>1. Perform air monitoring for VOCs and combustible gases.</li><li>2. Wear Modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry.</li><li>3. Avoid contact with potentially contaminated materials.</li></ol>

**TABLE D-1 (Cont.)**

<b>Activity</b>	<b>PPE/Control Measures</b>
Power Washing of Sewer Lift Stations, Sewer Lines, and TNT Pipelines	<ol style="list-style-type: none"><li>1. Perform air monitoring for VOCs and combustible gases.</li><li>2. Wear Modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry.</li><li>3. Avoid contact with potentially contaminated materials.</li><li>4. Provide hearing protection.</li><li>5. Avoid contact with high-pressure water stream.</li></ol>
Collect Soil Samples	<ol style="list-style-type: none"><li>1. Work upwind; perform monitoring for VOCs.</li><li>2. Wear Level D PPE and chemical resistant gloves. If contact with contaminated material is likely, also wear latex overboots and tyvek.</li></ol>
Collect Wipe Samples	<ol style="list-style-type: none"><li>1. Air monitoring for VOCs, combustible gases, and oxygen levels must be performed prior to and during confined space entry.</li><li>2. Wear modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry.</li></ol>
Sealing of Pipeline Tie-Ins and Placement of Pipeline Plugs	<ol style="list-style-type: none"><li>1. Wear modified Level D PPE. Upgrade as necessary.</li><li>2. Any trench deeper than 4 feet will also be considered a confined space. Implement Confined Space Entry Procedures (Table 7-3)</li></ol>
Sealing of Chemical Waste Sewer System	<ol style="list-style-type: none"><li>1. Wear hot work PPE (welder's coveralls, gloves, and welder's goggles with correct filters).</li><li>2. Wear respiratory protection recommended by the manufacturer of the welding rods, as necessary.</li></ol>

**TABLE D-1 (Cont.)**

<b>Activity</b>	<b>PPE/Control Measures</b>
Backfill and Compaction of Excavations	<ol style="list-style-type: none"><li>1. Wear Level D PPE.</li><li>2. Provide hearing protection and sound level monitoring.</li><li>3. Monitoring for dust levels; utilize dust suppression or modify work practices if action levels are exceeded.</li><li>4. Personnel shall wear high visibility vests when working adjacent to moving equipment.</li><li>5. Metatarsal foot protectors to prevent injuries to feet during compaction.</li></ol>
Decontaminate Sampling and Heavy Equipment	<ol style="list-style-type: none"><li>1. <u>Heavy Equipment</u>: Wear modified Level D PPE (including poly-coated tyvek or PVC rain suit, chemical resistant over-boots and gloves) and a face shield.</li><li>2. <u>Sampling equipment</u>: Wear Level D PPE and chemical resistant gloves. If contact with contaminated material is likely, also wear a poly-coated tyvek.</li><li>3. If equipment is excessively contaminated, Level C respiratory protection may be required.</li><li>4. Provide hearing protection.</li></ol>

## **2.0 PPE USE AND DONNING PROCEDURES**

### **2.1 General Requirements**

PPE is to be used in accordance with the recommended controls section in each specific activity-hazard analysis. Donning procedures will be in accordance with the design of the equipment. Special procedures include:

- Tape wrist, ankle, and zipper seams if there is a high splash potential, or when contact with contaminated material is likely.
- Conduct training on using a body harness and retrieval system during confined space entry operations.

### **2.2 Additional Use Requirements**

PPE will be used in accordance with OSHA 29 CFR 1910 Subpart I. All loose clothing will be properly secured to prevent it from becoming caught in moving machinery. All persons will be certified medically qualified to wear PPE prior to use. Medical clearance forms will be maintained by HSO at the project site, and by the Environmental, Health, and Safety Coordinator at the Radian office to which the individual is assigned.

## **3.0 WORK MISSION DURATION AND LIMITATIONS**

Chemical degradation or permeation of PPE and worker heat stress can significantly affect the length of time a person can work in PPE. Based on the anticipated site conditions, restrictions will apply to this project.

Additionally, site personnel will be working in protective clothing throughout the duration of the project, which may create the potential for heat stress. Site workers will be monitored for potential heat stress illnesses and injuries in accordance with the Corporate Health and Safety Program.

Modifications to these restrictions will be based on the findings of the in-use monitoring as outlined in Section 8.0 of this program.

## **4.0 MAINTENANCE AND STORAGE**

PPE will be maintained and stored in accordance with the manufacturer's recommendation. PPE maintenance and issuance at this project will be performed by the HSO. PPE will be stored in the site office. Reusable PPE that is potentially contaminated will be stored in the Contamination Reduction Zone (CRZ).

## **5.0 PPE DECONTAMINATION AND DOFFING PROCEDURES**

PPE decontamination will be performed in accordance with the corresponding SSHP for this project. In accordance with the SSHP, the following decontamination procedures will apply:

- Contaminant removal from the outer surfaces of reusable PPE
- Contaminant removal from the outer surfaces of disposable PPE
- Doffing (removal) of PPE
- Disposal of contaminated PPE
- Personal hygiene procedures

The following sequence details the decontamination requirements that have been selected for this project, including the two minimum requirements of doffing and personal hygiene:

- Remove seal tape from wrists, zipper, and/or ankle seams (if worn)
- Remove outer tyvek or PVC splash protection (if worn)
- Remove chemical resistant over-boots (if worn)
- Remove outer gloves (if worn)
- Remove respirator, discard cartridges, and clean respirator (if worn)
- Remove inner gloves (if worn)

## **6.0 PPE TRAINING AND FITTING**

All site personnel will be given site-specific PPE training as part of the initial site-specific safety training required by OSHA Standard 29 CFR 1910.120. Documentation of the training will be in accordance with the SSHP. Personnel will receive training on each item of PPE they will be required to use. Minimum requirements will include the need for PPE, proper use, proper donning/doffing, and limitations.

PPE training will be conducted by the HSO prior to the site worker using a specific PPE item. All site personnel will be properly fitted for each item of PPE required for this project.

## **7.0 PPE INSPECTION**

PPE will be inspected by the person issuing the PPE and by the site worker in accordance with the manufacturers' recommendations. Site worker inspections will be conducted before, during, and after each use. The following inspection criteria will apply for the PPE anticipated to be used:

ITEM	INSPECTION CRITERIA
Nitrile Gloves	No holes or signs of manufacturing defect or chemical degradation.
Protective Suits	No holes or signs of manufacturing defect or chemical degradation.
Boots	No holes or signs of manufacturing defect or chemical degradation.
Respirators	Check seals and cartridges in accordance with the Corporate Health and Safety Program and Attachment F of this SSHP.

## 8.0 PPE IN-USE MONITORING

As discussed in Section 3.0, PPE in-use monitoring will include observation of chemical degradation or permeation of PPE and signs or symptoms of heat/cold stress. Site workers are required to report any perceived problems or difficulties with PPE to the HSO or RCM/PjM, including:

- Any signs or symptoms of cold stress, such as slow pulse, sluggishness, pain, whitening, or numbness of extremities;
- Any signs or symptoms of heat stress, such as rapid pulse, nausea, or chest pain;
- Discomfort;
- Fatigue;
- Interference with vision or communication;
- Restrictions of movement;
- Unusual residues on PPE; or
- Skin irritation.

Additional in-use monitoring to be conducted by the HSO includes:

- Visual monitoring of the outer layers of protective clothing for signs of degradation, rips, or tears; and
- Visual monitoring of site personnel for signs of heat or cold stress.

## 9.0 PROGRAM EVALUATION

This site-specific PPE Program will be evaluated by the HSO on a monthly basis. The HSO will evaluate the effectiveness of prescribed PPE. PPE that does not withstand daily job site rigors will be re-evaluated and replaced with more suitable alternatives. These evaluations will be documented in the field health and safety logbook.



**Attachment E**  
**Project-Specific Hazard Communication Program**

**ATTACHMENT E**  
**PROJECT-SPECIFIC PERSONAL HAZARD COMMUNICATION PROGRAM**  
**at**  
**FORMER LAKE ONTARIO ORDNANCE WORKS**  
**NIAGARA COUNTY, NEW YORK**

1. The person responsible for the site-specific Hazard Communication program is the Severson HSO.
2. The preliminary inventory of hazardous substances to be used on-site is located in the site health and safety files.
3. Material safety data sheets (MSDSs) for all hazardous substances are located in the site health and safety files.
4. Employees may review MSDSs and the Hazard Communication Standard (29 CFR 1910.1200) by requesting copies of information from the HSO or the RCM/PjM. If an MSDS requested by the employee is not available, the HSO will request a copy of the MSDS from the supplier of the hazardous substance within seven days.
5. The MSDS file is updated with new information and new hazards identified by site employees, the HSO, the RCM/PjM, the Program Manager or the CHSM. Any new hazards will be reported immediately to the HSO and the affected employees will be notified within 30 days.

Severson relies on information contained in MSDSs as permitted by the OSHA Hazard Communication Standard, and does not perform independent hazard determination.

6. Containers of hazardous substances entering the site will be checked by the HSO, who will ensure that each container is properly labeled with the chemical name of the contents, the appropriate hazard warning, and the name and address of the supplier or manufacturer.

It is the responsibility of the employee receiving a shipment of hazardous substances to notify the HSO of its arrival. Newly arrived shipments of hazardous substances will not be distributed, used, or stored on-site until the HSO has checked for proper container labeling.

7. On-site containers of hazardous substances will be labeled with the chemical name and hazard warning. Exceptions must be approved by the CHSM. No labeling exceptions have been approved at this time.
8. No non-routine tasks involving hazardous substances are anticipated during this project.
9. Employee training will be initially provided to all employees and for all new employees. This training covers the following areas:
  - a. The basic requirements of the Hazard Communication Standard (29 CFR 1910.1200) and their right to information on chemical hazards;
  - b. The Corporate Health and Safety Program, which complies with the standard;
  - c. Procedures employees need to follow in order to review a copy of the Hazard Communication Standard, the Corporate Health and Safety Program, or MSDSs;
  - d. How to interpret and use the labels on containers of hazardous materials;
  - e. The potential physical hazards and health effects of the hazardous substances and how to use MSDSs for more information;
  - f. How to handle the hazardous substances safely, and other protective measures in place;
  - g. What to do in an emergency, spill, or overexposure to a hazardous substance;
  - h. How the presence of hazardous chemicals can be detected in the work area;
10. A Meeting Attendance form (Attachment A) will document hazard communication training, including employee attendance and subject matter reviewed. The form will be completed by the HSO.

Records will be maintained in the on-site project health and safety files until the project is completed. The records will then be transferred to the project files at Severson's Niagara Falls, New York office for permanent storage.

11. Training concerning new hazards (new hazardous substances or new information on MSDSs) will be provided within 30 days and the additional training will be documented.
12. Periodic refresher training will be provided in site safety briefings. The HSO will document this refresher training.
13. Outside employees (subcontractors and visitors) will be advised of chemical hazards at the project site by their attendance at the initial site-specific safety training. This training is mandatory for all employees working on-site.
14. Subcontractors will be required to provide information (including MSDSs) on any hazardous substances they will be using at this site as a condition of their contract.

**Attachment F**  
**Project-Specific Respiratory Protection Program**

**ATTACHMENT F**  
**PROJECT-SPECIFIC RESPIRATORY PROTECTION PROGRAM**  
**at**  
**FORMER LAKE ONTARIO ORDNANCE WORKS**  
**NIAGARA COUNTY, NEW YORK**

**1.0 SELECTION OF RESPIRATORY PROTECTION**

All respiratory protection used by Severson personnel must be selected according to the Corporate Health and Safety Program. The implementation of this site-specific Respiratory Protection Program will be under the direct supervision of the HSO. In order to simplify this procedure for field implementation, the action levels determined for this project are outlined in Table F-1.

**2.0 USE OF RESPIRATORY PROTECTION**

Based on the site-specific chemical hazards and the estimated level of site activity, it is anticipated that the primary level of respiratory protection will be Level D.

Respiratory protection used to prevent exposures to toxic chemicals must be only be used when accepted engineering controls are not feasible. Administrative controls (i.e., worker rotation) are not considered an accepted control measure to reduce personnel exposures on hazardous waste sites.

Only approved respiratory protective equipment that has been properly selected for the project will be used (refer to Corporate Health and Safety Program).

In areas where an employee, because of failure of a respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional person will be present. Communications (voice, visual, or signal line) will be maintained between all individuals present. One individual will be stationed so that they will be unaffected by any likely incident and they will have the necessary rescue equipment to assist the others in the event of an emergency.

All personnel on-site must be properly fit-tested for each type of respiratory protection available on-site. The HSO will be qualified to perform this testing. The records of all fit-tests for site personnel will be maintained by the HSO and may be reviewed in the site office.

**TABLE F-1**

<b>Activity/ Location</b>	<b>Action Level/ Monitoring Equipment</b>	<b>Required Protection</b>
<p>In employee's breathing zone during all invasive activities</p> <p>Local and area during these work activities</p> <p>Prior to entry and during any work within a trench, excavation, or confined space</p>	<p>OVM response &lt; 10 ppm above background</p> <p>OVM response &gt; 10 ppm and &lt; 100 ppm above background</p> <p>OVM response &gt; 100 ppm above background</p>	<p>Level D (i.e., no respiratory protection is required)</p> <p>Upgrade to Level C respiratory protection with organic vapor cartridges; add mechanical ventilation and allow to vent if working in a vault or lift station</p> <p>Retreat from work area; add mechanical ventilation and allow to vent if working in a vault or lift station; consider upgrade to Level B respiratory protection if mechanical ventilation is unsuccessful</p>
<p>In employee's breathing zone during all invasive activities</p> <p>Local and area during these work activities</p> <p>Prior to entry and during any work within a trench, excavation, or confined space</p>	<p>CGI response &lt;10% LEL</p> <p>CGI response &gt;10% and &lt;20% LEL</p> <p>CGI response &gt;20% LEL</p> <p>Oxygen level &lt; 19.5%</p> <p>Oxygen level &gt; 23.5%</p>	<p>Continue normal operations</p> <p>Eliminate all sources of ignition from work area; implement continuous monitoring</p> <p>Discontinue operations; allow to vent</p> <p>Retreat from work area; upgrade to Level B respiratory protection</p> <p>Retreat from work area; upgrade to Level B respiratory protection</p>
<p>In employee's breathing zone during dusty activities</p>	<p>Dust Monitor response &lt;1 mg/M<sup>3</sup></p> <p>Dust Monitor response &gt;1 mg/M<sup>3</sup> and &lt;5 mg/M<sup>3</sup></p> <p>Dust Monitor response &gt;5 mg/M<sup>3</sup></p>	<p>No respiratory protection required (i.e., Level D)</p> <p>Implement dust control measures</p> <p>Level C respiratory protection with HEPA cartridges; improve dust control measures</p>

Respirators will not be worn when conditions exist which prevent a good face-to-facepiece seal. These conditions include, but are not limited to, the growth of a beard or sideburns, a skull cap which projects under the facepiece, or the use of regular corrective glasses with temple bars which prohibit a proper seal. Also, the absence of one or both dentures can seriously affect the fit of any respiratory protection.

Workers will only use the respiratory protective equipment that has been assigned to them. The HSO will be responsible for assigning respiratory equipment. Site workers with potential chemical exposure will be issued respirators. The exception to this procedure will be subcontractors, who are responsible for reporting to the site with their own properly assigned respirators. Compliance with these requirements will be monitored by the HSO.

Contact lenses will not be worn while using respiratory protection unless prior approval is obtained from the CHSM.

All individuals required to use respiratory protection must successfully pass a physical examination and receive written approval from the examining physician to use both positive and negative pressure respiratory protection. The written approval for all site personnel will be maintained by the HSO and may be reviewed in the site office.

The actual use of all respiratory protective equipment will conform to the manufacturer's operating instructions and the training provided to the employee. A copy of the operating instructions for each type of respiratory protection will be maintained by the HSO and may be reviewed in the site office.

### **3.0 RESPIRATOR CLEANING**

All respirators must be cleaned and disinfected at a frequency necessary to insure that the proper protection is provided to the wearer. Respirators will **not** be used by more than one worker. Respirators must be cleaned and disinfected at the end of each shift in use. In order to accomplish this task, a respirator cleaning station will be set up in the CRZ. This station will include the following items to assist in the cleaning process:

- A bucket with respirator cleaner/sanitizer solution and a soft bristle brush
- A bucket with a warm water rinse
- A bucket with a clean water rinse
- A non-contaminated area where respirators may be hung to dry



The following procedures will be posted at the respirator cleaning station to ensure adequate cleaning and disinfection:

- Clean respirators regularly.
- Respirator cleaning procedures:
  - Remove mouth and nose pieces prior to cleaning respirators.
  - Wash all parts thoroughly with sanitizer solution, using a soft bristle brush.
  - Rinse all parts in warm water.
  - Hang up respirator to dry in a non-contaminated area.

Based on project logistics, respiratory protection will be cleaned and disinfected by individual workers trained to maintain respiratory equipment.

When air-purifying respirators are in use, fresh cartridges will be installed daily, at the beginning of the shift. If signs of cartridge degradation are noted, such as increased breathing resistance or odors passing through the cartridge, then fresh cartridges will be installed immediately.

#### **4.0 RESPIRATOR INSPECTION**

All respiratory protection equipment used on a routine basis will be inspected during cleaning. Worn or deteriorated parts must be immediately replaced or the respirator must be tagged with a “Do Not Use” sign and taken out of service. Respirators for emergency use must be inspected at least every 30 days and after each use. All respiratory protective equipment must be inspected by the HSO monthly, regardless of use, and the conditions documented.

The inspection procedure for each type of equipment will follow the manufacturer’s recommended procedure. The specific procedures to be used will be available on-site and can be reviewed by contacting the HSO.

#### **5.0 RESPIRATOR STORAGE**

All respiratory protection used by Severson employees must be stored in a convenient, clean, and sanitary location and according to specific manufacturer recommendations. Special attention must be paid to protecting respiratory protection from dusty conditions, temperature extremes, and potential contamination during storage.

Respirators worn a routine basis (i.e., storage during non-use periods of a work shift or storage between work shifts) will be stored on a drying/storage board away from heat, direct sun, and

dust. Once dry, clean respirators will be stored flay in the employee’s personal storage area (e.g., bucket, locker, etc.).

All equipment not routinely used will be stored in protective plastic bags or boxes away from heat, direct sun, and dust.

Any respirators not assigned to specific site personnel will be stored under the supervision of the HSO. These respirators will be stored in the site office in protective plastic bags or boxes away from heat, direct sun, and dust.

## 6.0 SURVEILLANCE OF WORK AREA

Appropriate monitoring of the work area conditions will be performed frequently to establish the degree of employee exposure or stress. In order to simplify this surveillance, the following procedures have been determined for this project:

<b>MONITORING EQUIPMENT</b>	<b>FREQUENCY OF SURVEILLANCE</b>	<b>PERSONNEL/AREA MONITORED</b>
Organic Vapor Meter	At least every 15 minutes during invasive activities until the HSO determines a more applicable schedule  Prior to entry and continually during work	In employee’s breathing zone and work area during trenching, excavating, and power washing activities  Within a confined space
Combustible Gas Indicator	At least every 15 minutes during invasive activities until the HSO determines a more applicable schedule  Prior to entry and continually during work	In employee’s breathing zone and work area during trenching, excavating, and power washing activities  Within a confined space
Oxygen Level Meter	Prior to entry and continually during work	Within a confined space
Dust Meter	At least every 15 minutes during dusty activities until the HSO determines a more applicable schedule	In employee’s breathing zone and work area during trenching, excavating, and backfilling activities

Records of the above surveillance will be recorded on an Air Monitoring Data Sheet or Real-time Monitoring Form (Attachment A), or in the health and safety logbook. Completed forms will be maintained by the HSO and may be reviewed in the site office.

## **7.0 PROGRAM EVALUATION**

There will be regular inspections and evaluations to determine the effectiveness of this site-specific Respiratory Protection Program. Documentation will be maintained by the HSO and will be maintained at the site office. The evaluation will assess the program's ability to provide clean and reliable respiratory protection equipment for this project.

**Attachment G**  
**Division Confined Space Entry Program**

**ATTACHMENT G**  
**CONFINED SPACE ENTRY PROGRAM**  
**at**  
**FORMER LAKE ONTARIO ORDNANCE WORKS**  
**NIAGARA COUNTY, NEW YORK**

**CONFINED SPACE ENTRY**

**Purpose**

The purpose of this procedure is to protect the health and safety of personnel working within confined spaces and to comply with all applicable regulations.

**General Requirements**

- ! An evaluation will be made at all job sites by the Health and Safety Officer if there are any permit required confined spaces.
  
- ! If these spaces are found, all employees will be notified at the initial site specific training.
  
- ! If the following conditions are met, then a less stringent entry procedure can be followed:
  - The only hazard is an actual or potentially hazardous atmosphere.
  - Forced air ventilation is sufficient to maintain safe entry.
  - Sufficient monitoring and inspection data are available.
  
- ! Classification of a non-permit confined space.
  - Has no actual or potential hazardous atmospheres.
  - Documentation that no hazardous atmospheres exist.
  
- ! Permit required confined space require:
  - Isolating the space - lock out/tag out, line breaking (follow procedures in Corporate Health and Safety Program); blanking or blinding, double blocks and bleeds, and disconnecting all mechanical linkages.
  - Purging, flushing, inerting or ventilating.
  - Verifying that conditions are acceptable for entry throughout the duration of an authorized entry.
  
- ! Preparation for entry.

- Equipment needed include - air monitoring instrumentation, air moving equipment, communication, personnel protective equipment, illumination, barriers to protect entrants from external hazards, retrieval systems, and rescue and emergency equipment.

! Confined space entry permits.

- No person will enter a confined space until a confined space entry permit has been completed.
- Only personnel trained and certified as entry supervisors may issue the permit.
- A copy of the permit must be posted until the permit is cancelled.
- Permit will be valid for the period required to complete the assigned task or for 24 hours whichever is less.

! Testing of the atmosphere.

- Tests for a flammable atmosphere, oxygen deficiency, and vapor concentration (if applicable) will be conducted.
- Oxygen content between 19.5 and 23%, Lower Flammability Level <10%, and vapor concentration less than the OSHA exposure level are acceptable for entry.
- Sufficient tests must be taken through a cross-section of the confined space to accurately characterize the environment.
- Test results and the tester's signature must be recorded on the permit form.
- Instrumentation must be tested and zeroed before each daily use and calibrated according to manufacturer's specifications.

! Attendants.

- An authorized attendant will be stationed at each confined space.
- The attendant will not enter the space unless he is relieved, trained and equipped for rescue operations, and a second rescuer arrives to assist.

! Training.

- All affected personnel must receive annual training.
- Documentation include signature of the trainee, dates of training, signature of trainer, lesson plan, and verification of each trainee's understanding.
- Authorized entrants will receive training in:
  - ! Recognition of hazards.
  - ! Need to maintain contact with attendants.
  - ! Proper use of personal protective equipment.

- ! Need to evacuate space if ordered by the attendant, O<sub>2</sub>/LFL alarm indicates a hazard, entrant detects a prohibited condition, or the entrant recognizes a warning sign and/or symptoms of exposure to a dangerous situation.
- ! All aspects of the permit.
- ! Use of the test equipment.
  
- Attendants will receive training in:
  - ! All aspects of the permit.
  - ! Requirement to remain outside confined space.
  - ! Recognition of hazards.
  - ! Requirement to maintain visual or verbal contact with entrants.
  - ! Alerting rescue personnel.
  - ! Use of test equipment.
  
- Entry supervisors will receive training in:
  - ! Determination that the space has been isolated.
  - ! Determination that permit is complete and correct.
  - ! Determination that all procedures are in effect before entry.
  - ! Cancellation of permit.
  
- Rescue services will receive training in:
  - ! Use of personal protective equipment and confined space rescue equipment.
  - ! Methods and procedures to rescue personnel.
  
- Contractor entry procedures:
  - ! Since we are a contractor at many facilities, we must be informed by the supervising engineer of:
    - The existence of the confined spaces and the facilities program.
    - Rationale for the designation of permit confined spaces.
    - Precautions and procedures while working in or near a confined space.
    - Debriefing at conclusion of entry.

## TRAINING OUTLINE FOR CONFINED SPACE ENTRANTS

### I. GENERAL HAZARDS OF WORKING IN CONFINED SPACES

#### A. Toxic Substances - Routes of Entry

1. Inhalation
2. Skin Absorption
3. Ingestion

#### B. Oxygen Deficiency - Oxygen 19.5 - 23%

#### C. % LFL Not Greater than 10%

#### D. Noise

#### E. Equipment Hazards

1. Sharp Edges
2. head Knockers

#### F. Temperature Extremes

1. Heat Stress
2. Cold Stress

#### G. Claustrophobia

#### H. Fall Protection Within Space and at Access Opening

#### I. Chemical Exposures

Introducing Chemicals and Contaminants (Solvents, Cleaners, Maintenance Activities, etc.)

1. Caustic
2. Acid
3. Organics
4. Welding/cutting fumes



## TRAINING OUTLINE FOR CONFINED SPACE ENTRANTS

- J. Disturbing Sludge or Vessel Surfaces
  - 1. Sludge can generate chemical vapors and gas
  - 2. Vessel surfaces can collect and then release atmospheric contaminants
  
- K. Toxicology (Examples)
  - ! Methylene Chloride
  - ! Hydrofluoric Acid
  - ! Phenol
  
- L. IDLH Atmospheres
  
- M. Radiation (Ionizing and Non-Ionizing)
  
- N. Dust/Mists
  - 1. Proper respiratory protection
  - 2. Dust explosion hazard
  
- O. Ventilation
  
- P. Hyperventilation

### II. SPECIFIC HAZARDS AT THE FACILITY

### III. REASONS FOR, PROPER USE OF, AND LIMITATIONS OF PPE IN CONFINED SPACES

- 1. Respiratory protection
- 2. Gloves
- 3. Chemical suits
- 4. Harness and lifeline
- 5. Hard hat
- 6. Goggles
- 7. Face shield
- 8. Boots/Safety toed shoes

## TRAINING OUTLINE FOR CONFINED SPACE ENTRANTS

### IV. PERMIT SYSTEM

1. Explanation of permit
2. Duties of entry supervisor
3. Duration of permit
4. Cancellation of permit

### V. ATTENDANT DUTIES

### VI. CONFINED SPACE RESCUE

1. Rescue plan
2. Rescue equipment
3. Rescue team
4. Entrant responsibilities

### VII. RECOGNITION OF POTENTIAL OVEREXPOSURE

- A. Self
- B. Others

**Attachment H**  
**Explosives Safety Plan**