Final
Site Safety and Health Plan Addendum
for
Occidental Chemical Corporation Property Data Gap and Lewiston-Porter Central School District Investigations at the Former Lake Ontario Ordnance Works (LOOW) Niagara County, New York

Addendum to the
Phase IV Remedial Investigation of the
Wastewater Treatment Plant (EU7)
Site Safety and Health Plan

August 2010

Prepared for

U.S. Army Corps of Engineers
Baltimore District

Contract W912DR-06-D-0002
Delivery Order 0009

Prepared by

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Approvers:

[redacted] 3 August 2010

[redacted] Date

Project Manager

[redacted] 3 August 2010

[redacted] Date

Program Manager

COMPLETION OF SENIOR TECHNICAL REVIEW

This document has been produced within the framework of the Earth Resources Technology, Inc. (ERT) and EA Engineering, Science, and Technology, Inc. (EA) quality management systems. As such, a senior technical review, as defined in the Quality Control Plan for this project, has been conducted. This included review of the overall design addressed within the document, proposed or utilized technologies and alternatives and their applications with respect to project objectives and framework of United States Army Corps of Engineers (USACE) regulatory constraints under the current Defense Environmental Restoration Program - Formerly Used Defense Sites (DERP-FUDS) No. C02NY0025 project, within which this work has been completed.

[redacted] 12 July 2010

[redacted] (EA) Date

Senior Technical Reviewer

COMPLETION OF INDEPENDENT TECHNICAL REVIEW

This document has been produced within the framework of ERT's total quality management system. As such, an independent technical review, appropriate to the level of risk and complexity inherent in the project as defined in the Quality Control Plan (QCP) for this project, has been conducted. This included review of assumptions (methods, procedures, and material used in analyses), alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the project objectives. Comments and concerns resulting from review of the document have been addressed and corrected as necessary.

[redacted] 9 July 2010

[redacted] Date

Independent Technical Reviewer (ERT)

CERTIFICATION

This Site-Specific Safety and Health Plan (SSHP) has been prepared under the supervision of, and has been reviewed by, a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene (ABIH).

[redacted]

9 July 2010

[redacted]

Date

Certified Industrial Hygienist (ABIH No. CP1254)

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LIST OF ACRONYMS

ABIH	American Board of Industrial Hygiene
AHA	Activity Hazard Analysis
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CNS	Central Nervous System
COPC	Chemicals of Potential Concern
CPR	Cardiopulmonary Resuscitation
CWM	Waste Management Chemical Services LLC
DERP-FUDS	Defense Environmental Restoration Program - Formerly Used Defense Sites
DOD	Department of Defense
EA	EA Engineering, Science, and Technology, Inc.
EM	Engineering Manual
ERT	Earth Resources Technology, Inc.
ES&H	Employee Safety and Health
EU	Exposure Unit
EU 7	Wastewater Treatment Plant
EU 8	Occidental Chemical Corporation Property
FS	Feasibility Study
FSP	Field Sampling Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDLH	Immediately Dangerous to Life and Health
LOOW	Lake Ontario Ordnance Works
MEC	Munitions and Explosives of Concern
mg/m^3	milligrams per cubic meter
mRem	Milliroentgen equivalent in man
MSDS	Material Safety Data Sheets
N/A	Not Applicable
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PM	Project Manager
PPE	Personal Protective Equipment
ppm	parts per million
QAPP	Quality Assurance Project Plan
QCP	Quality Control Plan
RI	Remedial Investigation
RSP	Radiation Safety Plan
SSHO	Site Safety and Health Officer
SSHP	Site-specific Safety and Health Plan
STEL	Short-Term Exposure Limit
TLV	Threshold Limit Value
TNT	Trinitrotoluene
USACE	US Army Corps of Engineers
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Earth Resources Technology, Inc. (ERT) has been contracted by the U.S. Army Corps of Engineers (USACE), Baltimore District to develop a Site-specific Safety and Health Plan (SSHP) Addendum for activities related to the Occidental Chemical Corporation Data Gap Investigation and Lewiston-Porter Central School District School Investigation at the Former Lake Ontario Ordnance Works (LOOW). This SSHP Addendum establishes procedures to protect employees of ERT, subcontractors, USACE, and site visitors from potential safety and health hazards resulting from activities conducted during this project. This SSHP Addendum is an addendum to the previously accepted Final Health and Safety Plan (USACE/ERT, 2009a), although enough site-specific information has been included herein to minimize the need to refer to both documents during day to day field activities. This SSHP has been developed in accordance with requirements set forth in:

- 29 Code of Federal Regulations (CFR) 1910.120 - the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard;
- 29 CFR 1926 - the OSHA Safety and Health Regulations for Construction;
- ERT's Corporate Health and Safety Program; and
- USACE Safety and Health Requirements Engineering Manual (EM) 385-1-1 (USACE, 2008).

This SSHP Addendum has been prepared in order to provide safe procedures and practices for personnel performing site work. This SSHP Addendum was developed using contract information provided by USACE, Baltimore District and will refer to the requirements discussed in OSHA regulations, USACE EM 385-1-1, ERT's Corporate Health and Safety Program, and the previously accepted Final Health and Safety Plan (USACE/ERT, 2009a). A crosswalk checklist of EM 385-1-1 requirements and their location within this plan is provided in Appendix A. All of the above mentioned documents will be kept onsite (or will be readily available), and are incorporated into the SSHP Addendum by reference. The SSHP Addendum will also be transmitted to all site workers and subcontractors.

Elevated radioactivity is not expected to be encountered during the activities; however, a Radiation Safety Plan (RSP) (USACE/ERT, 2009b) has been developed to outline procedures for providing radiological screening. This RSP has been produced under separate cover, but is also included as part of this SSHP, incorporated by reference, and will be maintained on site with the SSHP Addendum.

1.1 Site History

This section of the original Phase IV Remedial Investigation (RI) SSHP Addendum (USACE, 2009a) has not been amended.

1.2 Project Description

The overall project objectives for the Occidental Chemical Corporation (EU 8) Data Gap Investigation and Lewiston-Porter Central School District School Historic Soil Disturbances Investigation include the following:

- Evaluate the extent of chromium and explosives constituents on the Occidental Chemical Corporation Property (EU 8). This will be addressed by collecting field screening and analytical soil samples and evaluating whether chromium and/or explosives constituents exceed site-specific preliminary remediation goals for soil, thereby resulting in a defined volume of impacted soil requiring attention.

- Evaluate the nature and extent of chemical constituents associated with various historic soil disturbances (mounds and pits) located in the undeveloped portion of the Lewiston-Porter Central School District School campus. This will be addressed by performing field reconnaissance of the soil disturbances, performing field screens of soil samples and submitting soil samples for laboratory analysis; and evaluating whether chemical constituents associated with former Department of Defense (DOD) activities impacted the area.

Data collected and evaluated from the Occidental Chemical Corporation Data Gap Investigation will be used to supplement previous sampling data for a Feasibility Study (FS) evaluation of the remedial options of previously observed chromium and explosive constituent impacts. Data collected from the Lewiston-Porter Central School District School Investigation will be used to determine if previous DOD activities adversely impacted the undeveloped lands associated with the school campus.

Field work will be performed in accordance with the guidelines contained in the Field Sampling Plan (FSP), presented under separate cover. Analytical data will be evaluated against applicable standards as discussed in the Quality Assurance Project Plan (QAPP), also presented under separate cover.

Various activities to be performed require communication of the potential risks, safe operational procedures and adherence to required Activity Hazard Analyses (AHAs). The following activities require an AHA:

- Site reconnaissance
- Site preparation/mobilization
- Manual and mechanical brush removal
- Decontamination of field equipment
- Environmental sampling
- Investigative Derived Waste (IDW) management

1.3 ERT Corporate Safety and Health Policy

ERT's Safety and Health Program specifies that all ERT personnel are responsible for their safety and the safety of those working with them. However, it is also stated that the ultimate employee safety and health (ES&H) responsibility begins with the President of ERT and this responsibility radiates outward to all management, administrative, operations, and field personnel. To achieve this philosophy, ERT empowers all personnel with stop work authority regarding known or potential ES&H issues. Additionally, all ERT personnel are held accountable for performing their assigned tasks in a manner that promotes continuous, active hazard evaluation and safe task performance.

1.4 Project Safety and Health Program

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

2.0 ORGANIZATION OF PERSONNEL

Role	Person	Contact Information
ERT Program Manager	[redacted]	[redacted]
ERT Project Manager (PM)		
ERT Certified Industrial Hygienist (CIH)		
ERT Site Manager		
ERT Site Safety and Health Officer (SSHO)		
ERT Radiation Safety Officer	Pending	Pending
USACE Project Manager	[redacted]	[redacted]
USACE Technical Manager		

Training certifications/qualifications for key staff are included in Appendix C

2.1 Program Manager

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

2.2 Project Manager

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

2.3 Project Certified Industrial Hygienist

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

2.4 Site Manager

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

The Site Manager will be responsible for daily completion of site activities in accordance with the approved project planning documents. The Site Manager will be required to have OSHA 8-hour HAZWOPER Site Supervisor training in addition to current OSHA 40-hour HAZWOPER training. The responsibilities of the Site Manager include:

Reviewing health and safety documentation to ensure compliance with this SSHP; and

Work with SSHO to identify, evaluate, and control hazards.

During an emergency, the Site Manager will be responsible for initiating and coordinating responses. The Site Manager will be responsible for the following:

Initiating the evacuation of the work site when needed, communicating with offsite emergency responders, and coordinating activities of onsite and offsite emergency responders; and

Determine if hazardous conditions are adequately alleviated prior to allowing resumption of work operations after an emergency.

2.5 Site Safety and Health Officer

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

The SSHO will be onsite throughout the project and will be responsible for daily compliance with site safety and health requirements. The SSHO or their designee will be required to have OSHA 30-hour Construction Safety training in addition to current OSHA 40-hour HAZWOPER training.

The SSHO will have the following responsibilities:

- Monitor compliance with this SSHP;
- Ensure all site activities are performed in a manner consistent with ERT's Corporate Health and Safety Program and the SSHP;
- Interface with the CIH about onsite implementation of the SSHP;
- Direct daily health and safety activities onsite;
- In conjunction with the PM, ensure that all ERT's personnel and subcontractors designated to work at the project sites are qualified according to ERT's medical surveillance and training requirements;
- Report all incidents, accidents, and near misses to the PM, Site Manager and to the USACE PM or Authorized Site Representative and completes or oversees completion of Accident/Incident Report forms;
- Maintain health and safety equipment onsite;
- Inspect ongoing activities, and report any health and safety deficiencies to the Site Manager and Project Manager;
- Accompany or maintain communication with each work crew;
- Perform site monitoring to ensure that site personnel are adequately protected; and
- Conduct initial site-specific safety training and regular safety briefings for site personnel.

The SSHO 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 PM, and CIH and the USACE PM or Authorized Site Representative;
- Direct personnel to change a work practice if it is determined to be hazardous to the health and safety of site personnel; and
- Temporarily suspend an individual from site activities for infractions of the SSHP, pending discussion with the CIH.

Both the Site Manager and SSHO will be CPR/First Aid trained.

2.6 Environmental Field Technician

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

2.7 Field Personnel

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

2.8 Subcontractors

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

Various subcontractors will be utilized as the project proceeds. Anticipated subcontractors to be utilized are listed below.

- Cabrera Services (Health Physicist support)
- Test America, Inc (Contract Laboratory support)
- DM Landscavation (brush removal)

Subcontractor supervisors and staff will follow, at a minimum, the procedures and reporting requirements specified in this plan. If at any time, the Site Manager or SSHO feels the subcontractor is disregarding safe work practices, the subcontractor supervisor will be notified immediately to implement corrective actions. If unsafe work practices continue by the subcontractor, they will be requested to stop work and leave the site by the Site Manager. ERT's contract manager will also terminate their subcontract agreement if the subcontractor cannot resolve the issues to the satisfaction of the ERT PM.

2.9 Visitors

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

Visitors will not be allowed within work exclusion zones without appropriate OSHA training and medical surveillance, and the permission of the Site Manager and/or SSHO. Authorized site visitors, defined as anyone who is not a regular project worker, such as a contracting agency and other Federal or local agency personnel, may visit the site per the project-specification, but will be responsible for the following items:

- Signing the Site Entry and Exit Log upon entering and exiting the site (Appendix B);
- Receiving the site hazard and safety instructions from the SSHO;
- Reviewing and complying with the essential elements of the SSHP;
- Entering only those areas of the site deemed permissible by the SSHO and Site Manager;
- Entering work exclusion zones only after presenting appropriate documentation and after having been granted permission from the SSHO and Site Manager, and donning appropriate personal protective equipment (PPE) to enter regulated work areas when such controls are required for entry; and
- Reporting any observed unsafe act and/or condition at, or affecting, the work site to the PM

3.0 REQUIRED TRAINING AND MEDICAL SURVELLIANCE

3.1 General Safety and Health Training

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

3.2 Site-Specific Training

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

3.3 Medical Surveillance

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended

3.4 First Aid/CPR

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has been amended to include the following.

Members of the ERT filed team who are certified in First Aid and CPR are as follows:

- [redacted]
- [redacted]
- [redacted]
- [redacted]

4.0 GENERAL SAFETY REQUIREMENTS

4.1 SSHP Acknowledgment

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

4.2 Onsite Coordination

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

4.3 General Safety Rules

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

The general safety rules listed below apply to ERT and subcontractor personnel present at the former LOOW.

- Under no circumstance will field activities be conducted unless a competent person is present and aware of the activity;
- Eating, drinking, and smoking are prohibited on site, except in designated areas;
- All municipal wastes will be collected in dedicated trash canisters and removed from the site at the end of each work day and disposed of at an appropriate facility;
- All onsite personnel must wear protective clothing appropriate for designated level of protection (e.g., work boots) and personnel shall wash hands before eating and at the completion of work activities;
- Adequate lavatory facilities and wash stations will be provided to site personnel, in accordance with applicable OSHA regulation;
- An adequately stocked first-aid kit will be maintained; and
- All accidents, injuries, or possible exposures will be reported to the SSHO immediately and an accident report form will be completed. A copy of the incident report form is included in Appendix D.

4.3.1 Buddy System

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

4.3.2 Disciplinary Procedure

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

4.3.3 Alcohol and Drug Abuse Prevention

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

4.4 Site Sanitation

This section has been included in this addendum only and is not present in the original Phase IV RI SSHP Addendum (USACE, 2009a).

Temporary toilet(s) will be available for use at the Support Zone (further detailed in Section 6.1.2) and potable water will be available to allow field personnel to perform personal hygiene functions. Municipal trash will be kept in contractor grade garbage bags and removed from the site at the end of each work day.

5.0 ACTIVITY HAZARD ANALYSIS

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

The potential hazards associated with the project site include radiological, chemical, physical, 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. All personnel hours will be documented in the daily log book to track the number of man-hours and potential exposure. The potential for encountering physical and biological hazards will depend on the location and type of work being performed. The hazard assessment in this section is intended to communicate to site personnel the radiological, chemical, physical, and biological hazards and risks associated with site work. Activity Hazard Analyses are provided in Appendix E.

5.1 Radiological Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

Due to the area's proximity to sites with radiological impacts, field screening for radiological impacts will be conducted prior to mobilizing and while conducting certain activities associated with the Occidental Chemical Corporation Data Gap Investigation and Lewiston-Porter Central School District School Investigation. The RSP (USACE/ERT, 2009a) details procedures and techniques that will be utilized to ensure the health and safety of field personnel during RI activities and includes the AHA with respect to radiological hazards.

A radiation survey meter will be used initially upon site entry and during brush clearance activities. Readings will be taken from vegetation to be cleared. After background levels have been established, readings above two times the background level will prompt work to halt immediately. Work will not be performed if the dose rate is greater than 1 milliroentgen equivalent in man (mRem) per hour. Employees will evacuate the area and the SSHO will immediately contact the PM and the USACE PM or Authorized Site Representative. Work will not recommence until the site has been assessed by a health physicist.

5.2 Asbestos Containing Material Hazards

This section of the original Phase IV SSHP Addendum (USACE, 2009a) is hereby removed in its entirety.

5.3 Chemical Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.3.1 Volatile Organic Compounds

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.3.2 Trinitrotoluene

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Volatile Organic Compounds (VOC)				
Acetone	500 parts per million (ppm)/750 ppm	2,500 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, nose, throat; head-ache, dizziness, CNS depressant, dermatitis.
Bromoform	0.5 ppm	850 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, respiratory system; CNS depressant; liver, kidney damage.
Bromomethane (Methyl bromide)	1 ppm	Ca 250 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, respiratory system; muscular weakness, incoherence, visual disturbance, vertigo; nausea, vomiting, headache; malaise; hand tremor; convulsions; dyspnea; skin vesiculation. Liquid: frostbite; carcinogen.
2-Butanone (MEK)	200 ppm/300 ppm	3,000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, skin, nose; headache, dizziness; vomiting; dermatitis.
Carbon disulfide	10 ppm	500 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Dizziness, headache, poor sleep, fatigue, nervousness, anorexia, low-weight; psychosis; polyneuritis; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects.
Carbon tetrachloride	0.1 ppm/0.3 ppm C 25 ppm	Ca 200 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin; CNS depressant; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoherence; carcinogen.
Chlorobenzene	10 ppm	1,000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, skin, nose; drowsiness, incoherence, CNS depressant.
Chloroethane (Ethyl chloride)	100 ppm	3,800 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Incoherence, inebriation; abdominal cramps; cardiac arrhythmia, cardiac arrest; liver, kidney damage.
Chloroform	10 ppm C 50 ppm	500 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin; dizziness, mental dullness, nausea, confusion; headache, fatigue, anis; enlarged liver; carcinogen.
Chloromethane (Methyl chloride)	50 ppm/100 ppm	Ca 2,000 ppm	Inhalation, Skin/Eye Contact	Dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage; Liquid: frostbite; reproductive, teratogenic effects; carcinogen.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
1,1-Dichloroethane (1,1-DCA)	100 ppm	3,000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated skin; CNS depressant; liver, kidney, lung damage.
1,1-Dichloroethylene (1,1-DCE)	5 ppm/20 ppm	Ca	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, throat; dizziness, headache, nausea; liver and kidney dysfunction.
1,2-Dichloroethylene	200 ppm	1,000 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, respiratory system; CNS depressant.
1,3-Dichloropropene (*cis*- & *trans*-)	1 ppm	N.D.	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, skin, upper respiratory system; eye, skin burns; lassitude, loss of appetite, diarrhea, vomiting, slowing of pulse; CNS depressant.
Ethylene dichloride (1,2-Dichloroethane)	10 ppm	50 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, corneal opacity; CNS depressant; nausea, vomiting; dermatitis; liver, kidney, CNS damage; carcinogen.
2-Hexanone (MBK)	5 ppm/10 ppm	500 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose; peritoneal neuritis; weakness, paresthesis; dermatitis; headache; drowsiness.
Hydrogen sulfide (H_2S)	10 ppm/15 ppm C 20 ppm	100 ppm	Inhalation, Skin/Eye Contact	Irritated eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimitis, photo, corneal vesiculation; dizziness, headache, fatigue, irritability, insomnia; GI disturbance.
Methane	Simple asphyxiant	N.D.	Inhalation	Simple asphyxiant; at 1.5% creates oxygen depletion.
4-Methyl-2-pentanone (MIBK)	50 ppm/75 ppm	500 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, skin, mucous membranes; headache, narcosis, coma; dermatitis.
Methylene chloride	50 ppm C 1,000 ppm	Ca 2,300 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, skin; fatigue, weakness, sleepiness, light-headedness, nausea.
Styrene	20 ppm/40 ppm C 200 ppm	700 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose; respiratory system; headache, fatigue, dizziness, confusion, malaise, drowsiness, weakness, unsteady gait; narcosis; defatting dermatitis; possible liver injury, reproductive effects.
1,1,2,2-Tetrachloroethane (1,1,2,2-TECA)	1 ppm	100 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Nausea, vomiting, abdominal pain; tremor fingers; jaundice, hepatitis, liver tend; dermatitis, monocy; kidney damage; carcinogen.
Tetrachloroethylene (PCE)	25 ppm/100 ppm C 200 ppm	Ca 150 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose, throat; nausea, flush face, dizziness, headache, liver damage.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
1,1,1-Trichloroethane (TCA)	350 ppm/450 ppm	700 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, skin; headache, lassitude, CNS depressant, poor equilibrium; dermatitis; cardiac arrhythmia; liver damage.
1,1,2-Trichloroethane (1,1,2-TCA)	10 ppm	Ca 100 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose; CNS depressant; liver, kidney damage, dermatitis; carcinogen.
Trichloroethylene (TCE)	50 ppm/100 ppm	Ca 1,000 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin; headache, dizziness, vertigo, visual distortion, fatigue, giddiness, vomiting, dermatitis, nausea.
Vinyl chloride	1 ppm C 5 ppm	Ca N.D.	Inhalation, Skin/Eye Contact (with liquid)	Weakness, abdominal pain, GI bleeding, enlarged liver.
Volatile Organic Compounds (BTEX)				
Benzene	1 ppm/5 ppm	Ca 500 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose, skin, resp. system, nausea, headache, fatigue, dermatitis
Ethylbenzene	100 ppm/125 ppm	800 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, mucous membranes; headache, dermatitis, narcosis, coma
Toluene	50 ppm	500 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose; fatigue, weakness, confusion, euphoria, dizziness, insomnia, nervousness, muscle fatigue, dermatitis
Xylenes, total	100 ppm/150 ppm	900 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Dizziness, excitement, drowsiness, irritated eyes, nose and throat, nausea, vomiting, abdominal pain, and dermatitis
Semivolatile Organic Compounds (SVOC)				
Benzidine	Lowest feasible limit	Ca	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Hematosis, secondary anemia from hemolysis, acute cystitis, acute liver disorders, dermatitis; painful, irregular urination.
Di-n-butyl-phthalate	5 mg/m^3	4,000 mg/m^3	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, upper respiratory system, and stomach.
1,2-Dichlorobenzene (o-DCB)	25 ppm/50 ppm	200 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose; liver and kidney damage, skin blisters.
1,4-Dichlorobenzene (p-DCB)	10 ppm	Ca 150 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Headache, eye irritation, profuse rhinitis, weight loss, nausea, vomiting.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
3-3' Dichlorobenzidine	N.D. [(d)]	Ca	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Skin sensitivity, dermatitis; headache, dizziness; caustic burns; frequent urination; dysuria; hematosis; GI upset; upper respiratory infection; carcinogen.
Diethyl phthalate	5 mg/m^3	None	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, skin, nose, throat; headache, dizziness, nausea; lacrimitis; possible polyneuritis, vestibular dysfunction; pain, numbness, weakness, spasms in arms and legs.
Dimethyl phthalate	5 mg/m^3	2,000 mg/m^3	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, upper respiratory system; stomach pain.
Hexachlorobenzene	0.002 mg/m^3	N.D.	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Liver; metabolic disorders; skin and nervous system effects
Hexachlorobutadiene	0.02 ppm	Ca N.D.	Inhalation, Ingestion, Absorption, Skin/Eye Contact	In animals: irritated eyes, skin, respiratory system; kidney damage; carcinogen.
Hexachlorocyclopentadiene	0.01 ppm	N.D.	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, respiratory system; eye, skin burns; lacrimitis; sneezing, coughing, dyspnea, salivating, pulmonary edema; nausea, vomiting, diarrhea.
Hexachloroethane	1 ppm	Ca 300 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, mucous membranes; carcinogen.
Isophorone	C 5 ppm	200 ppm	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, nose, throat; head-ache, nausea, dizziness, fatigue dermatitis, narcosis.
2-Methyl phenol (o-Cresol)	5 ppm	250 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, mucous membranes; CNS effects: confusion, depression, respiratory failure; dyspnea, irregular rapid respiration, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage.
4-Methyl phenol (p-Cresol)	5 ppm	250 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, mucous membranes; CNS effects: confusion, depression, respiratory failure; dyspnea, irregular rapid respiration, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
4-Nitroaniline	3 mg/m^3	300 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated nose, throat; cyanosis, ataxia; tacar, tachypnea; dyspnea; irritability; vomiting, diarrhea; convulsions; respiratory arrest; anemia; methemo.; jaundice.
N-Nitrosodimethylamine	N.D. [(d)]	Ca N.D.	Inhalation, Ingestion, Absorption, Skin/Eye Contact	nausea, vomiting, diarrhea, abdominal cramps; headache; fever; enlarged liver, jaundice; decreased liver, kidney, pulmonary function; carcinogen.
Pentachlorophenol (PCP)	0.5 mg/m^3	2.5 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose, throat; sneezing, coughing; weakness, anorexia, low-weight; sweating; headache, dizziness; nausea, vomiting; dyspnea; chest pain; high fever; dermatitis.
Phenol	5 ppm/C 15.6 ppm	250 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, nose, throat; weight loss, dark urine, liver and kidney damage, muscle ache, skin burns, dermatitis, tremors, convulsions.
1,2,4-Trichlorobenzene	C 5 ppm	N.D.	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, mucous membrane; liver/kidney damage, possible teratogenic effects.
Semivolatile Organic Compounds (PAH)				
Benzo[a]anthracene	0.2 mg/m^3 [a]	Ca 80 mg/m^3 [a]	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Suspected human carcinogen.
Benzo[a]pyrene	0.2 mg/m^3 [a]	Ca 80 mg/m^3 [a]	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Suspected human carcinogen.
Benzo[b]fluoranthene	0.2 mg/m^3 [a]	Ca 80 mg/m^3 [a]	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Suspected human carcinogen.
Chrysene	0.2 mg/m^3 [a]	Ca 80 mg/m^3 [a]	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Suspected human carcinogen.
Naphthalene	10 ppm/15 ppm	250 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Eye irritation, headache, confusion, vomiting, profuse sweating, abdominal pain.
Explosive Compounds				
Cyclonite (RDX)	0.5 mg/m^3	N.D.	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin; headache, irritability, fatigue, weakness, tremors, nausea, dizziness, vomiting, insomnia, convulsions.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
2,4-Dinitrotoluene (DNT)	0.2 mg/m^3	Ca 50 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Anoxia, cyanosis; anemia, jaundice; reproductive effects; carcinogen.
2,4,6-Trinitrotoluene (TNT)	0.1 mg/m^3	500 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Mechanical damage possible from explosion. Orange staining on exposed skin. Irritated skin, mucous membrane; liver damage, jaundice; cyanosis; sneezing; cough, sore throat; peritoneal neuritis, muscular pain; kidney damage; cataract; sensitized dermatitis; leukocytosis; anemia, cardiac irregularity.
Polychlorinated Biphenyls (PCB)				
Chlorodiphenyl-42% chlorine (Aroclor 1242)	1 mg/m^3	Ca 5 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin; chloracne, dermatitis, liver damage, reproductive effects.
Chlorodiphenyl-54% chlorine (Aroclor 1254)	0.5 mg/m^3	Ca 5 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes; chloracne, liver damage, reproductive effects.
Organochlorine Compounds (Pesticides)				
Aldrin	0.25 mg/m^3	Ca 25 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Headache, dizziness, nausea, vomiting, myoclonic jerks of limbs, cloni/tonic convulsions.
Chlordane	0.5 mg/m^3	Ca 100 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Blurred vision, confusion, ataxia, delirium, coughing, abdominal pain, nausea, vomiting, diarrhea, tremors, convulsions, anuria.
Dieldrin	0.25 mg/m^3	Ca 50 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Headache, dizziness, nausea, vomiting, sweating, myoclonic limb jerks, clonic/tonic convulsions, coma.
Dichlorodiphenyltrichloroethane (4,4'-DDT)	1.0 mg/m^3	Ca 500 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin; paresis of tongue, lips, face and hands; tremor, dizziness, confusion, headache, fatigue, convulsions, vomiting.
Endosulfan	0.1 mg/m^3	N.D.	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated skin; nausea, confusion, agitation, flushing, dry mouth, tremor, convulsions, headache.
Endrin	0.1 mg/m^3	2 mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Epileptic convulsions; stupor, headache, dizziness; abdominal discomfort, nausea, vomiting; insomnia; aggressiveness, confusion, lethargy, weakness; anorexia.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Heptachlor	0.05 mg/m^3	Ca 35mg/m^3	Inhalation, Ingestion, Absorption, Skin/Eye Contact	In animals: tremor, convulsions; liver damage; carcinogen.
Methoxychlor	10 mg/m^3	Ca 5,000 mg/m^3	Inhalation, Ingestion	In animals: fasc., trembling, convulsions; kidney, liver damage; carcinogen.
Metals				
Antimony (Sb)	0.5 mg/m^3	50 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Irritated eyes, skin, nose, throat, mouth; coughing, dizziness, headache, nausea, vomiting, diarrhea, stomach cramps, insomnia, loss of smell.
Arsenic (As)	0.01 mg/m^3	Ca 5 mg/m^3 (as As)	Inhalation and Ingestion via particulates, Skin/Eye Contact	Ulceration of nasal septum, dermatitis, gastrointestinal bleeding.
Barium (Ba)	0.5 mg/m^3	50 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Upper resp. irritation, muscle spasm, slow pulse, irritated eyes, skin.
Beryllium (Be)	0.002 mg/m^3 C 0.005 mg/m^3	Ca 4 mg/m^3	Inhalation via particulates, Skin/Eye Contact	Berylliosis (chronic exposure): anorexia, low-weight; weakness, chest pain; cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritated eyes; dermatitis; carcinogen.
Boron oxide	10 mg/m^3	2000 mg/m^3	Inhalation and Ingestion via particulates	Eye, skin, and upper respiratory irritant; cough.
Cadmium (Cd)	0.005 mg/m^3	Ca 9 mg/m^3	Inhalation and Ingestion via particulates	Pulmonary edema, dyspnea, cough, chest tight, subs pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anos., emphysema, prot., mild anemia; carcinogen.
Chromium (Cr), total	0.5 mg/m^3	250 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Histological fibrosis of lungs; irritated eyes and skin.
Cobalt (Co)	0.02 mg/m^3	20 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Irritation of nasal membranes, pharynx, nasal perforation, eye irritation.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Copper (Cu)	1 mg/m^3	100 mg/m^3	Inhalation via particulates, Skin/Eye Contact	Irritated eyes, upper respiratory system; metal fume fever: chills, muscular ache, nausea, fever, dry throat, cough, weakness, lassitude; metallic or sweet taste; discoloration of skin, hair.
Lead (Pb)	0.050 mg/m^3	100 mg/m^3 (as Pb)	Inhalation and Ingestion via particulates, Skin/Eye Contact	Lassitude, insomnia, pallor, anoxia, weight loss, constipation, abdominal pain, colic, anemia, wrist paralysis.
Lithium (Li)	-	-	Inhalation and Ingestion via particulates	Corrosive to skin, eyes, and respiratory tract; lung edema.
Manganese (Mn)	0.2 mg/m^3 C 5 mg/m^3	500 mg/m^3	Inhalation and Ingestion via particulates	Parkinson's; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea, rales, flu-like fever; low-back pain; vomiting; malaise; fatigue; kidney damage.
Mercury (Hg)	0.01/0.03 mg/m^3	2 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Dizziness, nausea, vomiting, diarrhea, constipation, skin burns, emotional distance.
Nickel (Ni) (insoluble/soluble)	0.1 mg/m^3	Ca 10 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Sensitive skin, asthma, nasal cavity irritation, pneumonitis, carcinogen.
Selenium (Se)	0.2 mg/m^3	1 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Irritation eyes, skin, nose, and throat; headache, chills, dyspnea, bronchitis, metallic taste, garlic breath, liver/spleen damage.
Silver (Ag)	0.01 mg/m^3	10 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Blue-gray eyes, nasal septum, throat, skin; irritability, ulceration of skin; GI disturbance.
Thallium (Tl)	0.1 mg/m^3	15 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact, Absorption	Nausea, diarrhea, abdominal pain, vomiting, tremor, chest pain, pulmonary edema.
Vanadium (V)	C 0.05 mg/m^3	35 mg/m^3	Inhalation and Ingestion via particulates, Skin/Eye Contact	Irritated eyes, skin, throat; green tongue, metallic taste, eczema, cough, wheezing, bronchitis.
Radioactivity				

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Radionuclides	100 milliREM/ year [(b)] [Total effective dose equivalent for public or workers assumed not to be radiation workers.]	N/A [c]	In addition to external penetrating gamma radiation, possible exposures may be associated with inhalation and incidental ingestion. Beta particles are usually energetic enough to result in radiation exposure to the skin. Alpha particles are not energetic enough to expose the skin, as the skin's layer of dead cells is thick enough to stop particles from penetrating. For alpha particles, the routes of exposures of concern are inhalation and ingestion.	Acute symptoms will not be caused by the expected levels of radioactivity. Skin redness, dermatitis, hair loss, eye inflammation, genetic damage, cancer, tissue, and organ damage are caused by acute high level doses of 200 rad or higher. Technical overexposures at or just above regulatory limits are not accompanied with any of the traditional radiation sickness symptoms or cancer, as limits incorporate a large safety factor. For these effects to occur, the exposures need to be prolonged (occurring over an occupational lifetime and exposures well above regulatory limits) or acute (where large doses, such as hundreds of rads, are delivered over a brief time period, e.g., in minutes or hours).
Other Constituents				
Boron trifluoride	C 1 ppm	25 ppm	Inhalation and Skin/Eye Contact	Irritated eyes, skin, nose, respiratory system; epitasis (nosebleed); eye, skin burns. In animals: pneumonia, kidney damage.
Hydrazine	0.01 ppm	Ca 50 ppm	Inhalation, Ingestion, Absorption, Skin/Eye Contact	Irritated eyes, skin, nose, throat; temporary blindness; dizziness, nausea; dermatitis; eye, skin burns. In animals: bronchitis, pulmonary edema; liver, kidney damage; convulsions; carcinogen.
Lithium hydride	0.025 mg/m^3	0.5 mg/m^3	Inhalation, Ingestion, Skin/Eye Contact	Irritated eyes, skin; eye, skin burns; mouth, esophagus burns (if ingested); nausea; muscular twitches; mental confusion; blurred vision.
Asbestos	0.1 fibers/cc	Ca N.D.	Inhalation, Ingestion, and Skin/Eye Contact	Asbestosis (chronic exposure); breathing difficulties; interstitial fibrosis; restricted pulmonary function; finger clubbing; irritated eyes. Carcinogen.

Table 5-1. Summary of Known and Potential Chemicals of Concern at the Former Lake Ontario Ordnance Works (LOOW), Niagara County, New York.

Compound	PEL or TLV/STEL	IDLH	Route of Exposure	Symptoms
Phosgene	0.1 ppm	2 ppm	Inhalation and Skin/Eye Contact	Irritated eyes; dry burning throat; vomiting; cough, foamy sputum, dyspnea, chest pain, cyanosis.

(Source: USACE/EA, 2005)

5.4 Physical and Biological Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.1 General Physical Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.2 Fire/Explosion Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.3 Noise Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.4 Electrical Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.5 Utilities

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.6 Weather Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.7 Cold Stress

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.8 Heat Stress

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.9 Material Handling/Moving/Lifting

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.10 Brush Clearance

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.4.11 Slips, Trips, Falls

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.5 Biological Hazards

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.5.1 Poisonous Plants

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.5.2 Insect Bites/Stings

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.5.3 Animal Bites

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.5.4 Bacteria

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.5.5 Humans

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.6 Hazard Communication

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

5.7 CWM Emergency Response Procedures

This section of the original Phase IV SSHP Addendum (USACE, 2009a) is hereby removed in its entirety.

6.0 SITE ACCESS

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

Site access will be coordinated with the USACE Technical Manager or Authorized Site Representative who will notify the Occidental Chemical Corporation and/or Lewiston-Porter Central School District School of the proposed work schedule.

6.1 Site Control

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

6.1.1 Activities Not Requiring Work Zones

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

6.1.2 Activities Requiring Work Zones

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) is hereby replaced in its entirety by the following.

Vegetation clearance, direct push and surface soil sampling, field analytical screening, groundwater sampling, and equipment decontamination will require the establishment of work zones.

The three separate work zones that will be established for each of these activities include:

- The exclusion zone (EZ) ;
- The contamination reduction zone (CRZ); and
- The support zone (SZ).

The EZ for sampling will consist of a 10-foot (ft) radius from sampling locations. The EZ for non-essential personnel during brush clearance will consist of a 15-ft radius. Exclusion zones will also be verbally explained and maintained to site visitors or onlookers. Proper PPE will be worn when working in the EZ (see Section 2.9). The radius of the EZ may be expanded or decreased based on environmental monitoring results and as deemed appropriate by the SSHO.

The CRZ shall be immediately adjacent to the EZ and shall have equipment for appropriate decontamination and receptacles for used disposable supplies. Based on previous investigations, the expected concentrations of contaminants suggest that personnel decontamination will consist of simply removing and disposing of PPE or removal and bagging of soiled outer garments (e.g., coveralls), if worn. Potable water and an eye wash solution will be available in the CRZ.

If elevated levels of contaminants are encountered, as discussed in Section 5 work will stop and the site will be evaluated. If protection is to be upgraded, the EZs and CRZs shall become more stringent and visually demarcated. The EZ will be located within 25 ft of field-investigation activities where respiratory protection is required. The CRZ will be expanded to include a non-

phosphate detergent scrub station and potable water rinse station prior to removing and disposing of chemically protective coveralls, boot covers, and outer gloves.

The SZ shall consist of the site vehicle and will also contain emergency response equipment including phone and first aid supplies. Activities will be largely dispersed throughout the investigation areas and field teams will carry minimal first-aid components. There will be no temporary construction buildings for this project; therefore the following items will not be required:

- Facilities;
- Fencing;
- Anchoring systems for temporary structure;
- Access routes to the temporary structure;
- Spacing requirements of 09.A.19;
- Temporary power; and
- Temporary ramp, trestle, scaffold and platform approval.

The SZ and site access roads will be located as depicted in Figure 6-1.

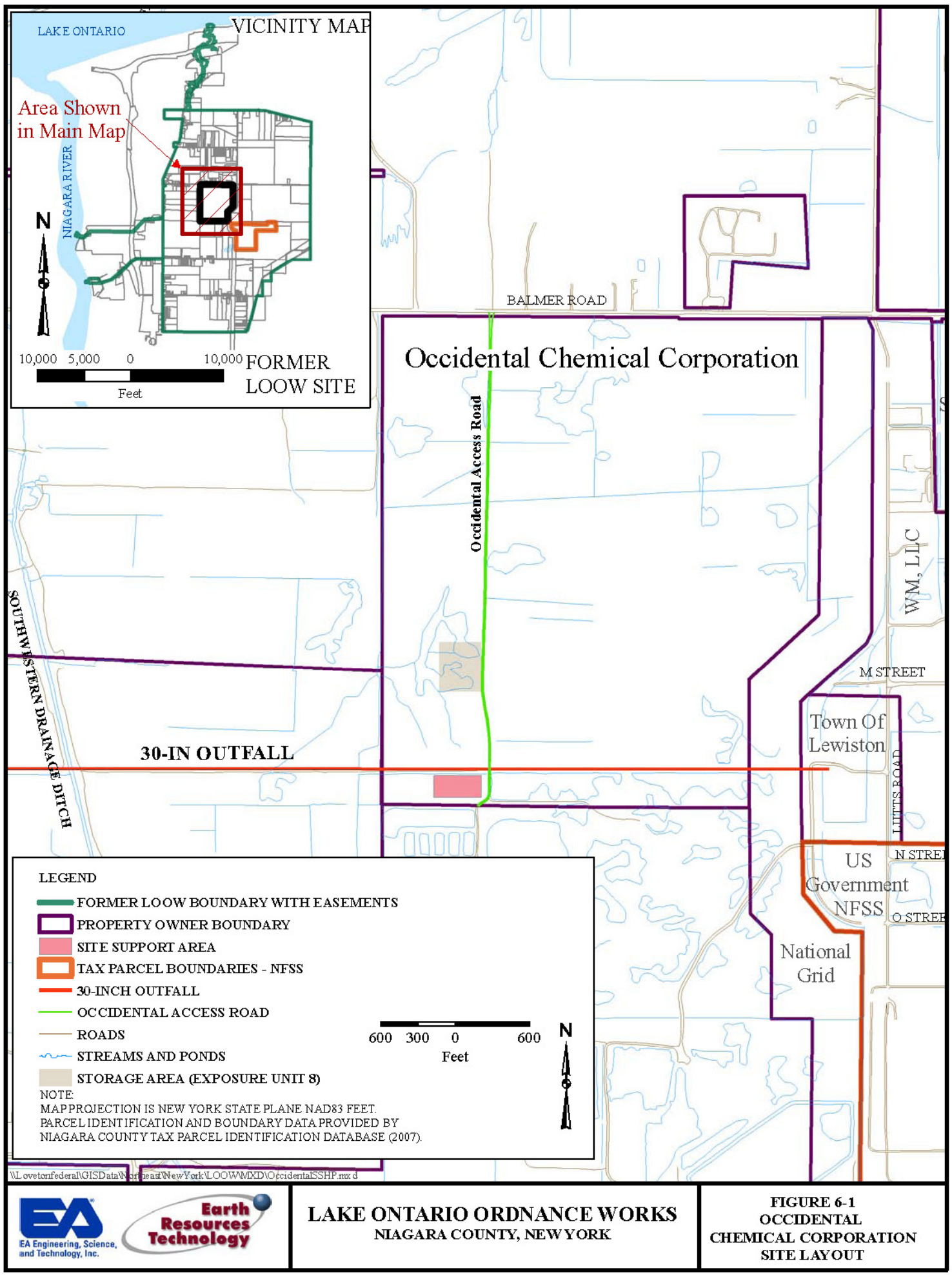

Figure 6-1. Occidental Chemical Corporation Site Layout

7.0 SAFETY MEETINGS

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

7.1 Pre-Entry Briefing / Daily Safety Meeting

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

7.2 Daily Safety Meeting

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

8.0 PERSONAL PROTECTIVE EQUIPMENT AND ENVIRONMENTAL MONITORING PROGRAM

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

8.1 General PPE Requirements

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

8.2 Initial Requirements / Upgrade or Downgrade of PPE Levels

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

8.3 Real-Time Monitoring

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

8.4 Action Levels

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

8.5 Inspection and Maintenance of Protective Equipment

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

9.0 SPILL CONTAINMENT

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

10.0 DECONTAMINATION

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

11.0 EMERGENCY RESPONSE PLAN

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

11.1 Emergency Response Equipment

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

11.2 Communication

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

11.3 Pre-Planning

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

11.4 Emergency Incident Procedures

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

11.5 Emergency Notification Procedures

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has been replaced in its entirety.

Emergency telephone numbers and directions to the nearest hospital are provided in Table 10-1 and in Appendix G, along with maps showing the routes to the nearest hospitals. The field personnel will immediately stop work and report to the Site Manager under the following potential emergency situations:

- Medical emergency;
- Discovery of unanticipated hazards [e.g., drums, heavily contaminated materials, etc.];
- Overexposure of personnel to onsite contaminants;
- Cold/heat-related injury or heat stress;

Onsite emergencies may ultimately be handled by offsite emergency support personnel. Initial response and first-aid treatment, however, will be available through onsite personnel. In case of a hazardous materials emergency, the Site Manager will assume control and direction of the emergency response until arrival of off-site emergency personnel. The Site Manager will work with the SSHO to identify and evaluate hazards. Emergency responders and communications will be coordinated and controlled through the Site Manager.

In the event of an emergency, the information available at that time will be properly evaluated and the appropriate steps will be taken to implement the emergency response procedures. The Site Manager (or SSHO if the Site Manager is part of the emergency) will assume command of the situation. He/she will call the appropriate emergency services, evacuate personnel to the pre-

designated evacuation location as needed, and take other steps necessary to gain control over the emergency.

Provide the following information when reporting an emergency:

1. Name and location of person reporting;
2. Location of accident/incident;
3. Name and affiliation of injured party;
4. Description of injuries, fire, spill, or explosion;
5. Status of medical aid and/or other emergency control efforts;
6. Details of chemicals involved;
7. Summary of accident, including suspected cause and time it occurred; and
8. Temporary control measures taken to minimize further risk.

This information will not be released to parties other than those listed in this section and emergency response team members. After emergency response agencies have been notified and supplied appropriate response information, the ERT PM will be notified. The ERT PM will immediately notify the USACE PM of all incidents, no matter how severe, as soon as possible, but no later than four hours.

11.6 Personnel Injury/Medical Emergency

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

11.7 Fire/Explosion Emergencies

This section of the original Phase IV RI SSHP Addendum (USACE, 2009a) has not been amended.

12.0 REFERENCES

USACE, 2008. *Safety and Health Requirements,* Engineering Manual 385-1-1. September.

USACE/Prepared by EA, 2005. *Addendum II to the Health and Safety Plan for Phase I Remedial Investigation at the Former Lake Ontario Ordnance Works, Niagara County, New York, for Phase III Remedial Investigation – Underground Lines.*

USACE/Prepared by Earth Resources Technology, Inc (ERT), 2009a. *Final Safety and Health Plan for Phase IV Remedial Investigation/Feasibility Studies at the Former Lake Ontario Ordnance Works, Niagara County, New York.* June.

USACE/Prepared by Earth Resources Technology, Inc (ERT), 2009b. *Radiation Safety Plan Addendum for Phase IV Remedial Investigation/Feasibility Studies at the Former Lake Ontario Ordnance Works, Niagara County, New York.* January.

APPENDIX A
Checklist of EM 385-1-1 Requirements

Appendix A
Accident Prevention Plan/ Site Safety and Health Plan (APP/SSHP) Checklist
(EM 385-1-1, Appendix A & Section 28, 15 September 2008)

CONTRACTOR ACCIDENT PREVENTION PLAN (APP) CHECKLIST (EM 385-1-1, Appendix - A, dated; 15 Sept. 08)

Minimum Basic Outline for Accident Prevention Plan

The APP is the Contractor Safety and Health Program Document. The following Site Specific Areas will be addressed:

NOTE: 1. Contractor will complete Checklist and Submit with their APP.
NOTE: 2. Contractor APP WILL be submitted in format below.
NOTE: 3. Safety Office will review Contractor APP and return to PM / COR.
NOTE: 4. Contractor APP's ARE NOT APPROVED by the USACE, only found as Acceptable or Non-Acceptable.

Safety Office Review Status: ACCEPTED BY/DATE: _____ NOT ACCEPTED BY/DATE:_____

Contractor Name: **Contract No:**

Project Title & Location:	Included ?			Location:
	Yes	No	N/A	Page(s)
ALL CHECKLIST ITEMS WILL BE COMPLETED!				
1. SIGNATURE SHEET. Title, signature, and phone number of the following:				See Below
a. ***Plan Preparer*** (qualified person, Competent Person such as corporate safety staff person, QC).	X			Title Section, Pg 1
b. ***Plan Approval*** by company/corporate officers authorized to obligate the company (e.g. owner company president, regional vice president etc.)	X			Title Section, Pg 1
c. ***Plan Concurrence*** (e.g. Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional, project QC). Provide concurrence of other applicable corporate and project personnel (Contractor).	X			Title Section, Pg 1-3
2. BACKGROUND INFORMATION. List the following:				See Below
a. Contractor;	X			Title Section, Pg 1
b. Contract number;	X			Title Section, Pg 1
c. Project name;	X			Title Section, Pg 1
d. Brief project description, description of work to be performed, and location; phases of work anticipated (these will require an AHA).	X			Section 1.1 – 1.2
3. STATEMENT OF SAFETY AND HEALTH POLICY. Provide a copy of your current corporate/company Safety & Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract should be provided.	X			Section 1.3
4. RESPONSIBILITIES AND LINES OF AUTHORITIES. Provide the following:				See Below
a. A statement of the employer's ultimate responsibility for the implementation of his SOH program;	X			Section 1.3 and Section 2.0

CONTRACTOR ACCIDENT PREVENTION PLAN (APP) CHECKLIST (EM 385-1-1, Appendix - A, dated; 15 Sept. 08)

Minimum Basic Outline for Accident Prevention Plan

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Safety Office Review Status: ACCEPTED BY/DATE: _____ NOT ACCEPTED BY/DATE:_____

Contractor Name: **Contract No:**

Project Title & Location:	Included ?			Location:
	Yes	No	N/A	Page(s)
b. Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes. Qualifications shall include the OSHA 30-hour course or equivalent course areas as listed here:	X			Section 1.3 and Section 2.0
(1) OSH Act/General Duty Clause;	X			Section 1.0
(2) 29 CFR 1904, Recordkeeping;	X			Section 3.0, Section 4.1 and Section 7.0
(3) Subpart C: General Safety and Health Provisions, Competent Person	X			Section 3.0
(4) Subpart D: Occupational Health and Environmental Controls, Citations and Safety Programs;	X			Section 1.3 and Section 1.4
(5) Subpart E: PPE, types and requirements for use;	X			Section 8.0
(6) Subpart F: understanding fire protection in the workplace;	X			Section 5.4.2 and Section 11.7
(7) Subpart K: Electrical;			X	
(8)Subpart M: Fall Protection;			X	
(9) Rigging, welding and cutting, scaffolding, excavations, concrete and masonry, demolition; health hazards in construction, materials handling, storage and disposal, hand and power tools, motor vehicles, mechanized equipment, marine operations, steel erection, stairways and ladders, confined spaces or any others that are applicable to the work being performed.			X	
c. The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached. The District SOHO will review the qualifications for acceptance;	X			Section 2.0
d. Requirements that no work shall be performed unless a designated competent person is present on the job site;	X			Section 3.0 – 3.2, and Section 4.0-4.3
e. Requirements for pre-task safety and health analysis;	X			Section 3.3, Section 4.1 and Section 11.3

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Contractor Name: **Contract No:**

Project Title & Location:	Included ?			Location:
	Yes	No	N/A	Page(s)
f. Lines of authority;	X			Section 2.0
g. Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;	X			Section 4.3.2
h. Provide written company procedures for holding managers and supervisors accountable for safety.	X			Section 4.3.2
5. SUBCONTRACTORS AND SUPPLIERS. If applicable, provide procedures for coordinating SOH activities with other employers on the job site:	X			See Below
a. Identification of subcontractors and suppliers (if known);	X			Section 2.8
b. Safety responsibilities of subcontractors and suppliers.	X			Section 2.8, 4.0 and 7.0
6. TRAINING.				See Below
a. Requirements for new hire SOH orientation training at the time of initial hire of each new employee.	X			Section 3.0
b. Requirements for mandatory training and certifications that are applicable to this project (e.g., explosive actuated tools, confined space entry, crane operator, diver, vehicle operator, HAZWOPER training and certification, PPE) and any requirements for periodic retraining/recertification.	X			Section 3.0
c. Procedures for periodic safety and health training for supervisors and employees.	X			Section 3.2, 3.3 and 3.4
d. Requirements for emergency response training. > See 9.b. below for a list of requirements that may require emergency response training.	X			Section 11.0
7. SAFETY AND HEALTH INSPECTIONS.				See Below
a. Specific assignment of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: Who will conduct (e.g., SSHO, PM, safety professional, QC, supervisors, employees – depends on level of technical proficiency needed to perform said inspections), proof of inspector's training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures;	X			Section 2.5
b. Any external inspections/certifications that may be required (e.g., USCG).			X	
8. ACCIDENT REPORTING. The Contractor shall identify person(s) responsible to provide the following:				See Below

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Contractor Name: **Contract No:**

Project Title & Location:	Included ?			Location:
	Yes	No	N/A	Page(s)
a. Exposure data (man-hours worked);	X			Section 11.5 – 11.6
b. Accident investigations, reports, and logs: Report all accidents as soon as possible but not more than 24 hours afterwards to the Contracting Officer/Representative (CO/COR). The contractor shall thoroughly investigate the accident and submit the findings of the investigation along with appropriate corrective actions to the CO/COR in the prescribed format as soon as possible but no later than five (5) working days following the accident. Implement corrective actions as soon as reasonably possible;	X			Section 11.5 – 11.6
c. The following require immediate accident notification:				See Below
(1) A fatal injury;	X			Section 11.5 – 11.6
(2) A permanent total disability;	X			Section 11.5 – 11.6
(3) A permanent partial disability;	X			Section 11.5 – 11.6
(4) The hospitalization of three or more people resulting from a single occurrence;	X			Section 11.5 – 11.6
(5) Property damage of $200,000 or more.	X			Section 11.5 – 11.6
9. PLANS (PROGRAMS, PROCEDURES) REQUIRED BY THE SAFETY MANUAL. Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational risks and compliance plans. Using the EM 385-1-1 as a guide, plans may include but not be limited to:				See Below
a. Layout plans (04.A.01);	X			Section 6.1.2
b. Emergency response plans:	X			See Below
(1) Procedures and tests (01.E.01);	X			Section 5.7 and Section 11.0-11.7
(2) Spill plans (01.E.01, 06.A.02);	X			Section 9.0
(3) Firefighting plan (01.E.01, Section 19);	X			Section 11.7
(4) Posting of emergency telephone numbers (01.E.05);	X			Section

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Contractor Name: **Contract No:**

Project Title & Location:	Included ?			Location:
	Yes	No	N/A	Page(s)
				11.0 – 11.3
(5) Man overboard/abandon ship (Section19.A.04);			X	
(6) Medical Support. Outline on-site medical support and offsite medical arrangements including rescue and medical duties for those employees who are to perform them, and the name(s) of on-site Contractor personnel trained in first aid and CPR. A minimum of two employees shall be certified in CPR and first aid per shift/site (Section 03.A.02; 03.D);	X			Section 11.0
c. Plan for prevention of alcohol and drug abuse (01.C.02);	X			Section 4.3.3
d. Site sanitation plan (Section 02);	X			Section 4.4
e. Access and haul road plan (4.B);	X			Section 5.7 and Section 6.0
f. Respiratory protection plan (05.G);	X			Section 8.0 – 8.5
g. Health hazard control program (06.A);	X			Section 5.0 – 5.6
h. Hazard communication program (06.B.01);	X			Section 5.6
i. Process Safety Management Plan (06.B.04);			X	
j. Lead abatement plan (06.B.05 & specifications);			X	
k. Asbestos abatement plan (06.B.05 & specifications);			X	
l. Radiation Safety Program (06.E.03.a);	X			Section 8.0 – 8.5
m. Abrasive blasting (06.H.01);			X	
n. Heat/Cold Stress Monitoring Plan (06.I.02)	X			Section 5.4
o. Crystalline Silica Monitoring Plan (Assessment) (06.M) ;			X	
p. Night operations lighting plan (07.A.08);			X	
q. Fire Prevention Plan (09.A);	X			Section 5.4
r. Wild Land Fire Management Plan (09.K);	X			Section 5.4
s. Hazardous energy control plan (12.A.01);			X	
t. Critical lift Plan (16.H);			X	
u. Contingency plan for Floating Plants for severe weather (19.A.03);			X	
v. Float Plan (19.F.04);			X	

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Contractor Name: **Contract No:**

Project Title & Location:	Included ?			Location:
	Yes	No	N/A	Page(s)
w. Site-Specific Fall Protection & Prevention Plan (21.C);			X	
x. Demolition plan (to include engineering survey) (23.A.01);			X	
y. Excavation/trenching plan (25.A.01);			X	
z. Emergency rescue (tunneling) (26.A.);			X	
aa. Underground construction fire prevention and protection plan (26.D.01);			X	
bb. Compressed air plan (26.I.01);			X	
cc. Formwork and shoring erection and removal plans (27.C);			X	
dd. PreCast Concrete Plan (27.D);			X	
ee. Lift slab plans (27.E);			X	
ff. Steel erection plan (27.F.01);			X	
gg. Site Safety and Health Plan for HTRW work (28.B);	X			Section 1.0 through Section 12.0
hh. Blasting Safety Plan (29.A.01);			X	
ii. Diving plan (30.A.13);			X	
jj. Confined space Program (34.A).			X	
10. RISK MANAGEMENT PROCESSES. Detailed project-specific hazards and controls shall be provided by an **Activity Hazard Analysis** (0I.A.13) for each major phase/activity of work.	X			Appendix E
11. ABBREVIATED APP for LIMITED-SCOPE SERVICE, SUPPLY AND R&D CONTRACTS. If service, supply and R&D contracts with limited scopes are awarded, the contractor may submit an abbreviated Accident Prevention Plan. This APP shall address the following areas at a minimum. If other areas of the EM 385-1-1 are pertinent to the contract, the contractor must assure these areas are addressed as well.			X	
a. Title, signature, and phone number of the plan preparer.			X	
b. Background Information to include: Contractor; Contract number; Project name; Brief project description, description of work to be performed, and location (map); The project description shall provide a means to evaluate the work being done (see AHA requirements in 01.A.13) and associated hazards involved. Contractor's APP shall address the identified hazards involved and the control measures to be taken.			X	
c. Statement of Safety and Health Policy detailing their commitment to providing a safe and healthful workplace for all employees.			X	

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Project Title & Location:	Included ?			Location:
	Yes	No	N/A	Page(s)
d. Responsibilities and Lines of Authorities – to include a statement of the employer's ultimate responsibility for the implementation of his SOH program; Identification and accountability of personnel responsible for safety at all levels to include designated site safety and health officer (SSHO) and associated qualifications. The District SOHO will review the qualifications for acceptance.			X	
e. Training - new hire SOH orientation training at the time of initial hire of each new employee and any periodic retraining/recertification requirements.			X	
f. Procedures for job site inspections - assignment of responsibilities and frequency.			X	
g. Procedures for reporting man-hours worked and reporting and investigating any accidents as soon as possible but not more than 24 hours afterwards to the Contracting Officer/Representative (CO/COR). An accident that results in a fatal injury, permanent partial or permanent total disability shall be immediately reported to the Contracting Officer.			X	
h. Emergency Planning. Employees working alone shall be provided an effective means of emergency communication. This may be cellular phone, two-way radio or other acceptable means. The selected means of communication must be readily available and must be in working condition.			X	
i. Drinking Water provisions, toilet and washing facilities.			X	
j. First Aid and CPR training (at least two employees on each shift shall be qualified/certified to administer first aid and CPR) and provision of first aid kit (types/size).			X	
k. Personal Protective Equipment.			X	
(1) WORK CLOTHING - Minimum Requirements. Employees shall wear clothing suitable for the weather however minimum requirements for work shall be short-sleeve shirt, long pants (excessively long or baggy pants are prohibited) and leather work shoes. If analysis determines that safety-toed (or other protective) footwear is necessary (i.e., mowing, weed eating, chain saw use, etc), they shall be worn.			X	
(2) Eye and Face Protection. Eye and face protection shall be worn as determined by an analysis of the operations being performed HOWEVER, all involved in chain saw use, chipping, stump grinding, pruning operations, grass mowing, weed eating and blowing operations shall be provided safety eyewear (Z87.1) as a minimum.			X	
(3) Hearing Protection. Hearing protection must be worn by all those exposed to high noise activities (to include grass mowing and trimming, chainsaw operations, tree chipping, stump grinding and pruning).			X	
(4) Head Protection. Hard hats shall comply with ANSI Z89.1 and shall be worn by all workers when a head hazard exists. At a minimum, hard hats shall be worn when performing activities identified in (2) above.			X	
(5) High Visibility Apparel shall comply with ANSI/ISEA 107, Class 2 requirements at a minimum and shall be worn by all workers exposed to vehicular or equipment traffic.			X	
(6) Protective Leg chaps shall be worn by all chainsaw operators.			X	
(7) Gloves of the proper type shall be worn by persons involved in activities that expose the hands to cuts, abrasions, punctures, burns and chemical irritants.			X	
(8) If work is being performed around water and drowning is a hazard, PFDs must be provided and worn as appropriate.			X	

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	Yes	No	N/A	Page(s)
l. Machine Guards and safety devices. Lawn maintenance equipment must have appropriate guards and safety devices in place and operational.			X	
m. Hazardous Substances. When any hazardous substances are procured, used, stored or disposed, a hazard communication program must be in effect and MSDSs shall be available at the worksite. Employees shall have received training in hazardous substances being used. When the eyes or body of any person may be exposed to corrosives, irritants or toxic chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within 10 seconds of the worksite.			X	
n. Traffic control shall be accomplished in accordance with DOT's MUTCD.			X	
o. Control of Hazardous Energy (Lockout/Tagout). Before an employee performs any servicing or maintenance on any equipment where the unexpected energizing or startup of the equipment could occur, procedures must be in place to ensure adequate control of this energy.			X	
p. Driving, working on (i.e., working with equipment/mowers) while on slopes, working from/in boats/skiffs, etc shall also be considered and dealt with accordingly.			X	
			X	
HTRW Projects Additional Requirements (EM 385-1-1, Section 28 HAZWOPER): SSHP (Site Safety and Health Plan) shall be attached to the APP as an Appendix. The SSHP shall cover the following in project-specific detail. General information adequately covered in the APP need not be duplicated.				
a. Site description and contamination characterization	X			Section 1.1 – 1.2
b. Hazard/Risk Analysis - AHA for each task	X			Section 5.0
c. Staff Organization; Qualifications; Responsibilities	X			Section 2.0
d. Training - General, Supervisor and Project Specific	X			Section 3.0
e. PPE Personal Protective Equipment	X			Section 8.0
f. Medical Surveillance	X			Section 3.3
g. Exposure Monitoring/ Air Sampling Program	X			Section 3.0and Section 8.2 – 8.3
h. Heat and Cold Stress - Procedures and Practices	X			Section 5.4.7 – 5.4.8
i. SOPs Standard Operating Procedures; Engineering Controls; Work Practices:	X			
(1) Site rules/prohibitions (buddy system, eating/drinking/smoking restrictions, etc.)	X			Section 4.3
(2) Work permit requirements (rad work, excavation, hot work, confined space etc.)			X	

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	Yes	No	N/A	Page(s)
(3) Material handling procedures (soil, liquid, rad materials, spill contingency)	X			Section 5.4.9
(4) Drum/container/tank handling (opening, sampling, draining, removal, etc.)	X			Section 5.0
(5) Comprehensive AHA of treatment technologies employed at site			X	
j. Site Control Measures: Clearly Defined EZ, SZ, CRZ	X			Section 6.0 – 6.2
k. Personal Hygiene and Decontamination	X			Section 5.3 and Section 10.0
l. Equipment Decontamination	X			Section 10.0
m. Emergency Equipment and First Aid	X			Section 3.4, Section 11.1 and Section 11.5-11.6
n. Emergency Response and Contingency Procedures:	X			Section 9.0 and Section 11.0-11.7
(1) Pre-emergency planning	X			Section 11.3
(2) Personnel and lines of authority for emergency situations	X			Sections 11.3 and 11.4
(3) Criteria and procedures for emergency recognition and site evacuation (alarms, etc.)	X			Section 11.5
(4) Decontamination and medical treatment of injured personnel				Section 11.6
(5) A route map to emergency medical facilities and phone numbers for emergency responders				Section 11.0 and Appendix G
(6) Criteria for alerting the local community responders				Section 11.5

APPENDIX B
Site Entry and Exit Log

APPENDIX B

SITE ENTRY AND EXIT LOG

Project: Phase IV RI/FS Activities
Site: Lake Ontario Ordnance Works (LOOW), Niagara County, New York
ERT Project No.: 3047

Date	Name	Representing	Date/Time	
			In	Out

APPENDIX C
SSHP Compliance, Review Record, and Training Records

APPENDIX C

SITE SAFETY AND HEALTH PLAN REVIEW RECORD

Project: Occidental Chemical Corporation Property Data Gap Investigation and Lewiston-Porter Central School District Investigation
Site: Lake Ontario Ordnance Works (LOOW), Niagara County, New York
ERT Project No.: 3047

I have read the Site-Specific Health and Safety Plan for this site and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project. I meet and agree to conform to all the requirements of this Plan.

Name	Signature	Affiliation	Date

Certificate of Completion

This certifies that

[redacted]

Has Successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does not necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)

And all State OSHA and EPA Regulations As Well

[redacted]

Instructor #892

100212527854

Certificate Number

2/12/2010

Issue Date

SAFETY **UNLIMITED, Inc.**
OSHA Compliant Safety Traiing Since 1993

690A East Los Angeles Ave Suite 180 Simi Valley, CA 93065
888-309-7233 * 805-306-8027 * 866-869-7097 (F)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

Certificate of Completion

This certifies that

[redacted]

Has Successfully completed

8 Hour HAZWOPER Refresher Training

Refresher certification does not necessarily indicate initial 24 or 40 Hour HAZWOPER certification

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)

And all State OSHA and EPA Regulations As Well

[redacted]

Instructor #892

100525514849

Certificate Number

5/25/2010

Issue Date

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OSHA Compliant Safety Training Since 1993

690A East Los Angeles Ave Suite 180 Simi Valley, CA 93065
888-309-7233 * 805-306-8027 * 866-869-7097 (F)
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Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

OSHACAMPUS.com™
powered by 360training

CERTIFICATE OF COURSE COMPLETION

[redacted]	Hazwoper 8 Hour Annual Refresher Course	06/08/2010 13:15 CST
Student's Name	Course Title	Course Completion Date MM / DD / YYYY

1584081
Certificate Number

[redacted]
Student's Signature

8
Approved # of Hours

I hereby attest and certify that I personally took the above named safety lesson in accordance to Osha Campus guidelines. I further state that I have paid for the course and that I did not use another's work (Plagiarism). Students should retain certificates and refer to course instructions to receive official certification where necessary.

360training
Corporate Headquarters
13801 N. Mo-Pac, Suite 100
Austin, Texas 78727
tel: 888-360-8764
fax: 512-727-7683
email: support@360training.com

SAFETY UNLIMITED, INC.

OSHA Compliant Safety Training & Consulting

690A East Los Angeles Ave.Suite. 180 Simi Valley , CA 93065
888 309-7233 * 805 306-8027 * 805 526-0377
www.SafetyUnlimited.com

Certifies that

[redacted]

has successfully completed

8 Hour HAZWOPER Supervisor Refresher Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120

[redacted]
Instructor #892

6/12/2009
Issue Date

090612414849
Certificate Number

TO VERIFY THE VALIDITY OF THIS CERTIFICATE, go to www.SafetyUnlimited.com/certificate.htm

OSHA 600230087

U.S. Department of Labor
Occupational Safety and Health Administration

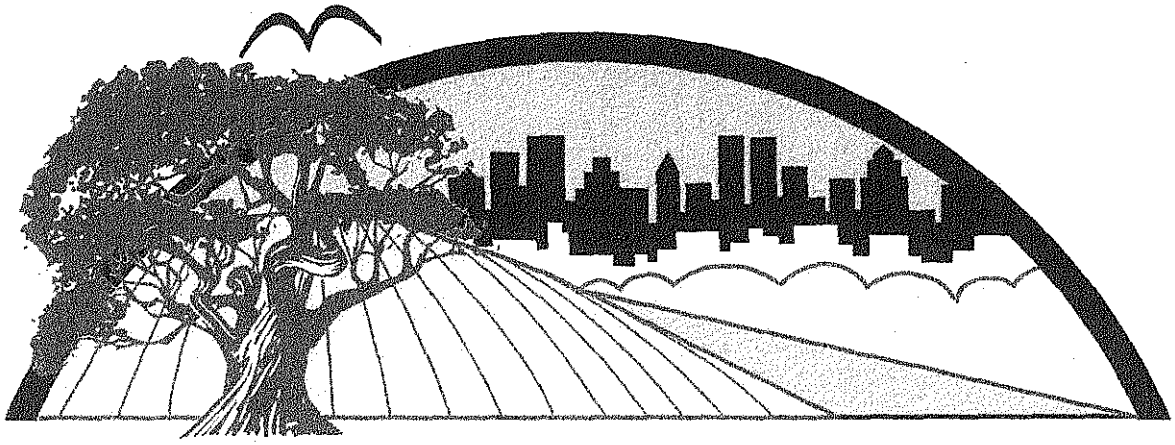
[redacted]

has successfully completed a 30-hour Occupational Safety and Health Training Course in

Construction Safety & Health

[redacted] M. Barton #278 5/14/2009

(Trainer) (Date)



ALL AMERICAN ENVIRONMENTAL SERVICES, INC.

This is to certify that

[redacted]

has successfully completed

"HAZARDOUS WASTE SITE WORKER" 40-HOUR COURSE
SATISFYING OSHA 29 CFR 1910.120 (e) (3) (i)

at

ALL AMERICAN SCHOOL OF OCCUPATIONAL SAFETY AND HEALTH
COLUMBIA, MARYLAND

[redacted]

School Director

OCTOBER 25-29, 2004
40S-04010B

AEROSOL MONITORING & ANALYSIS, INC.

This is to certify that

[redacted] [redacted]

has met the attendance requirements and successfully completed the course entitled

40-Hr OSHA HAZWOPER~ 29 CFR 1910.120

7/14/2008 to *7/18/2008*	*7/18/2008*	*7/18/2009*	[redacted]
Course Date	***Exam Date***	***Expiration Date***	***Principal Instructor***

[redacted]

HAZ07146	*VAHAZ07146*	[redacted]
Certification No.	***Virginia Certification No.***	***Course Director***

[redacted]

1331 Ashton Road *P.O. Box 646* *Hanover, MD 21076* *P: 410-684-3327* *F: 410-684-3724*

www.amatraining.com

Presented By

CONDOR

[redacted]

has completed a 40 Hour course in
Hazardous Materials and Site Investigations
required by OSHA 29 CFR 1910.120

Presented this

October 6, 2001

CONDOR GEOTECHNICAL SERVICES, INC

[redacted]

BRADFORD PUBLISHING

NO. B.-R. 4

U.S. ARMY CORPS OF ENGINEERS

TRAINING CENTER FOR PROFESSIONAL DEVELOPMENT
HUNTSVILLE, ALABAMA

CERTIFICATE

this is to certify that

[redacted]

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Given at Towson, MD (LOCATION) 12 April 2007 (DATE)

EXPIRES: 10 April 2012

[redacted]
Director of CE Training Management
[redacted]

CEHND FORM 586 (REVISED)
1 JULY 93

American Red Cross

This recognizes that

[redacted]

has completed the requirements for

CPR - ADULT

conducted by

Central Maryland Chapter

Date Completed 05/12/2010

The American Red Cross recognizes this certificate as valid for 1 year(s) from completion date.

American Red Cross

Together, we can save a life

This recognizes that

[redacted]

has completed the requirements for

STANDARD FIRST AID

conducted by

Central Maryland Chapter

Date completed **05/05/2009**

The American Red Cross recognizes this certificate as valid for **3** year(s) from completion date.

American Red Cross

Together, we can save a life

This recognizes that

[redacted]

has completed the requirements for

CPR - ADULT

conducted by

Central Maryland Chapter

Date completed **05/05/2009**

The American Red Cross recognizes this certificate as valid for **1** year(s) from completion date.

ALL AMERICAN ENVIRONMENTAL SERVICES, INC.
CONSULTING ▪ FIELD SERVICES ▪ TRAINING

LETTER OF SATISFACTORY COMPLETION

All American Environmental Services, Inc. hereby certifies that Christopher J. Scism has satisfactorily completed an 8-hour course of instruction titled "Basic CPR/First Aid/AED, Automated External Defibrillator" conducted on December 17, 2009.

This course satisfies the training requirements specified by the Department of Labor, Occupational Safety and Health Administration, as found in 29 CFR§1910.151 Subpart K "Medical Services and First Aid; Authority Secs. 4,6,8, of the Occupational Safety and Health Act of 1970" and 29 CFR§1910.266 App B Mandatory First Aid and CPR Training. All treatment guidelines follow the new 2008 American Heart Association Science Advisory "Hands-Only, Compression-Only" Resuscitation; The new 2005 American Heart Association for CPR and Emergency Cardiovascular Care; 2005 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations, International Liaison Committee on Resuscitation, ASTM Standard F2171-02, ASTM International, and the National Standard Curriculum for Bystander Care, National Highway Traffic Safety Administration, U.S. Department of Transportation.

All American Environmental Services, Inc. certifies that this course satisfies the training requirements for those individuals who will be performing as a First Aid Provider in Occupational Settings.

All American Environmental Services, Inc. provides this letter of satisfactory completion based on this individual's demonstration of practical skills. Annual recertification is required.

All American Environmental Services, Inc. recommends that this letter be made a part of your employee's personnel file.

[redacted]
President

9515 Gerwig Lane - Suites 105-106 ▪ Columbia, MD 21046 ▪ 410-309-6882 ▪ 1-800-777-8474 ▪ Fax: 410-309-9810
Web page: www.aaesi.com ▪ e-mail: aaesi@verizon.net

APPENDIX D
Incident Reporting Form

Earth Resources Technology

INCIDENT/INJURY/ILLNESS REPORTING FORM

Date: _____ **Project No:** _____

Time: _____ **Project Name:** _____

Employee's Name: _____ **Employee No.:** _____

Employee Office: _____ **Employee Phone:** _____

Incident/Injury/Illness Location: _____

Incident/Injury/Illness Description:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Extent of Injury or Damage:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

INCIDENT/INJURY/ILLNESS REPORTING FORM (page 2)

Actions Taken:

_____

_____

_____

_____

_____

List of all personnel involved and their home phone numbers:

Describe any measures taken to prevent reoccurrence:

_____

_____

_____

_____

_____

Other Notes:

_____

_____

_____

Employee's Signature/Date:

_____ _____

Site Supervisor's Signature/Date:

APPENDIX E
Activity Hazard Analyses

HAZARD ANALYSIS TABLE

Activity ATV Use Analyzed by/Date [redacted] Reviewed by/Date_____

Principal Steps	Potential Hazards	Recommended Controls
ATV Use	Chemical	This task involves handling petroleum products (gasoline and oil), the appropriate Level D PPE protection should be implemented for these tasks.
	Radiological	This task involves handling potentially contaminated materials, the appropriate Level D PPE protection should be implemented for these tasks. The work area should be surveyed for contamination to ensure the levels of protection are correct.
	OE	This task involves potentially handling OE, specifically TNT. If suspected OE is encounter, the SUXOS will be notified immediately.
	Heat/cold stress	Take appropriate weather protection measures. Temporary shelters will be provided in case of inclement weather.
	Wildlife, venomous snakes, insects, biological hazards	Be alert. Watch for snakes, make noise, and do not handle wildlife. Check yourself at end of the day for ticks. Wear light color clothing with cuffs and openings closed.
	Slips, trips, falls	Be alert. Watch for trip hazards and look where you walk.
	Moving mechanical parts from heavy equipment operations.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations. Guards will be kept in place during operation. A safe distance will be maintained from moving mechanical parts. Appropriate Level D PPE will be used.
	Noise during the operation of heavy equipment.	High noise areas will be identified. Hearing protection will be provided as appropriate.
	Electric Hazards	Extension cords will be properly rated for intended use.
	Fire	Flammable liquids will be stored in safety containers. Propane cylinders will be stored outside in secured areas. Properly rated fire extinguishers will be placed near fuel storage areas, within site vehicles, and the site trailer.
	Overhead	Awareness for overhead hazards and applicable Level D PPE is required (including hardhat, safety glasses and shoes, long sleeve form fit clothing.

ACTIVITY HAZARD ANALYSIS

Activity Brush Clearance Prepared by/Date _____ Reviewed by/Date_____

Principal Steps	Potential Hazards	Recommended Controls
Brush Clearance	Radiological	Areas to be cleared will be pre-screened for radiation. Any levels above threshold will be avoided. Modified Level D will be the minimum PPE requirement. Adhere to the approved radiation safety plan.
	Wildlife, venomous snakes, insects, biological hazards	Be alert. Watch for snakes, make noise, and do not handle wildlife. Check yourself at end of the day for ticks. Wear light color clothing with cuffs and openings closed.
	Slips, trips, falls	Be alert. Watch for trip hazards and look where you walk.
	OE	This task involves potentially handling OE, specifically TNT. If suspected OE is encounter, the SUXOS will be notified immediately. Adhere to the approved OE support plan.
	Traffic	Work areas will be clearly demarcated. Site traffic will be rerouted as necessary. Operators of machinery/vehicles will be properly licensed and expected to inspect vehicles/machinery on a daily basis. A log will be kept of all inspections.
	Moving mechanical parts from heavy equipment operations.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations. Guards will be kept in place during operation. A safe distance will be maintained from moving mechanical parts. Appropriate Level D PPE will be used.
	Heat stress	Take appropriate weather protection measures. Temporary shelters will be provided in case of inclement weather.
	Noise during the operation of heavy equipment.	High noise areas will be identified. Hearing protection will be provided as appropriate.
	Electric Hazards	Extension cords will be properly rated for intended use. Receptacles and plugs should be tested for correct operation of the equipment-grounding conductor. Equipment will be tested prior to use.
	Fire	Flammable liquids will be stored in safety containers. Propane cylinders will be stored outside in secured areas. Properly rated fire extinguishers will be placed near fuel storage areas, within site vehicles, and the site trailer.
	Sanitation	Drinking water, toilets and adequate washing facilities will be supplied to all personnel. Proper disposal of waste and adequate vermin control will be established.

ACTIVITY HAZARD ANALYSIS

Activity Brush Clearance Prepared by/Date _____ Reviewed by/Date_____

Equipment To Be Used	Inspection Requirements	Training Requirements
Brush Hog (or similar)	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations. Guards will be kept in place during operation. A safe distance will be maintained from moving mechanical parts.
Brush Chipper (or similar)	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations. Guards will be kept in place during operation. A safe distance will be maintained from moving mechanical parts.
Hand tools	Tools should be inspected prior to use. Damaged tools will be discarded and replaced..	Tools will be used properly and for their intended purpose. Proper lifting techniques will be used such as keeping straight back, lifting with legs; personnel will avoid twisting back, will use mechanical equipment, or get help from others.
Electrical hand tools	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations. A safe distance will be maintained from moving mechanical parts. Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 ft from overhead electric lines.
Electrical Generators	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be aware of all manufacturers' operational requirements. Generators will be grounded unless self-grounded.

ACTIVITY HAZARD ANALYSIS

Activity Decontamination of Equipment Prepared by/Date _____ Reviewed by/Date_____

Principal Steps	Potential Hazards	Recommended Controls
Decontamination of Equipment	Chemical	This task involves handling potentially contaminated materials, the appropriate Level D PPE protection should be implemented for these tasks. Face protection will be necessary during any spraying operations.
	Heat/cold stress	Take appropriate weather protection measures. Temporary shelters will be provided in case of inclement weather.
	Wildlife, venomous snakes, insects, biological hazards	Be alert. Watch for snakes, make noise, and do not handle wildlife. Check yourself at end of the day for ticks. Wear light color clothing with cuffs and openings closed.
	Slips, trips, falls	Be alert. Watch for trip hazards and look where you walk.
	Moving mechanical parts from heavy equipment operations.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations. Guards will be kept in place during operation. A safe distance will be maintained from moving mechanical parts. Appropriate Level D PPE will be used.
	Noise during the operation of heavy equipment.	High noise areas will be identified. Hearing protection will be provided as appropriate.
	Electric Hazards	Extension cords will be properly rated for intended use.
	Fire	Flammable liquids will be stored in safety containers. Properly rated fire extinguishers will be placed near any fuel storage areas, within site vehicles, and the site shed.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
Hand tools	Tools should be inspected prior to use. Damaged tools will be discarded and replaced.	Tools will be used properly and for their intended purpose. Proper lifting techniques will be used such as keeping straight back, lifting with legs; personnel will avoid twisting back, will use mechanical equipment, or get help from others.
Electrical hand tools	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations. Guards will be kept in place during operation. A safe distance will be maintained from moving mechanical parts.
		Extension cords will be properly rated for intended use. Prior to any intrusive activity, authorities will be contacted for permits. Elevated parts of machinery, ladders, and antennas will be kept at least 10 ft from overhead electric lines.
Electrical Generators	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be aware of all manufacturers' operational requirements. Generators will be grounded unless self-grounded.

ACTIVITY HAZARD ANALYSIS

Activity Field Sampling Prepared by/Date _____ Reviewed by/Date_____

Principal Steps	Potential Hazards	Recommended Controls
Drilling and Direct Push Sampling	Equipment and Drilling	Overhead and underground utilities will be identified. Daily equipment inspections are to occur and be documented. Proper Level D PPE should be worn at all times (including hardhat, safety glasses, protective boots, long pants, tight fit clothing and hearing protection.
	Chemical	This task involves handling potentially contaminated materials and chemical preservatives, the appropriate Level D PPE protection should be implemented for these tasks. The Level D PPE for equipment decontamination will be consistent with the level of protection at the borehole, and based on VOC air monitoring. Adhere to the approved site safety and health plan.
	Radiological	This task involves handling potentially contaminated materials, the appropriate Level D PPE protection should be implemented for these tasks. The work area should be surveyed for contamination to prior to any intrusive activities to ensure the levels of protection are correct. Adhere to the approved radiation safety plan.
	OE	This task involves potentially handling OE, specifically TNT. If suspected OE is encountered, the SUXOS will be notified immediately. Adhere to the approved OE support plan.
	Heat/cold stress	Take appropriate weather protection measures. Temporary shelters will be provided in case of inclement weather.
	Wildlife, venomous snakes, insects, biological hazards	Be alert. Watch for snakes, make noise, and do not handle wildlife. Check yourself at end of the day for ticks. Wear light color clothing with cuffs and openings closed.
	Electrical	Generators are to be properly grounded and power cables rated for intended use. Extension cords will be inspected and properly rated for intended use. All applicable permits will be acquired prior to commencing work.
	Slips, trips, falls	Be alert. Watch for trip hazards and look where you walk.
	Moving mechanical parts from heavy equipment operations.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations. Guards will be kept in place during operation. A safe distance will be maintained from moving mechanical parts. Appropriate Level D PPE will be used.
	Noise during the operation of heavy equipment.	High noise areas will be identified. Hearing protection will be provided as appropriate.
	Fire	Flammable liquids will be stored in safety containers. Properly rated fire extinguishers will be placed near any fuel storage areas, within site vehicles, and the site shed.
	Noise	Hearing protection will be required in high noise areas.

ACTIVITY HAZARD ANALYSIS

Activity Field Sampling Prepared by/Date _____ Reviewed by/Date_____

Principal Steps	Potential Hazards	Recommended Controls
	Traffic	Work areas will be clearly demarcated. Site traffic will be rerouted as necessary. Operators of machinery/vehicles will be properly licensed and expected to inspect vehicles/machinery on a daily basis. A log will be kept of all inspections.
	Sanitation	Drinking water, toilets and adequate washing facilities will be supplied to all personnel. Proper disposal of waste and adequate vermin control will be established.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
Drill Rig (CME-55, Geoprobe®, or similar)	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be aware of all manufacturers' operational requirements. Brief field personnel on OE, ACM and radiation hazards. All operators should be properly licensed.
Electrical generators	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be aware of all manufacturers' operational requirements. Generators will be grounded unless self-grounded.

ACTVITY HAZARD ANALYSIS

Activity IDW Management Prepared by/Date _____ Reviewed by/Date_____

Principal Steps	Potential Hazards	Recommended Controls
IDW Management	Chemical	This task involves handling potentially contaminated materials, the appropriate Level D PPE protection should be implemented for these tasks. Adhere to the approved site safety and health plan.
	Radiological	This task involves handling potentially contaminated materials, the appropriate Level D PPE protection should be implemented for these tasks. The work area should be surveyed for contamination prior to sampling, to ensure the levels of protection are correct. Adhere to the approved radiation safety plan.
	OE	This task involves potentially handling OE, specifically TNT. If suspected OE is encounter, the SUXOS will be notified immediately. Adhere to the approved OE support plan.
	Heat/cold stress	Take appropriate weather protection measures. Temporary shelters will be provided in case of inclement weather.
	Wildlife, venomous snakes, insects, biological hazards	Be alert. Watch for snakes, make noise, and do not handle wildlife. Check yourself at end of the day for ticks. Wear light color clothing with cuffs and openings closed.
	Slips, trips, falls	Be alert. Watch for trip hazards and look where you walk.
	Moving mechanical parts from heavy equipment operations.	Personnel should be made aware of the hazard and will coordinate carefully during handling equipment operations.. Appropriate Level D PPE will be used.
	Fire	Flammable liquids will be stored in safety containers. Propane cylinders will be stored outside in secured areas. Properly rated fire extinguishers will be placed near fuel storage areas, within site vehicles, and the site trailer.
	Traffic	Work areas will be clearly demarcated. Site traffic will be rerouted as necessary. Operators of machinery/vehicles will be properly licensed and expected to inspect vehicles/machinery on a daily basis. A log will be kept of all inspections.
	Sanitation	Drinking water, toilets and adequate washing facilities will be supplied to all personnel. Proper disposal of waste and adequate vermin control will be established.
Equipment To Be Used	**Inspection Requirements**	**Training Requirements**
Hand tools	Tools should be inspected prior to use. Damaged tools will be discarded and replaced.	Tools will be used properly and for their intended purpose. Proper lifting techniques will be used such as keeping straight back, lifting with legs; personnel will avoid twisting back, will use mechanical equipment, or get help from others.
Utility Truck	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	Personnel should be aware of all manufacturers' operational requirements. Brief field personnel on potential site hazards. All operators should be properly licensed.

ACTIVITY HAZARD ANALYSIS

Activity Site Preparation Prepared by/Date _____ Reviewed by/Date_____

Principal Steps	Potential Hazards	Recommended Controls
Site Preparation: Site reconnaissance, mobilization of the field office, radiation survey and establishing a grid system	Radiological	This task involves handling potentially contaminated materials, the appropriate Level D PPE protection should be implemented for these tasks. The work area should be surveyed for contamination to ensure the levels of protection are correct. Adhere to the approved radiation safety plan.
	OE	This task involves potentially handling OE, specifically TNT. If suspected OE is encountered, the SUXOS will be notified immediately. Adhere to the approved OE support plan.
	Heat/cold stress	Take appropriate weather protection measures.
	Wildlife, venomous snakes, insects, biological hazards	Be alert. Watch for snakes, make noise, and do not handle wildlife. Check yourself at end of the day for ticks. Wear light color clothing with cuffs and openings closed.
	Electrical	Generators are to be properly grounded and power cables rated for intended use. Extension cords will be inspected and properly rated for intended use. All applicable permits will be acquired prior to commencing work. All electrical hook-ups will be conducted by a professional electrician.
	Traffic	Work areas will be clearly demarcated. Site traffic will be rerouted as necessary. Operators of machinery/vehicles will be properly licensed and expected to inspect vehicles/machinery on a daily basis. A log will be kept of all inspections.
	Noise during the operation of heavy equipment.	High noise areas will be identified. Hearing protection will be provided as appropriate.
	Overhead	Awareness for overhead hazards and applicable Level D PPE is required (including hardhat, safety glasses and shoes, long sleeve form fit clothing).
	Fire	Flammable liquids will be stored in safety containers. Properly rated fire extinguishers will be placed near any fuel storage areas (for portable generators), within site vehicles, and the site shed.
	Slips, trips, falls	Be alert. Watch for trip hazards and look where you walk.
	Sanitation	Drinking water, toilets and adequate washing facilities will be supplied to all personnel. Proper disposal of waste and adequate vermin control will be established.

ACTIVITY HAZARD ANALYSIS

Activity Site Preparation Prepared by/Date _____ Reviewed by/Date_____

Equipment To Be Used	Inspection Requirements	Training Requirements
Hand Tools (specifically hand saws and machetes)	Inspect sharp edges routinely before, during and after use. If dull, either sharpen or replace tool.	Brief field personnel on site specific hazards.
Magnetometers (if required for utility)	In accordance with manufacturers' manuals	In accordance with manufacturers' manuals. Brief field personnel on site specific hazards.
Radiation Monitoring Equipment and Meters	In accordance with manufacturers' manuals. Daily inspection logs will be maintained onsite.	In accordance with manufacturers' manuals. Brief field personnel on site specific hazards.

Earth Resources Technology, Inc. Safety and Health Protocol **MOTOR VEHICLE SAFETY**			
Effective Date: **03/23/09**	Version: **001**	SOP#: **ERT SHP-01-1**	
Approvals			
Mike Dorman Program Manager [redacted] Signature	3/10/09 Date	George Payne Safety Manager [redacted]	3/24/09 Date

1.0 PURPOSE

The purpose of this procedure is to outline requirements associated with operating ERT owned, rented, or leased motor vehicles.

2.0 SCOPE

This procedure applies to all motor vehicles that are operated when performing ERT activities/operations.

It is neither the intent of this procedure to fully detail all actions required for safe motor vehicle operations nor define specific methodology, but rather offer general considerations for safe motor vehicle operation. ERT personnel safe driving requirements are to be included in site-specific health and safety plans and accident prevention plans.

3.0 SAFE VEHICLE OPERATION

Vehicle operators are responsible for observing established procedures including the following requirements:

- comply with all federal, state and local traffic laws
- drive defensively
- comply with all client requirements regarding motor vehicle operation
- use seat belts at all times when the vehicle is in motion
- ensure that all passengers, whether ERT, client or regulatory personnel are using seat belts at all times when the vehicle is in motion
- use caution when driving through congested areas, or in proximity of personnel and equipment operations
- use a spotter for backing vehicles, if possible.

Vehicle operators must observe the following prohibited actions:

- DO NOT operate a motor vehicle under the influence of alcohol or drugs.
- DO NOT leave keys in an unattended motor vehicle.
- DO NOT leave the driver's seat of a vehicle while the motor is running.
- DO NOT operate a motor vehicle when excessively tired.

- DO NOT drive beyond any barricades or into any area posted with designations, such as "NO TRESPASSING," "RESTRICTED AREA," and/or "DO NOT ENTER."
- DO NOT allow riders on the outside of a motor vehicle while it is in motion.
- DO NOT use cell phones while operating the motor vehicle (On Federal installations cell phone use while driving is prohibited)

4.0 SAFETY DURING TRAVEL

The following guidelines should be followed, as applicable, when traveling in ERT owned or leased vehicles:

- Know the traveling height (overhead clearance), width, length, and weight of the vehicle and know highway and bridge load, width and overhead limits, making sure these limits are not exceeded with an adequate margin.
- Never operate a motor vehicle unless the vehicle brakes are in sound working order.
- Allow for any overhang when cornering or approaching other motor vehicles or structures.
- Be aware that the canopies of service stations and motels may be too low for a high-profile motor vehicle.
- Watch for low hanging electrical lines, particularly at the entrances to work sites, restaurants, motels, or other commercial sites.
- Remove all ignition keys when a motor vehicle is left unattended.

5.0 LOADING AND UNLOADING

The following guidelines should be followed, as applicable, when loading and unloading vehicles.

Tractors and/or trailers must be chocked during loading and unloading activities. Deck plates and positive anchor systems must be used for unloading to elevated platforms at trailer floor level if unloaded by fork lifts. Detached trailers must have additional support if fork lifts will enter or if instability of load presents a hazard of front wheels collapsing.

When loading or unloading mobile equipment (such as a drill rig) or other "large" equipment on a trailer or a truck:

- Use ramps of adequate design that are solid and substantial enough to bear the weight of the equipment with carrier - including tooling.
- Load and unload on level ground.
- Use the assistance of a ground level spotter.
- Check the brakes on the vehicle or carrier before approaching loading ramps.
- Distribute the weight of the vehicle or carrier, and tools on the trailer so that the center of weight is approximately on the centerline of the trailer and so that some of the trailer load is transferred to the hitch of the pulling vehicle. Adhere to the trailer manufacturer's weight distribution recommendations.

- Secure the vehicle/equipment and tools to the hauling vehicle with ties, chains, and/or load binders of adequate capacity prior to unloading.

6.0 INSPECTIONS AND PRECAUTIONS

6.1 Tires

Motor vehicle tires must be checked prior to use and daily during extended travel for loss of air, and maintained and/or repaired in a safe manner. If tires are deflated to reduce ground pressure for movement on soft ground, the tires must be re-inflated to manufacture's recommended pressures before operating on firm or hilly ground, or on streets, roads, and highways. Under-inflated tires are not as stable on firm ground as properly inflated tires. Air pressures should be properly maintained for travel on streets, roads, and highways according to the manufacturer's recommendations. During tire checks, inspect for:

- Missing or loose wheel lugs.
- Objects wedged between duals or embedded in the tire casing.
- Damage to or poorly fitting rims or rim flanges.
- Abnormal or uneven wear and cuts, breaks, or tears in the casing.

The repair of truck and off-highway tires should only be made with required special tools and following the recommendations of a tire manufacturer's repair manual.

6.2 Batteries

Batteries contain strong acid. Use extreme caution when inspecting or charging batteries.

- Service batteries in a ventilated area while wearing safety glasses, long sleeves shirts, pants and gloves.
- When charging a battery with a battery charger, turn off the power source to the battery prior to connecting or disconnecting charger loads to the battery posts. Cell caps should be loosened prior to charging to permit the escape of gas.
- Spilled battery acid can burn your skin and damage your eyes. Immediately flush spilled battery acid off of your skin with copious amounts of water. Should battery acid get into someone's eyes, flush immediately with copious amounts of water and seek medical attention immediately.
- To avoid battery explosions, keep the cells filled with electrolyte, use a flashlight (not an open flame) to check electrolyte levels, and avoid creating sparks around the battery by shorting across a battery terminal. Keep lighted, smoking materials and flames away from batteries.
- When removing a battery from a motor vehicle or service unit, first disconnect the battery ground clamp.
- Secure batteries when transporting to prevent tipping over.
- When installing a battery, connect the battery ground clamp last.

6.3 Fuel

Special precautions must be taken for handling fuel and refueling motor vehicles. Motor vehicles should not be fueled from open cans or by other makeshift methods, as there is great

danger of flash fire from hot engines.

- Engines should be shut off while fueling.
- Only use the type and quality of fuel recommended by the engine manufacturer.
- Refuel in a well-ventilated area.
- Do not fill fuel tanks while the engine is running. Turn off all electrical switches.
- Do not spill fuel on hot surfaces. Clean any spillage before starting an engine.
- Wipe up spilled fuel with cotton rags or cloths - do not use wool or metallic cloth.
- Keep open lights, lighted smoking materials, and flames or sparking equipment away from the fueling area.
- Turn off heaters in carrier cabs when refueling the carrier.
- Do not fill portable fuel containers completely to allow for expansion of the fuel during temperature changes.
- When refueling, keep the fuel nozzle in contact with the tank being filled to prevent static sparks from igniting the fuel.
- Do not transport portable fuel containers in the motor vehicle or carrier cab with personnel.
- Keep fuel containers and hoses in contact with a metal surface during travel to prevent the buildup of static charge.

7.0 REFERENCES

ERTSHP-01-2 Traffic
ERTSHP-05-4 Earth Moving/Material Handling Equipment

8.0 ATTACHMENTS

Attachment 1 – ERT Daily Vehicle/Earth Moving/Material Handling Equipment Inspection Checklist

Prior to commencing field activities, each operator will perform a safety inspection of their motor vehicle. To ensure the inspection is accurate and complete, the Equipment/Motor Vehicle Inspection Checklist will be completed and reviewed with the Field Team Leader.

Attachment1

ERT DAILY VEHICLE/EARTH MOVING/ MATERIAL HANDLING EQUIPMENT INSPECTION CHECKLIST

VEHICLE TYPE:	**SITE/PROJECT**:	**DATE**:

	PASS	**FAIL**		**PASS**	**FAIL**
HEAD LIGHTS			ENGINE OIL LEVEL		
TAIL LIGHTS			ENGINE COOLANT		
BRAKE LIGHTS			BRAKE FLUID		
TURN SIGNALS LEFT FRONT			FAN BELTS		
TURN SIGNALS RIGHT FRONT			ENGINE LEAKS (FUEL)		
TURN SIGNALS LEFT REAR			ENGINE LEAKS (OIL)		
TURN SIGNALS RIGHT REAR			EXHAUST LEAKS		
WINDSHEILD			TIRE CONDITION LEFT FRONT		
SIDE WINDOWS			TIRE CONDITION RIGHT FRONT		
REAR WINDOW			TIRE CONDITION LEFT REAR		
FRONT WIPERS			TIRE CONDITION RIGHT REAR		
REAR WIPERS			TIRE CONDITION SPARE		
WASHER FLUID FRONT			**TRACK CONDITION ***		
WASHER FLUID REAR			**HYDRAULIC LINES ***		
BACK UP ALARM *			**LUBRICATION POINTS ***		

***Items unique to earth moving or material handling equipment**

Earth Resources Technology, Inc. Safety and Health Protocol **Site Clearing and Grubbing**			
Effective Date: **04/29/09**	Version: **001**	SOP#: **ERT SHP-01-5**	
Approvals			
Mike Dorman Program Manager [redacted] S	4/29/09 Date	George Payne Safety Manager [redacted] Signature	4/13/09 Date

1.0 PURPOSE

The purpose of this procedure is to outline requirements associated with clearing or grubbing on an ERT controlled site.

2.0 SCOPE

Safety procedures must be evaluated and utilized for all types of clearing, grubbing, and logging activities. The primary purpose of this SHP is to evaluate safe practices by ERT personnel who use chain saws and other equipment to perform limited tasks. Performance of logging activities by ERT personnel is limited to trained personnel performing small-scale ancillary tasks within the criteria outlined in this SHP. Basic subcontractor compliance requirements are also provided in this SHP.

Logging tasks on ERT projects are rare and typically performed by a subcontractor. ERT may perform mechanical clearing, grubbing, and logging using heavy equipment, or manually using hand and power tools.

3.0 TRAINING

Project Managers are responsible for verifying that personnel are appropriately trained and prepared to perform tasks as necessary.

Any employee or subcontractor performing logging tasks or work with chain saws must provide documentation of training to the Project and/or Site Manager prior to performance of task activities. Subcontractors may document compliance with requirements of 29 CFR 1910.266 by means of individual certificates or by a letter that certifies compliance by all subcontract employees. Training for ERT personnel consists of formal, documented overview of this SHP and OSHA's Logging Regulation (29 CFR 1910.266).

On-the-job training for chain saw and chipper operations will be provided by experienced personnel and consist of reviewing the chain saw operations manual, reviewing the equipment and protective equipment requirements, and observation for competency during task operations.

4.0 HAZARD EVALUATION

Operations must meet requirements of 29 CFR 1910.266 and activity hazards analyses must be performed. A site-specific safety and health plan (SSHP) will prepared in accordance with the ERT Corporate Safety and Health Program prior to beginning the task. For logging activities,

hazard evaluation must include, but is not limited to terrain, weather, tree size and lean, tree configuration and condition (e.g., visible dead wood, rotting, fungal growth, lack of new growth), potential for throwback during felling, and proximity to other workers, utilities and equipment. It is recommended that the on-line Logging Retool (available on www.osha.gov) be used as a tool for hazards analyses and SSHP development.

5.0 LIMITATIONS TO ERT PERFORMED ACTIVITIES

Because ERT personnel do not typically perform clearing or logging activities, the following ERT limitations on tree felling are established in the following sections. For those hazards or tasks that exceed the limitations indicated, work must be performed by a subcontractor.

6.0 MANUAL FELLING

Manual felling is limited to trained employees donning personal protection equipment (PPE) and other equipment appropriate for the task. Limitations include:

- Tree size limited to less than 12 inches diameter (maximum diameter will be outlined in the WP).
- Chain saw bar maximum size limited to 16 inches.
- No climbing or elevated platform cuts unless limited to non-powered hand tools for nuisance limb clearing.
- Felling cuts limited to the Open Face Cut.
- No felling of "Danger Trees" (i.e., standing trees that present employee hazard due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem or limbs, inappropriate direction or lean of the tree, prominent fork in trunk or double trees, creating potential felling hazard, hung or entangled trees and snags that create unreasonable risk to the feller during manual cuts). Danger trees are to be removed by mechanical aid or subcontractor.
- No felling of "Spring poles" created during felling unless employee is specifically qualified to release created tension, otherwise these must be mechanically removed.
- No felling of trees located within a 2 tree length distance to hazards, such as active roadways, elevated utility lines, buildings, etc.
- No felling on sloping terrain such that safe felling and retreat is compromised.

7.0 MECHANICAL FELLING

- Mechanical felling is limited to trained and experienced equipment operators with equipment appropriate to the task.
- Tree size is limited to less than 12 inches diameter.
- No mechanical felling of trees located within a 2 tree length distance to hazards, such as active roadways, elevated utility lines, buildings, etc.

8.0 ENVIRONMENTAL CONDITIONS

Work performed by ERT or a subcontractor must be stopped and employees moved to safe areas when environmental hazards are imminent such as, but not limited to, electrical storms, high winds, heavy rain, fog, or snow, extreme cold, or darkness.

9.0 SAFETY PRECAUTIONS

All hand tools, power tools, required safety equipment, and supplies must be inspected before use on each shift in accordance with the ERT Corporate Safety and Health Program and ERT SHP-05-5, "Hand and Power Tools." Damaged or missing items must be repaired or replaced before commencing work. ERT Corporate Safety and Health Program first aid and fire protection requirements must be met prior to commencing work. Signaling equipment (i.e., hand or audible - discernable above background noise) must be available. Operation and maintenance manuals must be available on-site for all tools to be used, such as chain-saws and chippers. Checklists should be developed to ensure compliance with 29 CFR 1910.266.

10.0 PERSONAL PROTECTIVE EQUIPMENT

Required PPE is determined during activity hazards analyses. The following should be considered for clearing, grubbing, and logging operations:

- Hand Protection: Must be adequate for protection from puncture wounds, cuts, lacerations.
- Leg Protection: Chain saw operators must wear cut-resistant (e.g., ballistic nylon or equivalent) leg protection which covers full length from thigh to the top of the boot for each leg (for subcontracted operations see exceptions in 29 CFR 1910.266(d) if necessary).
- Foot Protection: Water-proof or water repellent foot protection which covers and supports the ankle. If operating a chain saw, material must be cut-resistant (e.g., multiple layers of material such as ballistic nylon, Kevlar). Cut-resistant material can be intrinsic to the boot construction or as an approved supplemental attachment.
- Head Protection: Hard hats required.
- Hearing Protection: Hearing protection capable of reducing the noise level to less than 85 Dba required.
- Eye Protection: Safety glasses required.
- Face Protection: ANSI approved safety glasses and face shield required when operating chipper. Face shield (e.g. mesh screen or ANSI clear) required when operating chain saw, unless determined that use of face shield creates greater hazard.

11.0 REFERENCES

ERTSHP-01-2 Traffic
ERTSHP-05-3 Earth Moving/Material Handling Equipment
ERTSHP-07-1 Fire Prevention
ERTSHP-07-2 Fire Extinguisher Usage
ERTSHP-05-5 Hand and Power Tools
USACE EM 385-1-1
OSHA Occupational Noise and Hearing Conservation Program

Earth Resources Technology, Inc. Safety and Health Protocol **DECONTAMINATION**			
Effective Date: **04/29/09**	Version: **001**	SOP#: **ERT SHP-01-6**	
Approvals			
Mike Dorman Program Manager [redacted] Signature	4/29/09 Date	George Payne Safety Manager [redacted] Signature	4/13/09 Date

1.0 PURPOSE

The purpose of this procedure is to outline requirements associated with decontamination during ERT field operations.

2.0 SCOPE

This procedure applies to all ERT personal and contractors working under the supervision of ERT personal during field operations/activities. It is neither the intent of this procedure to fully detail all actions required for decontamination, but rather offer general considerations for safe field operations.

3.0 GENERAL

Site specific decontamination procedures for personnel and equipment are specified in each project field sampling plan (FSP) and/or site-specific safety and health plan (SSHP). Decontamination procedures are communicated to site workers during site safety and health orientation, and as necessary during the duration of field activities.

Standard operating procedures have been developed in order to minimize employee contact with hazardous substances or with equipment that has been in contact with hazardous substances. The standard procedures have been developed in accordance with *Occupational Safety and Health Guidance Manual for Hazardous Wastes Site Activities* (OSHA, 1998). These procedures include but are not limited to:

- Adherence to the site control plan.
- Limiting access to authorized and trained personnel.
- In unknown situations expose only those personnel who need to be exposed and only for the duration they need to be exposed. If a situation or contaminant is unknown, personal protective equipment (PPE) should be increased as necessary.
- Work in pairs using the buddy system to ensure proper outfitting of PPE, check on PPE integrity during site activities, and assisting with decontamination following work activities.
- Use double layers to protect most likely points of contact (hands and feet). Limit contact with potential contamination to the double protected areas (soles of feet and hands).
- When possible, do not contact known contamination. Avoid puddles, discoloration or obvious chemical residue.

- Do not touch containers under pressure or leaking containers. Open containers under pressure remotely. Use remote sampling and handling opening techniques (e.g., drum grapplers, pneumatic impact wrenches).
- Seal sensitive handheld equipment, instruments, etc. in bags which can be easily removed while allowing the equipment to function.
- Wear disposable outer garments and use disposable equipment where appropriate.
- Cover equipment and tools with a strippable coating which can be removed during decontamination.
- Encase or cover the source of contaminants, e.g., with plastic sheeting or over-packs.
- Set mobile equipment with long reach attachments in clean areas and limit contact with contaminants to as little of the equipment surface as possible.

4.0 PERSONNEL AND EQUIPMENT DECONTAMINATION

Only personnel who have completed the required training and medical exams/tests may enter an exclusion zone (EZ). Personnel decontamination facilities will be established on-site to ensure that personnel maintain a high degree of personal hygiene and minimize the possibility of exposure to chemical hazards. Personnel hygiene facilities will meet the requirements of 29 CFR 1910.120.

A personnel decontamination line will be established in the contamination reduction zone (CRZ) to facilitate decontamination and protective clothing removal. Storage and disposal containers will be used for the disposal of outerwear. If there is a rip or tear in the employee's chemical protective clothing, that individual will replace the torn garment in the decontamination area and replace the article with new protective clothing. If respiratory equipment becomes defective or damaged, the wearer will leave the EZ immediately and repair or replace the defective part.

As personnel move through the decontamination line, PPE will be removed in the order of highest to lowest potential contamination. This outside-in removal minimizes potential contamination of inner clothing or body. All personnel exiting the EZ will pass through the decontamination line. Respirators will be inspected daily, washed, and scrubbed in a detergent/water solution. Clean respirators will be left to dry in an uncontaminated protected atmosphere.

All PPE for decontamination line attendants will be removed on the decontamination line. Emergency eyewash station(s) will be located in the CRZ adjacent to the decontamination line.

Personnel are required to wash hands, face, and other exposed skin areas prior to leaving the CRZ for breaks or lunch. Towels and soap will be provided for personnel.

The use of tobacco products and eating or drinking will be prohibited except in a designated break area within the support zone (SZ).

4.1 Routine Equipment Decontamination

Unless otherwise stipulated in the FSP/HASP, any equipment or vehicle taken into the EZ must be assumed to be potentially contaminated and will be routinely inspected and decontaminated in

the CRZ prior to leaving the site. It will be the responsibility of the Field Safety Officer (FSO) or designee to properly inspect and approve, for general cleanliness, all tools or hand operated equipment, and the frame and tires of all vehicles or heavy equipment leaving the CRZ. Generally, in order for vehicles and heavy equipment to pass inspection, they must be free of loose dirt or stabilized material on tailgates, axles, wheels, etc. Approval will be based on visual inspection of all exposed surfaces.

If necessary, ERT will use an equipment decontamination pad located in the CRZ. This pad will be used to remove soil or residues from equipment leaving the work area. Decontamination procedures will generally consist of high-pressure water or steam cleaning of equipment to remove mud and/or dirt.

All equipment requiring maintenance or repair will be staged in the CRZ prior to servicing. Equipment wash water residue will be collected and disposed as either non-hazardous or hazardous liquid waste based upon site conditions. Only clean water is to be used for decontamination of personnel, equipment, and vehicles.

Personnel assigned to vehicle decontamination will wear PPE consistent with the established health and safety program as defined in the HASP. Seats and floors of equipment and vehicles to be used in the EZ will be covered to the extent possible with disposable polyethylene (as necessary).

4.2 PPE and Decontamination Procedures

As necessary, the Field Supervisor/Site Manager or FSO will designate personnel to assist the work party in the donning and doffing of PPE as they proceed in and out of the CRZ. Decontamination is accomplished to ensure the materials that personnel and equipment may have contacted in the EZ are removed in the CRZ before passing into the SZ.

4.3 Personnel Decontamination

The following procedures are based on standard guidance. Personnel decontamination plans may be more or less stringent based on contaminants of concern and potential for contamination. Personnel decontamination plans may be amended based on observed field conditions during activities.

Modified Level D

- Any site equipment will be deposited in a segregated area prior to entering the CRZ.
- At the perimeter of the EZ, rain gear or splash protection (if worn) will be damp wiped or wet sprayed to remove any adhered particulates or corrosive liquids.
- Over-boots or over-the-sock boots will be scrubbed with a detergent/water solution. The boots will be removed and placed on a rack to dry.
- Hard hats will be removed and properly stored. Hard hats will be scrubbed with detergent if grossly contaminated.
- Outer gloves will be cleaned and removed, and, depending on condition, will be discarded (if damaged or unclean able).
- Splash gear will be removed, cleaned, and hung to dry (if worn).

- Tyvek or Saranex suits will be discarded.
- Latex inner gloves will be discarded.
- Personnel will wash their hands, arms, neck, and face.

Level C/Level B

- Deposit any site-used equipment in a segregated area prior to entering the CRZ.
- At the perimeter of the EZ, rain gear or splash protection (if worn) will be damp wiped or wet sprayed to remove any adhered particulates or corrosive liquids.
- Outer-boot covers or over-the-sock boots will be scrubbed with a detergent/water solution. The boots will be removed and placed on a rack to dry.
- Hard hats will be removed and properly stored. Hard hats will be scrubbed with detergent and rinsed if grossly contaminated.
- Outer gloves will be cleaned and removed, and, depending on condition, will be discarded (if damaged or unclean able).
- Splash gear will be removed, cleaned, and hung to dry (if worn).
- Tyvek or Saranex suits will be discarded.
- Respirators will be removed and prepared for reuse or decontamination.
- Latex inner gloves will be discarded.
- Personnel will wash their hands, arms, neck, and face.

4.4 Emergency Decontamination

In the event that a site worker in the EZ is injured or appears to exhibit signs of chemical exposure, emergency decontamination will be performed. Supplies for the emergency decontamination will be placed in the CRZ prior to site activities and may include:

- Eyewash/shower
- First aid/Blood borne pathogen (BBP) kit
- Plastic sheeting or disposable rescue blanket

Emergency decontamination materials will be required in addition to the general decontamination equipment required for standard decontamination activities.

All employees leaving a contaminated area will be appropriately decontaminated and all contaminated clothing and equipment leaving a contaminated area will be appropriately disposed of or decontaminated.

Decontamination procedures will be monitored by the FSO to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies.

Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.

All equipment and solvents used for decontamination will be decontaminated or disposed of properly. Personal protective clothing and equipment will be decontaminated or handled as follows:

- Protective clothing and equipment will be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness.
- Employees whose non-impermeable clothing becomes wetted with hazardous substances will immediately remove that clothing and proceed to shower. The clothing will be disposed of or decontaminated before it is removed from the work zone.

Unauthorized employees will not remove protective clothing or equipment from change rooms. Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment will be informed of the potentially harmful effects of exposures to hazardous substances prior to receiving garments.

Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, they will be provided and meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing will be provided.

4.5 Equipment Decontamination

Any equipment, vehicles, or tools that have entered an EZ will be cleaned with water. Some equipment decontamination may require pressurized water or steam cleaning. Equipment removed from the EZ will be decontaminated in the CRZ. All water and material will be collected and placed in the designated waste disposal area.

Following this cleaning, all items will be inspected and approved by the FSO prior to removal from the site.

4.6 Disposal of Decontamination Wastes

All liquids and other decontamination waste will be collected and treated as contaminated waste and disposed of properly in accordance with the applicable regulations. The Level of protection for personnel handling and decontaminating contaminated equipment will be established in the HASP. Equipment must be cleaned prior to demobilization. Wash waters and residues must be collected for treatment and/or proper disposal.

5.0 REFERENCES

Occupational Safety and Health Guidance Manual for Hazardous Wastes Site Activities - (Occupational Safety and Health Administration [OSHA], National Institute for Occupational Safety and Health [NIOSH], the U.S. Coast Guard, and the U.S. Environmental Protection Agency [EPA])

Earth Resources Technology, Inc. Safety and Health Protocol **DRUM HANDLING OPERATIONS**			
Effective Date: **04/29/09**	Version: **001**	SOP#: **ERT SHP-04-5**	
Approvals			
Mike Dorman Program Manager [redacted] Signature	4/29/09 Date	George Payne [redacted] Signature	4/13/09 Date

1.0 PURPOSE

The purpose of this procedure is to outline requirements associated with drum handling during ERT field activities/operations.

2.0 SCOPE

One of the most hazardous operations to be conducted at any hazardous waste site is the handling of drums and other containers. Container contents cannot be relied upon to be the same as existing markings. Extreme caution is necessary for the safety of site workers, the public and the environment.

Hazards associated with drum or other container handling include; fires, explosions, vapor releases, spills and injuries from lifting or other physical hazards associated with moving containers. In order to increase employee safety when container movement or handling is anticipated, strict guidelines that limit the numbers of personnel exposed to drum/container handling hazards are necessary.

This SHP identifies generic safety guidance for those activities involving drum handling at hazardous waste operations. Site-specific criteria must be included in the site safety and health plan (SSHP) to anticipate potential hazards associated with drum handling task.

Various standards are utilized for the movement and handling of drums and other containers. Site- specific SSHPs must anticipate and follow the standards referenced as related to site activities. It is neither the intent of this procedure to fully detail all potential drum handling concerns nor define specific methodology, but rather offer general considerations for the safety of field personnel.

3.0 GENERAL

Hazardous substances, contaminated liquids, and other residues will be handled, transported, labeled, and disposed of in accordance with this SHP and applicable regulatory standards.

Drums and containers used during remediation activities must meet the appropriate DOT, OSHA, and EPA regulations. Drums and containers are to be inspected and their integrity ensured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions (e.g., buried beneath the earth, stacked behind other drums, and stacked several tiers high in a pile) will be moved to an accessible location and inspected prior to further handling.

Unlabeled drums and containers will be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.

Site operations must be organized to minimize the amount of drum or container movement. Fire extinguishing equipment will be on hand and ready for use to control incipient fires. Level B protective equipment must be used as a minimum unless available evidence/research indicates that a lower level of protection is safe or a higher level of protection is necessary.

4.0 LOCATING AND INSPECTING DRUMS/CONTAINERS-MINIMAL CRITERIA

Review background data and site history to determine types and location of containers either known or suspected. Conduct geophysical surveys utilizing devices such as, ground-penetrating system or other type of detection system or device to estimate the location and depth of buried drums or containers.

Monitor the site utilizing appropriate direct-reading instrumentation to verify the presence of potential volatile materials. For visible containers, approach containers cautiously and in appropriate levels of protection based upon available evidence. Continue air monitoring with direct-reading instruments following appropriate action levels. Visually determine container integrity and observe for signs of current or historic leakage.

5.0 CONTAINER MOVEMENT AND HANDLING-MINIMAL CRITERIA

Implement a spill containment plan prior to any container movement. This plan must include, at a minimum, provisions for appropriate types and numbers of over-pack containers, absorbent, tools and other emergency equipment determined to be necessary. Personnel must be instructed in spill containment procedures prior to container movement.

Monitor containers utilizing appropriate direct-reading instruments for each container to verify potential leakage and employee exposure to contents. Perform excavation activities carefully to avoid the possibility of rupturing any containers. Excavation activities must be in compliance with 29 CFR 1926 Subpart P (Excavations).

Prior to movement of drums or containers, brief all employees exposed to the transfer operation on the potential hazards associated with the contents of the drums or containers. Empty all drums and containers that cannot be moved without rupture, leaking, or spills. Drums or containers will be emptied into a sound container using a device classified for the material being transferred.

Move and handle containers preferably using a drum grappler. Other means of handling must be justified in the HASP. Movement by hand is to be offered as a last resort.

Over pack damaged containers or those with suspect integrity or transfer contents to appropriate containers prior to movement (if safe to do so). Proper assessment of contents must be made prior to transfer. Proper grounding and bonding techniques must be followed.

Use blast shields on excavation and container handling equipment unless the hazard and risk assessment indicates it is safe to perform the operation without blast shields.

If drums are to be moved utilizing drum slings, yokes, or other accessories, ensure that workers move away from the area after affixing the accessory and prior to drum movement by the equipment operator.

Do not move critically swollen containers by hand. Pressure is to be safely relieved prior to movement unless movement is by grappler and properly protected equipment operator.

Remotely handle containers suspected of containing explosive or reactive materials.

6.0 DRUM STAGING, OPENING, AND SAMPLING-MINIMAL CRITERIA

Identify staging areas prior to container movement. Based upon the perceived risk from container contents, the staging area must be remote from other site activities.

Ensure that minimal and appropriate equipment (e.g., fire protection, spill control and containment, PPE) is available at the staging area. Stage compressed gas cylinders in a shaded area. Remotely handle potentially reactive, explosive, or shock-sensitive containers and stage them separate from other containers.

Stage containers to allow ease in sampling, appropriate aisle space and the avoidance of cross-contamination or reaction during opening activities. Ensure that employees do not stand upon or work from atop drums or containers.

Open all drums and containers in such a manner that excess interior pressure will be safely relieved. If pressure cannot be relieved from a remote location, ensure that appropriate shielding is placed between the employee and the drums or containers to reduce the risk of injury.

Ensure that material handling equipment used to transfer drums and containers is selected, positioned and operated to minimize the potential for sources of ignition related to the equipment from igniting vapors released from ruptured drums or containers.

Do not handle drums and containers containing radioactive wastes until appropriate clearance is obtained in writing from the Corporate Radiation Safety Officer, Corporate Health and Safety Director, Certified Health Physicist or designee. Use only spark-proof tools in drum opening operations. Perform sampling of containers and drums in accordance with a sampling plan prepared as a part of the SSHP.

At a minimum, take the following special precautions when handling drums and containers containing or suspected of containing shock-sensitive wastes:

- All non essential employees will be evacuated from the area of transfer.
- Material handling equipment will be provided with explosive containment devices or protective shields to protect equipment operators from the potential of exploding containers.
- An employee alarm system capable of being heard or seen above surrounding light and noise conditions will be used to signal the commencement and completion of explosive waste handling activities.
- Continuous communications (i.e., portable radios, hand signals, telephones, as appropriate) will be maintained between the employee in charge of the immediate

handling area and both the field safety officer and the command post until such time as the handling operation is completed.

- Communication equipment or methods that could cause shock sensitive materials to explode will not be used.
- Drums and containers under pressure, as evidenced by bulging or swelling, will not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosive relief of the drum.
- Drums and containers containing packaged laboratory wastes will be considered to contain shock sensitive or explosive materials until they have been characterized or available site data preclude shock hazards.

7.0 LABORATORY WASTE PACS (LAB PACKS)

In addition to the requirements outlined for shock sensitive wastes, the following precautions will be taken at a minimum when handling laboratory waste packs (lab packs):

- Lab packs will be opened only when necessary and then only by an individual knowledgeable in the inspection, classification, and segregation of the containers within the pack according to the hazards of the wastes.
- If crystalline material is noted on any container, the contents will be handled as a shock sensitive waste until the contents are identified.
- Remote opening of Lab Pack containers is the preferred technique.
- Manual opening lab packs must be approved in the HASP based upon appropriate hazard analysis.

8.0 CONSOLIDATION AND RE-CONTAINERIZATION-MINIMAL CRITERIA

Segregate containers based upon on-site compatibility testing. Promptly clean up any spillage to preclude inadvertent reactions or cross-contamination. Perform bulking of materials only after appropriate compatibility testing. Ensure that drums and other repackaging containers meet DOT criteria for the hazard class of the material.

9.0 INTERIM STORAGE AND TRANSPORTATION-MINIMAL CRITERIA

Ensure that Interim Storage areas are in compliance with EPA standards for container storage. Inspect storage areas weekly, at a minimum. The criteria outlined in 40 CFR Part 265 will be utilized as guidance. Ensure that adequate aisle space is maintained for worker protection in the storage area. Ensure that containers are protected (as necessary) from adverse weather conditions. Containers of compressed gasses or reactive or explosive materials should be protected from environmental conditions by covers or shades.

Ensure that fire extinguishers and eye wash stations are available near the storage area. Ensure that adequate spill control equipment is available near the storage area. Transport containers according to appropriate USDOT and USEPA regulations.

10.0 TANK AND VAULT PROCEDURES

Tanks and vaults containing hazardous substances must be handled in a manner similar to that for drums and containers, taking into consideration the size of the tank or vault.

11.0 REFERENCES

29 CFR 1910.120 and 29 CFR 1926.65 – Occupational Safety and Health Administration (OSHA)
40 CFR Parts 264, 265 and 311 – U.S. Environmental Protection Agency (EPA)
49 CFR Parts 171 through 178 – U.S. Department of Transportation (DOT) USACE EM 385-1-1 – U.S. Army Corps of Engineers

12.0 ATTACHMENTS

Attachment 1 - Summary of Safety Precautions for Drum, Cylinder, and Unknown Container Handling

Attachment 1
Summary of Safety Precautions for Drum, Cylinder, and Unknown Container Handling

ACTIVITY: Locating Containers and Conducting Inventory	
POTENTIAL SAFETY HAZARD: Unknown location and contents of drums can lead to unsuspected hazards.	
Safety Tips	• Carefully review background data pertaining to the location and types of wastes on-site. • Conduct visual to minimize the possibility of puncturing drums. A spotter should be utilized to identify drums during excavation activities. • During the random sampling of containers, which may be required for an inventory, spacing between containers should be adequate to allow for emergency evacuation if needed. • Use remotely operated, non-sparking tools for random sampling whenever possible. • Use direct-reading air monitoring equipment to detect hot spots where contamination may pose a risk to worker safety.
ACTIVITY: Determining Container Integrity	
POTENTIAL SAFETY HAZARD: The process of visual inspections requires close contact with containers of unknown content.	
Safety Tips	• Approach container cautiously. Conduct air monitoring to indicate levels of hazards that require withdrawal from the work area or use of additional safety equipment. • Any container that is critically swollen should not be approached without proper PPE. It should be isolated using a barricade until the pressure can be relieved remotely. • Use of the grappler or other remotely operated equipment can eliminate the need for determining container integrity prior to excavation, provided that rupture of the container will not result in fire or unacceptable environmental impact.
ACTIVITY: Container Excavation and Handling	
POTENTIAL SAFETY HAZARD: Exposure to toxic/hazardous vapors; rupture of containers.	
Safety Tips	• Where buried drums are suspected, conduct a visual survey before using any construction equipment in order to minimize the possibility of rupture. (If practical, a geophysical survey could be used prior to excavation.) • Use a container grappler where possible and cost-effective to minimize contact with containers. If a grappler is not available, pump or over pack drums of poor integrity before excavation. • Ground equipment prior to transferring wastes to new containers. • Use non-sparking hand tools and non-sparking bucket teeth on excavation equipment, and use • Plexiglas shields on vehicle cabs. • Where slings, yokes, or other accessories must be used, workers should back away from the work area after attaching the accessory and before the container is lifted. • Critically swollen or bulging drums should not be handled until pressure can be relieved. • Use bars that fit over the teeth of excavation buckets to prevent container puncture. • Where ionizing levels of radiation are detected, the Field Safety Officer and Site Radiological • Control Technician should be contacted and the work activity should stop. • Where explosive or shock-sensitive material is suspected, every effort should be made to handle the container remotely. Gas cylinders should not be dragged during handling. • Use direct-reading air monitoring equipment when in close proximity to containers to detect any hot spots.

Earth Resources Technology, Inc. Safety and Health Protocol **DRILLING**			
Effective Date: **05/1/09**	Version: **001**	SOP#: **ERT SHP-05-1**	
Approvals			
Mike Dorman Program Manager [redacted] Signature	4/30/09 Date	George Payne Safety Manager [redacted] Signature	4/13/09 Date

1.0 PURPOSE

The purpose of this procedure is to outline requirements associated with drilling operations during ERT field activities/operations.

2.0 SCOPE

Safety is critical when working on or around a drill rig, moving the drill rig and tools from location to location on a site, or providing maintenance on a drill rig or drilling tools. It is neither the intent of this procedure to fully detail all drilling operations nor define specific methodology, but rather offer general considerations for the safety of field personnel.

3.0 INTRODUCTION

This SHP provides a summary of ERT's Corporate Safety and Health (S&H) Program and Plan, related processes to be used.

4.0 SAFETY DURING START-UP AND DRILLING OPERATIONS

The ERT project manager (PM) and safety personnel are responsible for determining the appropriate procedures to be followed to ensure drilling work is performed safely and must review local, state, and federal laws and regulations that are applicable to each project. If required, client drilling guidelines and/or procedures will be implemented.

Prior to drilling, the PM and Field Safety Officer (FSO) ensure that a site-specific safety and health plan (SSHP) and activity hazards analyses have been developed in accordance with ERT's Corporate S&H Program. Drill rigs must be operated safely in accordance with manufacturer's operating procedures.

The FSO observes drilling start-up and operations to ensure adherence to safety requirements. The operator must not attempt to exceed manufacturers' ratings of speed, force, torque, pressure, flow, etc. The drill rig and tools must be used only for the purposes that they are intended and designed.

Safety requirements established in ERTSHP-06-1 *Utilities* and ERTSHP-06-2 *Electrical Safety* must be observed on drilling operations.

5.0 FIELD SAFETY OFFICER

The FSO has the authority to enforce safety on the drilling site. A rig worker's first safety responsibility is to listen to the safety directions of the FSO.

6.0 PERSONAL PROTECTIVE EQUIPMENT

For most drilling projects, personal protective equipment (PPE) should include a safety hat, safety shoes, safety glasses, and close fitting but comfortable clothes, without loose ends, straps, draw strings, belts, or otherwise unfastened parts that might catch on some rotating or translating component of the drill rig. Rings and jewelry should not be worn during a work shift.

For some drilling operations, the environment or regulations may dictate that other PPE be used. The design and composition of the PPE must be determined jointly by the management of the drilling organization and the FSO. Such equipment might include face or ear protection or reflective clothing. Each drill rig worker should wear noise reducing ear protectors when appropriate. When drilling is performed in chemically-or radiological contaminated ground, special protective equipment and clothing may be required. Additional information regarding PPE is provided in the ERT S&H Program and in the project specific SSHP.

7.0 HOUSEKEEPING AND DRILL RIG MAINTENANCE

It is critical for safe field operations that the safety supervisor understands and fulfills the responsibility for maintenance and housekeeping on and around the drill rig. Drill rig maintenance must be performed in accordance with manufacturer’s recommendations. Alterations to a drill rig or drilling tools should only be made by qualified personnel and only after consultation with the manufacturer. Drill rigs must be inspected after any alterations.

8.0 SAFE USE OF HAND TOOLS

Numerous and various hand tools can be used on or around a drill rig and in repair shops. "Use the tool for its intended purpose" is the most important rule of proper use.

9.0 CLEARING THE WORK AREA

Prior to drilling, adequate site clearing and leveling should be performed in accordance with ERTSHP 01-5 to provide a safe working area for the drill rig and supplies. Additional information related to clearing and leveling is provided in the project specific SSHP.

10.0 FIRST AID

A first aid kit should be available and well maintained on each drill site. At least one member of the drill crew, preferably the drilling safety supervisor, should be trained to perform first aid. Training should be provided or sponsored by the American Red cross or a similar organization. For drilling operations, it is particularly important that the individual responsible for first aid should be able to recognize the symptoms and be able to provide first aid for electrical shock, heart attack, stroke, broken bones, eye injury, snake bite, and cuts or abrasions to the skin.

11.0 REFERENCES

ERTSHP-01-5 Site Clearing and Grubbing
ERTSHP-06-1 Utilities
ERTSHP-06-2 Electrical Safety

Earth Resources Technology, Inc. Safety and Health Protocol **ROUGH TERRAIN/ATV USE**			
Effective Date: 05/1/09	**Version: 001**	**SOP#: ERT SHP-05-2**	
Approvals			
Mike Dorman Program Manager [redacted] Signature	4/30/09 Date	George Payne Safety Manager [redacted] Signature	4/13/09 Date

1.0 PURPOSE

The purpose of this procedure is to outline requirements associated with rough terrain and ATV use during ERT field activities/operations.

2.0 SCOPE

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping. Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles. When working on foot, steep inclines and heavy or downed vegetation can hide holes or breaks in the terrain, increasing the risk of slips, trips, and falls. It is neither the intent of this procedure to fully detail all potential rough terrain hazards nor define specific methodology, but rather offer general considerations for the safety of field personnel.

3.0 RECOGNITION AND RISK ASSESSMENT

Rough terrain complicates work activities and increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard and identified in the site-specific Safety and Health Plan (SSHP). Risk assessment is usually accomplished from site history information (i.e., site topography) and onsite surveillance by the Field Safety Officer (FSO).

4.0 HAZARD PREVENTION AND PROTECTION PROGRAMS

4.1 Safety on Foot

Personnel working on rough terrain should maintain a high level of physical conditioning due to increased body stress and exertion.

The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls. Boots should be ankle high or higher to provide additional support and stability.

Work will be completed in adequate natural light or sufficient illumination will be maintained. Site personnel will conduct an initial walkover and the “buddy system” will be implemented. Emergency communications such as a cell phone or two-way radio should be carried at all times.

Personnel should be aware of potential hazards and ensure the availability of first-aid supplies and knowledge of the location of the nearest medical assistance.

4.2 Vehicle Safety

Vehicle drivers and passengers will wear seatbelts at all times. Hazards can be prevented by ensuring regular maintenance is performed on vehicles and all safety features are working. Have brakes and wheel bearings of vehicles used off road or in four wheel drive inspected at increased frequency (suggest inspections at twice the manufacturer's recommended frequency). In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths. Minimize side hill travel. Travel straight up and down hills whenever possible. Passengers will not be allowed when side hill travel is required.

Take into account loads or superstructure of vehicles which raise the center of gravity and increase risk of tipping.

Cross streams, small logs or other passable (there is adequate clearance of the undercarriage) obstructions at right angles.

Four wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for two wheel drive vehicles by the FSO. Use of vehicles off-road will be specifically addressed in the SSHP and personnel operating vehicles will be checked for proficiency.

- Before moving a vehicle in the field, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a vehicle before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Engage the all wheel drive when traveling off highway on hilly terrain.
- Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- After the vehicle/equipment has been moved to a new site, set all brakes and/or locks. When grades are steep, block the wheels.

4.3 Definitions

Class I, All-terrain vehicle (ATV): A motorized off-highway vehicle, 50 in. (127 cm) or less in width, having dry weight of 800 lbs (362.9 kg) or less, and traveling on three or more low pressure tires (10 lbs [4.5 kg] psi or less), with a seat designed to be straddled by the operator.

Class I, Category G, ATV: An ATV intended for general recreational and utility use.

Class I, Category U, ATV: An ATV intended primarily for utility use.

Class II, ATV: A motorized off-highway vehicle with a width which exceeds 50 in. (127 cm) or having a dry weight that exceeds 800 lbs (362.9 kg), traveling on four or more low-profile, low-pressure tires (10 lbs [4.5 kg] psi or less) and having a bench seat.

NOTE: Utility Vehicles are designed to perform off-road utility tasks such as passenger and cargo transportation and are addressed separately below. Examples of utility vehicles include Rangers, Rhino, M-Gators, Gators, and Mules.

Rollover Protective Structure (ROPS). A cab or frame that provides a safe environment for the tractor operator in the event of a rollover.

5.0 ALL TERRAIN VEHICLES (ATVs)

5.1 Qualifications

ATV operators will have completed a nationally recognized accredited ATV training course (such as provided by the Specialty Vehicles Institute of America or in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle.

The operator must pass an operating skills test prior to being allowed to operate an ATV. Proof of certification will be maintained.

5.2 Equipment

All ATVs shall be equipped with:

- An operable audible warning device (horn),
- Headlights (if it will be used during hours of darkness),
- Taillights,
- Brake lights, and
- Mufflers and spark arresters.

All Class II ATVs will be equipped with ROPS and seatbelts

5.3 Operation

Only Class I and Class II ATVs with four or more wheels may be used. Class III ATV's may not be used. The manufacturer's recommended payload will not be exceeded at any time. Gloves and an approved motorcycle helmet with full-face shield or goggles will be worn at all times while operating a Class I ATV. An ATV will not be driven on public roadways except to cross the roadway, and it will only be driven on a public roadway at designated crossing points or with a road guard (no paved road use unless allowed by the manufacturer).

A copy of the operator's manual will be kept on the vehicle and protected from the elements (if practicable). Tires shall be inflated to the pressures recommended by the manufacturer. Passengers are prohibited on Class I ATVs.

6.0 UTILITY VEHICLES

Utility vehicles are defined as specialty Class II ATVs designed to perform off-road utility tasks such as passenger and cargo transportation. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Utility vehicle operators shall be trained and familiar with the use of all controls; understand proper moving, stopping, turning and other operating characteristics of the vehicle. Operators must review all training materials provided by the manufacturer for the specific vehicles, and training should be in accordance with appropriate manufacturer recommendations. A copy of the

operator's manual shall be kept on the vehicle at all times and protected from the elements. At a minimum, training should address:

- basic riding tips from the manufacturer's published literature for each vehicle,
- reading terrain,
- climbing hilly terrain,
- descending a hill,
- traversing a slope,
- riding through water,
- cargo carriers and accessories,
- loading and unloading,
- troubleshooting, and
- proper preventative maintenance, (i.e., oil levels, tire pressure requirements and scheduled maintenance requirements according to the manufacturer's guidelines.).

Utility vehicles shall be equipped with:

- operable audible warning device (horn),
- headlights,
- taillights,
- brake lights,
- seatbelts, and
- ROPS.

Occupancy in utility vehicles is limited to manufacturer designated seating that has built-in seatbelts. Passengers may not ride in the vehicle's back cargo area unless the vehicle is otherwise equipped.

Note: When used for emergency response, medical litters may be placed in the back cargo area but must be secured as described below.

The manufacturer's recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed shall not be exceeded at any time.

Cargo items will be secured as necessary to prevent movement/tipping. All loads over fifty pounds (to include medical litters) must be securely strapped to cargo tie-downs in the rear and to the cargo shelf in the front.

Seatbelts will be worn by operators and passengers of specialty vehicles. Operators and passengers shall wear goggles at all times when a utility vehicle, not equipped with a windshield, is in motion.

Utility vehicles will not normally be driven on public roadways except to cross the roadway, and will only be driven on a public roadway at designated crossing points or with a road guard. Utility vehicles that are allowed to operate outside a controlled work area and/or on public roads will meet the minimum vehicle safety standards in accordance with 49 CFR 571.5, to include ROPs, seatbelts and placement of "Slow Moving Vehicle" emblems where required.

Manufacturer-installed safety equipment will be maintained in working order and used in compliance with the requirement of this regulation and in accordance with manufacturer's recommendations.

7.0 RULES

Observe the following practices to help prevent accidents:

- Do not misuse utility vehicles.
- Reduce speed and exercise extreme caution on slopes or on rough ground.
- Do not overload vehicle and avoid shifting loads. Reduce load when operating over rough or hilly terrain.
- Do not stop or start suddenly when going uphill or downhill. Be especially cautious when changing direction on slopes.
- Stay alert for holes, rocks, and other hidden hazards in the terrain.
- Keep away from drop-offs, ditches, embankments, as well as ponds and other bodies of water.
- The machine could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
- Keep front wheels straight at crest of hill or going over bumps.
- When descending a hill, remove foot from accelerator and apply brakes to reduce speed and maintain control.

7.1 Transport Loads Safely

- Be sure load is evenly distributed.
- Do not load above the load guard.
- Securely anchor all loads in cargo box.
- Reduce cargo box capacity when operating on rough or hilly terrain.
- Use existing trails. Avoid terrain such as dangerous slopes and impassable swamps. Watch carefully for sharp bumps, holes, ruts, or obstacles.
- Look ahead at terrain. Know what is coming and be prepared to react. Be alert for hazards.
- Keep front wheels straight at the crest of a hill or going over bumps.
- Reduce speed according to trail, terrain, and visibility conditions.
- The passenger should always use the hand holds.

7.2 Climbing or Descending a Hill

- Always use the brakes when going down slopes, the utility vehicle can speed up (freewheel)
- Balance and secure loads evenly. Braking could shift the load and affect vehicle stability.
- Sit on the center of the seat and keep both feet within the foot platform.
- Never drive past the limit of visibility. Slow down near the crest of a hill until getting a clear view of the other side.
- If the vehicle stops or loses power going up a hill, lock the park brake to hold the vehicle on slope. Maintain direction of travel and release the brake slowly. Back straight down hill slowly while maintaining control. Do not turn the vehicle sideways as the vehicle is more stable in a straight forward or rearward position.

- If the utility vehicle begins to tip, turn the front wheel downhill to gain control before proceeding.

7.3 Riding Through Water

- Avoid water whenever possible. If the drive belt becomes wet, slippage will occur and the vehicle will lose power.
- Never cross any body of water where the depth may be unknown to the operator. As an operational guideline, deep water is considered anything in excess of 152 mm (6 in.) in depth. Tires may float, making it difficult to maintain control.
- Choose a course within the waterway where both banks have a gradual incline.
- Cross at a point known to be safe.
- Proceed at a slow steady speed to avoid submerged obstacles and slippery rocks.
- Avoid water crossings where the operation of a utility vehicle may cause damage to waterway beds or erode waterway shoreline.

8.0 REFERENCES

ERTSHP-01-1 Motor Vehicle Safety
ERTSHP-01-5 Site Clearing and Grubbing
ERTSHP-03-2 Heat Stress Prevention/Monitoring
ERTSHP-03-3 Cold Stress
ERTSHP-05-3 Earth Moving/Material Handling Equipment

APPENDIX F
MSDS Information

MATERIAL SAETY DATA SHEET
(HYDROCHLORIC ACID)

I. PRODUCT IDENTIFICATION

Chemical Name : Hydrochloric Acid
Trade Name : Technical Grade Muriatic Acid
Synonyms : Muriatic Acid, Spirit of Salts

II. COMPOSITION /INGREDIENTS

Hydrochloric Acid, % : 32 – 34 % by weight
Chemical Formula : HCl
Molecular Weight : 36.46 g/mole
CAS Registry No. : 7647-01-0

III. HAZARDS IDENTIFICATION

THIS PRODUCT MAY BE : corrosive, toxic and a major potential hazard upon contact to skin, eyes and respiratory tract.

TOXICITY ROUTES OF EXPOSURE :

Ingestion can cause severe burns of the mucous membranes of the mouth, esophagus and stomach; pain, nausea and vomiting may also occur.

Inhalation causes irritation of the upper respiratory tract resulting in cough, burning of the throat and choking sensation.

Skin contact to a high concentration of the HCl gas or liquid may cause burns; repeated or prolonged exposures to dilute solutions may cause dermatitis.

Eye contact to high concentration of the acid can cause eye irritation to severe destruction like prolonged or permanent visual impairment, including blindness. These effects occur rapidly affecting all parts of the eye. Mist can also cause irritation to destructive burns.

OVEREXPOSURE :

Can cause serious damage to all body tissues contacted.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Fumes may aggravate eye, skin or respiratory conditions. Effects are usually limited to inflammation and occasionally ulceration of the nose, throat and larynx, if inhaled deeply, pulmonary edema may occur.

IV. FIRST AID MEASURES

SKIN : Remove contaminated clothing and immediately wash skin for a minimum of 15 minutes. Call or see a physician.

EYES : Immediately flush eyes with large amount of water. Occasionally lifting the upper and lower eyelids and rotating the eyeballs. Continue flushing for a minimum of 15 minutes. Call a physician.

INHALATION : Remove to fresh air. If breathing stops, administer artificial respiration. Call a physician.

INGESTION : DO NOT induce vomiting. Rinse or wash mouth with water. If person is conscious, give 2 or more glasses of water. If unconscious, never give anything by oth[illegible].

V. FIRE FIGHTING MEASURES

Autoignition Point : Not Applicable
Flash Point : Not Applicable
Flammability/Explosive limits : Not Applicable
Fire/Explosion Hazards: Emits toxic and choking fumes of hydrogen chloride. Hydrochloric acid is not flammable but flammable and explosive hydrogen gas may be formed on contact with metals.
Fire Prevention/ Extinguishing Media : Not Applicable

VI. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR RELEASE ;

Move people from the area. Move upwind. Avoid contact with acid. Stop leaks if safe to do so. Reposition container if this will reduce or stop leakage. If leak continues, remove leaking container from vehicle or move other materials from vehicle away from container. Absorb spill with sand or earth. If available, cover the spill with excess soda ash, lime or sodium bicarbonate, otherwise, wash away with large amounts of water. Scoop slurry to plastic drums. If leak cannot be safely stopped or if contents cannot be safely transferred to a sound container, contact fire brigade.

VII. HANDLING AND STORAGE

Storage Requirements: Keep container tightly closed.
FOR SMALL VOLUMES : Maybe stored in plastic jugs, carboys, and plastic drums.
FOR LARGE VOLUMES : Store in rubber-lined or epoxy lined steel storage tanks or fiber glass reinforced polyester (FRP) tanks.
Incompatible Materials: Store away from heat
Use Instructions: Wear suitable protective clothing, gloves and eye/face protection. In case of insufficient ventilation, wear suitable respiratory equipment.

MATERIAL SAETY DATA SHEET
(HYDROCHLORIC ACID)

VIII. EROSURE CONTROLS AND PROTECTION

Ventilation: Use only in well-ventilated areas.
Protective Equipment for the eyes and skin :
Splash proof and face shield goggles, disposable latex/ rubber apron, PVC rain suit, rubber boots with pant legs over boots.
Respiratory Protection Requirements: NIOSH/MSHA approved respirator should be used.
Precautionary Hygiene/control measures :
Avoid contact with skin, eyes, and clothing. Do not breathe mist or vapor. Wash thoroughly after handling. Safety showers and eye wash fountains should be available in storage and handling area. Any protective clothing contaminated with hydrochloric acid should be removed immediately and thoroughly laundered before wearing again.

IX PHYSICAL AND CHEMICAL PROPERTIES

STATE	:	fuming liquid
APPEARANCE	:	colorless to slightly yellow
ODOR	:	Irritating
pH	:	Strong acid <1
BOILING POINT	:	85^0 C
FLASH POINT	;	Not determined
SPECIFIC GRAVITY	:	1.150 -1.164
VAPOR PRESSURE	:	20 hPa @ 20^0 C
SOLUBILITY IN	:	WATER: miscible, BASE : miscible

X STABILITY AND REACTIVITY

Stability : Stable under normal handling conditions.
Hazardous polymerization will not occur.
Hazardous decomposition product: HCl gas will not decompose.
Materials and conditions to avoid (incompatibility) are:
Avoid high temperatures. Containers may burst. Corrosive to most metals, concrete, some plastics, some rubber and coatings. Fumes forms droplets which settle and promote corrosion of metals and unprotected equipment. Mixing with strong acids can cause evolution of hydrogen chloride gas. Oxidizing agents will cause the release of toxic chlorine gas. Contact of liquid acid or gas with alkali or active metal may develop enough heat to cause fire in adjacent combustible material.

X TOXICOLOGICAL INFORMATION

Reproductive Effects: No data available
MUTAGENICITY : Not applicable
CANCER INFORMATION : Not applicable

XI. ECOLOGICAL INFORMATION

ECOTOXICITY DATA: High acidity may pose potential hazard to plant and marine life.
WATER-POLLUTION RISK CLASSIFICATION: Slightly water-polluting substance.

XII. DISPOSAL CONSIDERATIONS

Dispose of in accordance with all Government and Local regulations.

XIV. TRANSPORT INFORMATION

Transportation of Dangerous Goods
TDG Classification: Do not ship by air.
DOT Hazard Classification: Class 8 : Corrosive: Group II
DOT Shipping Name : Hydrochloric acid ID: UN 1789

XV. REGULATORY INFORMATION

No data available

XVI OTHER INFORMATION

This MSDS contains information under the sixteen (16) section headings required by ISO 11014 "Safety Data Sheet for Chemical Products".

MSDS

Material Safety Data Sheet

From: Vinquiry, Inc.
7795 Bell Road
Windsor, CA 95492

VINQUIRY

24 hour Emergency Telephone:
Chemtrec: 1-800-424-9300

Outside U.S. and Canada Chemtrec: 202-483-7616

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

Sulfuric Acid 1+3

SULFURIC ACID, 10 - 51%

MSDS Number: SA264 --- *Effective Date: 01/01/01*

1. Product Identification

Synonyms: Oil of vitriol; Babcock acid; sulphuric acid
CAS No.: 7664-93-9
Molecular Weight: 98.07
Chemical Formula: H2SO4 in H2O
Vinquiry Inc. Product Codes: 10-264-0000, 10-264-0118, 10-264-0237, 10-264-0473, 10-264-0946

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sulfuric Acid	7664-93-9	10 - 51%	Yes
Water	7732-18-5	49 - 90%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR CONTACTED WITH SKIN. HARMFUL IF INHALED. AFFECTS TEETH. WATER REACTIVE. CANCER HAZARD. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure.

VINQUIRY INC. SAFETY DATA Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 3 - Severe (Water Reactive)
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:
Inhalation produces damaging effects on the mucous membranes and upper respiratory tract. Symptoms may include irritation of the nose and throat, and labored breathing. May cause lung edema, a medical emergency.
Ingestion:
Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach, leading to death. Can cause sore throat, vomiting, diarrhea. Circulatory collapse with clammy skin, weak and rapid pulse, shallow respirations, and scanty urine may follow ingestion or skin contact. Circulatory shock is often the immediate cause of death.
Skin Contact:
Corrosive. Symptoms of redness, pain, and severe burn can occur. Circulatory collapse with clammy skin, weak and rapid pulse, shallow respirations, and scanty urine may follow skin contact or ingestion. Circulatory shock is often the immediate cause of death.
Eye Contact:
Corrosive. Contact can cause blurred vision, redness, pain and severe tissue burns. Can cause blindness.
Chronic Exposure:
Long-term exposure to mist or vapors may cause damage to teeth. Chronic exposure to mists containing sulfuric acid is a cancer hazard.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
Ingestion:
DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Excess acid on skin can be neutralized with a 2% solution of bicarbonate of soda. Call a physician immediately.
Eye Contact:

Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Call a physician immediately.

5. Fire Fighting Measures

Fire:
Concentrated material is a strong dehydrating agent. Reacts with organic materials and may cause ignition of finely divided materials on contact.
Explosion:
Contact with most metals causes formation of flammable and explosive hydrogen gas.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Do not use water on material. However, water spray may be used to keep fire exposed containers cool.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving this material. Stay away from sealed containers.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

NEUTRASORB(R) or TEAM(R) 'Low Na+' acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, always add the acid to water; never add water to the acid. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Sulfuric Acid:

- OSHA Permissible Exposure Limit (PEL) -
1 mg/m3 (TWA)
- ACGIH Threshold Limit Value (TLV) -
1 mg/m3(TWA), 3 mg/m3 (STEL), A2 - suspected human carcinogen for sulfuric acid contained in strong inorganic acid mists.

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

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an acid gas cartridge and particulate filter (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P particulate filter. For emergencies or instances where the exposure levels are not known, use a full- facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

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

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9. Physical and Chemical Properties

Appearance:
Clear oily liquid.

Odor:
Odorless.

Solubility:
Miscible with water, liberates much heat.

Specific Gravity:
1.40 (50%), 1.07 (10%)

pH:
1 N solution (ca. 5% w/w) = 0.3; 0.1 N solution (ca. 0.5% w/w) = 1.2; 0.01 N solution (ca. 0.05% w/w) = 2.1.

% Volatiles by volume @ 21C (70F):
No information found.

Boiling Point:
ca. 290C (ca. 554F) (decomposes at 340C)

Melting Point:
3C (100%), -32C (93%), -38C (78%), -64C (65%).

Vapor Density (Air=1):
3.4

Vapor Pressure (mm Hg):
1 @ 145.8C (295F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Concentrated solutions react violently with water, spattering and liberating heat.
Hazardous Decomposition Products:
Toxic fumes of oxides of sulfur when heated to decomposition. Will react with water or steam to produce toxic and corrosive fumes. Reacts with carbonates to generate carbon dioxide gas, and with cyanides and sulfides to form poisonous hydrogen cyanide and hydrogen sulfide respectively.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Water, potassium chlorate, potassium perchlorate, potassium permanganate, sodium, lithium, bases, organic material, halogens, metal acetylides, oxides and hydrides, metals (yields hydrogen gas), strong oxidizing and reducing agents and many other reactive substances.
Conditions to Avoid:
Heat, moisture, incompatibles.

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11. Toxicological Information

Toxicological Data:
Oral rat LD50: 2140 mg/kg; inhalation rat LC50: 510 mg/m3/2H; standard Draize, eye rabbit, 250 ug (severe); investigated as a tumorigen, mutagen, reproductive effector.
Carcinogenicity:
Cancer Status: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mists containing sulfuric acid" as a known human carcinogen, (IARC category 1). This classification applies only to mists containing sulfuric acid and not to sulfuric acid or sulfuric acid solutions.

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

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Sulfuric Acid (7664-93-9)	No	No	None
Water (7732-18-5)	No	No	None

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12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition. When released into the air, this material may be removed from the atmosphere to a moderate extent by dry deposition.
Environmental Toxicity:
LC50 Flounder 100 to 330 mg/l/48 hr aerated water/Conditions of bioassay not specified; LC50 Shrimp

80 to 90 mg/l/48 hr aerated water /Conditions of bioassay not specified; LC50 Prawn 42.5 ppm/48 hr salt water /Conditions of bioassay not specified.
This material may be toxic to aquatic life.

13. Disposal Considerations

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

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SULFURIC ACID (WITH NOT MORE THAN 51% ACID)
Hazard Class: 8
UN/NA: UN2796
Packing Group: II
Information reported for product/size: 200L

International (Water, I.M.O.)

Proper Shipping Name: SULPHURIC ACID (WITH NOT MORE THAN 51% ACID)
Hazard Class: 8
UN/NA: UN2796
Packing Group: II
Information reported for product/size: 200L

15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Sulfuric Acid (7664-93-9)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

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

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Sulfuric Acid (7664-93-9)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.

Sulfuric Acid (7664-93-9)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

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

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Sulfuric Acid (7664-93-9)	1000	No	No
Water (7732-18-5)	No	No	No

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

Australian Hazchem Code: 2P
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **2** Other: **Water reactive**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR CONTACTED WITH SKIN. HARMFUL IF INHALED. AFFECTS TEETH. WATER REACTIVE. CANCER HAZARD. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe mist.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Do not contact with water.
Label First Aid:
In all cases call a physician immediately. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before re-use. Excess acid on skin can be neutralized with a 2% bicarbonate of soda solution. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Product Use:
Laboratory Reagent.
Revision Information:

Disclaimer

Vinquiry Inc. provides this information in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to laboratory use of this material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose. Vinquiry Inc. will not be responsible for damages resulting from use or reliance upon this information.

MSDS Number: **N3660** * * * * * *Effective Date:* ***02/15/08*** * * * * * *Supercedes:* ***05/06/05***

MSDS **Material Safety Data Sheet**

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

Mallinckrodt CHEMICALS J.T.Baker

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

National Response in Canada
CANUTEC: 613-996-6666

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

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

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

NITRIC ACID, 50-70%

1. Product Identification

Synonyms: Aqua Fortis; Azotic Acid; Nitric Acid 50%; Nitric Acid 65%; nitric acid 69-70%
CAS No.: 7697-37-2
Molecular Weight: 63.01
Chemical Formula: HNO3
Product Codes:
J.T. Baker: 5371, 5796, 5801, 5826, 5856, 5876, 5896, 9597, 9598, 9600, 9601, 9602, 9603, 9604, 9606, 9607, 9608, 9610, 9616, 9617, 9670
Mallinckrodt: 1409, 2704, 2705, 2716, 6623, H862, H988, H993, H998, V077, V650

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Nitric Acid	7697-37-2	50 - 70%	Yes
Water	7732-18-5	30 - 50%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.

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

Health Rating: 4 - Extreme (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 3 - Severe (Oxidizer)
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Nitric acid is extremely hazardous; it is corrosive, reactive, an oxidizer, and a poison.

Inhalation:
Corrosive! Inhalation of vapors can cause breathing difficulties and lead to pneumonia and pulmonary edema, which may be fatal. Other symptoms may include coughing, choking, and irritation of the nose, throat, and respiratory tract.
Ingestion:
Corrosive! Swallowing nitric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and stain skin a yellow or yellow-brown color.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth and lung damage. Long-term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye disease, or cardiopulmonary diseases may be more susceptible to the effects of this substance.

---

4. First Aid Measures

Immediate first aid treatment reduces the health effects of this substance.
Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

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

---

5. Fire Fighting Measures

Fire:
Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Can react with metals to release flammable hydrogen gas.
Explosion:
Reacts explosively with combustible organic or readily oxidizable materials such as: alcohols, turpentine, charcoal, organic refuse, metal powder, hydrogen sulfide, etc. Reacts with most metals to release hydrogen gas which can form explosive mixtures with air.
Fire Extinguishing Media:
Water spray may be used to keep fire exposed containers cool. Do not get water inside container.
Special Information:
Increases the flammability of combustible, organic and readily oxidizable materials. In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

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7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):
2 ppm (TWA), 4 ppm (STEL)
-ACGIH Threshold Limit Value (TLV):
2 ppm (TWA); 4 ppm (STEL)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Nitric acid is an oxidizer and should not come in contact with cartridges and canisters that contain oxidizable materials, such as activated charcoal. Canister-type respirators using sorbents are ineffective.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Colorless to yellowish liquid.
Odor:
Suffocating, acrid.
Solubility:
Infinitely soluble.
Specific Gravity:
1.41
pH:
1.0 (0.1M solution)
% Volatiles by volume @ 21C (70F):
100 (as water and acid)
Boiling Point:
122C (252F)
Melting Point:
-42C (-44F)
Vapor Density (Air=1):
2-3
Vapor Pressure (mm Hg):
48 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.

Hazardous Decomposition Products:
When heated to decomposition, emits toxic nitrogen oxides fumes and hydrogen nitrate. Will react with water or steam to produce heat and toxic and corrosive fumes.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A dangerously powerful oxidizing agent, concentrated nitric acid is incompatible with most substances, especially strong bases, metallic powders, carbides, hydrogen sulfide, turpentine, and combustible organics.
Conditions to Avoid:
Light and heat.

---

11. Toxicological Information

Nitric acid: Inhalation rat LC50: 244 ppm (NO2)/30M; Investigated as a mutagen, reproductive effector. Oral (human) LDLo: 430 mg/kg.

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

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Nitric Acid (7697-37-2)	No	No	None
Water (7732-18-5)	No	No	None

---

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NITRIC ACID
Hazard Class: 8
UN/NA: UN2031
Packing Group: II
Information reported for product/size: 6.5GL

International (Water, I.M.O.)

Proper Shipping Name: NITRIC ACID (WITH NOT MORE THAN 70% NITRIC ACID)
Hazard Class: 8
UN/NA: UN2031
Packing Group: II
Information reported for product/size: 6.5GL

---

15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Nitric Acid (7697-37-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

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

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Nitric Acid (7697-37-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Nitric Acid (7697-37-2)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

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

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Nitric Acid (7697-37-2)	1000	No	No
Water (7732-18-5)	No	No	No

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

Australian Hazchem Code: 2PE
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0** Other: **Oxidizer**
Label Hazard Warning:
POISON! DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG AND TOOTH DAMAGE.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep from contact with clothing and other combustible materials.
Do not store near combustible materials.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****
Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MATERIAL SAETY DATA SHEET
(CAUSTIC SODA)

I. PRODUCT IDENTIFICATION

Chemical Name : Sodium Hydroxide
Trade Name : Caustic Soda, 50 %
Synonyms : Liquid Caustic Soda, Caustic, Soda Lye, Lye Solution

II. COMPOSITION /INGREDIENTS

Sodium Hydroxide, % : 48 – 52 % by weight
Chemical Formula : NaOH
Molecular Weight : 40 g/mole
CAS Registry No. : 1310-73-2

III. HAZARDS IDENTIFICATION

THIS PRODUCT MAY BE : corrosive, toxic and a major potential hazard upon contact to skin and eyes.
TOXICITY ROUTES OF EXPOSURE : Ingestion can cause severe burning and pain in lips, mouth, tongue, throat and stomach. Death can result from ingestion.
OVEREXPOSURE : Causes burns and scarring. Can cause serious damage to all body tissues contacted.

CANCER INFORMATION : Not applicable
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Chronic eye or skin conditions

IV. FIRST AID MEASURES

SKIN : Remove contaminated clothing and immediately wash skin for a minimum of 15 minutes. Call or see a physician.
EYES : Immediately flush eyes with large amount of water, occasionally lifting the upper and lower eyelids and rotating the eyeballs. Continue flushing for a minimum of 15 minutes. See a physician.
INHALATION : Remove to fresh air. If breathing stops, administer artificial respiration. See a physician.
INGESTION : DO NOT induce vomiting. If person is conscious, give 2 or more glasses of water. If unconscious, never give anything by mouth. See a physician immediately.

V. FIRE FIGHTING MEASURES

Autoignition Point : Not Applicable
Flammability/Explosive limits : Not Applicable
Fire/Explosion Hazards: Contact with strong acids may generate enough heat to ignite combustibles.
Fire Prevention : Not Applicable

VI. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR RELEASE : Completely contain spilled material with dikes, sandbags, etc., and prevent run off into the ground or surface waters or sewers. Recover as much caustic material as possible into containers for disposal. Add water and neutralize remaining caustic material with dilute hydrochloric acid, citric acid or another solid acidic material to a pH between 6 and 9. Collect neutralized caustic with a dry sorbent. Flush residual neutralized waste to the drain with excess water.

VII. HANDLING AND STORAGE

Storage Requirements: Keep container tightly closed.
FOR SMALL VOLUMES : Maybe stored in plastic jugs.
FOR LARGE VOLUMES ; Store in steel storage tanks.
INCOMPATIBLE MATERIALS : Store away from acids. (Refer to Section X)

VIII. EXPOSURE CONTROLS AND PROTECTION

Adequate ventilation needed. TLV C : 2 mg/m^3
Protective Equipment for the eyes and skin :
Goggles, respirator, disposable latex/ rubber apron, PVC rain suit, rubber boots with pant legs over boots.
Precautionary Hygiene/control measures :
Avoid contact with skin, eyes, and clothing.
Do not breathe mist or vapor. Wash thoroughly after handling. Safety showers and eye wash fountains should be available in storage and handling area.

IX PHYSICAL AND CHEMICAL PROPERTIES

STATE	:	liquid
APPEARANCE	:	colorless or slightly turbid
ODOR	:	Irritating
pH	:	Strong base >14
BOILING POINT	:	145 ^{0}C for ~50% NaOH Solution
FLASH POINT	;	Not determined
SPECIFIC GRAVITY	:	1.51-1.54
VAPOR PRESSURE	:	~6.3 mm Hg @ 40^{0}C
SOLUBILITY IN	:	WATER: miscible, ACID : miscible

MATERIAL SAETY DATA SHEET
(CAUSTIC SODA)

X STABILITY AND REACTIVITY

Stable under normal handling conditions. Materials and conditions to avoid (incompatibility) are:

- Chlorinated hydrocarbons, acetaldehyde, acrolein, aluminum, chlorine triflouride, hydroquinone, maleic anhydride, and phosphorous pentoxide.
- Dilution with water evolves large quantity of heat.

Hazardous decomposition & combustion product = none
Hazardous polymerization will not occur.

XI TOXICOLOGICAL INFORMATION

Effects from skin contact – Contact with skin can cause severe burns with deep ulcerations. Contact with solution or mist can cause multiple burns with temporary loss of hair at burn site.

Effects from eye contact – Liquid in the eye can cause severe destruction and blindness. These effects can occur rapidly affecting all parts of the eye. Mist can cause irritation with high concentration causing destructive burns.

XII. ECOLOGICAL INFORMATION

ECOTOXICITY DATA : High basicity may pose potential hazard to plant and marine life.

XIII. DISPOSAL CONSIDERATIONS

Dispose of in accordance with all Government and Local regulations.

XIV. TRANSPORT INFORMATION

Transportation of Dangerous Goods
TDG Classification: Do not ship by air.
DOT Hazard Classification: Class 8 : Corrosive
DOT Shipping Name : Sodium Hydroxide ID: UN1824

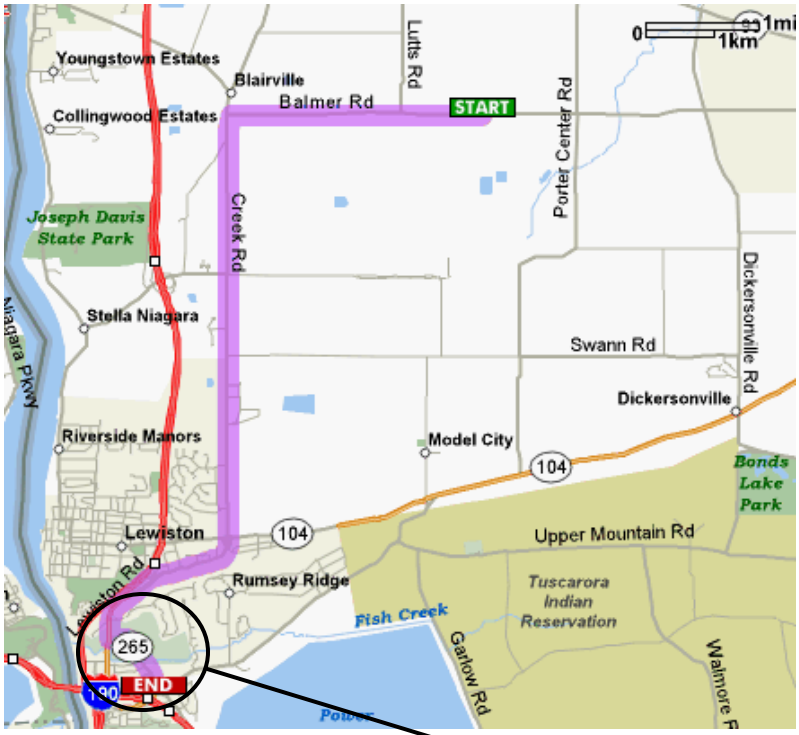
XV. REGULATORY INFORMATION

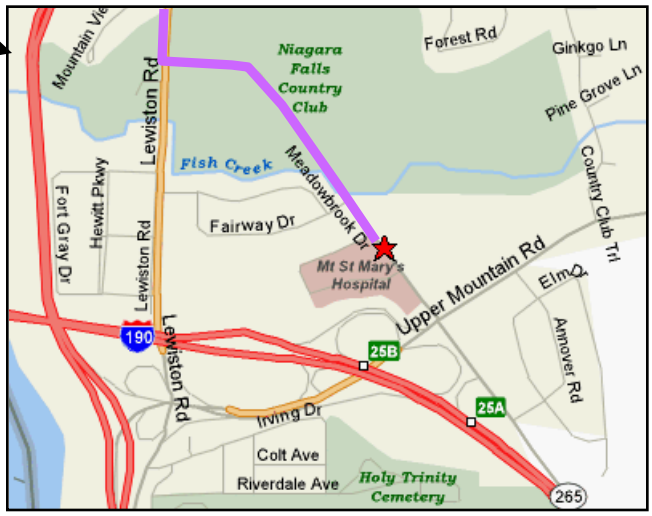
No data available

XVI OTHER INFORMATION

This MSDS contains information under the sixteen (16) section headings written in accordance with the International Standard ISO 11014 *"Safety Data Sheet for Chemical Products".*

APPENDIX G
Emergency Contacts and Emergency Medical Care Locations





Emergency Numbers:	
Police	911
Fire	911
Ambulance	911
Mount St. Mary's Hospital	(716) 297-4800
New York Poison Control	1-800-222-1222

Directions from CWM Main Gate:

Turn left (west) onto Balmer Rd. and proceed for 2 miles to Rt. 18 (Creek Rd.).
Turn left (south) onto Creek Rd. and proceed for approximately 5 miles.
Turn right (southwest) onto Rt. 104 (Lewiston Rd.) and proceed approximately 0.5 mile.
Turn left (southeast) onto Rt. 265 (Military Rd.) and proceed approximately 0.5 miles.
Mount St. Marys Hospital is on the right.

DIRECTIONS AND ROUTE TO NEAREST HOSPITAL

APPENDIX H
USACE Form 3394

(For Safety Staff only)	REPORT NO.	EROC CODE **GO**	**UNITED STATES ARMY CORPS OF ENGINEERS** **ACCIDENT INVESTIGATION REPORT** *(For Use of this Form See Attached Instructions and USACE Suppl to AR 385-40)*	REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT ☐ CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ **OTHER**	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. PERSONAL DATA

a. NAME (Last, First, MI)	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER (Specify)

3. GENERAL INFORMATION

a. DATE OF ACCIDENT *(month/day/year)*	b. TIME OF ACCIDENT *(military time)* hrs	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME: (2) SUBCONTRACTOR

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE
☐ CIVIL WORKS ☐ MILITARY ☐ OTHER (SPECIFY)	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER (SPECIFY)_____	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER (SPECIFY) _____

4. CONSTRUCTION ACTIVITIES ***(Fill in line and corresponding code number in box from list - see instructions)***

a. CONSTRUCTION ACTIVITY	(CODE)	b. TYPE OF CONSTRUCTION EQUIPMENT	(CODE)
	#		#

5. INJURY/ILLNESS INFORMATION ***(Include name on line and corresponding code number in box for items e, f & g - see instructions)***

a. SEVERITY OF ILLNESS/INJURY	(CODE)	b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS REST. DUTY
	#			

e. BODY PART AFFECTED	(CODE)	g. TYPE AND SOURCE OF INJURY/ILLNESS	(CODE)
PRIMARY	#		
_____	(CODE) #	**TYPE**	(CODE) #
f. NATURE OF ILLNESS/INJURY	(CODE)	_____	(CODE)
	#		#

6. PUBLIC FATALITY ***(Fill in line and correspondence code number in box - see instructions)***

a. ACTIVITY AT TIME OF ACCIDENT	(CODE)	b. PERSONAL FLOATATION DEVICE USED?
	#	☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
☐ PICKUP/VAN ☐ AUTOMOBILE ☐ TRUCK ☐ OTHER (Specify)	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER (Specify)	(1) FRONT SEAT (2) REAR SEAT			

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	b. OWNERSHIP	c. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT ***(Fill in line and correspondence code number in box from list - see instructions)***

a. TYPE OF VESSEL/FLOATING PLANT	(CODE)	b. TYPE OF COLLISION/MISHAP	(CODE)
	#		#

10. ACCIDENT DESCRIPTION (Use Additional paper, if necessary)

See attached page.

11. CASUAL FACTORS *(Read Instructions Before Completing)*

a. (Explain YES answers in item 13	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUIMAN FACTORS: Did any human factors such as size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc. contribute to the accident?	☐	☐

a. (CONTINUED)	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors, or physical agents such as noice, radiation, etc. contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc. contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQPT: Did the improper selection, use or maintenance of personal protective eqpt contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was deugs or alcohol factor to the accident?	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES (If yes, attach a copy) ☐ NO

12. TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING	c. DATE OF MOST RECENT FORMAL TRAINING
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	Month/Day/Year

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT: INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)

a. DIRECT CAUSE

See attached page.

b. INDIRECT CAUSE(S)

See attached page.

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S)

DESCRIBE FULLY:

See attached page.

15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14

a. BEGINNING (Month/Day/Year)	b. ANTICIPATED COMPLETION (Month/Day/Year)

c. SIGNATURE AND TITLE OF SUPERVISOR CORPS CONTRACTOR	d. DATE (Month/Day/Year)	e. ORGANIZATION IDENTIFIER (Div,Br,Sect)	f. OFFICE SYMBOL

16. MANAGEMENT REVIEW (1st)

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW

a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL

COMMENTS

COMMANDER SIGNATURE DATE

* U.S. GOVERNMENT PRINTING OFFICE: 1993-0-791-757

10. ACCIDENT DESCRIPTION (Continuation)

13a. DIRECT CAUSE (Continuation)

13b. INDIRECT CAUSES (Continuation)
14. ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) (Continuation)

APPENDIX I
ERT OSHA 300A Reporting Data

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 2009

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	1	0	5
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
1	0
(K)	(L)

Injury and Illness Types

Total number of...	(M)		
(1) Injury	3	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	3

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Establishment information

Your establishment name: Earth Resources Technology, Inc

Street: 10810 Guilford Rd, Suite 105

City: Annapolis Junction State: MD Zip: 20701

Industry description (e.g., Manufacture of motor truck trailers)
IT, Earth Sciences, Geophysics, Environmental, Remote Sensing

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
951 871 874 873 179 495

OR North American Industrial Classification (NAICS), if known (e.g., 336212)

Employment information

Annual average number of employees: 358

Total hours worked by all employees last year: 546211.5

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and comple[redacted]

Company executive

Title

1/29/2010
Date

Phone

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 2008

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types

Total number of…	(M)		
(1) Injury	1	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Establishment information

Your establishment name: Earth Resources Technology, Inc.

Street: 10810 Guilford Road, Suite 105

City: Annapolis Junction State: MD Zip: 20701

Industry description (e.g., Manufacture of motor truck trailers)
IT, Earth Sciences, Geophysics, Environmental, Remote Sensing

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
899 871 874 737

OR North American Industrial Classification (NAICS), if known (e.g., 336212)

Employment information

Annual average number of employees: 279

Total hours worked by all employees last year: 514347

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Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

[redacted]
Company executive

President
Title

301-323-1410
Phone

1/31/2009
Date

OSHA's Form 300A
Summary of Work-Related Injuries and Illnesses

Year 2007

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days of job transfer or restriction	Total number of days away from work
0	0
(K)	(L)

Injury and Illness Types

Total number of...	(M)		
(1) Injury	2	(4) Poisoning	0
(2) Skin Disorder	0	(5) All other illnesses	0
(3) Respiratory Condition	0		

Establishment information

Your establishment name Earth Resources Technology, Inc.

Street 10810 Guilford Road, Suite 105

City Annapolis Junction State MD Zip 20701

Industry description (e.g., Manufacture of motor truck trailers)
IT, Earth Sciences, Geophysics, Environmental, Remoting Sensing

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
899 871 874 737

Employment information

Annual average number of employees 174

Total hours worked by all employees last year 339023

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Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

[redacted]
Company executive

President
Title

301-361-0658
Phone

1/31/2008
Date

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 2006

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types

Total number of… (M)			
(1) Injury	0	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Establishment information

Your establishment name: Earth Resources Technology, Inc.

Street: 10810 Guilford Road, Suite 105

City: Annapolis Junction State: MD Zip: 20701

Industry description (e.g., Manufacture of motor truck trailers)
IT, Earth Science, Geophysics, Environmental, Remote Sensing

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
899 871 874 737

OR North American Industrial Classification (NAICS), if known (e.g., 336212)

Employment information

Annual average number of employees: 100

Total hours worked by all employees last year: 208,000

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Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

[redacted]
Company executive

President
Title

240-554-0161
Phone

1/24/2007
Date

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 2005

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types

Total number of…	(M)		
(1) Injury	0	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Establishment information

Your establishment name: Earth Resources Technology, Inc.

Street: 8106 Stayton Drive

City: Jessup State: MD Zip: 20794

Industry description (e.g., Manufacture of motor truck trailers)
IT, Earth Science, Geophysics, Environmental, Remote Sensing

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
899 871 874 737

OR North American Industrial Classification (NAICS), if known (e.g., 336212)

Employment information

Annual average number of employees: 35

Total hours worked by all employees last year: 48,000

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Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

[redacted]
Company executive

Principal
Title

240-554-0161
Phone

1/24/2006
Date

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

OSHA's Form 300A
Summary of Work-Related Injuries and Illnesses

Year 2004

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days of job transfer or restriction	Total number of days away from work
0	0
(K)	(L)

Injury and Illness Types

Total number of… (M)			
(1) Injury	0	(4) Poisoning	0
(2) Skin Disorder	0	(5) All other illnesses	0
(3) Respiratory Condition	0		

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Establishment information

Your establishment name: Earth Resources Technology, Inc.

Street: 8106 Stayton Drive

City: Jessup State: MD Zip: 20794

Industry description (e.g., Manufacture of motor truck trailers)
IT, Geophysics, and Environmental Consulting Services

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
899 874 871 737

Employment information

Annual average number of employees: 14

Total hours worked by all employees last year: 26550

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

[redacted] Principal (Title)

240-554-0161 (Phone) 1/26/2004 (Date)