STAUFFER MANAGEMENT COMPANY
SKANEATELES FALLS SITE
SKANEATELES FALLS, NEW YORK

FINAL REMEDIAL DESIGN REPORT FOR SITE WIDE SOILS / DEBRIS REMEDIATION

VOLUME 4 OF 5
Health and Safety Plan
(Appendix O)

December 13, 2002

Prepared for:

Stauffer Management Co.
1800 Concord Pike
Wilmington, DE 19850-5438

Prepared by:

18 Computer Drive West
Albany, NY 12205

SPEC Consulting Project #99-004

STAUFFER MANAGEMENT COMPANY, LLC
SITE SPECIFIC
HEALTH AND SAFETY PLAN

STAUFFER MANAGEMENT COMPANY
ENVIRONMENTAL SERVICES AND OPERATIONS
1800 CONCORD PIKE
P.O. BOX 15438
WILMINGTON, DE 19850-5438

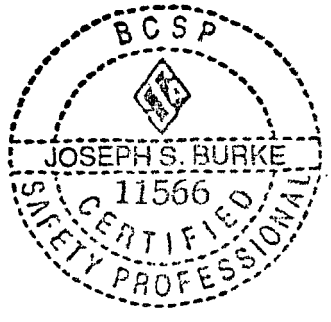
FOR SITE ACTIVITIES AT

STAUFFER MANAGEMENT COMPANY
JORDAN ROAD
SKANEATELES FALLS, NEW YORK
SITE #7-34-010

December 13, 2002
REVISION 4.0

Lee Erickson
Environmental Manager

JOSEPH BURKE, CSP
Health and Safety



Disclaimer: The enclosed Health and Safety Plan (HASP) has been designed for the methods presently contemplated by Stauffer Management Company, LLC (SMC) for execution of the proposed work. Therefore, the HASP may not be appropriate if the work is not performed by or using the methods contemplated by SMC. In addition, as the work is performed, conditions different from those anticipated may be encountered and the HASP may have to be modified. Therefore, SMC only makes representations or warranties as to the adequacy of the HASP for currently anticipated activities and conditions.

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APPENDICES

LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
BP	Breath pipe
BT	Body temperature
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
BWL	Body water loss
BWT	Body water temperature
CET	Certified Environmental Trainer
CFR	Code of Federal Regulations
CGI	Combustible gas indicator
CHMM	Certified Hazardous Materials Manager
CIH	Certified Industrial Hygienist
COHN	Certified Occupational Health Nurse
CNS	Central nervous system
CPR	Cardio-pulmonary resuscitation
CRZ	Contaminant reduction zone
CSE	Confined space entry
CSP	Certified Safety Professional
CZ	Clean zone
DM	Dust-particulate monitor
DOT	Department of Transportation
DT	Detector tube
DZ	Decontamination zone
EKG	Electrocardiogram
EMR	Environmental Medical Resources
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
EZ	Exclusion zone
FID	Flame ionization detector
FP	Flashpoint
GFCI	Ground fault circuit interrupter
GM	Geiger-Mueller
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBV	Hepatitis B-virus
HEPA	High efficiency particulate air purifying

LIST OF ACRONYMS (continued)

HR	Heart rate
HSM	Health and Safety Manager
HVDPE	High vacuum dual-phase extraction
HZ	Hot zone
IDLH	Immediately dangerous to life or health
ILO	International Labor Organization
IP	Ionization potential
IR	Incident Reporting Form
JSA	Job safety analysis
LEL	Lower explosive limit
LO/TO	Lockout / Tagout
mg/M_3	Milligrams per cubic meter
mg/L	Milligrams per liter
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
N	NIDA drug screen
NA	Not available
NBR	Nitrile butyl rubber
NEC	National Electrical Code
NIDA	National Institution on Drug Abuse
NIOSH	National Institute for Occupational Safety and Health
NFPA	National Fire Prevention Association
NL	NIDA-like drug screen
NRR	Noise reduction rating
O_2	Oxygen
O_3	Ozone
OM	Operations Manager
OJT	On the job training
OT	Oral temperature
OSHA	Occupational Safety and Health Administration
PEL	Permissible exposure limit
PID	Photoionization detector
PM	Project Manager
ppb	Parts per billion
PPE	Personal protective equipment

LIST OF ACRONYMS (continued)

ppm	Parts per million
RB	Random Breathalyzer
RBP	Random breath pipe
RCRA	Resource Conservation and Recovery Act of 1976
REL	Recommended exposure limit
RN	Registered Nurse
RR	Relative responses
RT	Random ten panel drug screen
SHSO	Site Health and Safety Officer
SLM	Sound level meter
SOW	Scope of work
SPL	Sound pressure level
STEL	Short-term exposure limit
SZ	Support zone
TLV	Threshold limit value
TP	Stauffer Management Company, LLC ten panel drug screen
TSF	Tons per square foot
TWA	8-hour time-weighted average
UEL	Upper explosive limit
µg/L	Micrograms per liter
UST	Underground storage tank
VP	Vapor pressure
WBGT	Wet bulb globe temperature

SITE EMERGENCY FORM

Contaminants of Concern: Xylenes, Toluic Acid, Toluene, Benzoic Acid, Polychlorinated Biphenols (PCB), and Heavy Metals
Note: Other contaminants have been detected in limited concentrations. These are presented in the tables 1-7 contained in Appendix D with MSDS.

Minimum Level of Protection: Level D.
Hazard Determination: Serious _____ Moderate XXXXX Low _____

Do not endanger your own life. Survey the situation before taking any action.

Stauffer Management Company, LLC Office Telephone, Skaneateles, NY	(315)-685-4878
Site Location Address	4512 Jordan Road, Skaneateles Falls, New York 13153
Telephone Located at	Construction Trailer

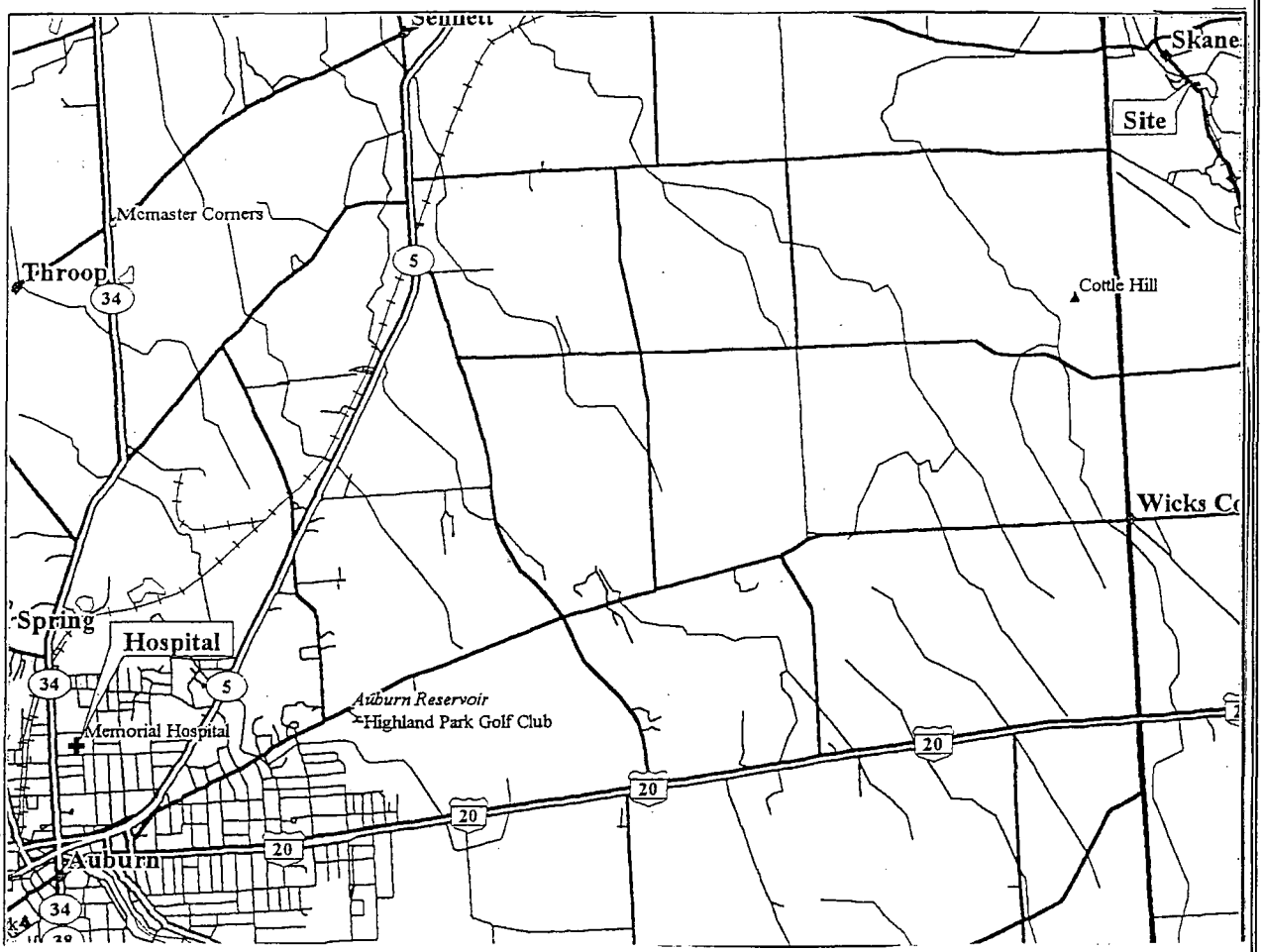
EMERGENCY PHONE NUMBERS **IN THE EVENT OF ANY EMERGENCY CONTACT PROJECT MANAGER (PM) OR HEALTH AND SAFETY REPRESENTATIVE**

Ambulance	911
Fire	911
Police	911 or (800)-342-4357
Poison Control	(800)-252-5695 or 476-4766
Hospital Name	Auburn Memorial Hospital
Hospital Phone Number	(315)-255-7211
Project Manager	Tom Haldas, P.E. (302)-886-4238
Superintendent	Ron Pucci (315)-685-4878
Site Health and Safety Officer	Annmarie Kearns (315) 685-3350
Health and Safety Consultant	Joseph Burke, CSP (518)-438-6809
SMC Main Office Contact	Lee Erickson (302)-886-4254 or (800) 456-3669 Ext 64254
New York State DOH	Henriette Hamel, Regional Toxics Coordinator (315)-426-7627
NYSDEC	David Chiusano, Environmental Engineer 1 (518)-402-9812
NYSDEC	John May, Sanitary Construction Inspector 2 (315)-426-7551
NYSDEC Site Trailer Phone Number	(315) 685-6245
Town Fire Marshall	(315) 685-5222

UTILITY MARKER EMERGENCY TELEPHONE NUMBERS

Utility	Color Code	Telephone Number
Water Gas Electric Telephone/Cable Sewer	Blue Yellow Red Orange Green	Call UFPO- number below
Dig Safe Telephone Number: Underground Facilities Protective Organization @ 1-800-962-7962		

HOSPITAL LOCATION MAP



HOSPITAL DIRECTIONS:

From project site on Jordan Road, head north for about 3 to 4 miles until the intersection of Route 5. Take a left (west) on Rte. 5 and proceed approximately 10 miles into the City of Auburn. Take a right onto Lansing. The hospital is located on 17 Lansing.

HOSPITAL INFORMATION:

Name: Auburn Memorial Hospital
Address: 17 Lansing
City, State Auburn, NY

Phone: Emergency: (315)-255-7211
General: (315)-255-7011

EMERGENCY FIRST AID

FIRST AID

Ingestion:	DO NOT INDUCE VOMITING. Call Poison Control - follow instructions. Administer cardiopulmonary resuscitation (CPR), if necessary. Seek medical attention.
Inhalation:	Remove person from contaminated environment. Administer CPR if necessary. Seek medical attention. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY TRAINED, EQUIPPED AND A STANDBY PERSON IS PRESENT.
Skin Contact:	Brush off dry material; remove wet or contaminated clothing. Flush skin thoroughly with water. Seek medical attention if irritation persists.
Eye Contact:	Flush eyes with water for 15 minutes. Seek medical attention.
Exposure Symptoms:	Headache, dizziness, nausea, drowsiness, irritation of eyes, nose, throat, breathing difficulties.
Contingency Plan:	Report incident to PM and Site Health and Safety Officer (SHSO) after emergency procedures have been implemented.

RESPONDER MUST HAVE A CURRENT CERTIFICATE TO ADMINISTER FIRST AID OR CPR

1. Survey the situation. Do not endanger your own life. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND TRAINED. ENSURE ALL PROTOCOLS ARE FOLLOWED INCLUDING THAT A STANDBY PERSON IS PRESENT.

2. Call 911 (if available) or the fire department **IMMEDIATELY**. Explain the physical injury, chemical exposure, fire, or release.

3. Decontaminate the victim without delaying life-saving procedures.

4. If the victim's condition appears to be non-critical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by trained Emergency Medical Services (EMS) personnel: let the doctor assume the responsibility for determining the severity of the injury. If the condition is obviously serious, EMS must transport the victim.

5. Notify the PM and the SHSO immediately. Complete the Stauffer Management Company, LLC Injury Report and any subcontractor required injury report and notifications within 24 hours.

EMERGENCY FIRST AID PROCEDURES	
To Stop Bleeding	**CPR**
1. Give medical statement.	1. Give medical statement.
2. Assure airway, breathing, and circulation.	2. Arousal: Check for consciousness.
3. Use **DIRECT PRESSURE** over the wound with clean dressing or your hand (use non-permeable gloves). Direct pressure will control most bleeding.	3. Open airway with chin-lift.
4. Bleeding from an artery or several injury sites may require **DIRECT PRESSURE** on a **PRESSURE POINT**. Use pressure points for 30 - 60 seconds to help control severe bleeding.	4. Look. listen, and feel for breathing.
5. Continue primary care and seek medical aid as needed.	5. If breathing is absent, give 2 slow, full rescue breaths.
	6. Check the pulse for 5 to 10 seconds.
	7. If pulse is present, continue rescue breathing: **1 breath every 5 seconds**.
	8. If pulse is absent, initiate CPR; 15 compressions for each two breathes.

1.0 INTRODUCTION

Stauffer Management Company, LLC, Inc. (SMC) is responsible for construction and remediation services at the SMC site located in Skaneateles Falls, New York. The site was formerly used to manufacture a variety of organic chemicals and detergents. The scope of work covered by this Health & Safety Plan (HASP) is for various site activities including site investigation, demolition, construction of structures and facilities, excavation, remediation and offsite disposal of excavated wastes.

The Health and Safety Plan (HASP) is written to assure the well being of all field personnel and the community surrounding the site. Accordingly, SMC project staff and approved SMC subcontractors, visitors, consultants, and representatives of government agencies must follow the policies and procedures established in the HASP. All Stauffer Management Company, LLC personnel, subcontractors, consultants and representatives of government agencies assigned to this project must sign the Agreement and Acknowledgment Form (**Appendix A**) to confirm that they understand and agree to abide by the provisions of the plan. This HASP covers only those activities occurring at the site. Off-site activities associated with trucking, handling, treatment, disposal or landfilling of the soils and wastes offsite is the responsibility of the waste hauler in accordance with their written procedures.

All work will comply with Stauffer Management Company, LLC health and safety guidelines in concurrence with all applicable sections of the Occupational Safety and Health Act (OSHA), 29 Code of Federal Regulations (CFR) 1910 and 1926; specifically 29 CFR 1910.120 and 1926.65 Standards, "Hazardous Waste Operations and Emergency Response," (29 CFR 1910.120) as well as other federal, state, and local regulations that require the development and implementation of a site specific health plan (SSHP). Generation of this document certifies that the workplace has been evaluated for the hazards as described. A hazard assessment has been performed and the adequacy of the personal protective equipment (PPE) selected is hereby certified per 29 CFR 1910.132(d) and is duly noted by the signature(s) and date appearing on the cover page of this document.

This HASP addresses the safety issues associated with this site, which was formerly used to manufacture organic chemicals and detergents and surrounding properties, and involving the following site tasks:

- Site clearing and preparation,
- Waste water treatment plant and construction water treatment plant operation,
- Site sampling and investigation activities,
- Building and structure improvements,
- Building and structure demolition exclusive of asbestos abatement,
- Drum handling and removal,
- Landfill Excavation,
- North Plant Excavation,
- South plant excavation,
- Equipment Decontamination, and
- PCB Interim Remedial Measures,

The minimum level of protection for this site is Level D. For each task, the potential hazards for employee exposure to site contaminants and/or air monitoring results, will determine the level of protection. Modified Level D will be worn during tasks that may have the potential for skin contact with contaminated media (soil or water). An Upgrade to Level C and/or B will occur when the possibility of exposure exists from the onset of site-specific tasks or results of real-time monitoring exceed established action levels listed in **Table 7, Air Monitoring Action Levels**. This HASP must be modified or amended when circumstances or conditions develop that are beyond the scope of this plan.

Any changes in project work scope and/or site conditions as described must be amended in writing by the Site Health and Safety Officer (SHSO) on the HASP Amendment Sheet (**Appendix A**) and approved by the Project CSP.

Table 1, Responsibilities of On-Site Personnel, lists those accountable and responsible for the implementation of the HASP. **Table 2, Hazard Analysis Matrix**, presents an overview of site-specific job tasks and the associated hazards. **Table 3, Contaminants of Concern Profile**, presents an overview of the hazards and control measures associated with the site contaminants of concern. Lastly, **Table 4, Stauffer Management Company, LLC Health and Safety Training Programs**, presents an overview of the Stauffer Management Company, LLC health and safety programs in which all field personnel are required to participate. These include the medical surveillance and comprehensive training programs in accordance with OSHA Hazardous Waste Operations and Emergency Response standard, 29 CFR 1910.120.

1.1 Site Description/Background Information

The North Plant area of the site includes the former Organics Plant area and sanitary sewage leach field.

The soils and shallow groundwater in this area have been characterized by impacts resulting from the presence of significant levels of site chemicals of concern (COC) such as xylene, toluic acid, toluene, and PCBs at relatively high soil concentrations. The former landfill area is southwest of the former plant location and contains a mixture of wastes. This landfill is covered with a clay cap. Soils and wastes in the landfill also contain relatively high concentrations of COCs.

1.2 Project Personnel and Responsibilities

Stauffer Management Company, LLC will oversee and act accordingly during all phases of the project. The following management structure will be instituted for the purpose of successfully and safely completing this project.

Technical Advisors

Tom Haldas, PE
Stauffer Management Company, LLC, Wilmington, DE
Phone (302)-886-4238

Joseph Burke, CSP, PE
SPEC Consulting, LLC, Albany, NY
Phone (518)-438-6809
Cell (800)-901-1429

The specific duties of the technical advisors include:

- Providing technical input into the design and implementation of the site HASP,
- Advising on potential for worker exposure to project hazards along with appropriate methods and/or controls to eliminate site hazards.

A site health and safety officer (SHSO) will be assigned during site activities and shall assist and shall represent the Health and Safety Director/Project CSP. The SHSO shall have the responsibility and authority to implement and enforce the approved HASP, this includes modifying/halting work, and removal of personnel from the site if work conditions change and effect on-site/off-site health and safety matters. The SHSO will serve as the main contact for any on-site emergency situation.

Table 1. Responsibilities of On-Site Personnel

Title	General Description	Responsibilities
Project Manager (PM) Ron Pucci	Reports to upper-level management. Has authority to direct response operations. Assume total control over site activities.	• Prepares and organizes background review of the project, the work plan, the HASP, and the field team. • Obtains permission for site access and coordinates activities with appropriate officials. • Sees that the work plan is properly carried out and on schedule. • Briefs the field personnel on specific assignments. • Together with the SHSO sees that health and safety requirements are met. • Implements a Site Specific Safety Incentive Award Program • Conducts periodic site audit(s) (**Project Safety Management Systems Review**): one report within 45 days of mobilization; follow-up reports every 90 days until job completion. • Implements a Safety Council (20 or more site personnel/>60 days duration) • Implements and reports findings for any near miss, first-aid and OSHA recordable incidents; assuring corrective action are taken. Reviewing and signing the SMC Incident Review Board form for all OSHA Recordable and Chargeable Vehicle Incidents.
SHSO Annmarie Kearns SHSO	Advises the PM on all aspects of health and safety on site. Stops work if site operations threaten worker or public health and safety. Informs health and safety specialist of any changes in conditions or project status.	• Periodically inspects protective clothing and equipment. • Sees that protective clothing and equipment are properly stored and maintained. • Reviews entry and exit at the access control points (eg exclusion zone). • Monitors the workers or designates a contractors' representative to monitor for signs of stress, including heat stress, cold exposure, and fatigue. • Publicizes emergency procedures, evacuation routes, and telephone number of local hospital, poison control center, fire department, and police department during HASP orientation. • Notifies, when necessary, local public emergency officials.

Title	General Description	Responsibilities
Annmarie Kearns (continued)		• Reevaluates site conditions on an on-going basis. Coordinates protective measures including engineering controls, work practices and personal protective equipment. • Audits the completion by the SS the preparation, presentation and documentation of daily safety meetings Checklist • Conducts and prepares reports of daily safety inspections of work processes, site conditions, equipment conditions and submitting to SS. Discussing any necessary corrective actions with the SS and reviewing new procedures. • Initiates revisions of the HASP as necessary for new tasks or modifications of existing operations and submits to the Project CSP for approval. • Oversees the performance of air monitoring as required by the Site Specific Health and Safety Plan. • Assists the PM and SS in incident investigations. • Prepares permits for special operations, e.g., hot work, confined spaces, LOTO etc. • Maintains appropriate safety records. • Audits weekly inspections of all fire extinguishers, supplied air respirators, first-aid kits, and eye washes/emergency showers. • Inform onsite personnel of the elements of the HASP. • Requests contractor personnel to prepare the job safety analysis for unusual • Assists in the coordination of the daily Safety Observer Program. • Assists the contractor with the Site Specific Safety Incentive Award Program (SIAP) with Project Manager and Supervisor
SHSO Annmarie Kearns (continued)	Advises the PM on all aspects of health and safety on site. Stops work if site operations threaten	• Coordinates emergency medical care. • Sets up decontamination lines and decontamination solutions appropriate for the chemical contaminants encountered. • Audits the implementation of site procedures for the decontamination of equipment, personnel, and samples from contaminated areas. • Audits the implementation of site procedures for

Title	General Description	Responsibilities
	worker or public health and safety. Informs health and safety specialist of any changes in site conditions or project status. (continued)	proper disposal of contaminated clothing and materials. • Advises Stauffer Management Company, LLC SHS Manager of potential exposures. • Notifies emergency response personnel in the event of an emergency if required. • Maintains and oversees operation of monitoring equipment and interpretation of data from the monitoring equipment. • Confirm that the Contractor conducts Daily Safety Meeting and documents attendance (Appendix L). • Conducts periodic field health and safety inspections (Appendix K).(Checklist)
Site Superinten-dent (SS) Darwin (Butch) Warner Abscope	Reports to PM. Has authority to direct response operations. Assumes total control over site activities.	• Manages field operations. • Executes the work plan and schedule. • Enforces safety procedures. • Enforces site control. • Documents field activities and sample collection. • Notifies when necessary, local public emergency officials. • Completes Site Specific Job Safety Analyses for all principal tasks. • Implements a Site Specific Safety Incentive Award Program. • Conducts weekly safety inspections of job sites. • Corrects SHSO and PM deficiencies as noted on Project Safety Management Systems Review and safety department audits, within recommended time frames.
Site Superinten-dent (SS) Darwin (Butch) Warner Abscope (continued)	Reports to PM. Has authority to direct response operations. Assumes total control over site activities. (continued)	• Investigates and reports findings for any near miss, first-aid, and/or OSHA recordable incidents; assures corrective actions are taken. • Completes the SMC incident Review form for all OSHA Recordable incidents
Work Team	Reports to	• Safely completes on-site tasks required to fulfill

Title	General Description	Responsibilities
	project supervisor for on-site activities. Work parties must comprise at least two people for high hazard operations.	the work plan. • Complies with the HASP. • Attends and participates in Daily Safety Tailgate Meetings. • Notifies SHSO or supervisor of suspected unsafe conditions. • Reports all safety incidents to SHSO and SS.

Subcontractor Health and Safety

If a subcontractor of this project, chooses to adopt Stauffer Management Company, LLC Health and Safety Plan, the subcontractor shall acknowledge this with signatures of all personnel being utilized on site, in the agreement and acknowledgment section (**Appendix A)** accepting the plan. All signatures must be obtained prior to the subcontractor's commencing work activities and the plan will be reviewed in full on site with a Stauffer Management Company, LLC representative. The subcontractor must make an independent determination of the applicability of this HASP to his/her work and must comply with all applicable statutes, federal, state and local regulations and codes. Stauffer Management Company, LLC does not warrant that this plan will be sufficient for the subcontractors work.

If the subcontractor adopts this HASP, this HASP becomes their responsibility to implement as it pertains to their work. The subcontractor assumes all liabilities for such adoption and implementation. All subcontractor personnel will read and sign the Stauffer Management Company, LLC HASP.

If a subcontractor chooses to develop its own HASP, the subcontractor will provide a copy for SMC to review within five (5) days of award of this subcontract or at least 5 days prior to commencement of work activities at the site, which ever occurs last. The subcontractor will insure his/her HASP will be in compliance with the minimum requirements presented in this HASP, and all appropriate federal state and local regulations.

Prior to starting of work on this project all subcontractors personnel will receive the site orientation from the SS or SSO. All subcontractor safety related incidents including near misses, shall be reported to the Site Safety Officer and SMC Project Manager immediately.

1.3 Hazard Analysis, Site-Specific Health and Safety Program Requirements

Site-specific job tasks and the associated hazards are identified in **Table 2, Hazard Analysis Matrix**. For each task involved with the project are the type of hazards that may be encountered. Utilize the hazard analysis table as a guide for implementing specific health and safety programs. **Table 5, Potential Hazards and Controls** provides additional guidelines to follow when conducting the tasks involved with this project.

Table 2. Hazard Analysis Matrix

Hazards	Tasks						
	WWTP Oper..	Site Constr. Activities	Drum Removal	Excav.	Demolition	Deconta-mination	Sampling
Contaminants of Concern Exposure		X	X	X	X	X	X
OSHA Chemicals Exposure	X	X	X	X	X	X	X
Mechanical Equipment/ Construction	X	X	X	X	X	X	X
Electrical	X				X		X
Fire and Explosion	X	X	X	X	X	X	X
Heat/Cold Stress	X	X	X	X	X	X	X
Vehicular Traffic	X	X	X	X	X	X	X
Pedestrian Traffic	X	X	X	X	X	X	X
Overhead Utilities	X	X	X	X	X		X
Underground Utilities		X		X	X		X
Noise	X	X	X	X	X	X	X
Confined Space Entry (CSE)	X				X	X	X
Poisonous Plants	X	X	X	X	X		X
Snakes/Spiders Insects	X	X	X	X	X		X

Site-Specific Health and Safety Program Requirements

Based upon the site-specific hazard analysis, the following programs must be implemented and the accompanying forms, found in the appendices of the HASP, completed. The completed forms can then be attached to this document.

SITE-SPECIFIC PROGRAM	HASP APPENDIX
Site-Specific Lockout/Tagout (LO/TO) Procedures	C
Air Monitoring Program	E
Noise Monitoring Form	E
Excavation and Trenching	F
Confined Space Entry (CSE)	G
Hot Work Permit	H
Heat/Cold Stress Procedure	I
Daily Safety Meeting	L

1.4 Contaminants of Concern Profile

Based upon information received from the background information, site history, and site characterization is a summary profile of the hazards and control measures to follow for the contaminants of concern. Summarized in **Table 3, Contaminants of Concern Profile**, the profile provides an overview of the hazards associated with potential exposure to the contaminants of concern and the preventative measures. For more detailed and specific information, always refer to the Material Safety Data Sheet (MSDS) or equivalent information for the compound located in Appendix D.

Table 3. Contaminants of Concern Profile

Contaminant of Concern	Profile of Hazards and Control Measures to Follow
Benzene, Toluene, Ethylbenzene & Xylenes, and PCBs	Benzene is a human carcinogen (Leukemia and bone marrow damage). All are constituents of gasoline and are very flammable. The target organs include the central nervous system, eyes, GI tract, liver, kidneys and skin. See MSDS in **Appendix D** for more detailed information and control measures.
Toluic Acid	Moderately toxic by ingestion, subcutaneous, and intraperitoneal routes. An experimental teratogen. See **Appendix D** for additional information.
Aroclor 1242, Aroclor 1254, Chlorodiphyenyl, Polychlorinated biphenyl (PCB's)	Suspected human carcinogen. Anticipated at the site in low levels measured in PPM. Target organs include skin, eyes, liver and fatty tissues of body if ingested.
Benzoic Acid	Irritating to eyes, skin and respiratory tract. May be an allergen. Minimize dust generation. See MSDS in **Appendix D**.
1,1-Dichloroethane, 1,2-Dichloroethylene, Ethylene Dichloride, Methylene Chloride, Perchloroethylene, Trichloroethylene & Vinyl Chloride	Compounds have been detected in a limited number of water samples. All are volatile chlorinated hydrocarbons and generally found to damage the liver, kidneys, CNS, and other internal organs. Some are carcinogens such as Vinyl Chloride. See MSDS in **Appendix D** for more detailed information on health hazards and control measures.

Table 4. Stauffer Management Company, LLC Health and Safety Training Programs

Training Program	Requirement/Action
• Training requirements and programs comply with the OSHA Hazardous Waste Operations and Emergency Response standard, 29 CFR 1910.120.	• Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction. • Field personnel must complete a minimum of 3 days supervised field instruction to be completed by the contractors representative. (On the Job Training) • Field personnel assigned to the site will also receive 8 hours of refresher training each year. • On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations receive an additional 8 hours of supervisory training.(Find out who has had it from Jack • Field personnel assigned to site may also receive first aid/Cardio-pulmonary resuscitation (CPR) and blood borne pathogen training. • Construction personnel and subcontractors assigned to site must participate in "Daily Safety Meeting" and document their attendance.
• Competent person training for excavation/trenching operations meet requirements outlined in 29 CFR 1926, Subpart P.	• An on-site supervisor directly responsible for employees engaged in excavation/trenching operations receives OSHA "Competent Person Training ."
• Authorized supervisor, attendant, and entrant training for permit required confined space entry meet requirements outlined in 29 CFR 1910.146.	• Field personnel assigned to site who must supervise, watch over and/or enter permit required confined spaces receive "OSHA Confined Space Entry" training.

Training Program	Requirement/Action
• Fall protection training that meets requirements in 29 CFR 1926.503	• Field personnel assigned to site who work in areas with fall hazards six feet or greater receive "Fall Protection/Prevention" training.

2.0 HAZARD IDENTIFICATION AND CONTROL

Based upon the hazard analysis of the tasks that will be conducted for the project, **Table 5, Potential Hazards and Control**, lists the general procedures and practices to follow to prevent injury or illness. Appropriate training for specific hazards must be completed by field personnel prior to initiating work activities. Precautions must be taken to prevent injuries and exposures to the following potential hazards. For additional information, refer to the Stauffer Management Company, LLC Health and Safety Policies and Procedures, or consult with your health and safety professional.

Table 5. Potential Hazards and Control

Potential Hazard	Control
Exposure to Chemical Products (See Appendix D: MSDS Definitions and MSDSs)	1. Stand up-wind of chemical products whenever possible. 2. Minimize direct contact and contact time with contaminated media to prevent exposure. 3. Avoid walking through discolored areas, puddles, leaning on drums, or contacting anything that is likely to be contaminated, unless wearing the appropriate PPE. 4. Do not eat, drink, smoke and/or apply cosmetics in the hot or warm zones. 5. Wear appropriate PPE when it is required to come in contact with contaminated media or surfaces. 6. Modified Level D PPE must be worn as a minimum when on project site. 7. > 5 ppm organic vapors, sustained for 5 minutes, in breathing zone requires upgrade from Modified Level D to Level C. 8. If unknown materials are encountered, call the HSM.
Exposure to OSHA Defined Hazardous Materials (See Appendix D: MSDS Definitions and MSDSs)	1. All chemicals brought on-site by Stauffer Management Company, LLC personnel or their subcontractors, such as pipe glues, solvents, reagents, decontamination solutions, or any other OSHA defined hazardous material must be adequately labeled and the MSDSs available on-site. 2. MSDSs brought on-site can be attached in **Appendix D** or in the MSDS binder that is kept in the company vehicle. 3. Training on OSHA defined hazardous materials must be completed and documented. Use the Daily Safety Meeting Form in **Appendix L** to record training attendance.

Potential Hazard	Control
Erecting a Temporary Structure or Working From an Aerial Lift	1. Wear leather gloves while attaching support members to protect against pinching injuries. 2. While working from elevated levels greater than 6 feet, ensure that all employees have 100% fall protection with full body harnesses and guardrails. 3. Do not stand under loads that are being raised or lowered with cranes or aerial lifts. 4. Conduct pre-operational inspection of aerial lifts to include: tire air pressure, hydraulic fuel level and pressure check, make sure pivot pins are secured, check hoses for worn areas, check for cracks or deviations in welded parts, the safety limit switch should work freely, security of the guardrail system on the platform, check both ground and platform control functions, raise and lower each boom system separately, listen for any unusual noises, vibrations, or uneven operations. 5. Maintain a safe distance of 10 feet from unguarded overhead power lines. 6. Conduct site evaluation to determine proper positioning for the unit. Make sure surface is level. Cordon off holes, drop-offs, bumps or weak ground surfaces. 7. Never climb a raised platform or stand on the mid-rail or top-rail. 8. Tools should always be hung or put into a belt whenever possible.
Exposure to Surface/ Subsurface Airborne Dust	1. Stand up-wind whenever intrusive activities occur and generate visible signs of airborne dust. 2. Monitor air for airborne soil dust (surface or subsurface soil) with portable aerosol dust-direct reading instrument. 3. Sustained readings >2.5 mg/M^3 in breathing zone requires upgrade to Level C. 4. > 50 mg/M^3 in breathing zone requires upgrade to Level B. Approval for Level B must first be approved by HSM. 5. Utilize wet methods (spraying ground, wet drilling, etc.) when visible signs of airborne dust are generated.
Vehicular Traffic	1. Wear traffic safety vest or other appropriate PPE when vehicle hazard exists. 2. Use cones, flags, barricades, and caution tape to define work area. 3. Use vehicle to block work area. 4. Engage police detail for high-traffic situations. 5. Refer to **Section 5.3, Site Control: Work Zones,** for specific details and guidance.

Potential Hazard	Control
Fall Protection	1. Assess the work to determine if there is a potential for falling. 2. Make a determination of the distance of the potential fall. 3. A fall protection system must be used for potential falls greater than 6 feet. 4. Consult a competent person, such as the HSM, regarding the applicability requiring fall protection and what type of protection systems should be used. 5. Inspect all fall protection equipment and anchoring points prior to their use. 6. Ensure Fall Protection training for applicable employees is completed prior to initiating work activities.
Confined Space Entry (CSE)	1. Ensure personnel assigned meet CSE training requirements. 2. Complete CSE permit. Post sign. 3. Ensure pre-entry CSE safety meeting is conducted. 4. Remove vault cover using proper lifting techniques. 5. Promote natural ventilation by opening the space to fresh air, if needed utilize mechanical purge ventilation. 6. Conduct remote air monitoring prior to entry. 7. Attendant can act as CSE Supervisor and must be present at CSE entry point all times when entrant is in CSE. 8. Access work for fall hazards and ensure provisions for non-entry rescue have been met. 9. Enter only when safe; conduct continuous air monitoring.
Inclement Weather	1. Stop outdoor work during electrical storms and other extreme weather conditions such as extreme heat or cold temperatures. 2. Take cover indoors or in vehicle. 3. Listen to local forecasts for warnings about specific weather hazards such as tornados, hurricanes, and flash floods.
Utility Lines Contact	1. Contact Dig Safe to have utility lines marked prior to excavation/trenching 2. Refer to site drawings or customer interviews if on private property for utility locations. 3. Hand dig 3 to 5 feet down and 5 feet each side of utility marker to avoid breaking utility lines.

Potential Hazard	Control
Noise	1. Wear hearing protection when equipment such as a drill rig, jackhammer, cut saw, air compressor, blower or other heavy equipment is operating on the site. 2. Wear hearing protection whenever you need to raise your voice above normal conversational speech due to a loud noise source; this much noise indicates the need for protection. 3. Hearing protection is required when measured sound pressure levels (SPL) exceed 85 dB(A) where employees stand or conduct work. 4. Conduct noise monitoring of suspected high noise operations at the beginning of the workday or start up of new operations to verify noise control/hearing protection requirements. 5. Refer to **Section 3.2, Noise Monitoring** for guidance.
Electric Shock	1. Maintain appropriate distance from overhead utilities **10-foot minimum clearance from power lines required; if within ten feet it has to be shielded.** 2. Use ground-fault circuit interrupters as required. 3. Perform LO/TO procedures (**Appendix C**). 4. Use three-pronged plugs and extension cords. 5. Contact your local underground utility-locating service. 6. Follow code requirements for electrical installations in hazardous locations.
Physical Injury	1. Wear hard hats and safety glasses when on-site. 2. Maintain visual contact with the equipment operator and wear orange safety vest when heavy equipment is used on-site. 3. Avoid loose-fitting clothing (driller and driller's helper). 4. Prevent slips, trips, and falls; keep work area uncluttered. 5. Keep your hands away from moving parts (i.e., augers). 6. Test the emergency shut-off switch on the drill rig daily.
Back Injury	1. Use a mechanical lifting device or a lifting aid where appropriate. 2. If you must lift, plan the lift before doing it. 3. Check your route for clearance. 4. Bend at the knees and use leg muscles when lifting. 5. Use the buddy system when lifting heavy or awkward objects. 6. Do not twist or jerk your body while lifting.
Heat Stress	1. Increase water intake while working. 2. Minimize and/or avoid alcohol intake the night before working in heat stress situations. 3. Increase number of rest breaks and/or rotate workers in shorter work shifts; take breaks in shaded areas. 4. Watch for signs and symptoms of heat exhaustion and fatigue. 5. Plan work for early morning or evening during hot months.

Potential Hazard	Control
	6. Use ice vests when necessary. 7. Rest in cool, dry areas. 8. In the event of heat stroke, bring the victim to a cool environment and initiate first aid procedures. Refer to **Appendix I**.
Cold Stress	1. Take breaks in heated shelters when working in extremely cold temperatures. 2. Remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration, upon entering the shelter. 3 Be aware of cold stress symptoms such as shivering, numbness in the extremities, and sluggishness. 4. Drink warm liquids to reduce the susceptibility to cold stress. Refer to **Appendix I**.
High Crime Areas	1. Be aware of surroundings. 2. Use the buddy system. 3. Request police detail when appropriate.
Insects	1. Tuck pants into socks. 2. Wear long sleeves. 3. Use insect repellent. 4. Avoid contact by always looking ahead to where walking, standing, sitting, leaning, grabbing, lifting or reaching-in-to. 5. Check for signs of insect/spider bites, such as redness, swelling, and flu-like symptoms. 6. Use buddy system to check each other for signs of insect/spider bites. 7. Remove ticks immediately with fine tipped tweezers by grasping the tick as close to your skin as possible and gently pulling straight out. Do not squeeze the tick's body as this may inject fluids into you. Wash the bite area of skin and apply antiseptic.
Poisonous Plants (Such as Poison Ivy, Oak or Sumac)	1. Don't enter areas infested with poisonous plants. 2. Immediately wash any areas that come into contact with poisonous plants. 3. Protect exposed skin area with gloves and Tyvek™ suits. 4. Be aware that the oil from the plant can be carried on boots, clothes and equipment. Always protect skin from contact. 5. If you have known or suspected allergies, carry an Epi-Pen at all times and notify co-workers that you are allergic.

Potential Hazard	Control
Poisonous Snakes	1. Avoid walking in areas where snake may nest or hide. Always look ahead to where walking for signs of snakes. 2. Use extreme caution when moving or lifting objects, which could be used by snakes as cover. 3. Never reach under or behind objects or into other areas where snakes may hide. 4. Wear sturdy leather boots.
Ladders	1. Assess work areas for fall hazards. 2. Make sure ladder rungs are sturdy and free of cracks. 3. Use ladders with secure safety feet. 4. Pitch ladders at a 4:1 ratio. 5. Secure ladder at the top or have another person at the bottom to help stabilize it. 6. Do not use ladders for access to air stripper towers. 7. Use non-conductive ladders near electrical wires.
Fire Control	1. Smoke only in designated areas. 2. Keep flammable liquids in closed containers. 3. Keep site clean; avoid accumulating combustible debris such as paper. 4. Follow Hot Work Safety Procedures when welding or performing other activities requiring an open flame. **(Appendix H)** 5. Isolate flammable and combustible materials from ignition sources. 6. Ensure fire safety integrity of equipment installations.
Static Electricity	1. Do not create static discharge in flammable atmospheres. 2. Electrically bond and ground pumps transfer vessels, tanks, drums, bailers and probes, when moving liquids. 3. Electrically bond and ground vacuum trucks and the tanks they are emptying. 4. Do not splash fill containers with flammable liquids.
Rapid Response	1. Ensure emergency response activities have been completed prior to beginning rapid response field activities. 2. Conduct hazard assessment of project site and communicate findings through a "Daily Safety Meeting" to all Stauffer Management Company, LLC employees and subcontractors prior to beginning rapid response field activities. 3. Communicate applicable Stauffer Management Company, LLC health and safety programs to other contractors on site that may be impacted and coordinate field activities with them.

Potential Hazard	Control
Welding, Cutting, Brazing	1. Conduct fire safety evaluation. 2. Complete Hot Work Permit (**Appendix H**). 3. Ensure flammable materials are protected from hot work, sources of ignition. 4. Ensure fire watch/fire extinguisher is on standby by hot work location.
Cleaning Equipment	1. Wear appropriate PPE to avoid skin and eye contact with isopropyl alcohol, alconox, or other cleaning materials. 2. Stand upwind to minimize any potential inhalation exposure. 3. Dispose of spent cleaning solutions and rinses accordingly.
**First aid kit, blood borne pathogen kit, emergency eye wash/shower station, fire extinguisher and Absorbent pads will be located on-site either in the decontamination zone, construction trailer or in the Stauffer Management Company, LLC company vehicle.	

3.0 AIR MONITORING AND NOISE MONITORING

3.1 Air Monitoring

The following section is a description of air monitoring activities that are applied towards on-site workers and activities. A Community Air Monitoring Plan is included with **Appendix O**.

Air monitoring must be performed on all sites in accordance with Stauffer Management Company, LLC practices. Organic vapor and/or concentrations are monitored in the field with a FID or PID with a 10.2 eV (electron-volts) lamp. Flammable vapor and/or gas are monitored with an oxygen/combustion meter (O_2/LEL) real-time instrument. Airborne dust/particulate concentrations are measured with a real-time aerosol monitor (using a scattered light photometric sensing cell) when there are visible signs of airborne dust. Benzene and Vinyl Chloride Detector Tube grab sampling is conducted when results of non-specific real-time monitor action levels are reached and when their presence is suspected. Site sampling data indicates these compounds present in some groundwater. Both area and personal air monitoring readings are to be taken to characterize site activities. Air monitoring results must be documented on the Air Monitoring Form (**Appendix E**).

ATTENTION:

SITE PERSONNEL ASSIGNED RESPONSIBILITY TO CONDUCT AIR MONITORING MUST HAVE BEEN TRAINED IN AIR MONITORING EQUIPMENT OPERATION AND CALIBRATION PRIOR TO SMCS USE.

Calibration and maintenance of air monitoring equipment must follow manufacture specifications and must be documented on appropriate forms. Recalibration and adjustment of air monitoring equipment must be completed when site conditions and equipment operation reveal the need or at a minimum daily. Record all air monitoring equipment calibration information on form in **Appendix E**.

Air monitoring action levels (**Table 7, Air Monitoring Action Levels at Exclusion Zone Work Areas**) have been developed by the Stauffer Management Company, LLC Project CSP, to indicate the chemical concentrations in the breathing zone that require an upgrade in level of PPE. Action levels are typically set at either one-half the OSHA Permissible Exposure Limit (PEL), National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (REL), or the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV). Rationale for establishing action levels is based upon the data available that characterizes contaminants of concern in soil or water. Calculation for estimating action levels is then completed using the principles of Henry's Law (volatiles in water), fugacity

(volatiles in soil), and proportionality (particulates in soil). When analytical data is not available, a qualitative assessment is conducted based on knowing the contaminants of concern and then setting action levels based on the compound(s) with the lowest OSHA PEL, NIOSH REL or ACGIH TLV, and following an air monitoring schedule that will minimize any potential for over exposure. At no time will action levels be relaxed by the SHSO without approval from health and safety professionals and New York State Department of Health.

All workers on-site must have been properly fitted with PPE (i.e., respirators) and have been trained in their use (i.e., donning and doffing). Air monitoring measurements will be taken in the breathing zone of the worker most likely to have the highest exposure. Transient peaks will not automatically trigger action. Action will be taken when levels are consistently exceeded in a 5-minute period. Similarly, if chemical odors are detected that are a nuisance, bothersome, or irritating, an upgrade in respiratory protection can provide an extra level of comfort or protection when conducting site activities. Guidelines for frequency of air monitoring are presented in **Table 6, Air Monitoring Frequency Guidelines**. Job tasks that require air monitoring, the applicable action levels that apply for those tasks, and the frequency of air monitoring are described in **Table 6** and **Table 7** respectively.

Engineering controls such as the venturi air mover (supplied by compressed air) to exhaust or dilute solvent vapors emanating from monitoring wells or when conducting intrusive activities can be utilized as a means to downgrade PPE requirements (Level B to C, Level C to D).

Engineering controls such as foam suppressants, surfactants, temporary covers (i.e., tarps), or other appropriate engineering controls and reducing the limits of excavation will be implemented to reduce and control the emission of VOCs during excavation activities.

Table 6. Air Monitoring Frequency Guidelines

Conduct periodic monitoring when:

1. It is possible that an immediately dangerous to life or health (IDLH) condition or a flammable atmosphere has developed, or

2. There is an indication that exposures may have risen over established action levels, permissible exposure limits or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with these situations:

   - **Change in site area** - work begins on a different section of the site.
   - **Change in contaminants** - handling contaminants other than those first identified.
   - **Visible signs of particulate exposure from intrusive activities such as drilling/boring and excavation.**
   - **Perceptible chemical odors or symptoms of exposure.**
   - **Change in on-site activity** - one operation ends and another begins.
   - **Handling leaking drums or containers**.
   - **Working with obvious liquid contamination** (e.g., a spill or lagoon).

Conduct air monitoring when the possibility of volatilization exists (such as with a new monitoring well or a well containing known product). **(Appendix O)**

Table 7. Air Monitoring Action Levels at Exclusion Zone Work Areas

Instrument*	Function	Measurement	Action
FID or PID (10.2eV lamp) - Measures Total Organic Vapors			
	Conduct air monitoring for volatile organic compounds during activities where contaminated media are present.	0 -5 ppm	Modified Level D required. Check for benzene and vinyl chloride with detector tubes. If benzene or vinyl chloride detected >0.5 ppm, upgrade to Level C PPE; determine source of emission and conduct integrated air sampling.
		>5 - 50 ppm	Upgrade to Level C.
		>50 - 1,000 ppm	Upgrade to Level B and conduct perimeter monitoring. Coordinate with PM and HSM for guidance.
		>1,000 ppm	Stop work required. Leave work area, contact PM and CSP for guidance.
Benzene and Vinyl Chloride Detector Tubes (Based on existing analytical data, limited anticipation in groundwater)			
	Conduct grab sampling for benzene and vinyl chloride when sustained PID/FID readings are detected in the breathing zone; if results exceed 0.5 ppm conduct integrated sampling to determine 8hr TWA.	0 - 0.5 ppm	Modified Level D required.
		>0.5 – 25 ppm	Upgrade to Level C required.
		>25 - 1,000 ppm	Upgrade to Level B required and conduct perimeter monitoring.
		>1,000 ppm	Stop work required. Contact PM and CSP for guidance.
Cyanide Detector Tubes (Based on existing analytical data, not anticipated to be present)			
	Conduct air monitoring when intrusive activities such as drilling, boring or excavation could release cyanide gas.	0 - 2.5 mg/m^3	Modified Level D required
		>2.5 - 12 mg/m^3	Upgrade to Level C required and conduct perimeter monitoring.
		>12 mg/m^3	Stop work required. Leave work area, contact PM and HSM for guidance.
Dust/Particulate Monitor			
	Conduct air monitoring for dust particulate when site activities may cause dust emissions, such as excavation, soil handling vehicle/heavy equipment operation.	0 - 2.5 mg/m^3	Modified Level D required.
		2.5 - 25 mg/m^3	Upgrade to Level C.
		>25 mg/M^3	Stop work. Contact PM and CSP for guidance.
Oxygen/Combustimeter (O_2/LEL) Measures oxygen level (O_2) and lower explosive limit (LEL)			

Instrument*	Function	Measurement	Action
Conduct air monitoring for O_2/LEL when conditions exist where flammable vapors/gases and/or oxygen deficiency or enrichment can occur. A decreased O_2 reading of 0.1% (e.g., 20.9% to 20.8%) actually represents a change in the total air envelope of approximately 0.5% or 5,000 ppm. This represents little hazard if the displacing gas is inert; if the displacing gas is toxic/flammable/reactive, such a concentration represents a real hazard. Verify reasons for O_2 depletion by conducting air monitoring with instruments that can measure suspected contaminants (PID/FID) or that can confirm presence of contaminants (detector tubes or chemical specific real-time air monitors).		O_2 = 20.9 %	Acceptable
		O_2 >19.5 - 20.8%	Verify reasons for O_2 depletion with appropriate air monitoring instrumentation before work continues. Utilize appropriate engineering controls/PPE once atmospheric contaminants have been verified.
		O_2 >20.9 % - 22 %	Verify reasons for O_2 enrichment before entering area. Utilize appropriate engineering controls/PPE to control O_2 enriched atmosphere.
		O_2 >22 %	**Leave area immediately;** this atmosphere is extremely flammable. Notify PM or CSP for guidance.
		O_2 <19.5%	**Leave area immediately;** this atmosphere is oxygen deficient. Verify reasons for O_2 depletion with appropriate air monitoring instrumentation before work continues. Utilize appropriate engineering controls/PPE once atmospheric contaminants have been verified.
		LEL <10%	Acceptable conditions. Continue normal activity.
		LEL >10%	**Leave area immediately.** Contact PM or CIH for guidance on venting and other safety measures.

*Note: Instruments must be calibrated according to manufacturer's recommendations.

Table 8. Hazard Summary

AIR MONITORING SUMMARY		
Job Task	Instruments	Frequency
Site Clearing and Preparation	DM[5] SLM[6]	No monitoring for organic contaminants expected to be required. If noise levels from machinery interfere with hearing, or if dusty conditions are encountered, monitoring for noise levels and dust levels should be conducted by the SHSO.
Waste Water Treatment Plant and Assoc. Storage Tanks Plant Maintenance and Temporary storm water system construction	DM[5] PID	Start up of work, then 30 minutes, or continuously based on sampling results and sample location. Continuously if action level is exceeded. Depending on levels recorded, the SHSO may decrease the frequency of monitoring, if levels are well below action levels in the HASP.
Sampling Activities	DM[5] PID	Start up of work, then 30 minutes, or continuously based on sampling results and sample location. Continuously if action level is exceeded. Depending on levels recorded, the SHSO may decrease the frequency of monitoring, if levels are well below action levels in the HASP.
Drum Removal	PID[1] or FID[2] O_2/LEL[3] DT[4], DM[5]	Before excavation, upon start up of work, then 30 minutes or continuously based on sampling results and sample location. Continuously if action level is exceeded.
Excavation/ Trenching in Non-contaminated soils Or Demolition of non-hazardous material	DM[5] PID	Before excavation, upon start up of work, then 30 minutes, or continuously based on sampling results and sample location. Continuously if action level is exceeded. Depending on levels recorded, the SHSO may decrease the frequency of monitoring to less than every 30 minutes if levels are well below action levels in the HASP. If visible dust is observed and wet methods of control do not remove the visible dust, particulate levels should be measured on a continuous basis.
Contaminated Soil & Solid Waste Excavation In designated AEC's	PID[1] or FID[2], O2/LEL[3], DT[4], DM[5]	Before excavation, upon start up of work, then 30 minutes or continuously based on sampling results and sample location. Continuously if action level is exceeded.

[1] PID, Photoionization Detector
[2] FID, Flame Ionization Detector
[3] O_2/LEL, Oxygen Level and Combustible Gas Meter
[4] DT, Detector Tube
[5] DM, Dust/ Particulate Monitor
[6] SLM, Sound Level Meter
Note: "Start up of work at each new task location" means to monitor the air quality at each new operation on the site. The breathing zone is the area inside a 1-foot radius around the head.

3.2 Noise Monitoring

Noise monitoring must be performed in accordance with Stauffer Management Company, LLC practices. Noise levels are monitored in the field with either a Type I or Type II Sound Level Meter (SLM). Noise dosimeter readings can also be obtained to determine the percent (%) noise dose. Noise levels and percent (%) dose measured are then compared to limits listed in OSHA standard 29 CFR 1910.95, Hearing Conservation.

Action levels listed in **Table 9**, **Noise Monitoring** will trigger upgrade in PPE to include appropriate bearing protectors (muffs or plugs) or initiate possible noise control engineering. Noise monitoring equipment must be calibrated prior to use each shift and checked at the end of the shift to determine accuracy. Noise readings must be recorded on data form in **Appendix E**, Noise Monitoring Form. Noise monitoring will be performed to identify background readings at the seven perimeter air monitoring locations prior to pilot test operations. Additional air monitoring surveys will be completed during initial excavation to establish hearing protection requirements. Noise monitor readings will then be taken two additional times at the air monitoring stations during the ten-day test.

Selection of hearing protection must match the employees' needs and the ability to attenuate noise below 90dB(A). Each hearing protection device (muff or plugs) has a Noise Reduction Rating (NRR) assigned by the U.S. Environmental Protection Agency (EPA). To calculate the hearing protector's effectiveness use the following formula:

$$\text{Noise Reading dB(A)} - (\text{NRR} - 7\text{dB}) < 90\text{dB(A)}$$

Table 9. Noise Monitoring

Instrument	Measurement	Action
Type I or Type II SLM - Calibrate Before Use		
	>80 dB(A) - 85 dB(A)	Hearing protection recommended. Limit work duration to 8-hour shifts.
	>85 dB(A) - 90 dB(A)	Hearing protection required. Limit work duration to 8-hour shifts.
	>90 dB(A) - 115 dB(A)	Hearing protection required. Investigate use of engineering controls. Limit work duration to 8-hour shifts.
	> 115 dB(A)	Stop work. Contact CSP and PM.

4.0 CONFINED SPACE ENTRY (CSE) PROCEDURES

In the event site work may require personnel to enter confined spaces, **No Stauffer Management Company, LLC employee or subcontractor shall enter an area identified as a confined space without using the CSE procedure and the site-specific entry procedures presented in Appendix G.** The purpose of the CSE procedure is to protect employees from potentially hazardous environments and to facilitate immediate rescue in an emergency situation. A CSE Permit must be posted at the entrance to each confined space. Permit required confined spaces may exist in the water treatment facility and must be followed if maintenance operations require entry into tanks or other equipment.

5.0 CHEMICAL HAZARD CONTROL

5.1 Chemical Handling Procedures

Personnel must practice the chemical-specific handling procedures outlined below.

Table 10. Chemical Handling Procedures

Chemical	Description	Procedures
Acids and Bases Acids: Including: hydrochloric, nitric, and sulfuric acids. Bases: Including: sodium hydroxide.	Extremely corrosive materials with a variety of uses.	• Wear gloves and eye-splash protection while using acid dispensed from a small dropper bottle during water sampling. • Wear a full-face, air-purifying respirator equipped with combination cartridges (organic vapor/acid gas) as well as poly coated Tyvek™ coveralls and nitrile and/or nitrile butyl rubber (NBR) gloves for large volume applications. • Have a plumbed eye wash/safety shower permanently installed within the immediate work area. • Cap all drums after dispensing chemicals. • Do not add anything into a virgin chemical drum, including unused product. • Avoid mixing strong acids and bases. Consult CSP for task-specific evaluation. If mixing is absolutely necessary, do it slowly. Wear eye/face and respiratory protection to avoid vapors or fumes that are generated. • When diluting acids, add the acid to water in small quantities and mix cautiously. • When diluting bases, add water to the base in small quantities and mix cautiously.
Activated Carbon	Granular adsorbent medium used to remove residual hydrocarbons from water and/or air.	• Use respiratory protection when activated carbon creates a dusty environment. • Avoid using Activated Carbon Filter Beds for Ketone Solvents - an exothermic reaction can develop over time and result in a possible explosion. • Contact CSP for task-specific evaluation.

5.2 PPE

The following protection levels have been established for the site work activities based on the information obtained by SMC concerning the levels of site contaminants and the scope of work. Results of site air monitoring and visual inspection of the work activities may indicate the need for changes in final PPE level(s). (See Site Activities on the next page.)

Task	Initial PPE Level	Upgrade/Downgrade PPE Level	Skin Protection	Respiratory Protection	Other PPE
Site Setup	Level D	---	Generally none; Some clearing/grubbing activities require Tyvek™ coveralls to prevent insect bites/contact with poisonous plants	None	Hard-hat, Steel-toe work boots, safety glasses with side shields, or goggles and face shield), work gloves and hearing protection >85 dBA
Clearing, grubbing	Level D+	Level C	Tyvek™ suit, leather gloves, chaps when using chain saws. Tape-up hand and foot areas	Initial: None Upgrade: APR with Survivair 1053 cartridge	Hard-hat, Steel toe work boots, latex gloves, latex boots, and hearing protection > 85 dBA
Utility Trench Construction	Level D	Level D+	Leather gloves	None	Hard-hat, Steel toe work boots, latex gloves, latex boots, and hearing protection > 85 dBA
Operation of water treatment system	Level D /D+	Level C Level B	General operation none; upgrade to Level C or Level B for certain maintenance operations involving potential for inhalation/contact with toxic or oxygen deficient atmospheres.	Initial: None Upgrade: APR with Survivair type 1053 if action levels for Level C are met; air supplied respirator for Level B.	Hard-hat, Steel toe work boots, latex boots, and hearing protection > 85 dBA
Landfill excavation North Plant excavation and AECs 1, 2, 5, 6, 7, 8	Level D+	Level C or Level B	Tyvek™ suit, surgical and nitrile gloves	Initial: APR with Survivair type 1053 cartridge. Upgrade: Supplied air respirator.	Hard-hat, Steel toe boots, latex boots, and hearing protection > 85 dBA.
Decontamination	Level D+	Level C	PVC rain suit or Tyvek™ coveralls	None	Hard-hat, Steel toe work boots, goggles/face shield, latex boots and hearing protection > 85 dBA.
General Activities	Level D	---	None	None	Hard-hat, Steel toe work boots, work gloves, Safety glasses.
Drum Removal	Level C	Level B	Saranex coated Tyvek™ coveralls	Initial: APR with Survivair type 1053 cartridge. Upgrade: Supplied air respirator.	Hard-hat, Steel toe work boots, latex boots, nitrile gloves, hearing protection > 85 dBA.

Only PPE that meets the following American National Standards Institute (ANSI) requirements are to be worn.

- Eye protection - ANSI Z87.1-1989
- Head protection - ANSI Z89.1-1986
- Foot protection - ANSI Z41-1991

Employees must maintain proficiency in the use and care of PPE that is to be worn. Typically this is covered during formal and informal refresher training sessions presented by Stauffer Management Company, LLC.

Level D is the minimum acceptable level of protection for this project site. Modified Level D is required when the possibility of contact to the skin or work uniform can occur from contaminated media. Upgrade to Level C will occur when results of air monitoring reveals action levels have been exceeded. Upgrade to Level B occurs when results of air monitoring reveals action levels have been exceeded, and site personnel meet training requirements. Wear hearing protection when in areas where high noise levels are generated.

Table 11. Personal Protective Equipment (PPE)

Level	Requirements
Level D	• Work uniform • Steel-toed boots • Approved safety glasses or goggles • Hard hat • Fluorescent vest, when vehicular traffic is on or adjacent to the site • Leather gloves for all material handling tasks • Nitrile gloves for water sampling handling
Modified Level D (D+)	**Add one or more of the following to Level D:** • Chemical resistance (acid or solvent) boot covers; e.g. latex booties • PE-coated Tyvek™ suit, NBR outer and nitrile inner gloves if skin contact with contaminants is possible. • Hearing protection (muffs and/or plugs).
Level C	• Level D and Modified Level D • Cooling vests/Thermal Protection • NIOSH/MSHA-approved full-face respirator with organic vapor/acid gas high efficiency particulate air-purifying (HEPA) cartridges.
Level B	• Level D and Modified Level D • Cooling vests/Thermal Protection • NIOSH/MSHA approved full-face positive pressure demand supplied air respirator, either airline or self contained.
Prior to use, all equipment must be inspected to ensure proper working condition.	

5.3 Site Control: Work Zones

Work zones will be established in order to:

- Delineate high-traffic locations,
- Identify hazardous locations, and
- Contain contamination within the smallest area possible.

Employees entering the work zone must wear the proper PPE for the area and work activity (See **Section 5.2, PPE**). Work and support zones will be established based on ambient air monitoring data, necessary security measures, and site-specific conditions. Work zones will be identified as either Exclusion Zone (EZ); Contamination Reduction Zone (CRZ); Support Zone (SZ), using physical barriers or visual aids.

Listed are general guidelines for delineation of work zones. CRZs will be developed for decontamination procedures listed in **Section 5.4, Decontamination Procedures**.

1. The EZ is identified to contain areas of contaminated soils or other environmental media where exposure to air borne contaminants exceeds air monitoring action levels. A minimum ten-foot distance surrounding this area will be demarcated with cones, barricades and/or caution tape depending on location to employees, general public, and high traffic areas.

2. The CRZ will be demarcated at its boundaries with barricades, cones, and/or caution tape depending on location to employees, general public, and high traffic areas.

3. Support areas are the areas outside the exclusion zone or contamination reduction zones, where no contamination has been identified.

Table 12. Safety Requirements for Working in Roadways and Excavations

WORKING IN STREET OR ROADWAY
• Wear traffic vest and hardhat when vehicle hazard exists.
• Use cones, flag-mounted cones, caution tape and/or barricades.
• Use vehicle strobe light and block area with truck.
• Develop traffic patternization plan for high traffic situations:
  • Use flag person,
  • Use flashing arrow sign,
  • Use "MEN WORKING" signs liberally,
  • Obtain lane closing permits, and
  • Engage police details.

WORKING AT EXCAVATION/TRENCHING SITES • "Competent person" is required per OSHA 29 CFR 1926 Subpart P. • Safety guard open excavations by restricting unauthorized access. • Highlight work area using prominent warning signs (cones, saw horses/barricades and signage) placed a minimum of 10' back from excavation opening. • Maintain zone definition along perimeter with **continuous string** of yellow orange caution tape.
EXCAVATIONS LEFT UNATTENDED OR OVERNIGHT **Use one of the following methods to address these situations:** • Surround entire perimeter with plastic or cloth construction net fencing. Anchor fence to ground using steel posts driven into ground. Space out posts no greater than 8 feet apart. Fence height minimum 4-feet high. Fence material must be of a quality capable of withstanding a pressure of 200 pounds. Place fence a minimum of 10 feet back from excavation opening. • Place 8-foot long barricades affixed with flashing lights end to end with 4-foot high construction net fence attached to barricades. • Utilize temporary curbing or concrete "jersey" barriers affixed with flashing signal lights or other effective warning signs.

5.4 Decontamination Procedures

Operations conducted at this site have the potential to contaminate field equipment and PPE. To prevent the transfer of contamination to vehicles, administrative offices and personnel, the procedures presented in **Table 13, Decontamination Procedures**, must be followed. Specific decontamination requirements will be followed by utilizing the equipment for that purpose. Contaminated work uniforms and Level D PPE must not be brought to employee residences and left either on-site, at the office location, or in the company vehicle. Laundering of company uniforms must be by Stauffer Management Company, LLC approved laundering services and not done at employees residence.

Table 13. Decontamination Procedures

Item	Examples	Procedure
Field Equipment	Excavators, shovels and miscellaneous construction equipment	• If required, remove excess material with hand tools. • Decontaminate with water; rinse prior to leaving the site. • Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.
Disposable PPE	Tyvek™ suits, inner latex gloves, respirator cartridges	• Dispose of according to the requirements of the client and state and federal agencies. • Change out respirator cartridges on a daily basis and dispose accordingly.
Nondisposable PPE	Respirators	• Wipe respirator with disinfecting pad prior to donning. (Do not use alcohol-based product.) • Decontaminate respirator on-site at the close of each day based upon extent of contamination. This procedure could include disassembling the respirator and cleaning, rinsing, sanitizing, and drying all parts with approved powders and solutions. Dry respirator and keep in resealable plastic bag.
	Boots and gloves	• Decontaminate outside with a solution of detergent and water; rinse with water prior to leaving the site. • Protect from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

All water used in decontamination procedures should be stored in portable storage tanks until a sufficient amount is stockpiled to facilitate disposal treatment. Disposable sampling and PPE will be placed in plastic bags and temporarily stored in designated drums. These drums shall be disposed of according to regulatory guidelines, if necessary.

5.5 Example Decontamination Diagram

If Level D+, C or Level B PPE is required, a CRZ will be constructed. The decontamination procedure for this project site is a two-stage process.

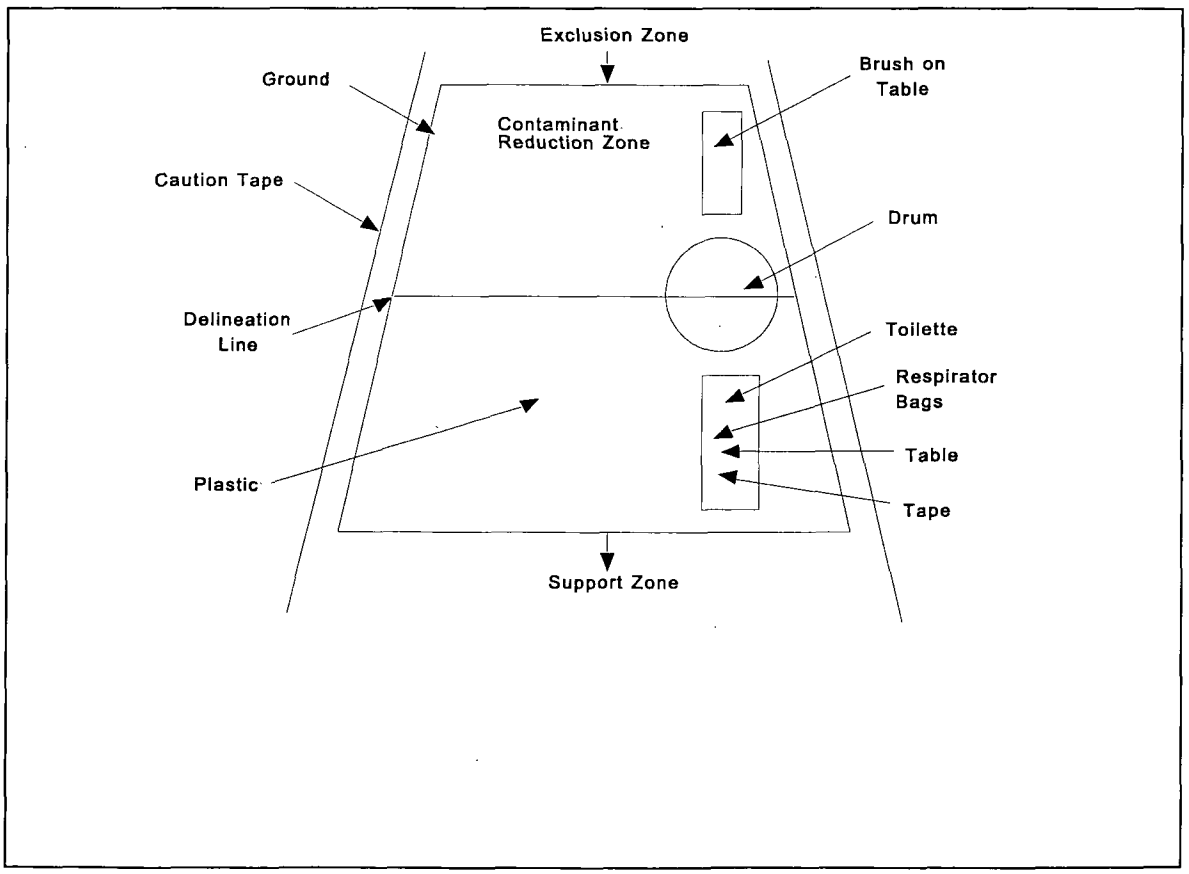
STAGE 1

- Gross contamination removal with a brush.
- Remove outer boots and dispose in a drum.
- Remove Tyvek™ suit and dispose in a drum.
- Remove outer gloves and dispose in a drum.
- Walk to Stage 2.

STAGE 2

- Remove respirator.
- Remove cartridge and dispose in a drum.
- Clean respirator and insert into a bag.
- Remove inner gloves and dispose.
- Wipe hands with a toilette and dispose.
- Walk out of decontamination area.

**Exclusion Zone Plan



6.0 CONTINGENCY PLANS

Table 14, Contingency Plans for Site Emergencies, presents contingency plans for potential emergency situations. Ensure that the information in the contingency plans have been clearly communicated to all project personnel and to those within the vicinity that may be affected, such as plant personnel and other contractors on site.

Table 14. Contingency Plans for Site Emergencies

Situation	Action
Evacuation	1. Immediately notify all on-site personnel of an emergency requiring evacuation. 2. Leave the dangerous area and report to a designated rally point. 3. Notify emergency medical service (EMS), as appropriate. 4. Account for all personnel. 5. Contact the PM and the CSP as soon as possible. 6. Maintain site security and control measures for community safety until emergency responders arrive. 7. Maintain contact with town response personnel such that the community shall remain informed
Medical Emergency	1. Survey the situation: **Do not enter an area that may jeopardize your safety.** • Establish the patient's level of consciousness. • Call for help. • Contact EMS and inform them of patient's condition. 2. Primary assessment (patient unconscious) • Arousal • Airway • Breathing • Circulation **Only trained personnel should perform CPR or First Aid - State that you are medically trained** 3. Secondary assessment (patient conscious) • Check for bleeding: Control with direct pressure. • Do not move patient (unless location is not secure). • Monitor vital signs. • Provide First Aid to the level of your training. • Contact the PM and CSP as soon as possible. • Document the incident on Stauffer Management Company, LLC's Supervisor's Employee Injury Report and associated forms.

Situation	Action
Fire Emergency	1. **Evacuate the area.** 2. Notify the Fire Marshall 3. Notify the EMS. 4. Extinguish small fires with an all-purpose extinguisher. 5. Contact the PM and CSP. 6. Document the incident using the SMC form.
Spill/ Release	Prevent problems by documenting the location of underground lines (e.g., product, sewer, telephone) before starting site work. If you drill through a line or tank or another leak occurs, document the spill/release in writing. Include dates, times, actions taken, agreements reached and names of people involved. In the event of a spill/release, follow this plan. 1. Wear appropriate PPE; stay upwind of the spill/release. 2. Turn off equipment and other sources of ignition. 3. Turn off pumps and shut valves to stop the flow/leak. 4. Plug the leak or collect drippings in a bucket, when possible. 5. Place sorbent pads to collect product, if possible. 6. Call Fire Department immediately if fire emergency develops. 7. Inform Stauffer Management Company, LLC PM about the situation. 8. Determine if the client wants to repair the damage or if the client will use an emergency repair contractor. 9. Based on agreements, contact emergency spill contractor for containment of free product. 10. Advise the client of spill discharge notification requirements and determine who will complete and submit forms. Do not submit or report to agencies without the client's consent. Document each interaction with the client and regulators and note, in writing: name, title authorizations, refusals, decisions, and commitments to actions. 11. Do not transport or approve transportation of contaminated soils or product until proper manifests have been completed and approved. Be aware that soils/product may meet criteria for hazardous waste. 12. Do not sign manifests as generator of wastes; contact the regional compliance manager to discuss waste transportation. 13. Document the incident using the accident/injury investigation reporting forms.

**The PM must contact the client or generator. The generator is under obligation to report to the proper government agencies. If the spill extends into waterways, the Coast Guard and the National Response Center ([800] 424-8802) must be notified immediately by SMC with their permission.

6.1 Emergency Communications

Emergency communications at the work site can be accomplished by verbal and/or non-verbal means to ensure contact with all Stauffer Management Company, LLC and subcontractors. Verbal communication can be impacted by the on-site background noise and while wearing respiratory protection. **Table 15, Emergency Communication Methods**, lists the type of emergency communication methods and equipment to use, depending on site conditions. Communication equipment must be checked daily to ensure proper operation. All project personnel must be initially briefed on the communication methods prior to starting work and periodically reviewed in the Daily Safety Meetings.

Table 15. Emergency Communication Methods

COMMUNICATION DEVICE	TYPE OF COMMUNICATIONS	SIGNAL
Telephone On-Site or Cellular Telephone	Emergency notification	Initiate phone call using applicable emergency numbers
Two-Way Radio	Emergency notification among site personnel	Initiate radio communication with Code Red message
Compressed Air Horn	Emergency evacuation	Three long continuous blasts
Visual	Hailing site personnel for distress, need help	Arms waved in circle overhead
Visual	Hailing site personnel for emergency evacuation	Arms waved in criss-cross over head
Visual	Contaminated air/strong odor	Hands clutching throat

7.0 MEDICAL MONITORING PROGRAM

Stauffer Management Company, LLC, requires that all subcontractors follow a medical monitoring program to track the physical conditions of their employees on a routine basis; starting with a baseline assessment, then periodic follow-up (annual or biennial) or specific project requirements based upon site contaminants or as assessment tool to aid in determining possible exposure. All potential or suspected exposures to hazardous wastes/ substances will be reported to the SMC Site Representative, the subcontractor's medical director and project CSP or CIH. The project CSP / CIH will function as the technical advisory for implementation of this plan. The duties and responsibilities of the Safety Technical Advisor are outlined below.

7.1 Safety Technical Advisors

The site safety technical advisor shall be:

Joseph Burke, CSP
SPEC Consulting, LLC, Albany, NY
(518) 438-6809

or other suitable individual(s) designated by SMC.

The specific duties of the safety technical advisors include:

- Recommending a suitable medical monitoring program for the site workers by the occupational health physician in conjunction with consultation of the above listed personnel,
- Providing interpretation of medical monitoring requirements and technical guidance for developing project specific medical monitoring requirements, and
- Advising worker exposure potential along with appropriate hazard reduction methods.

Table 16: Medical Monitoring Program

WORKER MEDICAL PROFILE		
Item	**Initial**	**Annual**
Medical History	X	X
Work History	X	X
Visual Acuity and Tonometry	X	X
Pulmonary Function Tests	X	X
Physical Examination	X	X
Audiometry Tests	X	X
Chest X-Ray	X	X
Complete Blood Counts	X	X
Blood Chem. (SSAC-23 or equivalent)	X	X
Urinalysis	X	X
Dermatology Exam	X	X
Electrocardiogram (Stress Test) – based on age	X	X (based on age)
Tetanus Booster Shot (if no inoculation has been received in the last five (5) years)	X	-

All site personnel shall participate in a medical monitoring program, such as outlined above. This program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis.

Employees are examined initially upon start of employment, bi-annually or annually thereafter, and may be examined upon termination of employment. Unscheduled medical examinations are conducted:

- At employee request after known or suspected exposure to toxic/hazardous materials or extreme environmental conditions, e.g. heat or cold stress.
- At the instruction of the CSP, SSO, or employer occupational physician after known or suspected exposure to toxic/hazardous materials, or extreme environmental environment.
- At the discretion of the employer occupational physician based on prior or present medical conditions.

APPENDIX A

Agreement and Acknowledgement Form
HASP Amendment Sheet
Visitor / Trainee Guidelines
Trainee / Observer Agreement Form

AGREEMENT AND ACKNOWLEDGEMENT SHEET

Stauffer Management Co. personnel have the authority to stop field activities at this site if any activity is not performed in accordance with the requirements of the Health and Safety Plan. All Stauffer Management Co. project personnel, subcontractor personnel, and visitors are required to sign the Agreement and Acknowledgment Sheet **prior** to conducting field activities at this site.

STAUFFER MANAGEMENT CO. AGREEMENT AND ACKNOWLEDGEMENT STATEMENT	
1. I have read and fully understand the SSP and my responsibilities. **2. I agree to abide by the provisions of the SSP.**	
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date

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STAUFFER MANAGEMENT CO.
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Company	Date
Name	Signature
Company	Date

SITE SPECIFIC HEALTH & SAFETY PLAN
AMENDMENT DOCUMENTATION

Project Name: _____ Project No,: _____

Amendment No.: _____ Date: _____

Amendment Revises: Page: _____ Section: _____

Task(s) Amendment Affects: *_____

_____

_____

(Attach New/Revised Job Safety Analysis if applicable)

Reason For Amendment

_____

_____

_____

_____

_____

Amendment: *(Attach separate sheet(s) as necessary)*

_____

_____

_____

_____

Completed by: _____ **Approved by:** _____

VISITOR/TRAINEE GUIDELINES

Stauffer Management Co. is committed to providing a safe environment on all work sites for visitors, trainees, employees and/or passersby. In order to accomplish this, the following guidelines must be followed.

1. VISITORS

Any person not actively participating in the work at the site is regarded as a "visitor" and must follow Stauffer Management Co.'s visitor/trainee guidelines. Visitors must be accompanied by a representative while on-site.

Sites must be marked with signs, placards, and/or barricades to designate hazardous boundaries. Visitors will not be allowed on any site that is not adequately marked.

2. TRAINEES

Trainees are employees of Stauffer Management Co. who have not yet completed Stauffer Management Co.'s required safety training program. New hires and in-house company transfers will be considered trainees until safety training requirements are met.

Trainees will be informed of restrictions by their supervisor and must abide by them before visiting active sites.

Trainees will be permitted to visit Stauffer Management Co. sites as observers as long as the following conditions are met:

- Trainees are supervised at all times while observing on-site.
- Trainees do not perform work functions of any type while on-site.
- Trainees do not handle any equipment, tools and/or supplies while on-site.
- Trainees do not enter any hazardous or hot zone or confined space areas while on-site.

Supervisors will be responsible for informing trainees of the above conditions and for ensuring that the conditions are met. Supervisors will also ensure that trainees will not be asked to violate the conditions listed above.

A Trainee/Observer Agreement Form must be signed by both the trainee and the supervisor and placed on file in the Regional Human Resources department.

Infractions of the above agreement will be viewed as extremely serious and will be subject to discipline up to and including termination for either the trainee and/or supervisor.

TRAINEE/OBSERVER AGREEMENT FORM

Stauffer Management Co. is committed to providing a safe working environment for all employees. In addition, Stauffer Management Co. will comply with OSHA requirements for employee safety training prior to working on any hazardous site.

The following section is to be filled out by trainee.

Agreement between:

_____ _____ and Stauffer Management Co..

Name (print/type) SS#

Because we have your safety in mind, you will be considered a trainee until all training criteria are met. This means you must complete all training requirements prior to performing work activities on-site. As a requirement of the training program, you will be asked to visit Stauffer Management Co. sites as an observer. You must be supervised on all of these site visits.

As an on-site observer trainee, your signature below indicates your agreement to these restrictions.

You may not:

1. Perform work functions of any type.
2. Handle any equipment/tools and/or supplies of any type.
3. Enter any hazardous or hot zone areas.

I agree to adhere to the above conditions in all instances while on-site as a trainee/observer.

Signature Date

This section is to be filled out by supervisor.
As supervisor to the above trainee, I agree to the above restrictions and agree not to request him/her to perform activities contrary to those restrictions.

Signature Date

APPENDIX B

SMC Accident Prevention and Reporting Forms

1.0 PURPOSE

The intent of this Accident Prevention Plan is to describe procedures to protect the lives and health of all persons associated with the referenced project, to prevent damage to property and materials, and to avoid work interruptions due to accidents. The Accident Prevention Plan must be considered in conjunction with the Emergency Spill Response Plan and the Site Specific Health and Safety Plan.

2.0 DUTIES AND RESPONSIBILITIES

Stauffer Management Co. will oversee and act accordingly during all phases of the project. The following management structure will be instituted for the purpose of successfully and safely completing this project.

A Site Safety Supervisor (SHSO) shall be assigned to the site during all site activities and shall assist and shall represent the Site Health and Safety Manager. The SHSO shall have the responsibility and authority to implement and enforce the approved Site Health and Safety Plan (HASP), this includes modifying/halting work, and removal of personnel from the site if work conditions change and effect on-site/off site health and safety matters. The SHSO will serve as the main contact for any on-site emergency situation. The SHSO shall be required to conduct various types of area air monitoring as describes in the HASP for the purpose of verifying worker exposure and proper selection of personal protective equipment. The SHSO shall be consulted before any changes in the recommended procedures or levels of protective clothing are made.

The responsibilities of the SHSO are:

- Maintain a daily logbook for recording all significant health and safety activities and incidents;
- Provide on-site technical assistance;
- Conduct routine air monitoring, including equipment maintenance and calibration;
- Issue/obtain any required work permits;
- Conduct daily inspections of all mechanical equipment;
- Conduct daily health and safety inspections;
- Ensure all appropriate personnel have received the necessary training;
- Provide daily tailgate safety meeting and document meeting attendance on the Daily Safety Meeting Form included in Appendix N ;
- Ensure that appropriate personnel have received the necessary physical examinations;
- Provide routine negative pressure respirator checks, if required;

- Periodically review the adequacy of the HASP;
- As appropriate, draft necessary amendments to the HASP for review;
- Assure that all Site, oversight, project and authorized personnel are made aware of the provisions of the HASP and have been informed of the nature of any physical, chemical and/or biological hazards associated with site activities; and
- Maintain control of required documents for record keeping purposes.

3.0 HEALTH AND SAFETY MANAGER

The Health and Safety Manager has the overall responsibility for establishing health and safety procedures. The Health and Safety Manager is responsible for documenting that employees have received proper health and safety training and have participated in a medical surveillance program. The Health and Safety Manager shall be responsible for developing the site specific HASP and conducted unannounced health and safety audits.

4.0 NOT USED

5.0 INSPECTIONS AND AUDITS

All inspections and audits shall be conducted in accordance with the provision describes in Section 4.0 Inspections and Audits, of the Stauffer Management Co. Health and Safety Policy and Procedures Manual. All employees are responsible for continuously inspecting their workplace and procedures and correcting deficient conformance to Stauffer Management Co. health and safety policies.

The Site Safety Supervisor shall conduct daily site safety inspections or as needed and document the results on Field Safety Inspection Checklist.

Project Managers are responsible for establishing inspection type and frequency at their sites and correcting deficient compliance to health and safety policy and procedures. During the duration of the project, two unannounced health and safety audits will be conducted by the Health and Safety Manager. The results of the audit shall be documented on Field Safety Audit Inspection Checklist.

Business Unit Managers are responsible for ensuring that field audits are conducted in a timely manner and that all deficiencies are corrected.

Health and Safety professionals are responsible for providing technical guidance on procedures and corrective actions.

Copies of all completed Field Safety Inspection and Audit Checklist shall be provided to the Project Engineer.

6.0 SITE HAZARDS

The site task to be performed at the site include:

- Confined Space Entry
- Hot Work

The anticipated hazards and related control measures associated with the site tasks are described in the Job Safety Analysis (JSA) included in Appendix J. Additional control measures are described in the HASP, Section 2.0, Potential Hazards and Control.

Good housekeeping at the site will be continuously enforced as an accident prevention technique. Smoking will be allowed only in designated areas in the support (cold) zone.

7.0 COMPLIANCE RECORDKEEPING

The Site Safety Supervisor shall maintain the referenced compliance records on-site for the duration of the project. At the completion of the project, records shall be maintained in the project file. The SHSO shall establish a project file which will include separate files for the following:

- Safety Meeting Attendance forms
- Preliminary Incident Reports (PIRs)
- Copies of all site personnel training certificates (8 hr. refresher), fit test records, and proof of medical evaluation.
- Copies of SHSO daily field notes.
- Copies of competed air monitoring forms.
- Copy of OSHA Form 200.
- Copies of all project permits.
- Copy of the HASP.

8.0 ACCIDENT AND INCIDENT REPORTING PROCEDURES

All incidents must be reported and investigated in accordance with the provisions of Section 2, Incident Investigation and Reporting of the Stauffer Management Co. Health and Safety Policy and Procedures Manual. Incidents shall be reported to the Project Manager and Project Engineer immediately, always within 24 hours. The Preliminary Incident Report (PIR) form shall be utilized to record and report the facts about the incident. The manager shall determine the extent and scope of follow-up actions to investigate the incident, take corrective actions and report. Class II and III incidents shall be reported to the Health and Safety Manager and Operations Manager within 24 hours. A manager shall issue a signed report within 30 days of all Class II and III incidents. The Director of Health and Safety is responsible for maintaining and communicating the results of trend analysis for incidents. A copy of the PIR form is included in Appendix D.

STAUFFER MANAGEMENT CO.
PRELIMINARY INCIDENT REPORT

Person Completing Report:_____ Phone:_____ Today's Date:

Incident Date:_____ Time:_____ am/pm Location:_____ Dept. #:

Type of Incident:

☐ Personal Injury/Illness	☐ Fire/Explosion	☐ Chemical Exposure
☐ Unsafe Condition/Action	☐ Equipment Damage	☐ Customer Incident
☐ Property Damage	☐ Spill/Release	☐ Near Miss
☐ Permit/Code Compliance	☐ Newspaper/Radio/Television	☐ Motor Vehicle

☐ Other

Personal Injury: ☐ Yes ☐ No (If no, go to next section)

☐ First Aid Only ☐ Hospitalization ☐ Medical Treatment ☐ Possible Injury, Not Confirmed

Person Injured: ☐ SPEC Employee ☐ Subcontractor ☐ Customer/Public/Other

Injured Name:_____ Telephone

Office/Address:

Nature of Injury, Illness or Exposure:

Describe nature of incident, how it occurred, who was involved, witnesses, and possible causal factors:

Describe actions taken and persons notified:

Manager Responsible for Follow-up:_____ Telephone

Provide this report to the responsible manager within 24 hours.

Distributed to:_____,

INCIDENT REPORTING GUIDE

Incident Class	**Class I** A minor incident that is dealt with at the local level.	**Class II** A serious incident that requires notification to Corporate within 24 hours	**Class III** A highly significant incident requiring immediate notification and assistance from Corporate
Examples of Incidents	■ First Aid injury ■ Minor damage to SMC property (less than $200) ■ Non-reportable quantity spill ■ Near miss incident ■ Unsafe condition or behavior	■Personal injury (more than first aid to employee, sub-contractor or public) ■Vehicle accident involving injury or damage to vehicle or property ■Damage to SMC property greater than $200 ■Near miss incident that could have been deadly ■Fire ■Explosion ■Facility damage or business interruption greater than $10,000 ■Non-emergency notification of regulatory agency is required	■Hospitalization (of one or more persons) ■Death ■Regulatory agency response to incident site ■Multiple injury of employees sub-contractors or public ■Emergency notification of regulatory agency
Notification Actions	1. On-scene person notifies manager immediately by phone 2. Provide PIR form to manager within 24 hours 3. Manager investigates and follows up	1.On-scene person notifies manager immediately by phone 2.Manager investigates 3.Manager notifies the business unit manager, H&S manager and corporate H&S with PIR form within 24 hours of the incident 4.Manager provides a detailed final investigation report within 30 days to corporate H&S	1.On-scene person notifies manager immediately by phone 2.Incident management team conferences by phone and formulates an action plan

APPENDIX C

Lock-Out / Tag-Out Procedures

LINE BREAKING PROCEDURE & LOCKOUT/TAGOUT

15.1 Purpose

This program establishes the safe line breaking and lockout & tagging methods to be used by the contractor. It applies to process lines, which may contain process liquids, utility lines with stored energy, electrical equipment, valves, or equipment capable of activation during removal, cleaning or repair, which may present a hazard to personnel and/or a release of a regulated substance. The contractor is responsible for development and submittal of a site specific line break and lock out / tag out procedure. The contractor's site-specific procedure shall be submitted to the owner for approval prior to implementation. At a minimum the following items are to be addressed in this procedure.

15.2 Policy

No process lines are to be broken, disassembled, disconnected or removed without following the established line breaking and lockout / tagout procedure. A standard lockout and tagging procedure consistent with OSHA requirements shall be utilized to assure accountability and control during operations in which equipment or systems are present which could endanger the lives of personnel or result in a release of a regulated substance should equipment or a system be activated, disassembled or energized.

15.3 Responsibility

15.3.1. The site contractors Health and Safety Officer is responsible for the following:

15.3.1.1 Identifying the personnel who are authorized to break product lines and act as lockout/tagging authorities.

15.3.1.2 Controlling and maintaining accountability of line breaks and tags/locks.

15.3.1.3 Approving the breaking of product lines and the removal of locks or tags from equipment or when systems keys are lost.

15.3.1.4 Coordinating system isolation activities that affect sub-contractors.

15.3.1.5 Maintaining a log for controlling and tracking lockout and tagging activities.

15.3.1.6 Checking the log on a monthly basis for the status of outstanding locks or tags

15.3.2 The lockout/tagging authority is responsible for the following:

15.3.2.1 Making or receiving requests for lockout/tagging.

15.3.2.2 Processing requests and coordinating the lockout/tagging activities.

15.3.2.3 Making appropriate log entries for the requested lockout/tagging.

15.3.2.4 Assuring that system status and configuration is appropriate for lockout/tagging.

15.3.2.5 Ensuring receipt of tags when work is complete.

15.3.2.6 Making appropriate log entries to release the equipment into service.

15.3.3 Supervisors are responsible for:

15.3.3.1 Educating their employees in the proper procedures of lockout/tagging.

15.3.3.2 Assuring that the equipment has the capability of being locked out

15.3.3.3 Checking on the jobs in progress to verify that they are properly locked or tagged out.

15.3.3.4 Administering appropriate disciplinary action for violations of the Lockout Program

15.3.4 All Employees are responsible for:

15.3.4.1 Reading, understanding, and having the lockout procedures available at all times.

15.3.4.2 Making sure that equipment is properly locked out with his/her own lock before beginning work on the equipment.

15.3.4.3 Ensure that if any employee has been released from a job, they remove their lock and have their replacement install their own lock.

15.4. Locking and Tagging System Control

All tags shall be numerically sequenced or personally identified and logged out for each system control operation. Log and rag information shall include job description, requester's name, requester's social security number, division, supervisor's name and date.

The Health and Safety Officer shall control padlocks. Pad locks must be used when there is a potential for danger to personnel or equipment. When pad locks are used to lock out a system or component they must be accompanied by a "Danger-Do-Not-Operate" tag. After the tag and lock have been installed, the employee shall maintain the key.

Everyone working on a piece of equipment requiring lockout will use individual locks or danger tags.

15.5 Lost Keys or Absence of Employee

If an employee cannot find their key, only the Health and Safety Officer can authorize removal of the locks and tags. The following steps must be taken prior to this authorized removal.

15.5.1 Ensure that the released equipment will not harm personnel or equipment.

15.5.2 Verify that it is essential to remove the locks and tags.

15.5.3 Verify that all reasonable effort has been expended to recover the key.

15.5.4 Verify that the absent employee has been notified and has acknowledged that the lockout/tagged system has been removed.

15.5.5 Note any special circumstances in the log.

15.6 Isolation Procedures

15.6.1 Machinery or equipment capable of movement shall be stopped and the power source deenergized or disengaged. When necessary, the moveable parts shall be physically blocked to prevent inadvertent movement during servicing or adjusting.

15.6.2 Any electrical equipment undergoing service, or adjustment shall be DE-ENERGIZED locked out.

15.6.3 Every prime mover or power driven machine shall be locked out or positively sealed in the off position during maintenance work. Where lockable controls are not available, compliance with this section shall be met through the use of positive means such as de-energizing or disconnecting the equipment from its power source, or other positive action which will prevent inadvertent movement of the equipment. In all cases, signed and dated tags of an appropriate type shall be affixed to the controls of the machines or equipment during work.

15.6.4 Each division lockout/tagging authority shall provide tags, padlocks, and chains, which may be required to complete and identify lockout conditions.

15.6.5 On machines or equipment where cleaning adjustment, or testing cannot be performed with the prime mover or energy source disconnected, such operations may be performed under the following conditions:

15.6.5.1 The operating station where the machine may be activated shall be under the control of a qualified operator at all times.

15.6.5.2 All participants in the cleaning, adjustment, etc., shall be in clear view of the control operator or in positive communication with him.

15.6.5.3 All participants must be beyond reach of equipment, which may present a hazard to them.

15.7 Electrical Equipment

15.7.1 Lock out the main power source in the off position before commencing work on electrical components. Lock out control circuits and associated drive mechanism(s) only when it is impossible or impractical to lock out the main power source.

15.7.2 Make all lockouts with a padlock and tag. Each employee working on or exposed to the hazard shall add his/her lock to the lockout. (Each lock must be noted in the appropriate log)

15.7.3 The control switch or valve shall be tested after the lockout has been made in order to assure that it cannot be operated.

15.8 Process Piping Systems

All process piping systems are to be positively isolated using the described procedures prior to line breaking. Personnel performing the line break shall be equipped with the appropriate PPE, and equipment necessary to drain, purge, and inert (if necessary) process piping systems, which contain regulated products. All free liquids are to be pumped, drained or purged into 55-gallon drums provided by the owner. Different process liquids CANNOT be mixed with other liquids. All drums shall be sealed labeled and stored in an area designated by the owner.

Pipelines may be isolated by the following methods:

15.8.1 Misalignment

15.8.1.1 Pipelines may be misaligned by unbolting them at a flange and then re-bolting them in the misaligned position.

15.8.1.2 A "Danger" tag and seal must also be attached to the pipeline.

15.8.1.3 Misalignment may be used for liquid lines, to enter vessels, etc. It should not be used on gas lines.

15.8.2 Blinding

15.8.2.1 Pipelines may be isolated by the use of blinds in the piping system at flanges.

15.8.2.2 On gas pipelines when double block and bleeds are not available for use, blinds shall be the primary method of isolation. When the blind is installed, sufficient bolts shall be places around the blind to keep it in place. The blind shall be rated no less than the operating pressure of the line. A "DANGER" tag shall also be attached to the blind.

15.8.3 Valves
Double Block and Bleed Procedures

15.8.3.1 Since blocked valves may leak, the techniques of the double block and bleed shall be used whenever possible.

15.8.3.2 When using double block and bleed procedures, both valves shall be locked and tagged.

15.8.3.3 If the double block and bleed cannot be used, then a blind shall be used if possible. However, if blinding is impractical, a single block valve may have to be utilized to isolate piping system.

15.8.4 Isolation by Valves

If it is necessary to isolate piping systems using valves, they shall be locked and tagged with a "Danger" tag. Pneumatic or electrically operated valves shall have the activation systems on the valves disconnected.

15.8.5 Pneumatic Operated Valves

When pneumatic operated valves are used as block valves, the pneumatic systems shall have the makeup air to the system blocked and the bleed valve of the air system shall be left open and tagged with a "Danger" tag.

15.8.6 Motor Operated Valves

15.8.6.1 When motor operated valves are used as block valves, the motor operated valves shall be locked into position by locking out the electrical activation switch and/or circuit breaker.

15.8.6.2 If these measures are not possible, the fuses for the system, if any, shall be pulled or the electrical leads to the motor operated valves disconnected and properly secured so no accidental contact can be made.

15.8.6.3 A "Danger' tag shall be attached to the disconnected electrical leads.

15.9 Block-Out Procedure for Equipment

15.9.1 Air-operated, gear-driven, hydraulically operated units, or suspended parts of a machine or equipment shall be physically blocked out to prevent movement.

15.9.2 Steam, air, gas, hydraulic cylinders, etc., shall be bled down.

15.9.3 Blocks shall be placed under raised parts, lifts, or any equipment that might descend or slide.

15.9.4 Coiled springs, spring-loaded devices, and securing cams shall be released prior to commencement of work.

15.9.5 Blocks or stands shall be utilized under raised vehicles, machines, or equipment to prevent failure or slippage of the jack or elevating device.

CAUTION: Under no circumstances is anyone allowed to remove a lock and tag other than the employee who installed them, unless specifically authorized in writing to do so by that employee's supervisor, and then only after careful inspection of the work area and the equipment which has been de-energized.

15.10 Control of Stored Energy

Take any of the following steps that are necessary to guard against energy left in the equipment after it has been isolated from its energy sources.

15.10.1 Inspect the system to make sure all parts have stopped moving.

15.10.2 Install ground wires.

15.10.3 Relieve tapped pressure.

15.10.4 Release the tension on springs, or block the movement of spring-driven parts.

15.10.5 Block or brace parts that could fall because of gravity.

15.10.6 Block parts in hydraulic and pneumatic systems that could move from loss of pressure. Bleed the lines and leave vent valves open.

15.10.7 Drain process piping systems and dose valves to prevent the flow of hazardous materials.

15.10.8 If a line must be blocked where there is no valve, use a blank flange.

15.10.9 Purge reactor tanks and process lines.

15.10.10 Dissipate extreme cold or heat, or wear protective clothing.

15.10.11 If stored energy can reaccumulate, monitor it to make sure it stays below hazardous levels.

15.11 Verifying Isolation

Use the following procedures to verify that equipment has been properly locked out.

15.11.1 Make sure all danger areas are clear of personnel.

15.11.2 Verify that the main disconnect switch or circuit breaker cannot be moved to the on position.

15.11.3 Use a voltmeter or other equipment to check the switch.

15.11.4 Press all start buttons and other activating controls on the equipment itself. Shut off all machine controls when the testing is finished.

SITE-SPECIFIC LOCKOUT/TAGOUT PROCEDURES		
Equipment	Operation	Lockout Method/Location

SITE-SPECIFIC LOCKOUT/TAGOUT PROCEDURES		
Equipment	**Operation**	**Lockout Method/Location**

APPENDIX D

MSDS Definitions
MSDSs

DEFINITIONS

(TLV-TWA) *Threshold Limit Value - Time Weighted Average.*
The time-weighted average concentration for a normal 8-hour work day and a 40-hour work week, to which nearly all workers may be repeatedly exposed without adverse effect.

(PEL) Time-weighted average concentrations similar to (and in many cases derived from) the Threshold Limit Values.

(REL) *Recommended Exposure Limit* as defined by NIOSH similar to the Threshold Limit Values.

(IDLH) *Immediately dangerous to life or health* means any atmospheric condition that poses an immediate threat to life, or which is likely to result in acute or immediate severe health effects. This includes oxygen deficiency conditions.

(LEL) *Lower Explosive Limit*
The minimum concentration of vapor in air below which propagation of a flame will not occur in the presence of an ignition source.

(UEL) *Upper Explosive Limit*
The maximum concentration of vapor in air above which propagation of a flame will not occur in the presence of an ignition source.

Flash Point (F.P.) The lowest temperature at which the vapor of a combustible liquid can be made to ignite momentarily in air.

Vapor Pressure (V.P.) The pressure characteristic at any given temperature of a vapor in equilibrium with its liquid or solid form, often expressed in millimeters of mercury (mm Hg).

Odor Threshold A property displayed by a particular compound, low detection indicates a physiological sensation due to molecular contact with the olfactory nervous system (Based on 50 percent of the population).

Ionization Potential The amount of ionization characteristic a particular chemical compound (I.P.) displays.

TABLE 1.1
SOILS AND WASTE
(AEC-1,2,6,7&8)

Contaminants of Concern	Soils SCG's (ppm)	Cleanup Goals (ppm)	Landfill and Interior Soil Samples Results (AEC-1) ppm	Area North of Main Plant Building Soil Sample Results (AEC-2) ppm
Volatiles:				
Toluene	1.5	1.5	ND-1,000	ND-0.037
Xylenes (total)	1.2	1.2	ND-25,000	ND-2,200
Semi Volatiles:				
Benzo(a)anthracene	0.224	0.224	ND-1.5	ND-6.7
Chrysene	0.4	0.4	ND-1.6	ND-6.6
Benzo(b)fluroanthene	1.1	1.1	ND-2.0	ND-5.6
Benzo(k)fluroanthene	1.1	1.1	ND-1.0	ND-7.9
Benzo(a)pyrene	0.061	0.061	ND-1.3	ND-7.9
o-Toluic Acid	50	50	ND-81	ND-19.0
m-Toluic Acid	50	50	ND-8,500	ND-46.0
p-Toluic Acid	50	50	ND-1,600	ND-14.0
PCBs	1.0 (10)	1.0 (10)	†ND-0.23	†ND-0.059
	SCG's	**SSRG's		
Inorganics:	(ppm)	(ppm)		
Chromium	*	100	4.2-164	9.0-162
Cobalt	*	60	5.7-4,230	4.2-30.3
Lead	*	500	1.9-160	5.6-3,030
Mercury	*	5	ND-17.2	ND-25.2
Nickel	*	100	14.0-99.2	13.5-166
Zinc	*	750	26.4-1,170	22.5-15,600

Note:
ND Not Detected
PCBs: 1.0 ppm for surface and 10 ppm for sub-surface.
† PCBs were detected in two of the total 34 soil samples analyzed.
* Imported soils used for clean backfill will meet NYS Department of Transportation registered quarry standards and approval by NYSDEC.
**Site Specific Remedial Goals (SSRG's).

Tables source, NYSDEC Amended Record of Decision December 2001 for SMC Site Skaneateles Falls NY.

TABLE 1.2
SKANEATELES CREEK SEDIMENTS (AEC-5)

Contaminants of Concern	Sediments SCG's (ppb)	Cleanup Goals (ppb)	Skaneateles Creek Sediments Round 1 (ppb)	Skaneateles Creek Sediments Round 2 (ppb)
Volatiles:				
Tetrachloroethene	9	9	ND-16	ND
Xylenes (total)	--	--	ND-2	ND-3,600
Toluene	--	--	ND	ND-48
1,2 Dichloroethene	--	--	ND	ND-1,100
Semi Volitiles:				
Benzo(a)anthracene	15	15	ND-4,700	ND-980
Benzo(b)fluroanthene	15	15	ND-3,800	ND-705
Benzo(k)fluroanthene	15	15	ND-3,500	ND-1,100
Benzo(a)pyrene	15	15	ND-4,600	ND-490
Chrysene	15	15	ND-4,500	ND-780
Inorganics:	(ppm)*	(ppm)		
Antimony	2-25	2-25	60.4-91.7	ND
Cadmium	0.6-9.0	0.6-9.0	1.3-1.9	1.4-2.2
Copper	16-110	16-110	16.7-56.8	23.2-351
Lead	31-110	31-110	12.8-293	28.4-215
Mercury	0.15-1.3	0.15-1.3	ND	0.19-2.0
Nickel	16-50	16-50	15.8-23.6	14.3-48.7
Zinc	120-270	120-270	44.1-155	44.5-229

SCG's for metals lists the range from the Lowest Effects Level to the Severe Effects Level

Tables source, NYSDEC Amended Record of Decision December 2001 for SMC Site Skaneateles Falls NY.

TABLE 1.3
SUMMARY OF ANALYTES IDENTIFIED
IN LANDFILL PIEZOMETERES (AEC 3)

Contaminants of Concern	SCG's (ppb)	Round 1 μg/L (ppb) Range
Volatiles:		
Toluene	5	140 – 1,600
Xylenes (total)	5	7,900 – 73,000
Semi Volatiles:		
o-Toluic Acid	31,000	30,000 – 40,000
m-Toluic Acid	31,000	78,000 – 100,000
p-Toluic Acid	31,000	23,000 – 42,000
4,4'DDE	ND	0.053 – 0.19
Inorganics:		
Arsenic	25	3.8 – 33.2
Chromium	50	21.3 – 76.7
Cobalt	-----	50.6 – 992
Zinc	2,000	146 – 747

TABLE 1.4
SUMMARY OF ANALYTES IDENTIFIED
IN OVERBURDEN GROUNDWATER (AEC 3)

Contaminants of Concern	SCG's (ppb)	Round 1 μg/L (ppb) Range	Round 2 μg/L (ppb) Range
Volatiles:			
Toluene	5	ND – 2	ND – 270
Xylenes (total)	5	ND – 19	ND – 28,000
Semi Volatiles:			
Benzo(a)anthracene	-----	ND – 2	ND – 14
Chrysene	-----	ND – 2	ND – 13
Benzo(b)fluroanthene	-----	ND – 1	ND – 19
Benzo(k)fluroanthene	-----	ND – 1	ND
Benzo(a)pyrene	ND	ND – 2	ND – 10
o-Toluic Acid	31,000	ND – 11,000	ND – 14,000
m-Toluic Acid	31,000	ND	ND – 6,500
p-Toluic Acid	31,000	ND	ND – 700
Inorganics:			
Aluminum	-----	885 – 19,3000	508 – 42,800
Chromium	50	5.6 – 2,550	ND – 6,870
Cobalt	-----	ND – 27.3	ND – 57.2
Lead	25	ND – 15	3.7 – 1,370
Zinc	2,000	26.1 – 643	23.8 – 1,140

Tables source, NYSDEC Amended Record of Decision December 2001 for SMC Site Skaneateles Falls NY.

TABLE 1.5
SUMMARY OF ANALYTES IDENTIFIED
IN UPPER BEDROCK GROUNDWATER (AEC 3)

Contaminants of Concern	SCG's (ppb)	Round 1 μg/L (ppb) Range	Round 2 μg/L (ppb) Range
Volatiles:			
Vinyl Chloride	2	ND – 3	ND – 21
1,2-Dichloroethene (total)	5	ND – 160	ND – 1,500
Trichloroethene	5	ND – 180	ND – 54
Terachloroethene	5	ND – 2,900	ND – 190
Toluene	5	ND – 63	ND – 37
Xylenes (total)	5	ND – 2,100	ND – 1,900
Semi Volatiles:			
Phenol	1	ND – 140	ND – 2,400
o-Toluic Acid	31,000	ND – 690,000	ND – 220,000
m-Toluic Acid	31,000	ND – 450,000	ND – 150,000
p-Toluic Acid	31,000	ND – 32,000	ND – 240,000
4,4'-DDE	ND	ND	ND – 0.61
Inorganics:			
Aluminum	-----	107 – 10,700	36 – 32,500
Arsenic	25	ND – 910	ND – 631
Cobalt	-----	ND – 42.4	ND – 73
Lead	25	ND – 122	ND – 128

TABLE 1.6
SUMMARY OF ANALYTES IDENTIFIED
IN DEEP BEDROCK GROUNDWATER (AEC 4)

Contaminants of Concern	SCG's (ppb)	Round 1 μg/L (ppb) Range	Round 2 μg/L (ppb) Range
Volatiles:			
1,2-Dichloroethene (total)	5	ND – 94	ND – 4
Toluene	5	ND – 23	ND – 4
Xylenes (total)	5	ND – 520	ND – 330
Semi Volatiles:			
Phenol	1	ND – 22	ND – 35
o-Toluic Acid	31,000	ND – 47,000	ND – 17,000
m-Toluic Acid	31,000	ND – 37,000	ND – 17,000
p-Toluic Acid	31,000	ND – 3,900	ND – 1,300
4,4'-DDE	ND	ND	ND – 0.14
Inorganics:			
Aluminum	-----	ND – 289	789 – 2,240
Arsenic	25	ND – 90.5	ND – 149
Nickel	-----	ND – 134	ND - 68

Tables source, NYSDEC Amended Record of Decision December 2001 for SMC Site Skaneateles Falls NY.

POLYSCIENCE -- DIELDRIN, 510C-12
MATERIAL SAFETY DATA SHEET
NSN: 681000N047403
Manufacturer's CAGE: 58378
Part No. Indicator: A
Part Number/Trade Name: DIELDRIN, 510C-12

General Information

Company's Name: POLYSCIENCE
Company's Street: 7800 MERRIMAC AVE
Company's City: NILES
Company's State: IL
Company's Country: US
Company's Zip Code: 60648
Company's Emerg Ph #: 321-965-0611
Company's Info Ph #: 321-965-0611
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 01MAR92
Safety Data Review Date: 14NOV95
MSDS Serial Number: BTYBT
Hazard Characteristic Code: T3

Ingredients/Identity Information

Proprietary: NO
Ingredient: 1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10- HEXACHLORO-6,7-EPOXY-1,4,4A,5,6,7,8,8A-OCTAHYDRO, ENDO, EXO-; (ING 2)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: IO1750000
CAS Number: 60-57-1
OSHA PEL: 0.25 MG/M3, S
ACGIH TLV: 0.25 MG/M3, S

Proprietary: NO
Ingredient: ING 1: (DIELDRIN (SARA III)
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Physical/Chemical Characteristics

Appearance And Odor: ORANGE-TAN POWDER
Melting Point: 289F,143C
Vapor Density (Air=1): 13.2

Fire and Explosion Hazard Data

Extinguishing Media: WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

Reactivity Data

Stability: YES

Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: STRONG OXIDIZING AGENTS.
Hazardous Decomp Products: TOXIC FUMES OF: CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN CHLORIDE GAS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: LD50:(ORAL,RAT) 38300 UG/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE: MAY BE FATAL IF INHALED, SWALLOWED, OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION. CARCINOGEN. MAY ALTER GENETIC MATERIAL. OVEREXP MAY CAUSE REPROD DISORDER(S) BASED ON TESTS W/LAB ANIMALS. TARGET ORGANS: CNS, LIVER, BLOOD. OVEREXP CAN CAUSE: MALAISE, HEADACHE, NAUSEA, VOMITING, DIZZ, (EFTS OF OVEREXP)
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT
Signs/Symptoms Of Overexp: HLTH HAZ: TREMORS, CLONIC AND TONIC CONVULSIONS, COMA, RESPIRATORY FAILURE.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYE/SKIN: FLUSH WITH COPIOUS AMOUNTS OF WATER REMOVE TO FRESH AIR. IF NOT BRTHG GIVE ARTF RESP. IF BRTHG IS DIFFICULT, GIVE OXYGEN. INGEST: WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN. WASH CONTAMINATED CLOTHING BEFORE REUSE.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS AND HEAVY RUBBER GLOVES. SWEEP UP, PLACE IN BAG AND HOLD FOR WASTE DISPOSAL. AVOID RAISING DUST. VENTILATE AREA AND WASH SPILL SITE AFTER MATL PICKUP IS COMPLETE.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISSOLVE OR MIX THE MATL W/A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL LAWS.
Precautions-Handling/Storing: DO NOT BREATHE DUST. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID PRLNGD/RPTD EXPOSURE. READILY ABSORBED THROUGH SKIN. HIGHTLY TOXIC. CARCINOGEN.
Other Precautions: MUTAGEN. REPRODUCTIVE HAZARD. KEEP TIGHLY CLOSED. STORE IN A COOL DRY PLACE. MAY CAUSE CANCER. MAY CAUSE HERITABLE GENETIC DAMAGE. VERY TOXIC BY INHALATION, IN CONTACT WITH SKIN & IF SWALLOWED.IF YOU FEEL UNWELL, SEEK MED ADVICE.

Control Measures

Respiratory Protection: WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation: USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves: CHEMICAL-RESISTANT GLOVES.
Eye Protection: ANSI APPROVED CHEM WORK GOGG (FP N).
Other Protective Equipment: PROTECTIVE CLOTHING. ANSI APPROVED SAFETY SHOWER AND EYE BATH (FP N).
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 26JAN94
Label Date: 19JAN94
Label Status: G
Common Name: DIELDRIN, 510C-12
Chronic Hazard: YES
Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Severe: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE: MAY BE FATAL IF INHALED, SWALLOWED OR MALAISE, HEADACHE, NAUSEA, VOMITING, DIZZINESS, TREMORS, CLONIC AND TONIC CONVULSIONS, COMA, RESPIRATORY FAILURE. CHRONIC: CARCINOGEN. MAY ALTER GENETIC MATERIAL. OVEREXPOSURE MAY CAUSE REPRODUCTIVE DISORDER(S) BASED ON TESTS W/LAB ANIMALS. TARGET ORGANS: CNS, LIVER, BLOOD.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: POLYSCIENCE
Label Street: 7800 MERRIMAC AVE
Label City: NILES
Label State: IL
Label Zip Code: 60648
Label Country: US
Label Emergency Number: 321-965-0611

POLYSCIENCE -- ENDRIN, 510C-4

MSDS Safety Information

FSC: 6810
MSDS Date: 03/01/1992
MSDS Num: BSTJG
LIIN: 00N047396
Product ID: ENDRIN, 510C-4
MFN: 01
Responsible Party
Cage: IO526
Name: POLYSCIENCE
Address: 7800 MERRIMAC AVE
City: NILES IL 60648
Info Phone Number: 321-965-0611
Emergency Phone Number: 321-965-0611
Published: Y

Contractor Summary

Cage: IO526
Name: POLYSCIENCE
Address: 7800 MERRIMAC AVE
City: NILES IL 60714
Phone: 708-965-0611
Cage: 58378
Name: POLYSCIENCE CORP
Address: 7800 N MERRIMAC AVE
Box: 48312
City: NILES IL 60714-3426
Phone: 708-965-0611

Ingredients

Cas: 72-20-8
RTECS #: IO1575000
Name: 1,4:5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10-HEXACHLORO-6, 7-EPOXY-1, 4,4A,5,6,7,8,8A- OCTAHYDRO-, ENDO, ENDO-;
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)
EPA Rpt Qty: 1 LB
DOT Rpt Qty: 1 LB

Name: ING 1: (ENDRIN) (MFR CAS # 105208-85-3)

Health Hazards Data

LD50 LC50 Mixture: LD50:(ORAL,RAT)3 MG/KG
Route Of Entry Inds - Inhalation: YES
Skin: YES
Ingestion: NO
Carcinogenicity Inds - NTP: NO
IARC: NO
OSHA: NO
Effects of Exposure: ACUTE: MAY BE FATAL IF INHALED, SWALLOWED/ABSORBED THRU SKIN. READILY ABSORBED THRU SKIN. EXPOSURE CAN CAUSE: WEAKNESS, NAUSEA, TWITCHING AND TINGLING OF LIMBS, DEAFNESS AND METAL CONFUSION, CONVULSIO NS, SOMETIMES ACCOMPANIED BY VIOLENT MUSCULAR CONTRACTIONS AND PERIODS OF UNCON MAY ALSO OCCUR. (EFTS OF OVEREXP)

Explanation Of Carcinogenicity: NOT RELEVANT
Signs And Symptions Of Overexposure: HLTH HAZ: CHRONIC: CONTAINS A RADIOACTIVE ISOTOPE WHICH MAY PRODUCE CANCER AND GENETIC MUTATION. TARGET ORGAN(S): NERVES, LIVER.
Medical Cond Aggravated By Exposure: NONE SPECIFIED BY MANUFACTURER.
First Aid: SKIN: OBTAIN MED ATTN IMMED. INGEST: WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN. INHAL: REMOVE TO FRESH AIR. IF BREATHNG BECOMES DIFFICULT, CALL A PHYSICIAN. EYES: FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING BY SEPARATING EYELIDS W/FINGERS. CALL A PHYSICIAN.

Handling and Disposal

Spill Release Procedures: EVAC AREA. WEAR NIOSH/MSHA APPRVD SCBA, RUBB BOOTS & HEAVY RUBB GLOVES. COVER W/AN ACTIVATED CARBON ABSORB, TAKE UP & PLACE IN CLSD CONTRS. TRANSPORT OUTDOORS. VENT AREA & WASH SPILL SITE AFTER MATL P ICKUP IS COMPLETE. HNDLE AS A RADIOACTIVE SPILL.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Methods: DISPOSE OF SPILLED MATERIAL AS RADIOACTIVE WASTE. CONSULT LOCAL, STATE AND FEDERAL REGULATIONS ON DISPOSAL OF RADIOACTIVE WASTE. OBSERVE ALL FEDERAL, STATE, AND LOCAL LAWS.
Handling And Storage Precautions: DO NOT BREATHE VAPOR. RADOIACTIVE MATERIAL. CAN CAUSE DEPRESSION.
Other Precautions: VERY TOXIC BY INHALATION, IN CONTACT W/SKIN AND IF SWALLOWED. IRRITATING TO EYES, RESP SYS AND SKIN. KEEP AWAY FROM SOURCES OF IGNITION. NO SMOKING.

Fire and Explosion Hazard Information

Extinguishing Media: USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.
Fire Fighting Procedures: WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire/Explosion Hazard: EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED SCBA SHOULD BE WORN.
Ventilation: USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves: HEAVY RUBBER GLOVES.
Eye Protection: ANSI APPRVD CHEM WORK GOGGLES (SUPP)
Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health: EYE PROT: WITH FULL LENGTH FACESHIELD (FP N).

Physical/Chemical Properties

HCC: T2
Appearance and Odor: NONE SPECIFIED BY MANUFACTURER.

Reactivity Data

Stability Indicator: YES
Stability Condition To Avoid: NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: STRONG OXIDIZING AGENTS, ACIDS.
Hazardous Decomposition Products: TOXIC FUME OF: CARBON MONOXIDE, CARBON DIOXIDE. HYDROGEN CHLORIDE GAS.
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: NOT RELEVANT

Toxicological Information
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Ecological Information
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MSDS Transport Information
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Regulatory Information
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Other Information
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HAZCOM Label
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Product ID: ENDRIN, 510C-4
Cage: IO526
Assigned IND: Y
Company Name: POLYSCIENCE
Street: 7800 MERRIMAC AVE
City: NILES IL
Zipcode: 60714
Health Emergency Phone: 321-965-0611
Label Required IND: Y
Date Of Label Review: 01/19/1994
Status Code: C
Label Date: 01/19/1994
Origination Code: G
Chronic Hazard IND: Y
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: DANGER
Respiratory Protection IND: YES
Health Hazard: Severe
Contact Hazard: Severe
Fire Hazard: None
Reactivity Hazard: None
Hazard And Precautions: RADIOACTIVE MATERIAL. KEEP FROM IGNITION SOURCES. ACUTE: MAY BE FATAL IF INHALED, SWALLOWED OR ABSORBED THRU SKIN. EXPOSURE CAN CAUSE: WEAKNESS, NAUSEA, TWITCHING AND TINGLING OF LIMBS, DEAFNESS AND M ENTAL CONFUSION, CONVULSIONS, SOMETIMESACCOMPANIED BY VIOLENT MUSCULAR CONTRACTIONS AND PERIODS OF UNCONSCIOUSNESS MAY ALSO OCCUR. CHRONIC: CONTAINS A RADIOACTIVE ISOTOPE WHICH MAY PRODUCE CANCER AND GENETIC MUTATION. TARGET ORGANS: NERVES, LIVER.
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Disclaimer (provided with this information by the compiling agencies): This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever expressly or implied warrants, states, or intends said information to have any application, use or viability by or to any person or persons outside the Department of Defense nor any person or persons contracting with any instrumentality of the United States of America and disclaims all liability for such use. Any person utilizing this instruction who is not a military or civilian employee of the United States of America should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation regardless of similarity to a corresponding Department of Defense or other government situation.

CHEM SERVICE -- F910 METHOXYCHLOR
MATERIAL SAFETY DATA SHEET
NSN: 655000F051063
Manufacturer's CAGE: 8Y898
Part No. Indicator: A
Part Number/Trade Name: F910 METHOXYCHLOR

General Information

Company's Name: CHEM SERVICE INC
Company's Street: 660 TOWER LN
Company's P. O. Box: 3108
Company's City: WEST CHESTER
Company's State: PA
Company's Country: US
Company's Zip Code: 19381-3108
Company's Emerg Ph #: 215-386-2100/215-692-3026
Company's Info Ph #: 215-692-3026/800-452-9994
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 25JAN95
Safety Data Review Date: 19SEP96
Preparer's Company: CHEM SERVICE INC
Preparer's St Or P. O. Box: 660 TOWER LN
Preparer's City: WEST CHESTER
Preparer's State: PA
Preparer's Zip Code: 19381-3108
MSDS Serial Number: CCDMW

Ingredients/Identity Information

Proprietary: NO
Ingredient: METHOXYCHLOR (IARC CARCINOGEN - GROUP 3) *96-3*
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: KJ3675000
CAS Number: 72-43-5
OSHA PEL: 15 MG/CUM
ACGIH TLV: 10 MG/CUM

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS CRYSTALLINE SOLID W/FRUITY/PLEASANT ODOR
Melting Point: 186.8-192F
Solubility In Water: INSOLUBLE

Fire and Explosion Hazard Data

Extinguishing Media: CO2, DRY CHEMICAL POWDER/SPRAY

Reactivity Data

Stability: YES
Materials To Avoid: STRONG OXIDIZING AGENTS
Hazardous Poly Occur: NO

Health Hazard Data

LD50-LC50 Mixture: ORAL LD50(RAT): 6000 MG/KG
Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: SKIN/EYES: CAN CAUSE IRRITATION. CAN BE IRRITATING TO MUCOUS MEMBRANES. MAY BE HARMFUL IF ABSORBED THROUGH THE SKIN, INHALED/IF SWALLOWED. EXPOSURE CAN CAUSE KIDNEY/LIVER DAMAGE.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION
IF NO BURNS HAVE OCCURRED, CLEANSE W/SOAP & WATER. INHALATION: REMOVE TO FRESH AIR. GIVE OXYGEN/CPR IF NEEDED. IF IN SHOCK, KEEP WARM/QUIET. INGESTION: INDUCE VOMITING. DON'T GIVE LIQUIDS/INDUCE VOMITING IF UNCONSCIOUS/CONVULSING. IF VOMITING, WATCH CLOSELY TO MAKE SURE AIRWAY DOESN'T BECOME OBSTRUCTED BY VOMIT. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE AREA. WEAR OSHA REGULATED EQUIPMENT. VENTILATE AREA. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.
Waste Disposal Method: BURN IN A CHEMICALS INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER/DISPOSE OF IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS.
Precautions-Handling/Storing: KEEP TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS. THIS PRODUCT IS FURNISHED FOR LABORATORY USE ONLY.
Other Precautions: AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATHE VAPORS. PRODUCT MAY NOT BE USED AS DRUGS, COSMETICS, AGRICULTURAL/ PESTICIDAL PRODUCTS, FOOD ADDITIVES/AS HOUSEHOLD CHEMICALS.

Control Measures

Respiratory Protection: USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.
Ventilation: THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Eye Protection: EYE SHIELDS
Work Hygienic Practices: REMOVE/Llaunder CONTAMINATED CLOTHING BEFORE REUSE. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY.
Suppl. Safety & Health Data: PERSONS NOT SPECIFICALLY/PROPERLY TRAINED SHOULDN'T HANDLE THIS CHEMICAL/ITS CONTAINER. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS-AVOID DIRECT PHYSICAL CONTACT. DATA INFORMATION IS FOR ACETONE.

Transportation Data

Disposal Data

Label Data

CHEM SERVICE INC -- PENTACHLOROPHENOL, F64

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MSDS Safety Information

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FSC: 6810
MSDS Date: 01/25/1995
MSDS Num: BZSLC
LIIN: 00N069936
Product ID: PENTACHLOROPHENOL, F64
MFN: 01
Responsible Party
Cage: 84898
Name: CHEM SERVICE INC
Box: 3108
City: WEST CHESTER PA 19381
Info Phone Number: 610-692-3026
Emergency Phone Number: 610-692-3026
Published: Y

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Contractor Summary

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Cage: 84898
Name: CHEM SERVICE INC
Box: 3108
City: WEST CHESTER PA 19381
Phone: 215-692-3026
Cage: 8Y898
Name: CHEM SERVICE, INC
Address: 660 TOWER LN
Box: 599
City: WEST CHESTER PA 19301-9650
Phone: 610-692-3026

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Ingredients

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Cas: 87-86-5
RTECS #: SM6300000
Name: PHENOL, PENTACHLORO-; (PENTACHLOROPHENOL) (SARA 313) (CERCLA)
% Wt: 100
OSHA PEL: 0.5 MG/M3, S
ACGIH TLV: 0.5 MG/M3, S
EPA Rpt Qty: 10 LBS
DOT Rpt Qty: 10 LBS

Name: SUPDAT: CAN CAUSE NERVOUS SYS INJURY. CAN CAUSE GEN FEELING OF DISORIENTATION. CAN CAUSE CONVULSIONS. EXPOS CAN

Name: ING 2: CAUSE LIVER DMG. EXPOS CAN CAUSE KINDEY DMG. MAY BE CONTAMD W/DIOXINS.

Name: FIRST AID PROC: STOPPED ADMIN ARTF RESP. IF IN CARD ARREST ADMIN CPR. CONTINUE LIFE SUPPORT MEASURES UNTIL MED

Name: ING 4: ASSISTANCE HAS ARRIVED. REMOVE & WASH CONTAMD CLTHG. IF EXHIBITING SIGNS OF SHOCK-KEEP WARM & QUIET.

Name: ING 5: INGEST: CNTCT POIS CTL CTR IMMED IF NEC. DO NOT ADMIN LIQS/INDUCE VOMIT TO UNCON OR CONVULSING PERSON.

Name: ING 6: IF VOMIT-WATCH CLOSELY TO MAKE SURE AIRWAY DOES NOT BECOME

OBSTRUCTED BY VOMIT. GET MED ATTN IF NEC.

Name: EYE PROT: AND FULL LENGTH FACESHIELD (FP N).

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Health Hazards Data

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LD50 LC50 Mixture: LD50: (ORAL, RAT) 50 MG/KG

Route Of Entry Inds - Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Inds - NTP: NO

IARC: YES

OSHA: NO

Effects of Exposure: ALL CHEMS SHOULD BE CONSIDERED HAZ-AVOID DIRECT PHYSICAL CNTCT! MAY BE FATAL IF ABSORBED THRU SKIN, INHALED OR SWALLOWED! POSS TERATOGEN-CAUSES EMBRYO-FETAL DMG. CAN CAUSE EYE & SKIN IRRIT. DUST &/OR VAPS CAN CAUSE IRRIT TO RESP TRACT. CANBE IRRIT TO MUC MEMBS. CAN CAUSE ALLERGIC SKIN RXN. CAN CAUSE (EFTS OF OVEREXP)

Explanation Of Carcinogenicity: PHENOL, PENTACHLORO-: IARC MONO ON EVAL OF CARCIN RISK OF CHEMS TO MAN, VOL 53, PG 371, 1991:GROUP 2B. ANIMAL:LIVER

Signs And Symptions Of Overexposure: HLTH HAZ:ALLERGIC SKIN RXN. CAN CAUSE SENSIT BY SKIN CNTCT. CAN CAUSE ALLERGIC RESP RXN. EXPOS CAN CAUSE LIVER DMG, KIDNEY DMG. VAPS CAN CAUSE SEV EYE INFLAM & SWELL OF ADJOINING TISS. MAY BE RAPIDLY ABSORBED THRU SKIN W/POTNTL ADVERSE HLTH EFTS. BASED ON TOX OF CMPDS OF SIMILAR STRUCTURE THIS MATL IS PROBABLY (SUPDAT)

Medical Cond Aggravated By Exposure: NONE SPECIFIED BY MANUFACTURER.

First Aid: AN ANTIDOTE IS SUBSTANCE INTENDED TO COUNTERACT EFT OF POIS. IT SHOULD BE ADMIN ONLY BY MD OR TRAINED EMER PERS. MED ADVICE CAN BE OBTAINED FROM POIS CTL CTR. EYES: FLUSH CONTINUOUSLY W/WATER FOR AT L EAST 15-20 MIN. SKIN: FLUSH W/WATER FOR15-20 MIN. IF NO BURNS HAVE OCCURRED-USE SOAP & WATER TO CLEANSE SKIN. INHAL: REMOVE TO FRESH AIR. ADMIN OXYGEN IF HAVING DFCLTY BRTHG. IF BRTHG HAS

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Handling and Disposal

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Spill Release Procedures: EVACUATE AREA. WEAR APPROPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. SWEEP UP AND PLACE IN AN APPROPRIATE CONTAINER. HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Methods: DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS (FP N). BURN IN A CHEMICALS INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

Handling And Storage Precautions: DO NOT BREATHE VAPS. KEEP TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE. STORE ONLY W/COMPAT CHEMICALS. CONTACT LENSES SHOULD NOT BE WORN IN THE LAB.

Other Precautions: PERSONS NOT SPECIFICALLY & PROPERLY TRAINED SHOULD NOT HANDLE THIS CHEM OR ITS CNTNR. PROD IS FURNISHED FOR LAB USE ONLY! PRODS MAY NOT BE USED AS DRUGS, COSMETICS, AGRICULTURAL OR PESTICIDAL PRODS, F OOD ADDITIVES OR AS HOUSEHOLD CHEMS.

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Fire and Explosion Hazard Information

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Extinguishing Media: CARBON DIOXIDE, DRY CHEMICAL POWDER OR SPRAY.

Fire Fighting Procedures: USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire/Explosion Hazard: NONE SPECIFIED BY MANUFACTURER.

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Control Measures

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Respiratory Protection: USE APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.

Ventilation: THIS CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPRVD CHEM WORKERS GOGGS
Other Protective Equipment: ANSI APPROVED EYE WASH & DELUGE SHOWER (FP N). USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.
Work Hygienic Practices: AVOID CONTACT WITH SKIN, EYES AND CLOTHING.
Supplemental Safety and Health: VP: 0.0001 @ 25C. EFTS OF OVEREXP: HIGHLY HAZ. CAN CAUSE DELAYED ADVERSE HLTH EFTS. CAN CAUSE DELAYED LUNG INJURY. CAUSES SNEEZING. PRLNGD EXPOS MAY CAUSE NAUS/HDCH/DIZZ &/OR EYE DMG. CAN CAUSE SKIN B URNS. CAN CAUSE SEV SKIN BURNS. CAN CAUSE CVS INJURY. RPTD EXPOS TO VAPS &/OR DUST CAN CAUSE EYE INJURY.

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Physical/Chemical Properties

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B.P. Text: >588F,>309C
M.P/F.P Text: >374F,>190C
Vapor Pres: SUPDAT
Spec Gravity: 1.978
Solubility in Water: INSOL (IMMISCIBLE)
Appearance and Odor: COLORLESS, CRYSTALLINE SOLID; PHENOL LIKE ODOR.

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Reactivity Data

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Stability Indicator: YES
Stability Condition To Avoid: READILY ABSORBED AND RETAINED ON CLOTHING AND/OR SHOES.
Materials To Avoid: INCOMPATIBLE WITH STRONG OXIDIZING AGENTS. REACTS WITH HALIDES AND ANHYDRIDES. INCOMPATIBLE WITH STRONG BASES.
Hazardous Decomposition Products: DECOMPOSITION LIBERATES TOXIC FUMES.
Hazardous Polymerization Indicator: NO
Conditions To Avoid Polymerization: NOT RELEVANT

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Toxicological Information

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Ecological Information

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MSDS Transport Information

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Regulatory Information

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Other Information

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HAZCOM Label

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Product ID: PENTACHLOROPHENOL, F64
Cage: 84898
Company Name: CHEM SERVICE INC
PO Box: 3108
City: WEST CHESTER PA
Zipcode: 19381
Health Emergency Phone: 610-692-3026
Label Required IND: Y
Date Of Label Review: 04/23/1996
Status Code: C
Label Date: 04/23/1996

Origination Code: G
Chronic Hazard IND: Y
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: DANGER
Respiratory Protection IND: YES
Health Hazard: Severe
Contact Hazard: Severe
Fire Hazard: Slight
Reactivity Hazard: None
Hazard And Precautions: HIGHLY TOXIC. ACUTE: MAY BE FATAL IF ABSORBED THROUGH SKIN, INHALED OR SWALLOWED. EYE, SKIN, RESPIRATORY TRACT AND MUCOUS MEMBRANE IRRITATION. ALLERGIC SKIN AND RESPIRATORY REACTION. SKIN SENSITIZATIO N. LIVER AND KIDNEY DAMAGE. EYE INFLAMMATION AND SWELLING OF ADJOINING TISSUES. DELAYED LUNG INJURY. SNEEZING, NAUSEA, HEADACHE, DIZZINESS AND/OR EYE DAMAGE. SEVERE SKIN BURNS. INJURY TO CARDIOVASCULA R AND NERVOUS SYSTEMS. DISORIENTATION, CONVULSIONS. CHRONIC: CANCER HAZARD. CONTAINS PENTACHLOROPHENOL WHICH IS LISTED AS AN ANIMAL LIVER CARCINOGEN (FP N).

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UNION OIL OF CALIFORNIA UNION -- PERCHLOROETHYLENE

MSDS Safety Information

FSC: 6810
NIIN: 00-819-1128
MSDS Date: 01/25/1990
MSDS Num: BJMFD
Product ID: PERCHLOROETHYLENE
MFN: 01
Responsible Party
Cage: DO716
Name: UNION OIL CO OF CALIFORNIA UNION CHEMICALS DIV
Address: 1900 E GOLF ROAD
City: SCHAUMBURG IL 60194-5021
Info Phone Number: 800-438-2968
Emergency Phone Number: 800-424-9300 CHEMTRC OR800-356-3129
Review Ind: Y
Published: Y

Contractor Summary

Cage: DO716
Name: UNION OIL CO OF CALIF;UNION CHEMICAL DIV
Address: 1345 NORTH MEACHAM ROAD
City: SCHAUMBURG IL 60196
Phone: 312-885-5450
Cage: 94684
Name: UNOCAL CHEMICALS DIV.,UNION OIL OF CALIFORNIA
Address: 1345 N MEACHAM
City: SCHAUMBURG IL 60196
Phone: 312-490-2500/800-424-9300(CHEMTREC)

Item Description Information

Item Manager: S9G
Item Name: TETRACHLOROETHYLENE,TECHNICAL
Specification Number: O-T-236
Type/Grade/Class: GRADE A
Unit of Issue: CN
Quantitative Expression: 00000000005GL
UI Container Qty: 1
Type of Container: CAN

Ingredients

Cas: 127-18-4
RTECS #: KX3850000
Name: PERCHLOROETHYLENE (TETRACHLOROETHYLENE) (SARA III)
% Wt: 100
Other REC Limits: NONE SPECIFIED
OSHA PEL: 100 PPM
ACGIH TLV: 25PPM/100,A3 STEL;94
EPA Rpt Qty: 100 LBS
DOT Rpt Qty: 100 LBS

Health Hazards Data

LD50 LC50 Mixture: ORAL LD50 (RAT) = 5000 MG/KG
Route Of Entry Inds - Inhalation: YES

Skin: YES
Ingestion: YES
Carcinogenicity Inds - NTP: YES
IARC: YES
OSHA: NO
Effects of Exposure: ACUTE: MAY CAUSE EYE & SKIN IRRITATION. MAY CAUSE RESPIRATORY TRACT IRRITATION. CENTRAL NERVOUS SYSTEM DEPRESSANT. LOSS OF CONSCIOUSNESS AND EVEN DEATH CAN OCCUR AT HIGH LEVELS OF EXPOSURE. CHRONIC:LIVER AND KIDNEY DAMAGE. ASPIRATION HAZARD DO NOT INDUCE VOMITING. PROBABLE CANCER HAZARD.
Explanation Of Carcinogenicity: LISTED AS A CARCINOGEN BY NTP AND IARC.
Signs And Symptions Of Overexposure: INCOORDINATION AND IMPAIRED JUDGMENT MAY OCCUR AT VAPOR EXPOSURES FROM 500-1000 PPM. DIZZINESS, DROWSINESS, AND GENERAL ANESTETHIC EFFECTS MAY OCCUR IN RANGES OF 1000 PPM AND HIGHER.
Medical Cond Aggravated By Exposure: EYE/SKIN/RESPIRATORY CONDITIONS MAY BE AGGRAVATED BY EXPOSURE. MAY CAUSE CANCER.
First Aid: INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE CPR. IF BREATHING IS DIFFICULT, GIVE OXYGEN. CALL A PHYSICIAN. EYE: FLUSH IMMEDIATELY WITH LARGE AMOUNTS OF WATER FOR 15 MINUTES. GET MEDICAL AT TENTION. SKIN: REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER PROMPTLY. INGESTION: DO NOT INDUCE VOMITING. GIVE MILK OR USP MINERAL OIL. GET IMMEDIATE MEDICAL ATTENTION.

Handling and Disposal

Spill Release Procedures: SMALL SPILL: WIPE UP WITH RAGS OR TOWELS. LARGE SPILLS: WEAR NIOSH APPROVED RESPIRATOR. VENTILATE AREA. DIKE TO RETAIN FLUID. PUMP UP FREE LIQUID. RESIDUE WILL EVAPORATE QUICKLY. DO NOT FLUSH TO SEWER OR WATERWAY.
Neutralizing Agent: NONE
Waste Disposal Methods: CLEAN-UP DEBRIS WILL LIKELY BE A LAND-BANNED HAZARDOUS WASTE. DISPOSAL WILL BE IN ACCORD WITH APPLICABLE REGULATIONS.
Handling And Storage Precautions: STORE IN A COOL, DRY, WELL-VENTILATED LOCATION, AWAY FROM ANY AREA WHERE THE FIRE HAZARD MAY BE ACUTE. KEEP CONTAINERS CLOSED WHEN NOT IN USE.
Other Precautions: DO NOT USE WITH PRESSURIZED ALUMINUM SYSTEMS. READ AND FOLLOW DIRECTIONS ON LABEL. DO NOT REUSE CONTAINERS. AVOID WELDING, BRAZING, DRILLING, SOLDERING AND OTHER HIGH TEMPERATURE AND SPARK CONDITIONS AROUND THIS PRODUCT.

Fire and Explosion Hazard Information

Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, OR DRY CHEMICAL.
Fire Fighting Procedures: FIRE FIGHTERS SHOULD USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT WHEN FIGHTING CHEMICAL FIRE. USE WATER SPRAY TO COOL NEARBY CONTAINERS EXPOSED TO FIRE.
Unusual Fire/Explosion Hazard: FIRE OR EXCESSIVE HEAT MAY CAUSE PRODUCTION OF HAZARDOUS DECOMPOSITION PRODUCTS INCLUDING PHOSGENE AND HYDROGEN CHLORIDE.

Control Measures

Respiratory Protection: IN HIGH VAPOR AREA, USE NIOSH/MSHA APPROVED RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE. USE SELF-CONTAINED BREATHING APPARATUS IF ALLOWABLE VAPOR LEVELS ARE EXCEEDED.
Ventilation: LOCAL EXHAUST RECOMMENDED TO CONTROL VAPORS BELOW 50% OF TLV.
Protective Gloves: NEOPRENE, PVA GLOVES RECOMMENDED.
Eye Protection: USE CHEMICAL SAFETY GOGGLES.
Other Protective Equipment: APRON AND WORK CLOTHING TO MINIMIZE EXPOSURE. EYE WASH STATION & SAFETY SHOWER RECOMMENDED.
Work Hygienic Practices: WASH THOROUGHLY AFTER USE AND BEFORE EATING, SMOKING

OR USING TOILET FACILITIES. DO NOT BREATH VAPORS OR MIST.
Supplemental Safety and Health: TARGET ORGANS ARE SKIN, CNS, CVS, AND EYES.
STORE IN COOL,DRY PLACE.

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Physical/Chemical Properties

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HCC: T4
B.P. Text: 250F,121C
Decomp Text: UNKNOWN
Vapor Pres: 14
Vapor Density: 5.8 AIR=1
Spec Gravity: 1.620
Evaporation Rate & Reference: 2.10 (N-BUTYL ACETATE=1)
Appearance and Odor: CLEAR, COLORLESS LIQUID,CHARACTERISTIC "DRY CLEANING" ODOR
Percent Volatiles by Volume: 100
Corrosion Rate: UNKNOWN

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Reactivity Data

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Stability Indicator: YES
Stability Condition To Avoid: HIGH TEMPERATURES, SPARKS, AND OPEN FLAMES. HIGH PRESSURE ALUMINUM SYSTEMS.
Materials To Avoid: STRONG OXIDIZING AGENTS. ACTIVE METALS (SODIUM, POTASSIUM, LITHIUM, ZINC, ALUMINUM, BARIUM ETC.)
Hazardous Decomposition Products: WHEN INVOLVED IN FIRE, TETRACHLOROETHANE EMITS HIGHLY TOXIC AND IRRITATING HYDROGEN CHLORIDE AND PHOSGENE FUMES.
Hazardous Polymerization Indicator: NO

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Toxicological Information

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Ecological Information

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MSDS Transport Information

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Regulatory Information

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Other Information

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Transportation Information

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Responsible Party Cage: DO716
Trans ID NO: 86828
Product ID: PERCHLOROETHYLENE
MSDS Prepared Date: 01/25/1990
Review Date: 01/22/1991
MFN: 1
Net Unit Weight: 67 LBS
Multiple KIT Number: 0
Review IND: Y
Unit Of Issue: CN
Container QTY: 1
Type Of Container: CAN

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Detail DOT Information

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DOT PSN Code: NYB
DOT Proper Shipping Name: TETRACHLOROETHYLENE
Hazard Class: 6.1
UN ID Num: UN1897
DOT Packaging Group: III
Label: KEEP AWAY FROM FOOD
Special Provision: N36,T1
Packaging Exception: 153
Non Bulk Pack: 203
Bulk Pack: 241
Max Qty Pass: 60 L
Max Qty Cargo: 220 L
Vessel Stow Req: A
Water/Ship/Other Req: 40

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Detail IMO Information

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IMO PSN Code: OJV
IMO Proper Shipping Name: TETRACHLOROETHYLENE
IMO PSN Modifier: P
IMDG Page Number: 6264
UN Number: 1897
UN Hazard Class: 6.1
IMO Packaging Group: III
Subsidiary Risk Label: -
EMS Number: 6.1-02
MED First Aid Guide NUM: 340

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Detail IATA Information

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IATA PSN Code: XOW
IATA UN ID Num: 1897
IATA Proper Shipping Name: TETRACHLOROETHYLENE
IATA UN Class: 6.1
IATA Label: TOXIC
UN Packing Group: III
Packing Note Passenger: 605
Max Quant Pass: 60L
Max Quant Cargo: 220L
Packaging Note Cargo: 612

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Detail AFI Information

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AFI PSN Code: XOW
AFI Proper Shipping Name: TETRACHLOROETHYLENE
AFI Hazard Class: 6.1
AFI UN ID NUM: UN1897
AFI Packing Group: III
Special Provisions: P5, N36
Back Pack Reference: A10.5

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HAZCOM Label

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Product ID: PERCHLOROETHYLENE
Cage: DO716
Assigned IND: Y
Company Name: UNION OIL CO OF CALIF;UNION CHEMICAL DIV
Street: 1345 NORTH MEACHAM ROAD
City: SCHAUMBURG IL
Zipcode: 60196

Health Emergency Phone: 800-424-9300 CHEMTRC OR800-356-3129
Label Required IND: Y
Date Of Label Review: 01/22/1991
Status Code: C
Label Date: 01/22/1991
Origination Code: F
Chronic Hazard IND: Y
Eye Protection IND: YES
Skin Protection IND: YES
Signal Word: WARNING
Respiratory Protection IND: YES
Health Hazard: Moderate
Contact Hazard: Slight
Fire Hazard: Slight
Reactivity Hazard: None
Hazard And Precautions: ACUTE: MAY CAUSE EYE & SKIN IRRITATION. MAY CAUSE RESPIRATORY TRACT IRRITATION. CENTRAL NERVOUS SYSTEM DEPRESSANT. LOSS OF CONSCIOUSNESS AND EVEN DEATH CAN OCCUR AT HIGH LEVELS OF EXPOSURE. CHRONIC:LI VER AND KIDNEY DAMAGE. ASPIRATION HAZARD DO NOT INDUCE VOMITING. PROBABLE CANCER HAZARD. SMALL SPILL: WIPE UP WITH RAGS OR TOWELS. LARGE SPILLS: WEAR NIOSH APPROVED RESPIRATOR. VENTILATE AREA. DIKE TO RETAIN FLUID. PUMP UP FREE LIQUID. RESIDUE WILL EVAPORATE QUICKLY. DO NOT FLUSH TO SEWER OR WATERWAY. STORE IN A COOL, DRY, WELL-VENTILATED LOCATION, AWAY FROM ANY AREA WHERE THE FIRE HAZARD MAY BE A CUTE. KEEP CONTAINERS CLOSED WHEN NOT IN USE.

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MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Rod 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.

PHENOL, CRYSTALS

MSDS Number: P1949 --- ***Effective Date: 08/02/00***

1. Product Identification

Synonyms: Carbolic acid; Phenic acid; Phenylic acid; Hydroxybenzene; Phenol, fused; Monohydroxybenzene; Phenol, solid
CAS No.: 108-95-2
Molecular Weight: 94.11
Chemical Formula: C6H5OH
Product Codes:
J.T. Baker: 2858, 2862, 4056
Mallinckrodt: 0028, 0052, 0273, 0605, H602

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Phenol	108-95-2	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. RAPIDLY ABSORBED THROUGH SKIN.

CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. COMBUSTIBLE.

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

Health Rating: 3 - Severe (Life)
Flammability Rating: 2 - Moderate
Reactivity Rating: 1 - Slight
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red Stripe (Store Separately)

Potential Health Effects

The major hazard of phenol is its ability to penetrate the skin rapidly, particularly when liquid, causing severe injury which can be fatal. Phenol also has a strong corrosive effect on body tissue causing severe chemical burns. Due to its local anesthetizing properties, skin burns may be painless.

Inhalation:
Breathing vapor, dust or mist results in digestive disturbances (vomiting, difficulty in swallowing, diarrhea, loss of appetite). Will irritate, possibly burn respiratory tract. Other symptoms listed under ingestion may also occur.
Ingestion:
Poison. Symptoms may include burning pain in mouth and throat, abdominal pain, nausea, vomiting, headache, dizziness, muscular weakness, central nervous system effects, increase in heart rate, irregular breathing, coma, and possibly death. Acute exposure is also associated with kidney and liver damage. Ingestion of 1 gram has been lethal to humans.
Skin Contact:
Corrosive. Rapidly absorbed through the skin with systemic poisoning effects to follow. Discoloration and severe burns may occur, but may be disguised by a loss in pain sensation.

Eye Contact:
Corrosive. Eye burns with redness, pain, blurred vision may occur. May cause severe damage and blindness.
Chronic Exposure:
Repeated exposure may cause symptoms described for acute poisoning as well as eye and skin discoloration.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin, eye or central nervous system disorders, or impaired liver, kidney, or pulmonary function may be more susceptible to the effects of this substance.

4. First Aid Measures

IN CASE OF PHENOL POISONING, start first aid treatment immediately, then get medical attention. People administering first aid should take precautions to avoid contact with phenol. A phenol antidote kit (castor oil or other vegetable oil, polyethylene glycol 300) should be available in any phenol work area. Actions to be taken in case of phenol poisoning should be planned and practiced before beginning work with phenol. Castor oil and or polyethylene glycol can be given by a first responder before medical help arrives.

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

Ingestion:
If swallowed, immediately administer castor oil or other vegetable oil. Never give anything by mouth to an unconscious person. Be ready to induce vomiting at the advice of physician or poison control center. Castor oil (or vegetable oil) dosage should be between 15 and 30 cc. Get medical attention immediately.

Skin Contact:
In case of skin contact, immediately flush skin with large amounts of water while removing contaminated clothing and shoes. As soon as possible, repeatedly apply polyethylene glycol to affected area. Destroy contaminated clothing and shoes. Flush skin with water for at least 30 minutes. It is very important to avoid rubbing or wiping affected parts which would aggravate irritation and cause product dispersion. Continue treatment until the burned area changes color from white to pink. Expect that this can take a long period of time (20 minutes or more). The polyethylene glycol application should be done during transportation to the hospital. If polyethylene glycol is not available, flush with water for at least 30 minutes prior to going to hospital. 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.

Note to Physician:
Treat ingestion with gastric lavage using 40% aqueous Bacto-Peptone, milk or water until phenolic odor is eliminated. Then give 15 to 50 cc castor or vegetable oil. Debride necrotic skin. Monitor vital signs, fluid status, electrolytes, BUN, renal and hepatic function, and electrocardiogram. Manage sedation, seizures, renal failure, and fluid electrolyte imbalances symptomatically as indicated.

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5. Fire Fighting Measures

Fire:
Flash point: 79C (174F) CC
Autoignition temperature: 715C (1319F)
Flammable limits in air % by volume:
lel: 1.3; uel: 8.6
Combustible. Contact with strong oxidizers may cause fire.

Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Sealed containers may rupture when heated.

Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide. 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

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. Do not flush to the sewer. Dry lime or soda ash may be used on spill for neutralization. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage. Store separately from reactive or combustible materials, and out of direct sunlight. Avoid dust formation and control ignition sources. Employ grounding, venting and explosion relief provisions in accord with accepted engineering practices in any process capable of generating dust and/or static electricity. Empty only into inert or non-flammable atmosphere. Emptying contents into a non-inert atmosphere where flammable vapors may be present could cause a flash fire or explosion due to electrostatic discharge. All phenol workers should be properly trained on its hazards and the proper protective measures required. This training should also include emergency actions. All phenol operations should be enclosed to eliminate any potential exposure routes. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Phenol:
-OSHA Permissible Exposure Limit (PEL):
5 ppm (TWA) (skin)

-ACGIH Threshold Limit Value (TLV):
5 ppm (TWA) (skin)
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, a full facepiece respirator with organic vapor cartridge and dust/mist 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. 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.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Butyl rubber and neoprene are suitable materials for personal protective equipment.

Eye Protection:

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

9. Physical and Chemical Properties

Appearance:
Colorless to light pink crystals.
Odor:
Sharp, medicinal, sweet, tarry.
Solubility:
1 g/15 ml of water; very soluble in alcohol.
Specific Gravity:
1.06 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
182C (360F)
Melting Point:
43C (109F)
Vapor Density (Air=1):
3.2
Vapor Pressure (mm Hg):
0.4 @ 20C (68F)
Evaporation Rate (BuAc=1):
< 0.01

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Heat will contribute to instability.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition. Toxic gases and vapors may be released if involved in a fire.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Oxidizers, aluminum chloride and nitrobenzene, calcium hypochlorite, butadiene, halogens, formaldehyde, mineral oxidizing acids, isocyanates, sodium nitrite and many other materials. Hot liquid phenol will attack aluminum, magnesium, lead, and zinc metals.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 317 mg/Kg; skin rabbit LD50:630 mg/kg; inhalation rat LC50: 316 mg/m3; irritation data: skin rabbit, standard Draize, 500 mg/24H severe; eye rabbit, standard Draize 5 mg/30S rinse, mild. Investigated as a tumorigen, mutagen, reproductive effector.

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

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Phenol (108-95-2)	No	No	3

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is not expected to leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into water, this material is not expected to evaporate significantly. When released into water, this material is expected to have a half-life between 10 and 30 days. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be moderately degraded by photolysis. When released into the air, this material is expected to have a half-life of less than 1 day.
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

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: PHENOL, SOLID
Hazard Class: 6.1
UN/NA: UN1671
Packing Group: II
Information reported for product/size: 2KG

International (Water, I.M.O.)

Proper Shipping Name: PHENOL, SOLID
Hazard Class: 6.1
UN/NA: UN1671
Packing Group: II
Information reported for product/size: 2KG

International (Air, I.C.A.O.)

Proper Shipping Name: PHENOL, SOLID
Hazard Class: 6.1
UN/NA: UN1671
Packing Group: II
Information reported for product/size: 2KG

15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Phenol (108-95-2)	Yes	Yes	Yes	Yes

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

	--Canada--

Ingredient	Korea	DSL	NDSL	Phil.
Phenol (108-95-2)	Yes	Yes	No	Yes

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Phenol (108-95-2)	1000	500*	Yes	No

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Phenol (108-95-2)	1000	U188	No

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

Australian Hazchem Code: 2X
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: **4** Flammability: **2** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! MAY BE FATAL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. RAPIDLY ABSORBED THROUGH SKIN. CORROSIVE. CAUSES SEVERE BURNS TO EVERY AREA OF CONTACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. COMBUSTIBLE.
Label Precautions:
Do not breathe dust.
Do not get in eyes, on skin, or on clothing.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat, sparks and flame.
Label First Aid:
IN ALL CASES, GET MEDICAL ATTENTION IMMEDIATELY. KEEP A PHENOL ANTIDOTE KIT in area of product use or storage. Administer castor oil and/or polyethylene glycol per pre-planned directions. If swallowed, immediately administer castor oil or other vegetable oil. Never give anything by mouth to an unconscious person. In case of skin contact, immediately flush skin with large amounts of water while removing contaminated clothing and shoes. As soon as possible, repeatedly apply polyethylene glycol

to affected area. Destroy contaminated clothing and shoes. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes while lifting lower and upper eyelids.

Product Use:
Laboratory Reagent.

Revision Information:
No changes.

Disclaimer:
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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

MONSANTO -- ASKAREL CAT#:M-508A-1 & M-508A-2,(PCBS),AROCLOR - CAPACITOR,FIXED,PAPER
MATERIAL SAFETY DATA SHEET
NSN: 5910001974068
Manufacturer's CAGE: 76541
Part No. Indicator: B
Part Number/Trade Name: ASKAREL CAT#:M-508A-1 & M-508A-2,(PCBS),AROCLOR SERIES(SUPP)

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General Information

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Item Name: CAPACITOR,FIXED,PAPER DIELECTRIC
Company's Name: MONSANTO CO
Company's Street: 800 N LINDBERGH BLVD
Company's City: ST LOUIS
Company's State: MO
Company's Country: US
Company's Zip Code: 63167
Company's Emerg Ph #: 314-694-6661, CHEMTREC 800-424-9300
Company's Info Ph #: 314-694-6661
Distributor/Vendor # 1: ACCUSTANDARD INC (203-786-5290)
Distributor/Vendor # 1 Cage: 0U4A8
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 003
Status: FE
Date MSDS Prepared: 01SEP93
Safety Data Review Date: 28FEB95
Supply Item Manager: TX
Preparer's Company: (MSDS NO:G 4048)
MSDS Serial Number: BWMPP
Specification Number: UNKNOWN
Hazard Characteristic Code: T6
Unit Of Issue: EA
Unit Of Issue Container Qty: EACH
Type Of Container: CAPACITOR
Net Unit Weight: UNKNOWN

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: POLYCHLORINATED BIPHENYLS (PCBS) (SARA III)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: TQ1350000
CAS Number: 1336-36-3
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: 1 MG/M3; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CHLORODIPHENYL;42% CHLORINE (AROCHLOR 1242) (SARA III)
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: TQ1356000
CAS Number: 53469-21-9
OSHA PEL: S, 1 MG/M3
ACGIH TLV: S, 1MG/M3; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: AROCLOR 1248 (SARA III)
Ingredient Sequence Number: 03
NIOSH (RTECS) Number: TQ1358000

CAS Number: 12672-29-6
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CHLORODIPHENYL;54% CHLORINE (AROCHLOR 1254) (SARA III)
Ingredient Sequence Number: 04
NIOSH (RTECS) Number: TQ1360000
CAS Number: 11097-69-1
OSHA PEL: S, 0.5 MG/M3
ACGIH TLV: S, 0.5MG/M3; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: AROCLOR 1260 (SARA III)
Ingredient Sequence Number: 05
NIOSH (RTECS) Number: TQ1362000
CAS Number: 11096-82-5
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: AROCLOR 1221, 1232 (SARA III)
Ingredient Sequence Number: 06
NIOSH (RTECS) Number: TQ1350000
CAS Number: 1336-36-3
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: 1 MG/M3; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: AROCLOR 1016 (SARA III)
Ingredient Sequence Number: 07
NIOSH (RTECS) Number: TQ1351000
CAS Number: 12674-11-2
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: OTHERS
Ingredient Sequence Number: 08
NIOSH (RTECS) Number: 1010611OT
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED
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Physical/Chemical Characteristics

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Appearance And Odor: MOBILE OIL/VIS LIQ/STICKY RESIN;APHA COLOR 40/100/
150;DEPENDS ON AROCLOR SELECTD
Boiling Point: N/A
Melting Point: N/A
Vapor Pressure (MM Hg/70 F): VARIES
Specific Gravity: 1.18-1.56 VAR
Viscosity: VARIES
Autoignition Temperature: N/A
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Fire and Explosion Hazard Data

Flash Point: FIRE-RESISTANT
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: PCBS ARE FIRE-RESISTANT COMPOUNDS.
Special Fire Fighting Proc: STD FIREFIGHTING WEARING APPAREL & SCBA SHOULD BE WORN WHEN FIGHTING FIRES THAT INVOLVE POSSIBLE EXPO TO CHEM COMBUST PROD.CLEAN WELL/DECONTAMIN EQMPT AFT USE.
Unusual Fire And Expl Hazrds: IF PCB TRANSFORMER INVOLVED IN FIRE-RLATED INCIDENT OWENR OF TRANSFORMER MAY BE REQUIRED TO REPORT INCIDENT.CONSULT/ FOLLOW FED/STATE/LOC REGS.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MFG.
Materials To Avoid: NONE SPECIFIED BY MFG.
Hazardous Decomp Products: CO,CO2,HCL,PHENOLICS,ALDEHYDES & OTHER TOXIC COMBUST PRODS UNDER SEVERE CONDITIONS(EXPO TO FLAME/HOT SURFACE).
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

Health Hazard Data

LD50-LC50 Mixture: UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: REPEAT/PROLONG CONTACT MAY CAUSE CHLORACNE IN SOME PEOPLE.SKIN:ABSROBED THRU INTACT SKIN.LOC ACTION SIMILAR TO COMMON MODERATELY IRRIT.INGEST:SLIGHTLY TOXIC.INHAL:ANIMAL EXPERIMENTS SHOWED 54% CHLORINATED MATL PRODUCES MORE LIVER INJURY THAN 42%.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: PER MSDS:PCBS HAVE BEEN LISTED IN IARC GROUP 2B & IN NTP.
Signs/Symptoms Of Overexp: CHLORACNE. DRYING & CRACKING SKIN. MODERATELY EYE IRRITANT. SLIGHTLY TOXIC BY INGEST. LIVER INJURY.
Med Cond Aggravated By Exp: A POTENTIAL EXISTS FOR CONTRACTING OF CHLORACNE IN SOME PEOPLE.
Emergency/First Aid Proc: INGEST:CONSULT PHYSICIAN.DO NOT INDUCE VOMIT OR GIVE ANY OILY LAXATIVES.SKIN:IF LIQ/SOLID PCBS SPLASHED/SPILLED ON SKIN REMOVE CONTAMIN CLOTH.WASH SKIN THOROUGHLY W/SOAP/WATER.EYES:IRRIGATE IMMED W/COPIOUS QUANT OF RUNNING WTER FOR @LEAST 15MINS.PETROLATUM-BASED OPHTHALMIC OINTMENT MAY BE APPLIED TO RELIEVE IRRIT EFFECTS.INHAL:REMOVE TO FRESH AIR.IF RASH/RESP IRRIT PERSIST CALL PHYSICIAN.(SUPPLEM)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE NON-ESSENTIAL PERSONNEL.ADEQUATELY VENTILATED.CONTAIN SPILL/LEAK.PREVENT MATL ENTERING SEWER SYS/NAVIGABLE WATERWAYS/STREAMS.REMOVE BY MEANS OF ABSORPTIVE MATL(SAWDUST,VERMICULITE, DRYSAND,CLAY,DIRT,ETC)OR TRAP/REMOVE BY PUMPING.USE PPE.
Neutralizing Agent: NOT APPLICABLE
Waste Disposal Method: ALL WASTES/RESIDUES CONTAINING PCBS:COLLECT,PLACE IN PROPER CNTNR,MARK,DISPOSE IN MANNER PRESCRIBED BY EPA REGS(40CFR761)& APPLICABLE STATE/LOC REGS.VAR FED/STATE/LOC REGS REQUIRE REPORTING PCB SPILLS & CLEANUP LEVELS.CONSULT ATTORN/OFFICAILS.

Precautions-Handling/Storing: NONE SPECIFIED BY MFG.
Other Precautions: FED REGS UNDER TSCA REQUIRE PCBS AND PCB ITEMS TO BE MARKED.(CHECK REGS FOR DETAILS).AVOID BREATH VAP/MIST.PCB IN ELECT EQPMT REPORTED TO PROD PCDD & PCDF DURING FIRE SITUATIONS-FROM NON PCB CMPD-SEE EQMPT MFG.

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVE EQPMT WHEN AIRBORNE EXPO LIMITS EXCEEDED.FULL FACEPIECE EQMPT RECOMMENDED-CAN REPLACE FACESHIELD &/ OR CHEM SPLASH GOGG.CONSULT RESP MFG FOR TYP/CONDITIONS.OBSERVED RESP USE LIMITATIONS.SCBA/SUP AIR RESP.29CFR1910.134.
Ventilation: PROVIDE VENTI TO CONTROL EXPO LEVELS BELOW AIRBORNE EXO LIMITS.USE LOC MECHANICAL EXHAU VENTI @SOURCES OF AIR CONTAMIN.
Protective Gloves: APPROP GLOVES(VITON)SEE MFG FOR TYP/OPER
Eye Protection: CHEM SPLASH GOGGLES & FACE SHIELD
Other Protective Equipment: EYEBATHS/SAFT SHOWER.PROT CLOTHING FOR BARRIER.PROT APRON.
Work Hygienic Practices: LAUNDER CONTAMIN CLOTH BEF REUSE.CLEAN PROT EQPMT BEF REUSE.WASH THOROUGHLY AFT HANDLING.AVOID BREATH VAP/MIST,CONTACT.
Suppl. Safety & Health Data: 1016;1221;1232;1242;1248;1254;1260.FLPT:170C 1016;141 150C 1221;152-154C 1232;176-180C 1242;193-196C 1248;NONE 1254/ 1260.1STAID:DR:LG AMTS INGEST GASTRIC LAVAGE SUGGESTED.HOT PCBS MAY CAUSE THERMAL BURNS.IF ELECTR EQMPT ARCS OVER PCBS/OTHER CHLORINATED HYDROCARBON DIELECTRIC FLUIDS MAY DECOMPOSE TO PRODUCE HCL-RESP IRR

Transportation Data

Trans Data Review Date: 95059
DOT PSN Code: LWI
DOT Symbol: AW
DOT Proper Shipping Name: POLYCHLORINATED BIPHENYLS
DOT Class: 9
DOT ID Number: UN2315
DOT Pack Group: II
DOT Label: CLASS 9
IMO PSN Code: LZM
IMO Proper Shipping Name: POLYCHLORINATED BIPHENYLS
IMO Regulations Page Number: 9034
IMO UN Number: 2315
IMO UN Class: 9
IMO Subsidiary Risk Label: -
IATA PSN Code: UKT
IATA UN ID Number: 2315
IATA Proper Shipping Name: POLYCHLORINATED BIPHENYLS
IATA UN Class: 9
IATA Label: MISCELLANEOUS
AFI PSN Code: UKT
AFI Prop. Shipping Name: POLYCHLORINATED BIPHENYLS
AFI Class: 9
AFI ID Number: UN2315
AFI Pack Group: II
AFI Special Prov: A37
AFI Basic Pac Ref: 13-3

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 28FEB95
Label Status: F
Common Name: ASKAREL CAT#:M-508A-1 & M-508A-2,(PCBS),AROCLOR SERIES(SUPP)
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: REPEAT/PROLONG CONTACT MAY CAUSE CHLORACNE IN SOME PEOPLE.SKIN:ABSROBED THRU INTACT SKIN.LOC ACTION SIMILAR TO COMMON ORG MODERATELY IRRIT.INGEST:SLIGHTLY TOXIC.INHAL:ANIMAL EXPERIMENTS SHOWED 54% CHLORINATED MATL PRODUCES MORE LIVER INJURY THAN 42%.TARORG:SKIN/EYE/LIVER. REMOVE CONTAMIN CLOTH.WASH SKIN WELL W/SOAP/WATER.EYES:IRRIGATE IMMED W/ LOTS OF WATER @LEAST 15MIN.PETROLATUM-BASED OPHTHALMIC OINTMENT MAY BE APPLIED TO RELIEVE IRRIT EFFECTS.INHAL:REMOVE TO FRESH AIR.RASH/RESP IRRIT PERSIST CALL DR.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: MONSANTO CO
Label Street: 800 N LINDBERGH BLVD
Label City: ST LOUIS
Label State: MO
Label Zip Code: 63167
Label Country: US
Label Emergency Number: 314-694-6661, CHEMTREC 800-424-9300

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.

TOLUENE

MSDS Number: T3913 --- ***Effective Date: 11/02/01***

1. Product Identification

Synonyms: Methylbenzene; Toluol; Phenylmethane
CAS No.: 108-88-3
Molecular Weight: 92.14
Chemical Formula: C6H5-CH3
Product Codes: J.T. Baker: 5375, 5584, 5809, 5812, 9336, 9351, 9364, 9456, 9457, 9459, 9460, 9462, 9466, 9472, 9476
Mallinckrodt: 4483, 8091, 8092, 8604, 8608, 8610, 8611, V560

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Toluene	108-88-3	100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR

CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

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

Health Rating: 2 - Moderate
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 0 - None
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.
Ingestion:
Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.
Skin Contact:
Causes irritation. May be absorbed through skin.
Eye Contact:
Causes severe eye irritation with redness and pain.
Chronic Exposure:
Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired liver or kidney function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

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4. First Aid Measures

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.
Ingestion:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention

immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

Skin Contact:

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician 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.

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5. Fire Fighting Measures

Fire:

Flash point: 7C (45F) CC
Autoignition temperature: 422C (792F)
Flammable limits in air % by volume:
lel: 3.3; uel: 19
Flammable liquid and vapor!
Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire or explosion. Sensitive to static discharge.

Fire Extinguishing Media:

Dry chemical, foam or carbon dioxide. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

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. Water spray may be used to keep fire exposed containers cool.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. 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 SOLUSORB® solvent adsorbent is recommended for spills of this product.

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7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. 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.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Toluene:
- OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).
- ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) skin, A4 - Not Classifiable as a Human Carcinogen.

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

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator 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. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

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, colorless liquid.

Odor:
Aromatic benzene-like.
Solubility:
0.05 gm/100gm water @ 20C (68F).
Specific Gravity:
0.86 @ 20C / 4 C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
111C (232F)
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
3.14
Vapor Pressure (mm Hg):
22 @ 20C (68F)
Evaporation Rate (BuAc=1):
2.24

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, coatings.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Toxicological Data:
Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m3/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown some evidence of reproductive effects in laboratory animals.

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

---NTP Carcinogen---

Ingredient	Known	Anticipated	IARC Category
Toluene (108-88-3)	No	No	3

12. Ecological Information

Environmental Fate:
When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. Bioconcentration factor = 13.2 (eels).
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

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: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

International (Water, I.M.O.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294

Packing Group: II
Information reported for product/size: 390LB

15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Toluene (108-88-3)	Yes	Yes	Yes	Yes

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

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Toluene (108-88-3)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Toluene (108-88-3)	No	No	Yes	No

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

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Toluene (108-88-3)	1000	U220	No

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

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 3[Y]E
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR

CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Label Precautions:

Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.

Label First Aid:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head below hips to prevent aspiration into lungs. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 8.

Disclaimer:

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

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.

TRICHLOROETHYLENE

MSDS Number: T4940 --- *Effective Date: 09/14/00*

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride
CAS No.: 79-01-6
Molecular Weight: 131.39
Chemical Formula: C2HCl3
Product Codes:
J.T. Baker: 5376, 9454, 9458, 9464, 9473, 9474
Mallinckrodt: 8598, 8600, 8633

2. Composition/Information on Ingredients

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

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT.

SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

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

Health Rating: 3 - Severe (Cancer Causing)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.
Ingestion:
Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.
Skin Contact:
Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.
Eye Contact:
Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.
Chronic Exposure:
Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by

mouth to an unconscious person. Call a physician.

Skin Contact:

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

Eye Contact:

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

Note to Physician:

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

5. Fire Fighting Measures

Fire:

Autoignition temperature: 420C (788F)
Flammable limits in air % by volume:
lel: 8; uel: 12.5

Explosion:

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

Fire Extinguishing Media:

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

Special Information:

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

6. Accidental Release Measures

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

7. Handling and Storage

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

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Trichloroethylene:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA), 200 ppm (Ceiling),
300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) 100 ppm (STEL);
listed as A5, not suspected as a human carcinogen.

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

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

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

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:
Clear, colorless liquid.

Odor:
Chloroform-like odor.
Solubility:
Practically insoluble in water. Readily miscible in organic solvents.
Specific Gravity:
1.47 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
87C (189F)
Melting Point:
-73C (-99F)
Vapor Density (Air=1):
4.5
Vapor Pressure (mm Hg):
57.8 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.
Hazardous Decomposition Products:
May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.
Conditions to Avoid:
Heat, flame, ignition sources, light, moisture, incompatibles

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11. Toxicological Information

Toxicological Data:
Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
This material has been linked to mutagenic effects in humans.

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

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

12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

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

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 5GL

International (Water, I.M.O.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III

Information reported for product/size: 5GL

International (Air, I.C.A.O.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 5GL

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15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Trichloroethylene (79-01-6)	Yes	Yes	Yes	Yes

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

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Trichloroethylene (79-01-6)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Trichloroethylene (79-01-6)	No	No	Yes	No

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

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Trichloroethylene (79-01-6)	100	U228	No

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

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

Australian Hazchem Code: No information found.
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.

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16. Other Information

NFPA Ratings: Health: **2** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat and flame.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8, 11.
Disclaimer:
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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.
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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
959 ROUTE 46 EAST
PARSIPPANY, NEW JERSEY USA 07054-0624
OR
530 WATSON STREET

WHITBY, ONTARIO, CANADA L1N 5R9

EMERGENCY CONTACT:
CHEMTREC 1-800-424-9300

INFORMATION CONTACT:
(USA) 973-257-1100
(WHITBY) 905-668-3570
(EDMONTON) 780-471-4036

SUBSTANCE: VINYL CHLORIDE

TRADE NAMES/SYNONYMS:
MTG MSDS 97; CHLOROETHYLENE; CHLOROETHENE; CHLORETHENE; TROVIDUR; ETHYLENE MONOCHLORIDE; MONOCHLOROETHYLENE; EXON 470; MONOCHLORO ETHENE; VINYL CHLORIDE MONOMER; VINYL CHLORIDE, INHIBITED; STCC 4905792; RCRA U043; UN 1086; C2H3CL; MAT24940; RTECS KU9625000

CHEMICAL FAMILY: halogenated, aliphatic

CREATION DATE: Jan 24 1989
REVISION DATE: Mar 22 2001

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

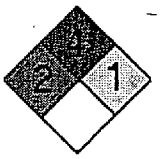
COMPONENT: VINYL CHLORIDE
CAS NUMBER: 75-01-4
EC NUMBER (EINECS): 200-831-0
PERCENTAGE: >99.9

COMPONENT: PHENOL
CAS NUMBER: 108-95-2
EC NUMBER (EINECS): 203-632-7
PERCENTAGE: <0.1

COMPONENT: INHIBITORS
CAS NUMBER: Not assigned.
EC NUMBER: Not assigned.
PERCENTAGE: <0.1

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=4 REACTIVITY=1



EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: gas
ODOR: faint odor, sweet odor
MAJOR HEALTH HAZARDS: harmful if swallowed, skin irritation, eye irritation, central nervous system depression, cancer hazard (in humans)
PHYSICAL HAZARDS: Flammable gas. May cause flash fire. May polymerize. Containers may rupture or explode.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, nausea, difficulty breathing, irregular heartbeat, headache, drowsiness, symptoms of drunkenness, disorientation, joint pain, hearing loss, lung congestion
LONG TERM EXPOSURE: impotence, bluish skin color, blood disorders, liver damage, cancer
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation, blisters
LONG TERM EXPOSURE: same as effects reported in short term exposure
EYE CONTACT:
SHORT TERM EXPOSURE: irritation, eye damage
LONG TERM EXPOSURE: same as effects reported in short term exposure
INGESTION:
SHORT TERM EXPOSURE: frostbite
LONG TERM EXPOSURE: cancer

CARCINOGEN STATUS:
OSHA: Yes
NTP: Yes
IARC: Yes

SECTION 4 FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

EYE CONTACT: Wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION: If a large amount is swallowed, get medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Severe explosion hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. For smaller tanks or cylinders, extinguish and isolate from other flammables. Evacuation radius: 800 meters (1/2 mile). Stop flow of gas.

FLASH POINT: -108 F (-78 C)
LOWER FLAMMABLE LIMIT: 3.6%
UPPER FLAMMABLE LIMIT: 33%
AUTOIGNITION: 882 F (472 C)

SECTION 6 ACCIDENTAL RELEASE MEASURES

WATER RELEASE:
Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

SECTION 7 HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Protect from physical damage. Store outside or in a detached building. Inside storage: Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances. Grounding and bonding required. Keep separated from incompatible substances.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

VINYL CHLORIDE:
1.0 ppm OSHA TWA
5 ppm OSHA ceiling 15 minute(s)
0.5 ppm OSHA action level
1 ppm ACGIH TWA

VENTILATION: Provide local exhaust or process enclosure ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: For the gas: Wear appropriate chemical resistant gloves. For the liquid: Wear insulated gloves. OSHA REGULATED SUBSTANCES: U.S. OSHA 29 CFR 1910.1017.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
10 p/m
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.
Any chemical cartridge respirator with cartridge(s) providing protection against this substance.
25 p/m
Any powered, air-purifying respirator with a full facepiece and cartridge(s) providing protection against this substance.
Any air-purifying respirator with a full facepiece, a canister providing protection against this substance and a high-efficiency particulate filter.
100 p/m
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.
1000 p/m
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any supplied-air respirator operated in a continuous-flow mode.
Any supplied-air respirator with a full facepiece.
Any supplied-air respirator operated in a continuous-flow mode.
3600 p/m
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: gas
COLOR: colorless
ODOR: faint odor, sweet odor
MOLECULAR WEIGHT: 62.50
MOLECULAR FORMULA: C-H2-C-H-CL
BOILING POINT: 9 F (-13 C)
FREEZING POINT: -245 F (-154 C)
VAPOR PRESSURE: 2515.6 mmHg @ 21.1 C
VAPOR DENSITY (air=1): 2.2
SPECIFIC GRAVITY (water=1): 0.9106
WATER SOLUBILITY: 0.25%
PH: Not applicable
VOLATILITY: Not applicable
ODOR THRESHOLD: 260 ppm
EVAPORATION RATE: Not applicable
VISCOSITY: 0.01072 cP @ 20 C
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable
SOLVENT SOLUBILITY:
Soluble: alcohol, ether, carbon tetrachloride, benzene

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: May polymerize. Avoid contact with light or storage and use above room temperature.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: metal carbide, metals, oxidizing materials, peroxides

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: May polymerize. Avoid contact with heat, light, air, water or incompatible materials. Closed containers may rupture violently.

SECTION 11 TOXICOLOGICAL INFORMATION

VINYL CHLORIDE:
TOXICITY DATA:
18 pph/15 minute(s) inhalation-rat LC50; 500 mg/kg oral-rat LD50
CARCINOGEN STATUS: OSHA: Carcinogen; NTP: Known Human Carcinogen; IARC: Human Sufficient Evidence, Animal Sufficient Evidence, Group 1; ACGIH: A1 -Confirmed Human Carcinogen; EC: Category 1
LOCAL EFFECTS:
Irritant: skin, eye
ACUTE TOXICITY LEVEL:

Toxic: ingestion
Relatively Non-toxic: inhalation
TARGET ORGANS: central nervous system
TUMORIGENIC DATA: Available.
MUTAGENIC DATA: Available.
REPRODUCTIVE EFFECTS DATA: Available.
ADDITIONAL DATA: Stimulants such as epinephrine may induce ventricular fibrillation.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 388000 ug/L 10 month(s) LETH (Mortality) Northern pike (Esox lucius)
INVERTEBRATE TOXICITY: 41.74 ug/L 72 day(s) (Residue) Mosquito (Culex pipiens quinquefasciata)
ALGAL TOXICITY: 41.74 ug/L 72 day(s) (Residue) Green algae (Oedogonium cardiacum)

SECTION 13 DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U043. Hazardous Waste Number(s): D043. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.2 mg/L. Dispose in accordance with all applicable regulations.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Vinyl chloride, inhibited or Vinyl chloride, stabilized
ID NUMBER: UN1086
HAZARD CLASS OR DIVISION: 2.1
LABELING REQUIREMENTS: Flammable gas
QUANTITY LIMITATIONS:
PASSENGER AIRCRAFT OR RAILCAR: Forbidden
CARGO AIRCRAFT ONLY: 150 kg

SECTION 15 REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
Vinyl chloride: 1 LBS RQ
PHENOL: 1000 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):
Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):
Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: Yes
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: Yes

SARA TITLE III SECTION 313 (40 CFR 372.65):
Vinyl chloride

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65:
Known to the state of California to cause the following:
Vinyl chloride
Cancer (Feb 27, 1987)

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: ABD2

EUROPEAN REGULATIONS:
EC CLASSIFICATION (ASSIGNED):

F+	Extremely Flammable
	Carcinogen Category 1

EC Classification may be inconsistent with independently-researched data.

DANGER/HAZARD SYMBOL:


F+


T

EC RISK AND SAFETY PHRASES:

R 12	Extremely flammable.
R 45	May cause cancer.
S 45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53	Avoid exposure - obtain special instructions before use.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL): Not determined.

CANADA INVENTORY (NDSL): Not determined.

SECTION 16 OTHER INFORMATION

MSDS SUMMARY OF CHANGES
SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION
SECTION 3 HAZARDS IDENTIFICATION
SECTION 7 HANDLING AND STORAGE
SECTION 14 TRANSPORT INFORMATION
SECTION 15 REGULATORY INFORMATION

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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.

XYLENES

MSDS Number: X2000 --- ***Effective Date: 01/14/02***

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene
CAS No.: 1330-20-7
Molecular Weight: 106.17
Chemical Formula: C6H4(CH3)2
Product Codes: J.T. Baker: 5377, 5810, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516
Mallinckrodt: 8664, 8668, 8671, 8672, 8685, 8802, V052

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
m-Xylene	108-38-3	40 - 65%	No
o-Xylene	95-47-6	15 - 20%	No
p-Xylene	106-42-3	< 20%	No
Ethyl Benzene	100-41-4	15 - 25%	Yes

3. Hazards Identification

Emergency Overview

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL.

AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

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

Health Rating: 2 - Moderate (Life)
Flammability Rating: 2 - Moderate
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.

Ingestion:
Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.

Skin Contact:
Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.

Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

Chronic Exposure:
Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or 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:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.

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

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

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5. Fire Fighting Measures

Fire:
Flash point: 29C (84F) CC
Autoignition temperature: 464C (867F)
Flammable limits in air % by volume:
lel: 1.0; uel: 7.0

Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.

Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

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. Vapors can flow along surfaces to distant ignition source and flash back.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. 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 SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. 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. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA) xylene
100 ppm (TWA) ethylbenzene
-ACGIH Threshold Limit Value (TLV):
100 ppm (TWA) 150 ppm (STEL) xylene
Carcinogen Category (xylene): A4
100 ppm (TWA) 125 ppm (STEL) ethyl benzene

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. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator 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. For emergencies or instances where the exposure levels are not known, use a full-face piece 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

The following physical data is for xylene.
Appearance:
Clear, colorless liquid.
Odor:
Characteristic odor.
Solubility:
Insoluble in water.
Specific Gravity:
0.86 @ 20C/4C
pH:
Not applicable.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
137 - 140C (279 - 284F)
Melting Point:
-25C (-13F)
Vapor Density (Air=1):
3.7
Vapor Pressure (mm Hg):
8 @ 20C (68F)
Evaporation Rate (BuAc=1):
0.7

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Involvement in a fire causes formation of carbon monoxide and unidentified organic components.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents and strong acids.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector. Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
May cause teratogenic effects.

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

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
m-Xylene (108-38-3)	No	No	3
o-Xylene (95-47-6)	No	No	3
p-Xylene (106-42-3)	No	No	3
Ethyl Benzene (100-41-4)	No	No	2B

12. Ecological Information

Environmental Fate:
Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)
Environmental Toxicity:
For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

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: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
m-Xylene (108-38-3)	Yes	Yes	Yes	Yes
o-Xylene (95-47-6)	Yes	Yes	Yes	Yes
p-Xylene (106-42-3)	Yes	Yes	Yes	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

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

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
m-Xylene (108-38-3)	Yes	Yes	No	Yes
o-Xylene (95-47-6)	Yes	Yes	No	Yes
p-Xylene (106-42-3)	Yes	Yes	No	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
m-Xylene (108-38-3)	No	No	Yes	No
o-Xylene (95-47-6)	No	No	Yes	No
p-Xylene (106-42-3)	No	No	Yes	No
Ethyl Benzene (100-41-4)	No	No	Yes	No

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

	-RCRA-	-TSCA-

Ingredient	CERCLA	261.33	8(d)
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No
p-Xylene (106-42-3)	100	No	Yes
Ethyl Benzene (100-41-4)	1000	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: 3[Y]
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: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.
Label Precautions:
Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use only with adequate ventilation.
Avoid breathing vapor.
Wash thoroughly after handling.
Label First Aid:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
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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.

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

MSDS Material Safety Data Sheet

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

Mallinckrodt CHEMICALS

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.

DICHLOROMETHANE

MSDS Number: D2895 --- ***Effective Date: 07/13/00***

1. Product Identification

Synonyms: DCM; Methylene chloride (MC); Methylene dichloride; Methylene bichloride; Methane dichloride
CAS No.: 75-09-2
Molecular Weight: 84.93
Chemical Formula: CH2Cl2
Product Codes:
J.T. Baker: V653
Mallinckrodt: 3023, 4877, 4879, 4881, 4883, 4884, 4885, H077, H485, V183

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Methylene Chloride	75-09-2	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER,

CARDIOVASCULAR SYSTEM, AND BLOOD. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Potential Health Effects

Inhalation:
Causes irritation to respiratory tract. Has a strong narcotic effect with symptoms of mental confusion, light-headedness, fatigue, nausea, vomiting and headache. Causes formation of carbon monoxide in blood which affects cardiovascular system and central nervous system. Continued exposure may cause increased light-headedness, staggering, unconsciousness, and even death. Exposure may make the symptoms of angina (chest pains) worse.

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

Skin Contact:
Causes irritation, redness and pain. Prolonged contact can cause burns. Liquid degreases the skin. May be absorbed through skin.

Eye Contact:
Vapors can cause eye irritation. Contact can produce pain, inflammation and temporal eye damage.

Chronic Exposure:
Can cause headache, mental confusion, depression, liver effects, kidney effects, bronchitis, loss of appetite, nausea, lack of balance, and visual disturbances. Can cause dermatitis upon prolonged skin contact. Methylene chloride may cause cancer in humans.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye problems, impaired liver, kidney, respiratory or cardiovascular function may be more susceptible to the effects of this 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. Get medical attention.

Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

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

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

5. Fire Fighting Measures

Fire:
Autoignition temperature: 556C (1033F)
Flammable limits in air % by volume:
lel: 12; uel: 23

Forms flammable vapor-air mixtures above 100C (212F).
Explosion:
Concentrated can be ignited by a high intensity ignition source. Vapor may form flammable mixture in atmosphere that contains a high percentage of oxygen. Sealed containers may rupture when heated.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. 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. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

6. Accidental Release Measures

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

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Outside or detached storage is recommended. 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. To minimize decomposition, all storage containers should be galvanized or lined with a phenolic coating. This material may corrode plastic and rubber. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed

established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Odor Threshold: 205 - 307 ppm. The odor threshold only serves as a warning of exposure; not smelling it does not mean you are not being exposed.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Methylene Chloride (Dichloromethane):
- OSHA Permissible Exposure Limit (PEL) -
25 ppm (TWA), 125 ppm (STEL), 12.5 ppm (8-hour TWA - Action Level)
- ACGIH Threshold Limit Value (TLV) -
50 ppm (TWA), A2 - suspected human carcinogen.

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

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. The cartridges recommended for this material have a predicted service of less than 30 minutes at concentrations of ten times (10x) the exposure limits. Actual service life will vary considerbly, depending on concentration levels, temperature, humidity, and work rate. This substance has poor warning properties.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment. Natural rubber and polyvinyl chloride ARE NOT recommended materials for personal protective equipment.

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.

Other Control Measures:
Do not use closed circuit rebreathing system employing soda lime or other carbon dioxide absorber because of formation of toxic compounds capable of producing cranial nerve paralysis. See OSHA Standard for medical surveillance, record keeping, and reporting requirements for methylene chloride (29 CFR 1910.1052).

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9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.

Odor:

Chloroform-like odor.
Solubility:
1.32 gm/100 gm water @ 20C.
Specific Gravity:
1.33 @ 15C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
39.8C (104F)
Melting Point:
-97C (-143F)
Vapor Density (Air=1):
2.9
Vapor Pressure (mm Hg):
400 @ 24C (75F)
Evaporation Rate (BuAc=1):
27.5

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Emits highly toxic fumes of phosgene when heated to decomposition. Decomposes in a flame or hot surface to form toxic gas phosgene and corrosive mists of hydrochloric acid. Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers, strong caustics, plastics, rubber, nitric acid, water + heat, and chemically active metals, such as aluminum and magnesium powder, sodium, potassium, and lithium. Avoid contact with open flames and electrical arcs. Liquid methylene chloride will attack some forms of plastics, rubber, and coatings.
Conditions to Avoid:
Moisture, heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Toxicological Data:
Dichloromethane: Oral rat LD50: 1600 mg/kg; inhalation rat LC50: 52 gm/m3; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Dichloromethane has been linked to spontaneous abortions in humans.

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

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Methylene Chloride (75-09-2)	No	Yes	2B

12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of greater than 30 days. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.
Environmental Toxicity:
The LC50/96-hour values for fish are over 100 mg/l. This material is not expected to 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: DICHLOROMETHANE
Hazard Class: 6.1
UN/NA: UN1593
Packing Group: III
Information reported for product/size: 20L

International (Water, I.M.O.)

Proper Shipping Name: DICHLOROMETHANE

Hazard Class: 6.1
UN/NA: UN1593
Packing Group: III
Information reported for product/size: 20L

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15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Methylene Chloride (75-09-2)	Yes	Yes	Yes	Yes

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

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Methylene Chloride (75-09-2)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Methylene Chloride (75-09-2)	No	No	Yes	No

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

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Methylene Chloride (75-09-2)	1000	U080	No

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

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

Australian Hazchem Code: 2Z
Poison Schedule: S5
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: **2** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH

SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, CARDIOVASCULAR SYSTEM, AND BLOOD. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

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

Label First Aid:

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 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. In all cases, get medical attention.

Product Use:

Industrial chemical.

Revision Information:

MSDS Section(s) changed since last revision of document include: 1.

Disclaimer:

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

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.

1,2-DICHLOROETHANE

MSDS Number: D2440 --- ***Effective Date: 08/02/00***

1. Product Identification

Synonyms: Ethylene dichloride; dichloroethylene; 1,2-Bichloroethane
CAS No.: 107-06-2
Molecular Weight: 98.96
Chemical Formula: ClCH2CH2Cl
Product Codes:
J.T. Baker: 9302, H076
Mallinckrodt: 4966, 5338, 6422

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethylene Dichloride	107-06-2	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, AND CARDIOVASCULAR SYSTEM. CAUSES

IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

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

Health Rating: 3 - Severe (Cancer Causing)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors irritates the respiratory tract. May cause headache, weakness, cyanosis, nausea, vomiting, and diarrhea. These symptoms may be followed by central nervous system effects, liver damage, kidney damage, adrenal gland damage, cyanosis, weak and rapid pulse and unconsciousness. Death can occur from respiratory and circulatory failure.
Ingestion:
Causes irritation to the gastrointestinal tract. Symptoms may include nausea, vomiting and diarrhea. Toxic effects parallel those of inhalation. Doses of 0.5 - 1.0 g/kg can be fatal.
Skin Contact:
Causes irritation, rash and blister formation. Prolonged contact can cause skin burns. Can be absorbed through skin with toxic effects.
Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.
Chronic Exposure:
Repeated or prolonged exposure may cause weight loss, low blood pressure, jaundice, reduced urinary output, dermatitis, eye damage and anemia. Dichloroethane is a suspected human carcinogen based on animal data.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, cardiovascular, neurological or 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.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give

anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

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:

Flash point: 13C (55F) CC
Autoignition temperature: 413C (775F)
Flammable limits in air % by volume:
lel: 6.2; uel: 15.9
Flammable.

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Sealed containers may rupture when heated. Contact with strong oxidizers may cause fire. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.

Fire Extinguishing Media:

Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. 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 SOLUSORB(R) solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. 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):
50 ppm (TWA), 100 ppm (ceiling)
200 ppm (max)/5 min/3 hour

- ACGIH Threshold Limit Value (TLV):
10 ppm (TWA), A4 - not classifiable as a human carcinogen

- NIOSH IDLH:
50 ppm

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. This substance has poor warning properties.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Polyvinyl alcohol (PVA) and Viton are recommended materials for personal protective equipment.

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 heavy liquid.
Odor:
Chloroform-like odor.
Solubility:
0.81g/100g water @ 20C (68F).
Specific Gravity:
1.24 @ 20C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
83.4C (181F)
Melting Point:
-35.4C (-31F)
Vapor Density (Air=1):
3.42
Vapor Pressure (mm Hg):
87 @ 25C (77F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Darkens on exposure to air or light.
Hazardous Decomposition Products:
Emits toxic fumes of phosgene, hydrogen chloride, acetylene, and vinyl chloride when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Aluminum or magnesium powder, oxidizing agents, reducing agents, organic peroxides, alkali and alkali earth metals, nitric acid, caustics, nitrogen tetraoxide, ammonia, and dimethylaminopropylamine.
Conditions to Avoid:
Heat, flame, sources of ignition, light and incompatibles.

11. Toxicological Information

Oral rat LD50: 670 mg/kg; inhalation rat LC50: 1000 ppm.7H; skin rabbit LD50: 2800

mg/kg; irritation eye rabbit, Standard Draize, 63 mg severe; skin rabbit, Open Draize, 625 mg mild; investigated as a tumorigen, mutagen, reproductive effector.

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

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Ethylene Dichloride (107-06-2)	No	Yes	2B

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to quickly evaporate. When released into the soil, this material may leach into groundwater. When released to water, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of greater than 30 days. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.
Environmental Toxicity:
This material is not expected to be toxic to aquatic life. The LC50/96-hour values for fish are over 100 mg/l. The EC50/48-hour values for daphnia are over 100 mg/l.

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: RQ, ETHYLENE DICHLORIDE
Hazard Class: 3, 6.1
UN/NA: UN1184
Packing Group: II
Information reported for product/size: 52L

International (Water, I.M.O.)

Proper Shipping Name: ETHYLENE DICHLORIDE
Hazard Class: 3, 6.1
UN/NA: UN1184
Packing Group: II
Information reported for product/size: 52L

International (Air, I.C.A.O.)

Proper Shipping Name: ETHYLENE DICHLORIDE
Hazard Class: 3, 6.1
UN/NA: UN1184
Packing Group: II
Information reported for product/size: 52L

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15. Regulatory Information

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

Ingredient	TSCA	EC	Japan	Australia
Ethylene Dichloride (107-06-2)	Yes	Yes	Yes	Yes

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

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Ethylene Dichloride (107-06-2)	Yes	Yes	No	Yes

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

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Ethylene Dichloride (107-06-2)	No	No	Yes	No

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

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Ethylene Dichloride (107-06-2)	100	U077	No

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

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

Australian Hazchem Code: 2YE
Poison Schedule: No information found.

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

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, AND CARDIOVASCULAR SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.
Label Precautions:
Wash thoroughly after handling.
Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Do not get in eyes, on skin, or on clothing.
Keep away from heat, sparks and flame.
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 call a physician.
Product Use:
Laboratory Reagent.
Revision Information:
No changes.
Disclaimer:
****

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****

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

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 409
Cresol (Mixed Isomers)

Issued: 12/78 Revision: B, 3/92

Section 1. Material Identification

Cresol, *mixed isomers* ($CH_3C_6H_4OH$) Description: Derived from coal tar or petroleum. Cresol is marketed by individual isomer and as pure or crude cresol. Pure cresol is a mixture of *ortho*, *meta*, and *para* isomers. Crude cresol (commercial cresol) is prepared by distilling "grey phenic acid" at 356 to 401 °F (180 to 205 °C) and is comprised of 20% *ortho*, 40% *meta*, and 30% *para* isomers, plus small amounts of phenol and xylenols. Each isomer can be prepared synthetically by diazotization of the specific corresponding toluidine. Used in manufacturing synthetic resins, explosives, photographic developers, petroleum, paint, disinfectants, and fumigants; as an ore flotation agent; and in the agriculture industry for herbicides and insecticides.
Other Designations: CAS No. 1319-77-3, Bacillol, cresylic acid, Tekresol, tricresol.
Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*(73) for a suppliers list.

Cautions: Cresol is severely irritating to mucous membranes, eyes, and skin. Depending on the cresol concentration, extent of exposure, and amount of skin exposed, toxicity may be slight (irritation) or severe (permanent injury or death).

R 1
I 4
S 3*
K 2
* Skin absorption

NFPA

HMIS
H 3
F 2
R 0
PPG†
† Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Cresol (*mixed isomers*) National Formulary (NF) grade contains < 5% phenol

1990 OSHA PEL (Skin)
8-hr TWA: 5 ppm (22 mg/m³)

1990 NIOSH REL
TWA: 5 ppm (22 mg/m³)

1990 IDLH Level
250 ppm

1991-92 ACGIH TLV (Skin)
TWA: 5 ppm (22 mg/m³)

1990 DFG (Germany) MAK
TWA: 5 ppm (22 mg/m³) (H)*
Peak Exposure Limit: 10 ppm, 5 min, momentary value/8 per shift

1985-86 Toxicity Data†
Rat, oral, LD_{50}: 1454 mg/kg; toxic effects not yet reviewed
Mouse, inhalation, LC_{50}: 179 mg/m³/2 hr; no toxic effects noted (*o*-)
Rabbit, eye: 103 mg produced severe irritation (*p*-)
Rabbit, skin: 517 mg applied for 24 hr produced severe irritation (*m*-)
Rabbit, skin, LD_{50}: 2000 mg/kg; toxic effects not yet reviewed

* Danger of cutaneous absorption.
† See NIOSH, *RTECS* (GO5950000), for additional toxicity data. For data on specific isomers, see *RTECS* (GO6125000, *meta*; GO6300000, *ortho*; and GO6475000, *para*).

Section 3. Physical Data

Boiling Point Range: 375.8 to 397.4 °F (191 to 203 °C)
Melting Point Range: 51.8 to 95 °F (11 to 35 °C)
Vapor Pressure: 0.25 (*ortho*), 0.15 (*meta*), 0.11 (*para*) mm Hg at [illegible] °F (20 °C)
Vapor Density (air = 1): 3.72
pH: Saturated solutions are neutral or slightly acidic to litmus
Viscosity: 4.49 to 7.0 cP at 104 °F (40 °C)

Molecular Weight: 108.13
Specific Gravity: 1.030 to 1.038 at 77 °F (25 °C)
Water Solubility: Soluble, 1%
Other Solubilities: Soluble in alcohol, ether, dilute alkalies, glycol and vegetable oils
Refraction Index: 1. 5353 at 75.2 °F (24 °C)
Odor Threshold: Low, 0.012 mg/m³; high, 22 mg/m³

Appearance and Odor: Colorless, yellow, or pinkish liquid turning brown on exposure to air or light with a phenolic odor and pungent taste.

Section 4. Fire and Explosion Data

Flash Point: 178 °F (81.11 °C, *ortho*), 187 °F (86.11 °C, *meta* and *para*), CC	Autoignition Temperature: 1110 °F (559 °C, *ortho*), 1038 °F (558 °C, *meta* and *para*)	LEL: 1.4% (*ortho*), 1.1% (*meta* and *para*) at 302 °F (150 °C)	UEL: None reported

Extinguishing Media: While cresol does not ignite easily, it burns. For small fires, use dry chemical, carbon dioxide (CO_2), water spray, or regular foam. For large fires, use water spray, fog, or regular foam. Do not scatter material with more water than is necessary to put out fire.
Unusual Fire or Explosion Hazards: Container may explode in heat of fire.
Special Fire-fighting Procedures: Since fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighters' protective clothing is ineffective for fires involving cresol. Use clothing the manufacturer recommends specifically for use with cresol. If possible without risk, remove container from fire area. Fight fire from maximum distance. Stay away from ends of tanks. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Cresol is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Cresol reacts with oxidizing materials and causes a temperature and pressure increase with chlorosulfonic acid, nitric acid, and oleum.
Conditions to Avoid: Ignition sources and contact with incompatibles.
Hazardous Products of Decomposition: Thermal oxidative decomposition of cresol can produce carbon dioxide (CO_2) and toxic cresol fumes.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,(164) NTP,(142) and OSHA(164) do not list cresol as a carcinogen. Summary of Risks: Cresol is corrosive to eyes, skin, and mucous membranes. Degree of toxicity depends on the cresol concentration involved, amount of surface area exposed, and duration of exposure. Ingestion is corrosive to the digestive tract's mucous membranes and can pose serious problems if not treated promptly. Because cresol has a low vapor pressure, it is not volatile enough under normal conditions to present an inhalation hazard. If heated, vapor inhalation is likely. Severe chemical burns and dermatitis are the main hazards in industry. Note that cresol's *ortho* and *para* isomers (if used individually) are in crystal form and thus are a dust inhalation hazard. By routes of exposure, cresol produces toxic symptoms similar to phenol's. Medical Conditions Aggravated by Long-Term Exposure: Skin diseases. Target Organs: Eyes, skin, central nervous system (CNS), liver and kidney. Primary Entry Routes: Skin and eye contact/absorption. Acute Effects: Cresol is absorbed through skin, open wounds, and the mucous membranes of the respiratory and digestive tracts. The rate at which skin absorbs cresol depends more on the size of exposure area than on the concentration of material applied. Cresol is corrosive to the skin causing smarting; tingling; redness; swelling; burns that may be very painful and become white and wrinkled with softening that may become gangrenous; blisters; possible shock as a result

Continue on next page

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: 1,2-Dichloroethylene, 99%, mixture of isomers
Catalog Numbers:
AC113400000, AC113400250
Synonyms:
Acetylene Acetylene Dichloride
Company Identification (Europe): Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
Company Identification (USA): Acros Organics
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For information in Europe, call: 0032(0) 14575211
For emergencies in the US, call CHEMTREC: 800-424-9300
For emergencies in Europe, call: 0032(0) 14575299

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
540-59-0	1,2-Dichloroethylene		208-750-2

Hazard Symbols: XN F
Risk Phrases: 11 20 52/53

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: colourless. Flash Point: 6 deg C.
Warning! Flammable liquid and vapor. Light sensitive. Air sensitive. Moisture sensitive. May be harmful if swallowed. May cause central nervous system depression. May cause eye and skin irritation. May cause respiratory and digestive tract irritation.
Target Organs: Central nervous system.

Potential Health Effects

Eye:
May cause eye irritation.

Skin:
May cause skin irritation.

Ingestion:
May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed.

Inhalation:
May cause respiratory tract irritation. May cause narcotic effects in high concentration.

Chronic:
Not available.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin:
Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion:
If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation:
Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician:
Treat symptomatically and supportively.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.
Extinguishing Media:
Use water spray to cool fire-exposed containers. Use water fog, dry chemical, carbon dioxide, or regular foam.
Autoignition Temperature:440 deg C (824.00 deg F)
Flash Point: 6 deg C (42.80 deg F)
Explosion Limits, lower:5.6
Explosion Limits, upper:12.8
NFPA Rating: health-2; flammability-3; reactivity-2

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:
Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:
Wash thoroughly after handling. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.
Storage:
Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:
Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,2-Dichloroethylene	200 ppm	200 ppm TWA; 790 mg/m3 TWA 1000 ppm IDLH	200 ppm TWA; 790 mg/m3 TWA

OSHA Vacated PELs:
1,2-Dichloroethylene:
200 ppm TWA; 790 mg/m3 TWA

Personal Protective Equipment

Eyes:
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:
Wear appropriate protective gloves to prevent skin exposure.

Clothing:
Wear appropriate protective clothing to prevent skin exposure.

Respirators:
Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:	Liquid
Appearance:	colourless
Odor:	acrid odor
pH:	Not available.
Vapor Pressure:	Not available.
Vapor Density:	Not available.
Evaporation Rate:	Not available.
Viscosity:	Not available.
Boiling Point:	48 - 60 deg C @ 760.00mm Hg
Freezing/Melting Point:	-57 deg C
Decomposition Temperature:	
Solubility in water:	Insoluble.
Specific Gravity/Density:	1.2650g/cm3
Molecular Formula:	C2H2Cl2
Molecular Weight:	96.94

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Light, ignition sources, exposure to air, excess heat, exposure to moist air or water.
Incompatibilities with Other Materials:
Oxidizing agents, bases.
Hazardous Decomposition Products:
Hydrogen chloride, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 540-59-0: KV9360000
LD50/LC50:
CAS# 540-59-0: Draize test, rabbit, skin: 100 mg/24H Moderate; Oral, rat: LD50 = 770 mg/kg.
Carcinogenicity:
1,2-Dichloroethylene -
Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology:
No data available.
Teratogenicity:
No data available.
Reproductive Effects:
No data available.
Neurotoxicity:
No data available.
Mutagenicity:
See actual entry in RTECS for complete information.
Other Studies:
No data available.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste.
US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

**** SECTION 14 - TRANSPORT INFORMATION ****

US DOT
Shipping Name: 1,2-DICHLOROETHYLENE
Hazard Class: 3
UN Number: 1150
Packing Group: II
Canadian TDG
Shipping Name: ETHYLENE DICHLORIDE

Hazard Class: 3(6.1)(9.2)
UN Number: UN1184
Other Information: FLASHPOINT 13 C

**** SECTION 15 - REGULATORY INFORMATION ****

US FEDERAL

TSCA

CAS# 540-59-0 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

Section 302 (RQ)

None of the chemicals in this material have an RQ.

Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

Section 313

This chemical is not at a high enough concentration to be reportable under Section 313.

No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
CAS# 540-59-0 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

1,2-Dichloroethylene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level:

None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN F

Risk Phrases:

R 11 Highly flammable.
R 20 Harmful by inhalation.
R 52/53 Harmful to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 7 Keep container tightly closed.
S 16 Keep away from sources of ignition - No smoking.
S 29 Do not empty into drains.

S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)
CAS# 540-59-0: 2

United Kingdom Occupational Exposure Limits
CAS# 540-59-0: OES-United Kingdom, TWA 200 ppm TWA; 806 mg/m3 TWA
CAS# 540-59-0: OES-United Kingdom, STEL 250 ppm STEL; 1010 mg/m3 STEL

Canada
CAS# 540-59-0 is listed on Canada's NDSL List.
This product has a WHMIS classification of B2, D2B.
CAS# 540-59-0 is listed on Canada's Ingredient Disclosure List.

Exposure Limits
CAS# 540-59-0: OEL-AUSTRALIA:TWA 200 ppm (790 mg/m3)
OEL-AUSTRIA:TWA 200 ppm (790 mg/m3)
OEL-BELGIUM:TWA 200 ppm (793 mg/m3)
OEL-DENMARK:TWA 200 ppm (790 mg/m3)
OEL-FINLAND:TWA 200 ppm (790 mg/m3);STEL 250 ppm (990 mg/m3)
OEL-GERMANY:TWA 200 ppm (790 mg/m3)
OEL-HUNGARY:TWA 80 mg/m3;STEL 160 mg/m3
OEL-JAPAN:TWA 150 ppm (590 mg/m3)
OEL-THE NETHERLANDS:TWA 200 ppm (790 mg/m3)
OEL-THE PHILIPPINES:TWA 200 ppm (790 mg/m3)
OEL-POLAND:TWA 50 mg/m3
OEL-RUSSIA:TWA 150 ppm
OEL-SWITZERLAND:TWA 200 ppm (790 mg/m3);STEL 400 ppm
OEL-TURKEY:TWA 200 ppm (790 mg/m3)
OEL-UNITED KINGDOM:TWA 200 ppm (790 mg/m3);STEL 250 ppm
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 11/20/1997 Revision #2 Date: 8/02/2000

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

CHEM SERVICE INC -- F13 1,1-DICHLOROETHANE

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MSDS Safety Information

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FSC: 6550
MSDS Date: 06/01/1989
MSDS Num: BWJHT
LIIN: 00F037545
Product ID: F13 1,1-DICHLOROETHANE
MFN: 01
Responsible Party
Cage: 84898
Name: CHEM SERVICE INC
Address: 660 TOWER LN
Box: 3108
City: WEST CHESTER PA 19381-3108
Info Phone Number: 215-692-3026/800-452-9994
Emergency Phone Number: 215-692-3026/800-452-9994
Review Ind: Y
Published: Y

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Preparer Co. when other than Responsible Party Co.

==========

Cage: 84898
Name: CHEM SERVICE INC
Box: 3108
City: WEST CHESTER PA 19381

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Contractor Summary

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Cage: 84898
Name: CHEM SERVICE INC
Box: 3108
City: WEST CHESTER PA 19381
Phone: 215-692-3026
Cage: 8Y898
Name: CHEM SERVICE, INC
Address: 660 TOWER LN
Box: 599
City: WEST CHESTER PA 19301-9650
Phone: 610-692-3026

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Ingredients

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Cas: 75-34-3
RTECS #: KI0175000
Name: 1,1-DICHLOROETHANE (ETHYLIDINE CHLORIDE)
Other REC Limits: 200 PPM
OSHA PEL: 100 PPM
ACGIH TLV: 200 PPM
EPA Rpt Qty: 1000 LBS
DOT Rpt Qty: 1000 LBS

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Health Hazards Data

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LD50 LC50 Mixture: ORAL LD50 (RAT/MOUSE): 725 MG/KG
Route Of Entry Inds - Inhalation: YES
Skin: YES
Ingestion: YES
Carcinogenicity Inds - NTP: NO

IARC: NO
OSHA: NO
Effects of Exposure: SKIN: RAPIDLY ABSORBED/HARMFUL/IRRITATION/ALLERGIC REACTION/SENSITIZATION. INHALATION: HARMFUL/RESPIRATORY TRACT IRRITATION/MUCOUS MEMBRANE IRRITATION. INGESTION: HARMFUL. EYES: IRRITATION. EXPOSURE C AN CAUSE LIVER/KIDNEY/NERVOUS SYSTEM INJURY, DELAYED ADVERSE HEALTH AFFECTS. NARCOTIC AT HIGH CONCENTRATIONS.
Explanation Of Carcinogenicity: NONE
Signs And Symptions Of Overexposure: IRRITATION, DISORIENTATION.
First Aid: EYES: FLUSH W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NOT BURNED, WASH W/SOAP & WATER. INHALATION: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED. KEEP WARM & QUIET. INGESTION: DO N'T INDUCE VOMITING/GIVE LIQUIDS IF UNCONSCIOUS/CONVULSIVE. IF VOMITING, WATCH CLOSELY FOR ANY AIRWAY OBSTRUCTION. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Handling and Disposal

Spill Release Procedures: EVACUATE AREA. WEAR APPRORPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL. SWEEP UP & PLACE IN APPROPRIATE CONTAINER/HOLD FOR DISPOSAL. WASH CONTAMINATED SURFAC ES TO REMOVE ANY RESIDUES.
Waste Disposal Methods: BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER IAW/FEDERAL, STATE & LOCAL REGULATIONS.
Handling And Storage Precautions: KEEP TIGHTLY CLOSED IN A COOL DRY PLACE. STORE ONLY W/COMPATIBLE CHEMICALS. FOR LABORATORY USE ONLY.
Other Precautions: AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATH VAPORS. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS. AVOID DIRECT PHYSICAL CONTACT.

Fire and Explosion Hazard Information

Flash Point Text: 23F
Lower Limits: 6
Upper Limits: 16
Extinguishing Media: CO2, DRY CHEMICAL POWDER. DON'T USE WATER.
Unusual Fire/Explosion Hazard: FLAMMABLE CHEMICAL.

Control Measures

Respiratory Protection: WEAR APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.
Ventilation: CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Eye Protection: EYE SHIELDS
Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. READILY ABSORBED & RETAINED ON CLOTHING &/SHOES.

Physical/Chemical Properties

B.P. Text: 135.14F
M.P/F.P Text: -142.6F
Vapor Pres: 182
Vapor Density: 3.4
Solubility in Water: SLIGHT
Appearance and Odor: COLORLESS LIQUID W/FRUITY/PLEASANT ODOR.

Reactivity Data

Stability Indicator: YES
Stability Condition To Avoid: SENSITIVE TO HEAT.
Materials To Avoid: STRONG OXIDIZING AGENTS/BASES, CAUSTICS.
Hazardous Decomposition Products: TOXIC FUMES.

Hazardous Polymerization Indicator: NO

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Toxicological Information

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Ecological Information

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MSDS Transport Information

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Regulatory Information

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Other Information

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HAZCOM Label

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Product ID: F13 1,1-DICHLOROETHANE
Cage: 84898
Company Name: CHEM SERVICE INC
PO Box: 3108
City: WEST CHESTER PA
Zipcode: 19381
Health Emergency Phone: 215-692-3026/800-452-9994
Label Required IND: Y
Date Of Label Review: 12/16/1998
Status Code: C
Label Date: 12/16/1998
Origination Code: G
Hazard And Precautions: SKIN: RAPIDLY ABSORBED/HARMFUL/IRRITATION/ALLERGIC REACTION/SENSITIZATION. INHALATION: HARMFUL/RESPIRATORY TRACT IRRITATION/MUCOUS MEMBRANE IRRITATION. INGESTION: HARMFUL. EYES: IRRITATION. EXPOSURE C AN CAUSE LIVER/KIDNEY/NERVOUS SYSTEM INJURY, DELAYED ADVERSE HEALTH AFFECTS. NARCOTIC AT HIGH CONCENTRATIONS. IRRITATION, DISORIENTATION.

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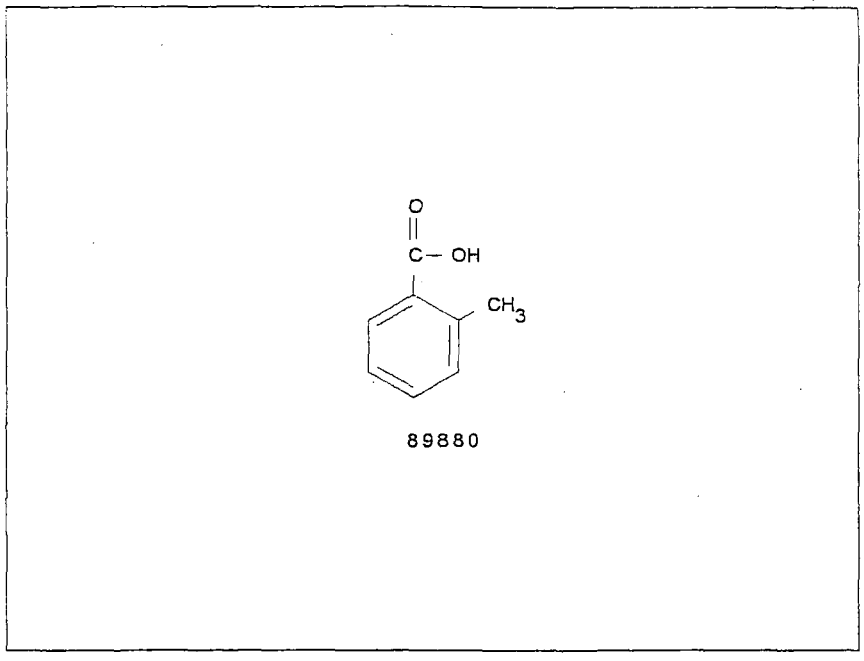


Sigma-Aldrich
3050 Spruce Street
St. Louis, MO 63103, US
Technical Phone: 314 771 5765
Emergency Phone: 314 771 5765
Fax: 800 325 5052

SECTION 1. - - - - - - - - - - CHEMICAL IDENTIFICATION- - - - - - - - - -
CATALOG #: 89880
NAME: O-TOLUIC ACID
SECTION 2. - - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - - -
CAS #: 118-90-1
MF: C8H8O2
EC NO: 204-284-9
SYNONYMS
BENZOIC ACID, 2-METHYL- (9CI) * O-METHYLBENZOIC ACID * 2-METHYLBENZOIC ACID * ORTHOTOLUIC ACID * O-TOLUYLIC ACID *
SECTION 3. - - - - - - - - - - HAZARDS IDENTIFICATION - - - - - - - - - -
DATA NOT AVAILABLE
SECTION 4. - - - - - - - - - - FIRST-AID MEASURES- - - - - - - - - -
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

CTION 5. - - - - - - - - - - FIRE FIGHTING MEASURES - - - - - - - - - -
EXTINGUISHING MEDIA
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
SECTION 6. - - - - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - -
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
SWEEP UP, PLACE IN A BAG AND HOLD FOR WASTE DISPOSAL.
AVOID RAISING DUST.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.
SECTION 7. - - - - - - - - - - - HANDLING AND STORAGE- - - - - - - - - - -
REFER TO SECTION 8.
SECTION 8. - - - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - - -
WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
DO NOT BREATHE DUST.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.
ECTION 9. - - - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - - - -
APPEARANCE AND ODOR
YELLOW-TAN FLAKES
PHYSICAL PROPERTIES
MELTING POINT: 103 TO 105C
FLASHPOINT 298.40F
148C
SECTION 10. - - - - - - - - -STABILITY AND REACTIVITY - - - - - - - - -
INCOMPATIBILITIES
STRONG OXIDIZING AGENTS
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
TOXIC FUMES OF:
CARBON MONOXIDE, CARBON DIOXIDE
SECTION 11. - - - - - - - - - TOXICOLOGICAL INFORMATION - - - - - - - -
ACUTE EFFECTS
MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
MAY CAUSE IRRITATION.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.
RTECS #: XU1400000
O-TOLUIC ACID
TOXICITY DATA
IPR-MUS LD50:422 MG/KG JMCMAR 11,1020,1968
TARGET ORGAN DATA
BEHAVIORAL (RIGIDITY)
BEHAVIORAL (MUSCLE CONTRACTION OR SPASTICITY)

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

SECTION 12. - - - - - - - - - - ECOLOGICAL INFORMATION - - - - - - - - - -

DATA NOT YET AVAILABLE.

SECTION 13. - - - - - - - - - - DISPOSAL CONSIDERATIONS - - - - - - - - - -

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - - - - - - TRANSPORT INFORMATION - - - - - - - - - -

CONTACT FLUKA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - - - - - - REGULATORY INFORMATION - - - - - - - - - -

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK

EPA TSCA SECTION 8(B) CHEMICAL INVENTORY

SECTION 16. - - - - - - - - - - OTHER INFORMATION- - - - - - - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. SIGMA, ALDRICH, FLUKA SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

APPENDIX E

Air Monitoring Form
Daily Instrument Calibration Check Form
Noise Monitoring Form

STAUFFER MANAGEMENT CO.
AIR MONITORING FORM

Project Name:

Project Number:

Contaminants:

Date	Time	Ionization Detector Reading		Explosimeter Reading		Detector Tube Reading	Location	Purpose	Initials
		FID	PID	%LEL	$\%O_2$	ppm			

DAILY INSTRUMENT CALIBRATION CHECK FORM

Project Name_____ Instrument_____

Job Number_____ ID #_____

DATE	INSTRUMENT	BATTERY CHECK OK?	ZERO ADJUST OK?	CALIBRATION GAS (PPM)	READING (PPM)	CALIBRATED BY:	COMMENTS

NOISE MONITORING FORM

Project Name:

Project Number:

Noise: Equipment Used: (Type/Model)*

Date	Task	Location/Employee	Noise Reading dB(A)	Initials

*Pre-calibrate noise monitor prior to conducting noise survey.

APPENDIX F

Excavation and Trenching

EXCAVATION/TRENCHING SAFETY PROCEDURES

Evaluation: Conducted by Competent Person 29 CFR 1926.

- Two soil classifications must be completed to determine sloping/shoring requirements.
- Conduct daily inspections of all open excavations prior to entry.

Egress: Excavation areas 4 feet (1.22M) or more deep

- Ladders must be spaced no more than 25 feet (7.62M) apart so that a person in the trench is always within 25 feet (7.62M) of a ladder for egress.

Shoring: Excavation areas 5 feet (1.52M) or more deep

- Excavations must be sloped or shored if personnel will be entering the excavation.
- Soil classification may be done only by a competent person using both a visual and manual test.

WARNING: One soil classification may not be enough. Outside disturbances during excavation may change even the best classification.

Inspect the soil after any condition change.

Storage: All excavations

- Spoils and heavy equipment must be stored a minimum of 2 feet (.61M) from the edge of the excavation.
- Store spoils on the downhill side.

Maximum Allowable Slopes

Soil or Rock Type	Maximum allowable slopes (H:V) [1] for excavations less than 20 feet (6.10M) deep [3]
Stable Rock	Vertical (90°)
Type A [2]	3/4:1 (53°)
Type B	1:1 (45°)
Type C	1½:1 (34°)

Notes:

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.

2. A short-term maximum allowable slope of 1/2 H:1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67M) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67M) in depth shall be 3/4 H:1V (53°)

3. Sloping or benching for excavations greater than 20 feet (6.10M) deep shall be designed by a registered professional engineer.

EXCAVATION/TRENCHING - UNDERGROUND UTILITIES

Documentation:

- Contact the local utility service (Digsafe, Misutility...), and document Permit No.
- Accompany utility representative in questionable areas, elaborate trenching projects tight/tricky areas or whenever drilling adjacent to a building or structure
- Contact the property owner and/or town building department for plans

Physical Location:

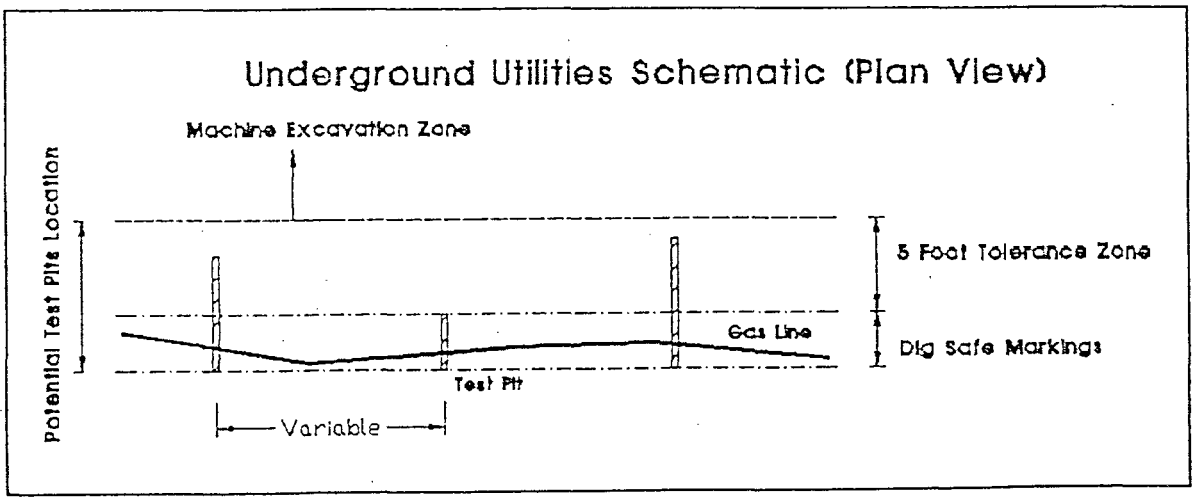
- Use a metal detector to aid in the identification of obstructions
- Observe utility markers, vent pipes, catch basins, newly paved areas, etc.

Safety Procedures:

- Machine excavate five feet from any underground utility, tank, or utility marker
- Hand dig in utility "five-foot tolerance zone" until the service is exposed
- Utilize test pits to establish and QC markers for sensitive utility locations

General Notes:

- Comply with local and state codes and regulations
- Utilize experienced and trained equipment operators
- Use appropriate subcontractors and applicable insurance riders
- Hand dig per customer mandate



JOB SAFETY ANALYSIS

EXCAVATE/TRENCHING

TASK - JOB STEPS	JOB HAZARDS	CONTROL/SAFEGUARDS
Excavate/Trenching	1. Collapse of pit; failure of slope	1. a. assign "competent person" as a supervisor per OSHA; b. excavation activities to be performed per OSHA 29 CFR 1926. 650(scope); 1926.651 (general); 1926.652 (protective system)
	2. Employee buried upon slope failure	2. a. see above; b. allow proper egress from excavations >4' deep using ladder every 25' distance.
	3. Damage to adjacent structures	3. Implement shoring/bracing to preserve integrity of adjacent structures.

JOB SAFETY ANALYSIS WORKSHEET

JOB STEPS	JOB HAZARDS	SAFEGUARDS/PRECAUTIONS
Operate backhoe or excavator to remove contamined soils	1. Underground utilities	1. Level D personal protective equipment
	2. Cave in	2. Audible alarms (back-up, etc.) for heavy equipment
	3. Vehicle/equipment traffic	3. Test for LEL (10% LEL action level) and ppm (75 ppm on PID for action level to Level C)
	4. Falling loads	4. Slope and shore per specification in OSHA standard 1926.650-652
	5. Toxic or hazardous environments	5. Competent person supervising
		6. Secure opening of excavation when fall hazard exists (e.g., barricade openings)
		7. Stop work if strong odors reach property perimeter
		8. Prevent all skin contact

JOB SAFETY ANALYSIS
SOIL EXCAVATION

JOB STEPS	JOB HAZARDS	SAFEGUARDS & PRECAUTIONS
Soil Excavation	1. Exposure to airborne contaminants released during intrusive activities. Flammable atmospheres encountered in excavation.	1. Monitor for airborne contaminants. Allow test pits to purge and/or use personal protective equipment.
	2. Sides of excavation can cave in. Possible burying or crushing of workers due to: (1) absence of shoring, (2) misjudgment of stability, (3) defective shoring, and/or (4) undercut sides.	2. a. Provide adequate shoring or sloping of sides of the excavation. Regularly inspect trenches for changing conditions. b. Solid rock, cemented sand or gravel = 90 degrees. c. Compact angular gravel = 63 degrees 26 ft. deep. d. Compacted sharp sand = 33 degrees 41 ft. deep. e. Rounded loose sand = 26 degrees 34 ft. deep.
	3. Falling during access/egress or while monitoring or dismounting equipment, or stumbling into the excavation.	3. Provide ramps or ladders to trenches to allow safe access and egress.
	4. An overhead hazard can result from material, tools, rock and/or soil falling into the excavation.	4. Provide an adequate barrier around open pits. Material from pit must be placed away from edge to prevent cave ins and instability of pit.
	5. Congested work area due to too many workers in a small area.	5. Maintain ample work room between workers.

JOB SAFETY ANALYSIS		
Task Job Steps	Job Hazards	Control/Safeguards

APPENDIX G

Confined Space Entry Procedures
Confined Space Entry Permit

CONFINED SPACE ENTRY PERMIT

This permit must be completed prior to entering any confined space and is **ONLY VALID FOR THE DATE AND TIME INDICATED ON THIS FORM.** All procedural requirements contained in Stauffer Management Co. Health & Safety Policy & Procedure No. 14 must be followed.

In the event a confined space emergency situation develops and rescue is required, notify the following appropriate emergency services:

[redacted]ce Fire: Police:

Purpose of entry Location of confined space:

Date: Authorized Duration: Expires on:

Atmospheric Hazards: [ ] Oxygen Deficiency [ ] Flammable [ ] Toxic [ ] Other [ ] Other

Physical Hazards: [ ] Mechanical [ ] Electrical [ ] Chemical [ ] Engulfment [ ] Other

PRE-ENTRY REQUIREMENTS

Yes	N/A		Yes	N/A	
[ ]	[ ]	Entry area is free of debris and objects	[ ]	[ ]	Non-sparking tools used
[ ]	[ ]	Warning barriers and signs are in place	[ ]	[ ]	Low voltage (less than 25v) lighting used
[ ]	[ ]	Atmospheric monitoring conducted	[ ]	[ ]	Electrical equipment rated for explosive atmospheres
[ ]	[ ]	All hazardous lines have been isolated	[ ]	[ ]	No compressed gas cylinders in the confined space
[ ]	[ ]	Hot work permit attached	[ ]	[ ]	Host employer and/or contractors notified
[ ]	[ ]	All energy sources have been locked out/tagged out	[ ]	[ ]	Entry and emergency procedures have been reviewed
[ ]	[ ]	The confined space has been drained and flushed	[ ]	[ ]	All personnel have been trained (classroom/exercise)
[ ]	[ ]	Forced air or exhaust ventilation is provided	[ ]	[ ]	All personnel have been informed of potential hazards
[ ]	[ ]	Electrical equipment is properly grounded	[ ]	[ ]	Attendant stationed at entrance and property inspected
[ ]	[ ]	Ground fault circuit interrupters (GFCI) provided	[ ]	[ ]	Rescue equipment on location and readily accessible

PROTECTIVE EQUIPMENT

Yes	No		Yes	No		Yes	No	
[ ]	[ ]	Hard Hat	[ ]	[ ]	Protective clothing	[ ]	[ ]	Communications Equipment
[ ]	[ ]	Eye/Face Protect.	[ ]	[ ]	Hearing protection	[ ]	[ ]	Ventilation to provide fresh air
[ ]	[ ]	Boots	[ ]	[ ]	Retrieval Device/Tripod	[ ]	[ ]	Respirator (type)
[ ]	[ ]	Gloves	[ ]	[ ]	Harness and Lifeline	[ ]	[ ]	Other

Atmosphere Test(s) to be taken* [redacted]	Yes	No	Acceptable Entry Conditions	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time	Time
			Allowable Limits	Enter Air Monitoring Findings Below										
Oxygen			19.5% - 22.0%											
Combustible Gas			Below 10% LEL											
PID/FID														
Carbon Monoxide			0-15 PPM											
Hydrogen Sulfide			0-5 PPM											
Hydrogen Cyanide			0-2 PPM											
Sulfur Dioxide			0-1 PPM											
Ammonia			0-10 PPM											
Other														

SUPERVISOR APPROVAL: I certify that all necessary precautions have been taken to make this confined space safe for entering and conducting the work during the prescribed time(s) as well as emergency response procedures.

Print Name Sign Name Date

Entry Supervisor
Permit Prepared by
Atmosphere Tester
Attendant

ENTRANT ACKNOWLEDGEMENT: I HAVE BEEN PROPERLY INSTRUCTED FOR SAFE ENTRY INTO THIS CONFINED SPACE AND UNDERSTAND MY DUTIES AND EMERGENCY PROCEDURES

Print Entrant Name Sign Entrant Name Employee or S.S. No. Date Time

*An evaluation should be performed to consider all potential air contaminants which could be present and represent a hazard.

Rev. 3/10/97

CONFINED SPACES

Definition

A confined space has limited or restricted means of entry or exit, is large enough for an employee to enter and perform assigned work, and is not designed for continuous occupancy by the employee.

Examples

These spaces may include, but are not limited to, underground vaults, tanks, storage bins, pits and diked areas, vessels, and silos.

Characteristics

A permit-required confined space is one that meets the definition of a confined space and has one or more of these characteristics:

- Contains or has the potential to contain a hazardous atmosphere,
- Contains a material that has the potential for engulfing an entrant,
- Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section, and/or
- Contains any other recognized serious safety or health hazards.

Protocol for Confined Space Entry

- Personnel trained to conduct confined space entry procedures.
- Perform the appropriate air monitoring activity at various depths in the space prior to entry. Monitor for: (1) oxygen level, (2) flammable vapors, and (3) toxic vapors.
- Ventilate the atmosphere in the space so that entry may be made safely without respiratory protection. If this is not feasible, appropriate respiratory protection must be worn by authorized entrants and attendants.
- Wear respiratory protection when ventilation alone can not achieve acceptable atmospheric levels of oxygen or flammable or toxic vapors.
- Have appropriate retrieval equipment worn by employees in the event of a mishap.

Location	Permit Required (Y or N)	Buddy Required (Y or N)	Specific Entry Procedures

CONFINED SPACE PERSONNEL REQUIREMENTS

ENTRANT INSTRUCTIONS

All personnel who enter confined spaces must be thoroughly familiar with the following duties for entrants as listed below. Your primary responsibilities include:

- Understand the hazards of the confined space to be entered and the physical effects of those hazards.
- Continuously monitor the atmosphere inside of the confined space with a calibrated, direct reading, air monitoring instrument.
- Evacuate the confined space:
  - If atmospheric hazards exceed the action level
  - If a hazardous condition is identified inside of the confined space
  - Whenever attendant signals entrants to evacuate
- Read and understand the rescue procedures.
- If personal protective equipment is required, the entrant must be properly trained on the use of the equipment prior to entry. Personal protective equipment must be in good working condition.

ATTENDANT INSTRUCTIONS

You should be thoroughly familiar with the following duties when you assume the responsibility of attendant for a person or persons inside of a confined space. Your primary responsibilities are:

- The safety of the personnel inside.
- Understand the hazards of the confined space to be entered and the physical effects of those hazards.
- Maintain the conditions and requirements listed on entry permit.
- Evacuate the space if you observe any condition which you consider hazardous.
- Read and understand the rescue procedures. Get help if an emergency situation develops. never enter the confined space in an emergency unless you are trained and equipped with the proper equipment for confined space rescue operations (i.e., self contained breathing apparatus, safety harness, life line) and are relieved by another attendant.
- Keep an accurate count of all personnel inside of the confined space at all times.
- Do not leave the entrance to the confined space while any personnel are still inside unless you are properly relieved. These instructions must be passes onto your relief.
- If you have any questions regarding the job, check with your supervisor or a health and safety professional.

ENTRY SUPERVISOR'S INSTRUCTIONS

You should be thoroughly familiar with the following details to quality as the Entry Supervisor for a permit-required confined space entry procedure.

- Requirements for confined space entrant and attendant instructions.
- Knowledge of the hazards that may be faced during entry, including information in the mode, signs and symptoms and consequences of exposure.
- Verifies that the appropriate entries have been made on the permit, and that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- Terminate the entry permit when the confined space entry operations hate been complete or when a condition exists that is not allowed under entry permit requirements.
- Verifies that rescue services are available and that the means of summoning them are operable.
- Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
- Responsibility for the confined space when entry is transferred to other personnel.
- Determines that entry operations are still consistent with the terms of the confined space entry permit and that the prescribed intervals regardless of changes in entry personnel.

APPENDIX H

Hot Work Procedure
Hot Work Permit

HOT WORK PROCEDURES

1.0 PUROPSE

The purpose of this permit procedure is to protect the personnel and equipment form fires and/or explosions that could result from hot work performed in a hazardous area. This section outlines minimum precautions for safety when performing hot work in any location not designated as a routine hot work area. In all such areas, a "Hot Work Permit" is required for all hot work.

2.0 SCOPE

Hot work is any activity performed with or on equipment that can ignite a flammable atmosphere by heat or spark. Included are energized electrical circuits, grinders, welding or brazing equipment, explosives, open fires, portable grinders, unattended internal combustion engines, concrete busters, soldering irons, electric motors, floor or string lights, dry sandblasting, explosion activated tools, electric hot plates, turbine and coriolis meter, portable generators, electrical cameras and instruments proving using portable equipment or any other flame or spark providing equipment. Excluded are devices approved for hazardous areas, or devices in enclosures approved for hazardous areas.

3.0 Responsibilities

A. The contractor or his designated representative, such as: Mechanical Supervisor, contract man, and Safety Permit Inspector are responsible for determining that all blinding and clearing of equipment necessary for execution of hot work is completed.

   1. Equipment which has been removed from service for hot work and has contained flammable and/or toxic material or is connected to equipment that contains flammable and/or toxic material must be (1) blinded, inverted and vented, (2) blinded and cleaned or (3) disconnected and cleaned before issuing "Hot Work Permit."

   2. Each designated person shall personally inspect the job, and consider it safe for the designated hot work activity prior to the signing of the permit.

B. The designated Safety representative is primarily responsible for issuing the "Hot Work Permit." The contractor is responsible for doing any work necessary to prepare the equipment for the hot work to be done safely and designating boundaries within which the permit applies. The contractor is responsible for posting the permit at a conspicuous location at the job site.

C. The contractor's representative is primarily responsible for seeing that only the type of work covered by the permit is performed and that conditions at the jobsite are safe for the schedule work assuring that hot work is confined to the item for which the permit was issued.

D. The safety representative is responsible for performing any required gas tests and inspecting the jobsite before signing the permit. By signing the permit, the representative is signifying that the contractor considers all conditions and equipment to be safe for performing hot work.

E. If a hazardous condition develops, all hot work and machines shall be stopped at once. The employees shall immediately vacate the vicinity. The permit shall be removed and the person removing the "Hot Work Permit" shall notify others involved. Before work may be resumed, a new "Hot Work Permit" shall be issued. When an employee returns to a jobsite, they shall check to see that the permit has not been removed before they resume work.

F. The employee is responsible for checking the "Hot Work Permit" to be sure that it is current, valid and properly signed. If any signature is missing, work shall not be started until the permit is complete.

G. The Safety Department shall not issue a "Hot Work Permit" while other potential conflicting activities are in existence in that area. The area of concern shall cover the geographical limits where there is a remote possibility that sparks from a hot work could cone into contact with any vapors which could be released from an opening, or from a spill which could flow to a point where sparks might ignite them. If a potential conflict exists it is the responsibility of the Safety Department to see that a "Hot Work Permit" is not issued until all of the existing conflicts are eliminated.

H. When electric welding is to be performed, the contractor shall assure that the ground connection are attached within the area covered by the permit, and the welding machine is positioned in this area or in an approved one.

4.0 PROCEDURES

A. Before the safety department is requested to review a task requiring a hot permit, the contractor shall determine that the area is prepared for hot work as follows:

1. Check to see that flammable liquids or solids have not been released or trapped in the equipment.

2. Cover all sewer catch basins and manholes as appropriate in the immediate area

3. Check to see that adequate fire-fighting equipment is at the jobsite.

4. Check for other flammable or combustible material such as an accumulation of chemicals, trash, wood, or dry grass. Due caution should be taken to prevent convection or conduction of heat to flammable or combustible materials which might cause ignition of these materials. Where hot work is to be carried out over dry grass, the area shall be saturated with water before performing hot work, and a water hose left connected as part of the first protective requirement.

5. Check for the possible release of flammable vapors upwind of the hot work area, such as safety valve discharges, leaks from pumps, compressors, or other equipment handling flammable materials.

6. If hot work is to be performed on containers or lines in service, determine that the container is full of liquids; or if a line, that adequate flow is provided with appropriate venting.

7. It hot work is to be performed inside vessels, tanks or confined spaces such as pits, sewers, etc., all applicable items in Appendix G for Confined Spaces shall be accomplished before the hot work permit is issued.

B. After "A" above has been performed, and before any hot work is started, the contractor shall inform the HSM that a hot work permit review is appropriate. The initial issuance of a hot work permit requires that the HSM and the contractor inspect the area together. The employees may participate in the inspection. The area shall be checked for at least the following:

1. A check of items listed under item 1 in the above

2. A check for proper blanking (LO/TO) of equipment.

3. The HSM shall perform any necessary gas tests for explosivity, oxygen deficiency and toxic materials.

4. The HSM and the contractor are to review and determine if a "fire watch" or other special precautions are necessary.

5. The HSM and the contractor shall check to determine that there are no conflicting activities in the area of hot work.

5.0 SPECIAL PROCEDURES

A. Overhead Hot Work

1. When hot work is to be performed in overhead locations, a suitable method for catching resulting scrap, hot metal and/or electrodes, must be proved where these materials would create a safety hazard.

B. Hot Work Inside a Unit that is in Operation

1. At times it is necessary to perform work in an operation unit, i.e. welding. This can be done safely only with the use of equipment deemed appropriate. A pressurized box must be used when these occasions arise. The contractor and the HSM will determine the necessity of a pressurized box. Specifications for the pressurized box are as follows:

a. Must be of sufficient size to allow a workman to perform his/her task.

b. Walls, roof, and floor must be made of plywood and tightly constructed blanket or other fire retardant material must cover the floor and as far up the walls as deemed necessary. All cracks must be sealed with insulating mud.

c. The door must be hinged and constructed to swing outward only. No other method will be acceptable. The door must have a peephole "covered with Plexiglas" of sufficient size that the standby can observe the workmen inside.

d. Ground cable must be installed inside the pressurized box.

e. Fresh air blowers must be placed in a gas free area and the blower duct installed near the bottom of one of the sides excluding the door. There must also be a hole for exhaust air, but small enough to maintain pressure inside the box to prevent the gases and/of toxic fumes from entering. The exhaust must be in the upper section of the box, such as the roof or top section of the wall.

f. A Standby must be present to warn the workman inside in case of an emergency and to assist the workman in performing his/her task.

C. Hot Taps

1. For hot taps or other jobs requiring hot work on equipment to be serviced, must follow the procedures (listed below) before a "Hot Work Permit" can be issued:

a. Tank Description

b. Necessary permits and approvals

c. A description of t welding procedures and any unusual technical considerations

d. A summary of the procedures for installing and testing and "taps"

e. Any special considerations and a check list for them.

6.0 Duration

A. The HSM's Representative and contractor shall determine the duration of the permit.

1. Eight (8)-hour Permit

a. A permit for up to eight hours shall be issued when the job involves work adjacent to or on equipment handling flammable or toxic materials. Eight-hour permits are void at the end of the shift for which they are issued.

b. If a permit is issued for a shift that is longer then eight hours, the arriving contractor and the arriving Owner's Representative must approve and acknowledge the extended shift by signing the extension section of the permit.

2. Twenty-Four (24)-Hour Permits

   a. A 24-hour permit may be issued where the job involves work in an area where there is no nearby equipment in flammable or toxic service. A 24-hour permit may be continued beyond the end of the mechanical shift in which it was issued. However, each shift shall make a personal inspection of the jobsite to determine that conditions have not changed and that it is safe to continue work. If conditions have not changed, the new shift Owner's Representative and contractor's representative shall sign the jobsite permit and retain a copy.

3. Job Completion Permits

   a. Under certain conditions, a "Hot Work Permit" may be issued for job duration. In general, this is allowed where the job conditions at, and surrounding, the work area are not anticipating any change that would create an unusual flammable or toxic material hazard.

   b. The next level of supervision above the first-line supervisors shall give approval for a job completion permit. This permit requires an inspection at the beginning of each shift to ensure that conditions remain safe. The permit shall then be signed and any other file copy to signify completion of this inspection.

7.0 Disposition of Permits

A. Initial Issuance

1. After a hot work permit has been authorized, the following steps shall be taken:

   a. A designated representative shall assure that the signed permit has been located in a conspicuous place at the jobsite.

   b. The first copy of the permit shall be retained by the HSM after being completed.

2. Job Completion, Expiration, or Termination

   a. At the job completion, or upon expiration of the "Hot Work Permit" the accountable person for the work must return the jobsite section of the permit to the Owner's representative, the contractor or the HSM.

8.0 Special Requirements

A. Standby requirements

1. A standby person shall be available when the situation is such that the additional warning notification may be necessary (i.e. confined spaces).

2. This person shall be equipped with an appropriate alarming device for warning purposes.

B. Ventilation

1. Adequate ventilation must be provided while working in any OSHA regulated confined space. If adequate ventilation is not possible, suitable air supplied respiratory protection must be used.

C. Venting Hollow Equipment

1. Before burning into, or heating, any hollow vessel, or equipment, such as ball floats, pistons, impellers, pipes, valves, fittings, or similar equipment which has been in service of any kind, the vessel or equipment must be properly vented (unless the operation is performed under controlled conditions so that any over pressuring will be avoided, as in the case of heating barrels of oil or opening plugged lines or similar operations.)

D. Portable Fire Extinguishers

1. Fully charged portable fire extinguisher of a type and size designated as suitable by the HSM shall be provided.

E. Welding and Burning in Confined Spaces

1. To prevent welding gases from escaping through leaking or improperly closed, torch valves, the gas supply to the torch, as an alternate shall be positively shut off external to the confined break space. The hoses can be disconnected at the regulatory whenever gas welding or burning is suspended for a substantial amount of time, or when the torch is left unattended such as during a lunch period.

2. The torch and hose shall be removed from the confined space, or if this is impractical, the hoses shall be properly disconnected at the regulator (1) at the end of the shift when work is not to be continued on the next shift, (2) at any time when positive ventilation of the confined space is discontinued.

3. The action eliminates the continual need to remove the torch or other gas-consuming device from the hose inside the confined space until the task is completed.

F. Gas Cylinders in Closed Containers

1. Cylinders containing any flammable materials shall never be placed in a confined space where hot work is to be performed.

G. Work on Tank Cars

1. Hot work shall not be done on any tank car while it is at a loading rack

H. Establishment of Routine Hot Work

1. When authorization for a routine permit for hot work is desired, the requestor, HSM representative, and the contractor representative shall review the request at the proposed location. Based upon the investigation, the requestor shall make a recommendation in writing. A copy shall be sent to the HSM, plant maintenance and the requestor. The HSM representative shall either approve or disapprove the request and inform the Owner of the decision.

I. Hot Work on Disconnected and Unused Equipment Outside a Unit

1. When hot work is to be performed on a disconnected and/or unused piece of equipment outside a unit limit, this work shall be considered as a normal "Hot Work Permit."

J. Hot Work on Equipment in Service

1. Each job shall be considered on an individual basis and shall be justified before authorization is given.

K. Protective Equipment Required

1. Any protective devices and personal protective equipment required will depend upon the conditions of the specific tasks. Contractors are required to supply their own necessary equipment.

APPENDIX M,

FRONT VIEW

BACK VIEW

DISPLAY PERMIT AT JOBSITE

HOT WORK PERMIT

000001

WORK ORDER NO. _____ PROJECT NO. _____
SCI

LOCATION/EQUIPMENT:

DESCRIPTION OF WORK:

CONFINED SPACE ENTRY PERMIT YES [] N/A []

HOT TAP YES [] N/A []

FIREWATCH NECESSARY YES [] N/A []

DOES/DID EQUIPMENT OR AREA CONTAIN HAZARDOUS MATERIALS NO [] YES [] TYPE:

EQUIPMENT MODIFICATION APPROVED YES [] N/A []

PRESSURIZED BOX NECESSARY YES [] N/A []

BASIC EQUIPMENT OWNER: am
DATE TIME pm

MECHANICAL SUPERVISOR: am
DATE TIME pm

HOT WORK PERMIT EXPIRES am
DATE TIME pm

GAS TEST % LEL_____ NECESSARY PRECAUTIONS HAVE BEEN TAKEN AND ALL CONDITIONS AND EQUIPMENT ARE SAFE FOR HOT WORK TO BEGIN.
SAFETY PERMIT INSPECTOR: am
DATE TIME pm

BASIC EQUIPMENT OWNER: am
DATE TIME pm

MECHANICAL SUPERVISOR: am
DATE TIME pm

BASIC EQUIPMENT OWNER: am
DATE TIME pm

MECHANICAL SUPERVISOR: am
DATE TIME pm

JOB COMPLETE YES [] NO []
RETURNED BY:

FIRST COPY RETAINED BY SAFETY DEPARTMENT
SECOND COPY RETAINED BY BASIC EQUIPMENT OWNER

PERMIT VOID WHEN ALARM SOUNDS

HOT WORK CHECKLIST

INSPECT FOR FOLLOWING ITEMS	YES	NO	N/A
Blinding/Disconnect Complete			
Equipment Cleared Properly			
Equipment Nitrogen Inerted			
Dry Grass Wetted/Hose Present			
Flammables Removed From Area			
Heat Conduction Considered			
No 'Opening and/or Blinding Permits' Active in Area			
Fire Blanket/Spray Positioned			
Fire Extinguisher Present			
Charged Handline Present for Potential Flammable Vapor			
Welding Machine/Ground Lead Located in Hot Work Area			
HOT TAP PRECAUTIONS NEEDED			
Hot Tap Authorization Form Complete & on Jobsite			
Adequate Flow or Liquid Level Has Been Established			
CONFINED SPACE PRECAUTIONS NEEDED			
Ventilation is Adequate To Remove Fumes from Hot Work			
All Compressed Cylinders are Outside Confined Space			
Confined Space is Cleaned Thoroughly and Properly			

LIST ANY HAZARDOUS MATERIAL IN AREA/EQUIPMENT
(Read MSDS for specific information)
The material of concern in this area/equipment is:

Three C...es of Front View - Top Two on Carbonless Pap... Reinforced Eye Around Hole - Wire Tie Area

Weat...
Car...

HOT WORK PERMIT

Permit Valid
For 1 Work Day

Project Name_____ Job #_____
Hot Work Description:_____

WORKERS/WELDERS CONDUCTING HOT WORK_____

PERMIT MUST BE COMPLETED IN ITS ENTIRETY BEFORE HOT WORK BEGINS

	Yes	No
Has project supervisor been notified of intended hot work?		
Does customer representative need to be notified of the intended hot work?		
Will hot work impact the general public, customers or operations employees?		
Will the intended hot work need to be coordinated with other contractors who may be working on the site to make them aware of any hazards and the scope of work to be performed?		
Have hazardous energy sources been identified, isolated, and locked out - tagged out before the start of the project?		
Will hot work be conducted within a confined space?		
All testing equipment (i.e. CGI, oxygen meter, etc) and fire fighting equipment (i.e. extinguisher, etc) have been checked to ensure proper operation and calibration before the start of this project?		
Has a fire watch been designated an on station?		
Coatings on metal surfaces have been tested for ignitability and flame spread?		
Area has been cleared of all flammable materials.		
All fuel sources have been identified and protected.		
The area has been restricted with proper barriers and signs.		
The area has been tested to be certain that atmosphere is 0% LEL before starting hot work.		
Flame sensitive areas and equipment (including cylinders and gas delivery lines) exposed to slag and sparks protected by flame resistant blankets or removed from the area?		
All equipment and hoses protected from falling metal structures and debris?		
Escape routes have been identified before starting work?		
Is ventilation equipment needed? Type needed:_____		

THE FOLLOWING PROTECTIVE EQUIPMENT WILL BE REQUIRED:

	Yes	No		Yes	No
Welding Goggles/Shield_____ Tint	__	__	Supplied Air Respirator	__	__
Safety Boots	__	__	Head Protection	__	__
Leather Gloves	__	__	Safety Harness	__	__
Hearing Protection	__	__	Welding Leathers - Top	__	__
APR ____ Cartridge	__	__	Welding Leathers - Bottom	__	__

The following procedures will be applicable prior to hot work on tanks or other types of enclosed structures. (All that applies and fill in appropriate information)

_____Ventilate to 0% LEL Confined Space Entry Permit_____

_____Mechanical Ventilation Required: Cold Cut Only Method Required:_____

_____Inert<_____% Oxygen: Hot Cut Method Allowed:_____ (Fill In)

_____Inert<_____% Oxygen: Cold Cut Only Method Required:

APPROVALS: DATE:_____

_____
GTI Project Manager

_____
Project Fire Watch

_____
Employee Performing Hot Work

FILE PERMIT IN PROJECT WORK FILE

HOT WORK PERMIT

Permit Valid
For 1 Work Day

Project Name_____ Job #_____
Hot Work Description:_____

WORKERS/WELDERS CONDUCTING HOT WORK_____

PERMIT MUST BE COMPLETED IN ITS ENTIRETY BEFORE HOT WORK BEGINS

	Yes	No
Has project supervisor been notified of intended hot work?		
Does customer representative need to be notified of the intended hot work?		
Will hot work impact the general public, customers or operations employees?		
Will the intended hot work need to be coordinated with other contractors who may be working on the site to make them aware of any hazards and the scope of work to be performed?		
Have hazardous energy sources been identified, isolated, and locked out - tagged out before the start of the project?		
Will hot work be conducted within a confined space?		
All testing equipment (i.e. CGI, oxygen meter, etc) and fire fighting equipment (i.e. extinguisher, etc) have been checked to ensure proper operation and calibration before the start of this project?		
Has a fire watch been designated an on station?		
Coatings on metal surfaces have been tested for ignitability and flame spread?		
Area has been cleared of all flammable materials.		
All fuel sources have been identified and protected.		
The area has been restricted with proper barriers and signs.		
The area has been tested to be certain that atmosphere is 0% LEL before starting hot work.		
Flame sensitive areas and equipment (including cylinders and gas delivery lines) exposed to slag and sparks protected by flame resistant blankets or removed from the area?		
All equipment and hoses protected from falling metal structures and debris?		
Escape routes have been identified before starting work?		
Is ventilation equipment needed? Type needed:_____		

THE FOLLOWING PROTECTIVE EQUIPMENT WILL BE REQUIRED:

	Yes	No		Yes	No
Welding Goggles/Shield_____ Tint	__	__	Supplied Air Respirator	__	__
Safety Boots	__	__	Head Protection	__	__
Leather Gloves	__	__	Safety Harness	__	__
Hearing Protection	__	__	Welding Leathers - Top	__	__
APR ____ Cartridge	__	__	Welding Leathers - Bottom	__	__

The following procedures will be applicable prior to hot work on tanks or other types of enclosed structures. (All that applies and fill in appropriate information)

_____Ventilate to 0% LEL Confined Space Entry Permit_____

_____Mechanical Ventilation Required: Cold Cut Only Method Required:_____

_____Inert<_____% Oxygen: Hot Cut Method Allowed:_____ (Fill In)

_____Inert<_____% Oxygen: Cold Cut Only Method Required:

APPROVALS: DATE:_____

_____
GTI Project Manager

_____
Project Fire Watch

_____
Employee Performing Hot Work

FILE PERMIT IN PROJECT WORK FILE

APPENDIX I

Heat / Cold Stress Procedures

HEAT/COLD STRESS PROCEDURE

1.0 HEAT STRESS

Heat stress is a significant potential hazard associated with the work task performed and the type and degree of protective equipment used in hot weather environments. Local weather conditions may produce conditions which will require restricted work schedules in order to protect employees. Monitoring for heat stress will follow one of two protocols depending on whether impermeable clothing (tyvek, saranex, rain gear, etc.) or permeable clothing (cotton coveralls) is worn. This section will apply to both hazardous and non-hazardous waste workers at the site. The SSHO with direction from HSR will determine the environmental Wet Bulb Globe Temperature (WBGT) and physiological (heart rate [HR] and oral temperature) monitoring to be conducted for both types of workers.

1.1 Workers Wearing Permeable Clothing

The American Conference of Governmental Industrial Hygienists (ACGIH) have set Threshold Limit Values (TLVs) for worker exposure to heat stress in which it is believed that nearly all workers may be repeatedly exposed without adverse health effects. The TLVs assume that workers are acclimatized, fully clothed in permeable clothing with adequate water and salt intake, and capable of functioning effectively under the given working conditions without exceeding a deep body temperature of 100.4°Fahrenheit (F). Measurement of the WBGT has been found to be the most adequately measurable environmental factor in which to correlate with the deep body temperature and other physiological responses to heat. The following table reviews the work/rest regimen to be followed by all permeably clothed workers based upon routinely measured WBGT.

Permissible Heat Exposure TLVs Applicable to Workers Wearing Permeable Clothing

Work/Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	86 (76)	80 (70)	77 (67)
75% work - 25% rest, each hour	87 (77)	82 (72)	78 (68)
50% work - 50% rest, each hour	89 (79)	85 (75)	82 (72)
25% work - 75% rest, each hour	90 (80)	88 (78)	86 (76)

Values are given in °F WBGT.

Rest means minimal physical activity. Rest should be accomplished in the shade. Any activity requiring only minimal activity can be performed during rest period.

() Parentheses indicate the 10 degree adjustment for working in impermeable protective clothing.

1.2 Workers Wearing Impermeable Clothing

Workers who must wear impermeable clothing are held at a higher risk of suffering heat stress. Impermeable clothing impedes sweat evaporation, one of the body's major cooling mechanisms. It is the duty of each employer to alert or notify the SSHO if symptoms of heat stress occur to their respective site personnel. Physiological and environmental monitoring of personnel wearing an impermeable protective equipment ensemble will commence at the discretion of the field team leader when suspicion is based on changes in worker's performance or exhibits symptoms (described in section 1.14). Environmental monitoring will be conducted continuously for as long as is necessary. Frequency of physiological monitoring will increase as the ambient temperature increases or if slow recovery rates are indicated. The break time must be sufficient to allow workers to recover from the effects of heat stress. This will be accomplished by measuring the recovery heart rate and oral temperature (OT). The break time duration will be determined using the following methodology and criteria:

- Seat person being monitored
- Take oral temperature
- Measure pulse in the following sequence:
  Pulse #1: 30 seconds to 1 minute after sitting
  Pulse #2: 2½ to 3 minutes after sitting

An excessive heat stress condition exists when any of the following conditions exist:

1. Oral or ear temperature exceeds 99.5°F
2. If pulse #2 is greater than 90 beats/minute, and
3. Pulse #1 is greater than 100 beats/minute.

Worker cannot return to work until:

- Oral or ear temperature is below 99.5°F
- Pulse rate is below 90 beats/minute
- Recovery heart rate for workers with heart rates over 90 beats per minute is less than 100 beats per minute less than the original heart rate.

Adhering to the guidelines for heat stress prevention and monitoring will greatly minimize the possibility of the occurrence of heat stress. Site personnel must also be aware of the symptoms of heat-related disorders and be prepared to administer the appropriate treatments.

1.2.1 Prevention

A. Provide plenty of fluids. A 50 percent solution of fruit juice or similar solution in water, or plain water will be available. For workers performing work inside an exclusion zone, fluid intake may occur in the contaminated reduction zone (CRZ). Workers must first perform a partial decontamination process which will include removal of gloves and washing of hands and face prior to consumption of fluids. The SSHO will monitor the partial decontamination and fluid consumption process to ensure that ingestion of site contaminants does not occur.

B. Work in pairs. No activity where personnel are in Level C/B or confined space entry will be conducted alone.

C. Provide cooling devices. Ice vests or on-site showers can be provided to reduce body temperature and/or cool protective clothing.

The amount and type of undergarments worn will be left to the preference of each individual unless prone to heat stress, especially heat rash. In this case, the worker can wear "long john" cotton type underwear to keep skin off chemical resistant clothing.

D. Adjustment of the work schedule. When practicable, the most labor-intensive tasks should be carried out during the coolest part of the day.

E. Shaded or cooled rest areas. Shaded or cooled rest areas will be provided when site environmental and/or workers physiological responses warrant.

1.2.2 Heat Stress Monitoring

Physiological monitoring of personnel wearing an impermeable protective ensemble will be conducted at regular intervals when deemed necessary by the field team leader. Heart rate must be periodically measured for all site personnel when heat stress conditions (climate or wearing impermeable clothing). Additional physiological monitoring such as body temperature (BT) and body water temperature (BWT) monitoring can be measured for extreme temperatures and when impermeable clothing is worn.

A. HR must be measured by the radial pulse for 30 seconds as early as possible in the resting period and repeated approximately 3 minutes into rest period.

The HR at the beginning of the rest period should not exceed 110 beats per minute. The HR also should not exceed 90 beats per minute after approximately 3 minutes of rest. If the HR does exceed the criteria, the next work period will be shortened by 33 percent, while the length of the rest period will remain the same. If the HR still exceeds the criteria at the beginning of the next rest period, the following work period will be shortened by 33 percent.

B. Body temperature can be measured orally with a clinical or disposable thermometer, in accordance with manufacturer's instructions, as early as possible in the rest period (before drinking liquid). Oral or ear temperature at the beginning of the rest period should not exceed 99.5°F. If it does, the next work period will be shortened by 33 percent while the length of the rest period will remain the same. However, if the OT exceeds 99.5°F at the beginning of the next rest period, the following work period will be shortened by another 33 percent. A worker will not be permitted to wear a semi-permeable or impermeable protective ensemble when his/her body temperature exceed 99.5°F.

C. Body water loss (BWL) due to perspiration can be measured by having the worker weigh him/her self at the beginning and end of each work day. Similar clothing should be worn at both weighing. BWL should not exceed 1.5 percent total body weight in a work day.

Suggested Frequency of Physiological Monitoring for Fit and Acclimated Workers[1]

Adjusted Temperature[2]	Normal Work Ensemble[3]	Impermeable Ensemble[4]
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

1 For work levels of 250 kilocalories per hour.

2 Calculate the adjusted air temperature (T_{adj}) using the following equation:

T_{adj} (°F) = T_{adj} (°F) + (13 x percent sunshine)

Measure the air temperature (T_{adj}) using a standard mercury-in-glass thermometer with the bulb shielded from radiant heat.

3 A normal work ensemble consists of cotton overalls with long sleeves and pants.

4 An impermeable work ensemble consists of impermeable coveralls with long sleeves and pants.

1.2.3 Recognition and Treatment

Any personnel who observes any of the following forms of heat stress either in themselves or in another worker, will report this information to his or her immediate supervisor or the SSHO.

A. Heat rash (or prickly heat)

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

Treatment: Remove sources of irritation and cool the skin with water or wet cloths.

B. Heat Cramps or Heat Prostration

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Sudden development of pain and/or muscle spasms in the abdominal region.

Treatment: Remove the worker to the contamination reduction zone. Remove protective clothing. Decrease body temperature and allow a period of rest in a cool location.

C. Heat Exhaustion - **SERIOUS**

Cause: Overexertion in a hot environment and profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing.

Treatment: Perform the following while simultaneously making arrangements for transport to a medical facility.

Remove the worker to the contamination reduction zone. Remove protective clothing. Lie the worker down on his or her back in a cool place, and raise the feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of a salt water solution consistency of one teaspoon salt in 12 ounces water. Transport the worker to a medical facility.

D. Heat Stroke - **EXTREMELY SERIOUS**

Cause: Same as heat exhaustion.

Symptoms: **No perspiration**, dry mouth, pain in the head, dizziness, nausea.

Treatment: Perform the following while making arrangements for transport to a medical facility.

Remove the worker to the contamination reduction zone. Remove protective clothing. Lie the worker down in a cool place and raise the head and shoulder slightly. **Cool without chilling**. Apply ice bags or cold wet cloth to the head. Sponge bare skin with cool water or rubbing alcohol. If possible, place the worker in a tub of cool water. Do not give stimulants. Transport to a medical facility.

2.0 COLD STRESS

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Localized cold exposure is generally labeled frostbite.

A. Hypothermia: hypothermia is defined as a decrease in the patient core temperature below 96°F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference's with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include: shivering, apathy, listlessness, sleepiness, and unconsciousness.

B. Frostbite: frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 2°F. Symptoms of frostbite are: a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

Prevention of cold related illness can be aided by educating workers on recognizing the symptoms of frostbite and hypothermia and by identifying and limiting known risk factors. The workers should be provided with enclosed, heated environments on or adjacent to the site, dry changes of clothing, and warm drinks.

To monitor the worker for cold related illnesses, start (oral) temperature recording at the job site:

- At the field team leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20°F, or wind-chill less than 30°F with precipitation).
- As a screening measure whenever any one worker on the site develops hypothermia.

Workers developing moderate hypothermia (a core temperature of 92°F) should not return to work for at least 48 hours.

Table 3. Progressive Clinical Symptoms of Hypothermia

Core Temperature (°F)	Symptoms
99.6	Normal rectal temperature
96.8	Metabolic rate increases
95.0	Maximum shivering
93.2	Victim conscious and responsive
91.4	Severe hypothermia
89.6 - 87.8	Consciousness clouded, blood pressure difficult to obtain, pupils dilated but react to light, shivering ceases
86.0 - 84.2	Progressive loss of consciousness, muscular rigidity increases, pulse and blood pressure difficult to get, respiratory rate decreases
78.8	Victim seldom conscious
64.4	Lowest accidental hypothermia victim to recover

In order to minimize the risk of the hazards of working in cold environments, workers will be trained and periodically reinforced in the recognition of the physiologic responses of the body to cold stress. In addition, the use of insulated work clothing, warm shelters and work/warming regimens may be used to minimize the potential hazards of cold stress. Also, special attention will be paid to equipment warm-up time and freeze protection for vessels, piping, equipment, tools, and walking/working surfaces. The current ACGIH TLVs for cold stress found in this appendix will be used as a guideline.

HEAT STRESS MONITORING FORM

Project Name:_____

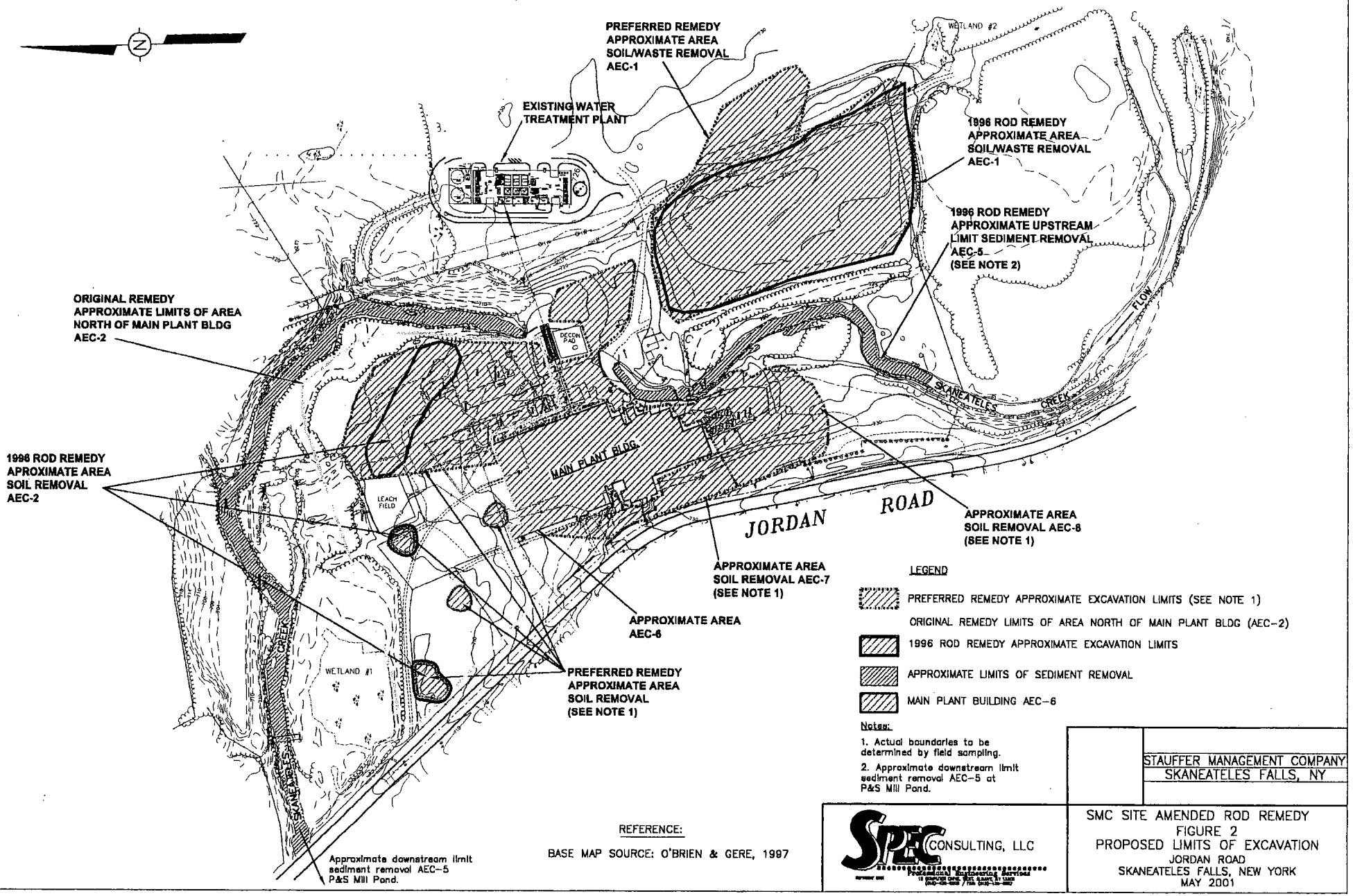
Project Number:_____

Site Safety and Health Officer:_____

Date	Title	Ambient Temp	WBGT	Work/ Rest Regimen	Employee/ Location	Pulse Rate	Body Temp	Body Water Loss	Comments

APPENDIX J

Site Maps


PREFERRED REMEDY
APPROXIMATE AREA
SOIL/WASTE REMOVAL
AEC-1
EXISTING WATER
TREATMENT PLANT
1996 ROD REMEDY
APPROXIMATE AREA
SOIL/WASTE REMOVAL
AEC-1
1996 ROD REMEDY
APPROXIMATE UPSTREAM
LIMIT SEDIMENT REMOVAL
AEC-5
(SEE NOTE 2)
ORIGINAL REMEDY
APPROXIMATE LIMITS OF AREA
NORTH OF MAIN PLANT BLDG
AEC-2
1996 ROD REMEDY
APROXIMATE AREA
SOIL REMOVAL
AEC-2
APPROXIMATE AREA
SOIL REMOVAL AEC-8
(SEE NOTE 1)
APPROXIMATE AREA
SOIL REMOVAL AEC-7
(SEE NOTE 1)
APPROXIMATE AREA
AEC-6
PREFERRED REMEDY
APPROXIMATE AREA
SOIL REMOVAL
(SEE NOTE 1)
Approximate downstream limit
sediment removal AEC-5
P&S Mill Pond.
WETLAND #2
WETLAND #1
MAIN PLANT BLDG.
LEACH FIELD
DECON PAD
SKANEATELES CREEK
JORDAN ROAD
FLOW
LEGEND
PREFERRED REMEDY APPROXIMATE EXCAVATION LIMITS (SEE NOTE 1)
ORIGINAL REMEDY LIMITS OF AREA NORTH OF MAIN PLANT BLDG (AEC-2)
1996 ROD REMEDY APPROXIMATE EXCAVATION LIMITS
APPROXIMATE LIMITS OF SEDIMENT REMOVAL
MAIN PLANT BUILDING AEC-6
Notes:
1. Actual boundaries to be determined by field sampling.
2. Approximate downstream limit sediment removal AEC-5 at P&S Mill Pond.
REFERENCE:
BASE MAP SOURCE: O'BRIEN & GERE, 1997
SPEC CONSULTING, LLC
STAUFFER MANAGEMENT COMPANY
SKANEATELES FALLS, NY
SMC SITE AMENDED ROD REMEDY
FIGURE 2
PROPOSED LIMITS OF EXCAVATION
JORDAN ROAD
SKANEATELES FALLS, NEW YORK
MAY 2001

APPENDIX K

SMC, LLC Field Inspection Report

Site Investigation Report Protocol

Almost all investigations conducted by SMC result in the issuance of a Site Investigation Report (SIR). The project manager is responsible for the preparation of the report as detailed in Section 1.2. A specific format is necessary for the preparation of such technical reports. The following report outline shall be used and modified only when absolutely necessary;

1.0 Executive Summary:	should include an overview of what was performed and the results and conclusions developed.
2.0 Introduction:	should include a statement of the problem, who requested the study, where the study was conducted and the objectives of the study.
3.0 Background/Site Description	a description of the area studied and any pertinent operational history. This section should also include subsections describing the general physiographic conditions of the site including reference literature concerning geology, groundwater and topography.
4.0 Investigation Activities:	field and analytical methods employed during the study.
4.0 Investigation Results	a brief summary of study findings, results and any relevant conclusions
5.0 Conclusions/Recommendations	a bullet-oriented summary of all major findings and recommendations for additional work of future course of action.

Figures:	A topographic map locating the project
Figures:	A facility map location of all samples collected or relevant structural or physical features
Figures:	Other figures as necessary
Appendices:	A listing of all relevant data collected during the study.

As a general rule, reports should contain only factual information. These reports shall not contain recommendations or personal opinions. Recommendations and personal opinions for these investigations may be included in a separate letter.

The draft SIR for all non-routine projects shall be reviewed in accordance with the following peer review policy:

1) Project Manager
2) Quality Assurance Manager
3) Operations Manager

Routine project peer review will be identified to the non-routine project except the QAM review is not necessary but may be substituted for the Operations Manager's review.

STAUFFER MANAGEMENT

Report No. _____

Page No. _____ of _____

Date _____

Weather	Temperature
	High _____
	Low _____

SITE OBSERVATION REPORT

Project _____ Project No. _____

Location

The above comment were made by: _____

Photographs _____ Time charged to project _____ (Hrs)

APPENDIX L

Daily Safety Meeting
And
Safety Observer Form

STAUFFER MANAGEMENT CO.
DAILY SAFETY MEETING

Project/Site:_____ Date:_____

Presented by:_____ Title:_____

Topic(s)/Information Reviewed:_____

_____

_____

_____

Comments/Follow-up Actions:_____

_____

_____

_____

Sign in:

NAME	SIGNATURE	COMPANY

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form and file with Site Safety Plan.
- Follow-up on any noted items and document resolution of any action items.

Instructions

**Completed by Safety Observer at Time of Observation*

Observation Type: Check the box, which indicates the type of observation performed: "General" or "Focused"

5. Record the "Observer's Name," "Job Title," of Observer, "Project Name," "Project Number," "Date/Time" of observation.
6. Check the task observed or specify the task observed if not listed.
7. If this is a Focused Observation, list the name and job position of the employee observed.
8. Provide any information/comments regarding the observation (focused or general), which may add value to the report, i.e. weather conditions.
9. List all "Positive Observations", e.g. wore proper PPE.
10. List all "Unsafe Practices/Conditions" observed which could affect safety, e.g. not wearing hearing protection. **(See Observation Check List)**
11. **Safety Observer's Recommended Action(s):** List the recommended actions that can be taken to correct any observed unsafe practices and/or conditions which could affect safety. Submit the completed form to the Site Supervisor by the end of the work shift. For General Observations Only, give a brief review at the next daily safety meeting.

**Completed by Site Supervisor Immediately Following the Receipt of Safety Observer's Report.*

12. **Supervisor's Follow –up Actions Taken**: List the actual actions taken to correct the observed unsafe practices and/or conditions.
13. **(a) Supervisor's Review**: Sign the report and enter the date after reviewing the Safety Observer's Report and listing the follow up actions taken to correct any observations.

**Completed by the Site Safety Officer Immediately After Review by the Site Supervisor*

13. **(b) Site Safety Officer's Review**: Review of the report for accuracy and completeness. Return to the Site Supervisor if deficiencies are noted. If accurate and complete, sign and date the form. Retain all forms in the project safety files.

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SAFETY OBSERVER REPORT

Observation Type:
☐ General
☐ Focused

1. Observer Name	2. Job Title	3. Project Name	4. Project Number	5. Date / Time

6. Task / Area Observed (check one)

☐ Excavation ☐ Clearing / Grubbing
☐ Tank Removal / Cleaning ☐ Rigging / Lifting ☐ Decontamination
☐ Confined Space Entry ☐ Water Treatment ☐ Facility Construction
☐ Filter Press Operations ☐ Demolition ☐ Drum Handling
☐ Thermal Treatment ☐ Other_____

7. Name/ Job Position of Worker Observed
(Focused Observation Only)

8a. Background Information / Comments:

8b. Job Safety Analysis (JSA)
☐ Yes
☐ No

9. Positive Observations:

a. [redacted]

b.

c.

d.

10. Unsafe Practices / Conditions

a.

b.

c.

d.

11. Safety Observer's Recommended Action(s)	12. Supervisor's Corrective Action Taken
a.	a.
b.	b.
c.	c.

13a. Supervisor Review	13b. Site Safety Officer Review (if applicable)
[redacted]	

Observation Checklist
What to Look For

Position of People

Striking Against (Struck By)
Caught Between
Falling
Climbing
Off Balance
Temperature Extremes
Electrical Current
Inhaling, Absorbing, or Swallowing
Overexertion
Walking in Designated Aisles or Walkways
Riding on Portable Equipment

Actions of People

Changing Position
Rearranging Job
Stopping Job
Hurrying
Running
Exposure to Moving Equipment
Wearing Proper Equipment and Tools
Following Rules, Procedures
Using Good Judgment
Trained on Job being Performed

Personal Protective Equipment

Protection for:
Eyes
Face
Hands
Head
Arms
Legs and Feet
Respiratory System
Trunk

Tools and Equipment

Right for the Job
Used Correctly
In Safe Condition
Carried and Stored Properly
Inspected and Coded Properly

Work Area Equipment

Housekeeping and Appearance
Cramped Quarters
Blind Corners
Exposure to Moving Equipment and Traffic
Aisles
Exits
Lighting
Unsecured Items Overhead
Stairs
Fumes, Dust, Smoke
Restricted or Prohibited Areas
Hazards from Nearby Operations
Material Handling
Ladders Properly Tied Off
Exposed Hot Surfaces
Sharp Edges or Burrs
Barricades
Chemicals (Identified and Labeled)
Guards in Place (Adequate)
Pinch Points
Painting, Insulation, General Repair
Noisy Equipment

Rules and Procedures

Established? (Understood?)
Adequate? (Reviewed and Upgraded?)
Maintained?

Fire and Safety Equipment

Available?
Adequate?
Operable?
Blocked?
Inspected?

APPENDIX M

Respiratory Protection Program

RESPIRATORY PROTECTION PROGRAM

RESPIRATORY PROTECTION PROGRAM

5.1 Purpose

The purpose of SMC's Respiratory Protection Program is to coordinate the use and maintenance of respiratory protection equipment as determined is necessary to reduce employee exposure to environmental contaminants in the workplace and to allow employees to work safely in work environments with contaminants. In so far as possible, atmospheric contamination shall be controlled by engineering control measures such as local exhaust ventilation or by administrative controls such as product substitution. When effective engineering or administrative controls are not feasible, or while they are being instituted or evaluated, respiratory protection shall be utilized. This program is designed to comply with the OSHA Respiratory Protection Standard, 29 Code of Federal Regulations (CFR)1910.134.

5.2 Scope and Applicability

5.2.1 Scope

The Respiratory Protection Program applies to all SMC's employees whose assigned duties with SMC may involve the use of respiratory protection.

5.2.2 Responsibilities of SMC Employees

5.2.2.1 Program Administrator

The Health and Safety Program Administrator is the Program Administrator for the Respiratory Protection Program. The following dirties are assigned to the Program Administrator:

5.2.2.1.1 Coordinate the implementation of the RPP with Health and Safety Officers and SMC employees.

5.2.2.1.2 Coordinate respirator fit testing.

5.2.2.1.3 Coordinate the purchase of respirators, component parts and cartridges.

5.2.2.1.4 Maintain exposure records.

5.2.2.1.5 Perform an annual audit of the program to ensure its continued effectiveness.

5.2.2.1.6 Review and update the RPP as necessary.

5.2.2.1.7 Develop and conduct employee training programs on respiratory protection.

5.2.2.2 Health and Safety Officer

The Health and Safety Officer has the primary responsibility for implementing the Respiratory Protection Program for their company. The Health and Safety Officer shall:

5.2.2.2.1 Advise the Program Administrator on the appropriate respiratory protection as requested.

5.2.2.2.2 Distribute copies of Respiratory Protection Program (RPP) to employees participating in the RPP.

5.2.2.2.3 Advise employees on the respiratory protection required for their hazardous operations.

5.2.2.2.4 Ensure the appropriate respirators and cartridges are available.

5.2.2.2.5 Monitor the use of respirators to ensure they are worn properly.

5.2.2.2.6 Monitor workplace environments to determine worker exposure potential.

5.2.2.2.7 Implement employee training programs on respiratory protection.

5.2.2.2.8 Supervise respirator selection procedure.

5.2.2.2.9 Implement record keeping procedures for respiratory protective equipment.

5.2.2.2.10 Maintain medical surveillance program for employees assigned to wear respiratory protective equipment.

5.2.2.2.11 Conduct periodic inspections of workplace/conditions requiring respiratory equipment to determine the use and effectiveness of the equipment.

5.2.2.3 Employee

Each SMC employee has the following responsibilities in the Respiratory Protection Program:

5.2.2.3.1 Comply with all safety procedures and regulations governing the use of respiratory protection.

5.2.2.3.2 Maintain, inspect, clean and store respiratory protective equipment according to the directions provided by the manufacturer and the procedures outlined in this program.

5.2.2.3.3 Inform the Program Administrator of any hazardous materials or conditions present in an area when they become known to the employee.

5.2.2.3.4 Report any malfunction of the respirator to the Program Administrator or Health and Safety Officer.

5.3 Requirements for Use of Respirators

5.3.1 Prior to Use

Prior to any work assignment requiring the use of a respirator, each SMC employee must be qualified to wear respiratory protection. Each of the following elements must be satisfied to be a qualified candidate for use of any respirator:

5.3.1.1 Medical Surveillance

Each SMC employee requiring the use of respiratory protection must receive a medical evaluation prior to issuance of the respirator and at least annually thereafter by a qualified physician. The physician shall determine the pertinent health and physical conditions to be evaluated. The physician shall determine whether or not a person may be assigned to a task requiring the use of a respirator and shall provide SMC with a written statement on the fitness of theemployee for respirator use.

5.3.1.2 Training

Prior to the use of any respiratory protection device, each employee will receive instruction as to the proper use, care and limitations of the respiratory equipment. This training will allow the employee to wear a respirator for a familiarity period. The employee will be issued a copy of SMC's Respiratory Protection Program for personal use.

5.3.1.3 Fit Testing

Each employee must complete a qualitative or quantitative fit test on the respirator to be used prior to issuance of the respirator.

5.3.2 Use of Respirators

The following general requirements shall apply to the use of any respiratory protection device.

5.3.2.1 Negative pressure respirators will be assigned to each individual for their use. Powered air purifying respirators (PARR), airline respirators and self-contained breathing apparatus (SC8A) shall be assigned to an individual for the duration of a project assignment but may then be reassigned to another individual.

5.3.2.2 Respirators provided by SMC are for use in assigned tasks and are not to be taken home for personal use.

5.3.2.3 Facial hair such as beards, sideburns, mustaches or stubble which interferes with the seal between the facepiece and the face will not be permitted when respirators are required.

5.3.2.4 Gum or tobacco chewing is prohibited while wearing a respirator.

5.3.2.5 Contact lenses shall not be worn while wearing any form of respiratory protection. When corrective lenses interfere with the proper sealing of a respirator, corrective lens inserts will be provided by SMC.

5.3.2.6 Use of SMC respiratory protection shall be for their employees only. SMC shall not provide or lend respirators to persons other than their employees who are participants in the Respiratory Protection Program.

5.3.2.7 Visitors and other non-employees are prohibited from entering areas where respirators are required unless they can provide their own respirator and documentation of medical evaluation, training and fit testing.

5.3.2.8 A respirator wearer shall leave a hazardous area if any of the following circumstances occur:

5.3.2.8.1 Failure of the respirator to provide protection or malfunction of

5.3.2.8.2 Detection of leakage of an air contaminant into the respirator.

5.3.2.8.3 Increase in resistance to breathing.

5.3.2.8.4 Any sensation of dizziness, nausea, weakness, breathing difficulty, coughing, sneezing, vomiting, fever and chills.

5.4 Selection of Respiratory Protection

5.4.1 Approved Respirators

5.4.1.1 Only NIOSH/MSHA approved respirators will be selected for use by SMC.

5.4.1.2 Disposable (single-use) respirators are not to be used by SMC personnel unless approved by the Program Administrator.

5.4.2 Nature of the Hazard

The selection of respirators shall be made by the Program Administrator based on the nature of the hazard. The following factors shall be considered:

5.4.2.1 The characteristics of the hazardous operation.

5.4.2.2 The type of hazard; whether oxygen deficiency or airborne contaminant.

5.4.2.3 The physical and chemical characteristics of the hazard.

5.4.2.4 The concentration of the contaminant.

5.4.2.5 The physiological effects of the contaminant on the body.

5.4.2.6 The warning properties of the contaminant.

5.4.2.7 The Respirator Decision Logic found in Appendix 5-1 will serve as the basic guide when selecting respiratory protection.

5.4.3 General Considerations

The following general considerations shall also be taken into account in the selection of respiratory protection:

5.4.3.1 The location of the hazardous area.

5.4.3.2 The period of time for which respiratory protection will be required.

5.4.3.3 The activities and physical demands of workers in the hazardous area.

5.4.3.4 The physical characteristics, functional capabilities and limitations of the available respirators.

5.4.3.5 The respirator protection factors and respirator fit.

5.4.4 Employee Considerations

5.4.4.1 The employee will have the opportunity to select from several equivalent respirators. The initial employee selection shall be made on the basis of comfort.

5.4.4.2 A variety of respirators, to include three sizes from at least two manufacturers, will be made available to employees for their selection.

5.4.4.3 An employee may request a powered respirator in lieu of a negative pressure respirator. SMC shall provide a powered respirator if requested by an employee, provided there is a powered respirator capable of supplying the required protection.

5.5 Fitting of Respiratory Protection

5.5.1 Responsibility and Qualifications

5.5. 1.1 Respirator fit testing shall be performed by Workplace Health and Safety or other qualified designee.

5.5. 1.2 The Program Administrator or designee shall receive specialized training in the use and fitting of respiratory protection. This training may be achieved through a formal respiratory protection training class or by instruction from a qualified individual.

5.5.2 Frequency

5.5.2.1 Qualitative fit testing shall be conducted every twelve months for all users of half facepiece negative pressure respirators.

5.5.2.2 Quantitative fit testing shall be conducted every twelve months for all users of full facepiece negative pressure respirators.

5.5.2.3 Quantitative fit testing may be conducted for all users of negative pressure respirators in lieu of qualitative fit tests.

5.5.3 Fit Checks

5.5.3.1 A negative pressure fit check shall be performed each time the respirator is put on. The negative pressure fit check consists of the following steps:

5.5.3.1.1 Don the respirator.

5.5.3.1.2 Close the inlet opening of the respirator cartridges by covering each inlet with the palms of the hands or by squeezing the breathing tube so that it will not allow passage of air.

5.5.3.1.3 Inhale and hold your breath for at least 10 seconds.

5.5.3.1.4 If a facepiece collapses slightly and there is no inward leakage of air into the facepiece, it can be reasonably assured that the fit of the respirator wearer is satisfactory.

5.5.3.2 A positive pressure fit check shall be performed each time the respirator is pert on. The positive pressure fit check consists of the following steps:

5.5.3.2.1 Don the respiration

5.5.3.2.2 Close the exhalation valve or breathing tube by covering the opening with the palm of the hand.

5.5.3.2.3 Exhale gently.

5.5.3.2.4 If a slight positive pressure can be built up inside the facepiece without the detection of any outward leakage of air between the sealing surface of the facepiece and the respirator wearer's face, the fit is considered to be satisfactory.

5.5.4 Qualitative Fit Testing

5.5.4.1 Qualitative fit testing shall be performed according to the procedures described in 29 CFR 1926.58.

5.5.4.2 All personnel assigned to use a half facepiece negative pressure air purifying respirator shall be qualitatively fit tested every twelve months.

5.5.4.3 Workplace Health and Safety or other qualified designee shall conduct the fit testing.

5.5.5 Quantitative Fit Testing

5.5.5.1 Quantitative fit testing shall be performed by Workplace Health and Safety or other occupational health professional.

5.5.5.2 All personnel assigned to use a full facepiece negative pressure air purifying respirator shall be quantitatively fit tested annually.

5.5.5.3 Personnel assigned to use a half facepiece negative pressure air purifying respirator may be quantitatively fit tested in lieu of the annual qualitative fit tests.

5.6 Issuance of Respiratory Protection

5.6.1 Responsibility

Respirators for SMC personnel shall be issued by Program Administrator or Health and Safety Officer.

5.6.2 Requirements for Respirator Issue

5.6.2.1 Respirators shall only be issued to SMC personnel with the following documentation:

5.6.2.1.1 Written statement from a physician that the employee has been medically evaluated and is fit for respirator use.

5.6.2.1.2 Certificate of attendance from a respiratory protection training class.

5.6.2.1.3 Documentation of a successful qualitative or quantitative fit test on the respirator to be issued.

5.6.2.2 The respirator issue shall be recorded on the Personal Protective Equipment Issue Log.

5.7 Information and Training

5.7.1 Information

5.7.1.1 All SMC employees shall be informed of the requirements of the OSHA Respiratory Protection Standard.

5.7.1.2 Each employee required to use respiratory protection shall receive a copy of the SMC Respiratory Protection Program.

5.7.1.3 All SMC employees shall be informed of the work assignments where respiratory protection is required and the type of respiratory protection needed for the assignment.

5.7.1.4 Instruction manuals for the respiratory protective equipment used by SMC is found in Appendix 5-2.

5.7.2 Training

5.7.2.1 All SMC employees participating in the RPP shall be trained in the hazards to the respiratory system and in the use, care and maintenance of each respiratory protective device prior to any assignment requiring the use of a respirator.

5.7.2.2 The training program shall be developed and presented by the Program Administrator or other qualified designee. The training program shall include the following information:

5.7.2.2.1 The respiratory hazard, health effects of the hazard, and what happens ii the respirator is not used property.

5.7.2.2.2 The engineering and administrative controls being used and the need for the respirator to provide protection.

5.7.2.2.3 The reason for selecting a particular type of respirator.

5.7.2.2.4 The function, capabilities and limitations of the selected respirator.

5.7.2.2.5 The method of donning the respirator and testing its fit and operation.

5.7.2.2.6 The proper wearing of the respirator.

5.7.2.2.7 Respirator maintenance.

5.7.2.2.8 Recognizing and handling emergency situations.

5.7.2.3 The Program Administrator or designee shall receive specialized training in respiratory protection either through a formal training class or instruction from a qualified individual.

5.7.2.4 Respiratory protection training shall be given prior to the issuance of respiratory protection and repeated annually.

5.7.2.5 After attending the Respiratory Protection training class, each employee will sign the Training Attendance Record to verify attendance in the training session and an understanding of the information presented on respiratory protection.

5.8 Respirator Care and Maintenance

5.8.1 Responsibility

5.8.1.1 Care and maintenance of a respirator is the responsibility of the individual to whom the equipment was assigned.

5.8.1.2 The Program Administrator or Health and Safety Officer shall assist the employee with equipment maintenance/replacement as necessary.

5.8.1.3 The Health and Safety Officer shall ensure that all cartridges, cleaning supplies and replacement parts are available to maintain the equipment according to instructions provided by the manufacturer.

5.8.2 General Considerations

5.8.2.1 Respiratory protective equipment shall be maintained by SMC personnel according to manufacturer recommendations.

5.8.2.2 Only recommended replacement parts for each respirator type will be used to maintain SMC respirators. Parts from different respirator types or manufacturers shall never be interchanged.

5.8.3 Cleaning and Sanitizing

5.8.3.1 Field cleaning shall be performed by the wearer after each use. Field cleaning shall consist of surface decontamination prior to storage but shall not include any disassembly of the respirator. Field cleaning shall consist of wiping the outside of the respirator facepiece with a damp towel or pre-moistened towelette such as North Respirator Refresher wipes. A clean towelette shall then be used to clean the inside of the respirator facepiece.

5.8.3.2 Complete or laboratory cleaning shall be performed at the end of each task assignment and prior to issuance of the respirator to another individual. Complete cleaning shall consist of a complete disassembly of the respirator into its component parts followed by immersion in a disinfectant solution such as MSA Cleaner-Sanitizer or equivalent.

5.8.3.3 Cartridges should be changed after every eight hours of use or if any of the following occur:

5.8.3.3.1 An increase in resistance when inhaling through the cartridge.

5.8.3.3.2 The wearer detects any odor while wearing a respirator designed to remove chemical contaminants.

5.8.3.3.3 The cartridges become dirty, dented, wet or otherwise damaged.

5.8.4 Inspection

5.8.4.1 Each respirator shall be inspected by the wearer before and after each use to ensure it is in proper working condition (ENT-288A)

5.8.4.2 Each respirator used for emergency or rescue shall be inspected monthly by the Program Administrator or Health and Safety Officer to ensure it remains in proper working order. A record of the inspection dates, findings and remedial actions shall be kept for all emergency/rescue equipment.

5.8.4.3 Inspection for defects shall include the following items:

RESPIRATOR PART/SYSTEM	CHECK FOR POTENTIAL PROBLEMS
Facepiece	Dirt Cracks Tears Holes General Distortion
Straps	Tears Loss of Elasticity Broken Snaps or Clips
Valves	Dirt Cracks Holes Warpage (be sure valve seals properly)
Filters	Dents, Cracks Corrosion Proper Approval

Additional inspection items for Powered Air Purifying Respirators (PAPR):

RESPIRATOR PART/SYSTEM	CHECK FOR POTENTIAL PROBLEMS
Hose	Tears Punctures Loose Clamp
Battery	Fuses Cracks Loose Connections Switch Defects Moisture
Motor Blower Unit	Noise Faulty Motor Dirt Cracks Holes

5.8.4.4 After examining the respirator, any defects discovered must be corrected prior to use. If the defects cannot be repaired at the project location, the respirator must be removed from service and returned to the Program Administrator for repair or replacement parts. Under no circumstances shall a defective respirator be worn.

5.8.5 Storage

5.8.5.1 Respirators shall be stored away from dust, direct sunlight, heat, extreme cold, excessive moisture and damaging chemicals.

5.8.5.2 Respirators shall be stored to prevent distortion of rubber or other elastomeric parts.

5.8.5.3 Respirators shall be stored in a clean, zip-lock bag whenever they are not in use.

5.9 Record keeping

5.9.1 Responsibility

5.9.1.1 The Program Administrator shall be responsible for reviewing the training documentation, fit test records and exposure monitoring for all SMC employees.

5.9.1.2 The Program Administrator shall be responsible for the record keeping requirements of this program and the Health and Safety Officer shall maintain a file copy of the training documentation, fit test records and medical surveillance for each employee in their company.

5.9.2 Duration

5.9.2.1 Exposure data and medical records for SMC employees must be maintained for 40 years.

5.9.2.2 Fit test records for each employee must be maintained for at least three years or the duration of employment.

5.9.2.3 Records of attendance at respiratory protection training classes must be maintained for one year.

5.10 Program Compliance

5.10.1 General

Compliance with the written procedures of this program and with the OSHA Respiratory Protection Standard (29 CFR 1910.134) is required by all SMC employees in the Respiratory Protection Program.

5.10.2 Workplace Monitoring

The Program Administrator or designee shall periodically conduct air sampling during respirator use to evaluate employee exposure potential to airborne contaminants. This exposure monitoring shall be breathing zone air samples that are representative of the time weighted average exposure of each employee (See Section 8.0, Exposure Monitoring).

5.10.2.1 Initial monitoring shall be conducted at the initiation of project involving exposure to airborne contaminants. At least one sample shall be collected which is representative of each job category performing the work. This data should be compared to the action level and the permissible exposure limit for the contaminant being sampled to ensure these limits are not exceeded and that the appropriate respiratory protection is being utilized.

5.10.2.2 Periodic monitoring must be conducted that is representative of the exposure of each employee assigned to work within a regulated area. Approximately 25 percent of those workers in a job category should be sampled to obtain representative samples. This monitoring shall be continued until periodic sampling is consistently below the action level.

5.10.3 Program Audits

5.10.3.1 The Program Administrator shall periodically check program compliance by inspecting project sites and observing respirator use, maintenance and storage. The following items shall be evaluated as part of the program audit.

- 5.10.3.1.1 Wearer acceptance of the respirator, including comfort, fatigue, interference with vision and communication, restriction of movement and confidence in the respirator.
- 5.10.3.1.2 Proper selection of respirators.
- 5.10.3.1.3 Respirators are in good operating condition.
- 5.10.3.1.4 Respirator wearers are properly trained.
- 5.10.3.1.5 Respirator hazards are being monitored.

5.10.3.2 Annually, the Program Administrator and the Health and Safety Officer shall review the overall effectiveness of the Respiratory Protection Program and implement any required changes in the RPP for their company.

5.10.4 Disciplinary Action

Any employee who fails to comply with the requirements of the Respiratory Protection Program is subject to disciplinary action.

5.10.4.1 A verbal and written reprimand will be issued by the Program Administrator. This reprimand will become part of the employee record and a copy will be maintained in their employee file.

5.10.4.2 The employee may receive further disciplinary action unless extenuating or mitigating circumstances were involved.

APPENDIX N

Dust Control Plan

1.0 INTRODUCTION

The Dust Control Program (DCP) has been developed to outline SMC's approach to controlling dust emissions during construction activities at the Stauffer Management Company (SMC) Site in Skaneateles Falls, New York. Dust Monitoring will be conducted within the work areas and at various perimeter locations throughout the site.

2.0 ON SITE ACTIVITIES

Remedial and construction tasks at the SMC Skaneateles Falls, New York Site that are likely to create air borne contaminants are described below:

- Excavation and transportation of impacted materials
- Construction of on-site haul roads
- Operation and Maintenance of the on-site Waste Water Treatment Plant
- Building Demolition

The health and safety officer or designated air monitor will monitor total aerosol concentrations at a minimum of once daily if any of the above activities involve the handling of waste or contaminated soil. Monitoring will also be conducted when possible fugitive aerosols may be produced from exposed waste or contaminated soil.

3.0 WORK PERIMETER MONITORING

During monitoring activities total aerosol concentrations will be measured with a real-time aerosol monitor using a scattered light photometric sensing cell. Results of aerosol monitoring will be documented on the Air Monitoring Form located in **Appendix E**.

To ensure the accuracy and validity of collected data each monitor will be factory calibrated prior to arrival on-site and zeroed on a daily basis. Qualified personnel who have undergone training on the monitors will conduct the setup, operation, and downloading of the monitors. All training, calibration, and air monitoring forms will be kept on site in a dedicated file for referencing.

Plan guidelines and action levels are consistent with and mirror those established in the NYSDEC TAGM 4031. Action levels are based on Data-Ram readings conducted in the field. Action levels are illustrated below.

Monitoring Device	Monitoring Location/ Personnel	Monitoring Frequency	Action Level	Action
MIE Data Ram	1 Upwind; 2 Downwind of EZ Perimeter	Continuous during excavation	<0.100 mg/m^3 (15 min TWA) downwind EZ perimeter	Continue normal operations
			≥ 0.100 mg/m^3 (15 min TWA) downwind EZ perimeter	Implement dust control measures; Monitor upwind background level
			≥ 0.150 mg/m^3 (15 min TWA) difference between upwind and downwind background level at the Site perimeter	Halt all excavation work until EZ perimeter reading is <0.100 mg/m^3 (15 minute TWA)

Monitoring along the E2 perimeter will be done at two locations: one downwind and one upwind of the exclusion zone perimeter. The upwind station will serve as the daily background sample. Monitoring will be continuous while samples are collected at fifteen-minute intervals during intrusive activities and any other activities that may produce aerosols. At the completion of each workday monitoring stations will be downloaded to a computer spreadsheet and stored for historical records.

4.0 DUST CONTROL METHODS

Dust control will be performed as needed during construction activities. Methods of dust control to be utilized include, but are not limited to the following:

- Wetting unpaved roads and exposed soils that are being used for site activities to maintain the moisture content of the top 6 inches at a level, which will minimize dust emissions, but will not create runoff or ponding. Water trucks and fixed stations will be used to control dusting in each area.

- Non-contaminated water will be used for dust control and will be clean, free from oil or other deleterious materials. Chemical based adhesives or salts will not be used.

- Minimize the movement of vehicles and equipment during site activities and minimize the traffic in and out of the area by establishing dedicated access lanes.

- Reduce speed of traffic as required to prevent dusting. Site speed limit will be posted at 10 miles per hour.

- Perform manual cleaning, mechanical sweeping, flushing and general housekeeping on paved road surfaces on-site.

- Minimizing the limits of excavation keeping exposed soils to a minimum.

In the event that dust emissions exceed acceptable limits, the above steps (individually or combined) will be taken, as appropriate to reduce dust levels. In the event that dust is observed leaving the site, suppression methods will be re-evaluated and modified accordingly with the approval of the NYSDEC and the NYSDOH.

Engineering controls such as foam suppressants, surfactants, temporary covers (i.e., tarps), or other appropriate engineering controls and reducing the limits of excavation will be implemented to reduce and control the air born contaminants during excavation activities.

5.0 CONCLUSION

In the event of aerosol emissions exceeding action levels along the property perimeter, notification of the NYSDEC and the NYSDOH consistent with the HASP and TAGM #4031 will be made. Additional procedures and action levels for aerosol monitoring within the work areas are discussed in the HASP.

APPENDIX O

Perimeter Air Monitoring Plan / Emissions Response Plan
Community Air Monitoring Plan

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1.0 INTRODUCTION

This Air Quality Monitoring Plan/Odor Control (AMOCP) has been prepared to describe the means and methods to be used in evaluating ambient air quality during remedial action activities at the Stauffer Management Company (SMC) facility in Skaneateles Falls, New York. This plan has been prepared in accordance with Technical Specifications 020006 (3.3) and may be referenced as an Employee and Community Protection Plan (ECPP). Air quality monitoring for personnel in the site work zones is also described in general. Specific Air Monitoring requirements and procedures for the work zones are specified in the Site Specific Health and Safety Plan (HASP).

The AMOCP/ECPP will describe the methods that will be used to collect direct measurements of air borne particulate matter and Volatile Organic Compounds (VOCs) that may be present at the facility during intrusive site activities.

The AMOCP/ECPP will be implemented in conjunction with the site-specific health and safety plan (HASP), but is not meant to replace the HASP. Investigative activities have identified VOCs and dust particulates as potential air contaminants. The site perimeter atmosphere will be monitored for VOCs (with xylene the most prevalent VOC compound detected at the site) and dust during the course of site activities in order to document the impacts (if any) to the site perimeter air quality during a variety of site work.

Seven permanent air-monitoring stations are installed at designated locations along the perimeter of the property. A designated on-site representative (Health and Safety Officer) will be responsible for the collection of data and maintenance of each monitoring stations each workday. This monitoring data will be used to document air quality and guide appropriate action to reduce/minimize air emissions to acceptable levels, if required.

1.1 Site Background

The SMC site is located in central New York State in the town of Skaneateles Falls, Onondaga County. The property, located at 4512 Jordan Road, is approximately 3 miles north of Skaneateles Lake and 20 miles west of the city of Syracuse.

The site is a Class 2 site, listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York as Site Number 734010. The SMC facility encompasses an area of approximately 70 acres. The focuses of the proposed remedial actions are in the areas formerly used to support production operations (including existing and former structures located west of Skaneateles Creek and east of Jordan Road) and the landfill located east of Skaneateles Creek. This portion of the property encompasses approximately 20 acres. Skaneateles Creek, the outlet of Skaneateles Lake, flows in a northerly direction through the western portion of the site. The SMC site is bounded by residential and commercial areas to the west and north. Undeveloped land occupies the areas immediately to the east and south of the site. The town of Skaneateles's water supply system services the

areas along the Skaneateles Creek Valley in the vicinity of the site and uses surface water from Skaneateles Lake as its source.

The SMC facility in Skaneateles Falls, New York, was formerly used to manufacture organic chemicals and detergents. The principal organic compound manufactured at the site was toluic acid, which used xylene as a raw material. Stauffer discontinued the manufacture of toluic acid in 1972; however, they continued to manufacture various organic compounds until 1981 and inorganic compounds until 1985. Currently, there are no manufacturing activities conducted at the site. A full-time caretaker is present to maintain the security of the facility, and to monitor the operation of the on-site groundwater treatment facility.

2.0 ONSITE ACTIVITIES

SMC is performing remediation activities at their former chemical manufacturing plant located in Skaneateles Falls, New York. The remediation work includes the collection and treatment of contaminated groundwater, excavation and transportation of contaminated soils. A list of major on-site work tasks that are likely to create air borne contaminants is described in Table 1 below.

TABLE 1 SITE ACTIVITIES

	Potential Air Impacts	
Activity	**Dust**	**VOCs**
Access road construction	Yes	No
Groundwater Management Activities	Yes	Yes
Drilling in contaminated soils and groundwater	Yes	Yes
Excavation of contaminated soils	Yes	Yes
Transportation of contaminated soils with trucks, and other equipment	Yes	Yes

3.0 WORK AREA AIR MONITORING

Work area air monitoring at the SMC Skaneateles Falls site will include direct reading methods as well as integrated sampling strategies. Air monitoring will be conducted during all intrusive activities.

3.1 Direct Reading Air Monitoring

During intrusive work, direct reading air monitoring will be performed in the work area of the Exclusion Zone (EZ) to determine exposure to workers and off-site receptors. Monitoring will also be performed at one upwind location and downwind location at the EZ perimeter. This configuration of monitoring stations takes into account the proximity of the Site Perimeter and the EZ perimeter. Photoionization detectors (PID) will be used to monitor for VOC concentrations. A MIE Data-RAM (or equivalent) will be used to monitor air borne particulates. At the EZ perimeter, levels of >5 ppm for volatiles organic compounds and 150 ug/m^3 for particulates will be used to initiate the evaluation of using engineering controls. Readings of >25 ppm and/or 150 ug/m^3 above background will initiate suspension of intrusive activities and/or site work stoppages until airborne VOC or particulate concentrations have returned to acceptable levels at the perimeter of the EZ. A summary of air monitoring information is provided in the following table.

TABLE 2 AIR MONITORING INFORMATION

Monitoring Location/ Personnel	Monitoring Device	Monitoring Frequency	Action Level*	Minimum Protection Level/Action
EZ intrusive activities/ Equipment Operator (EO) Recovery Technician (RT)	Photoionization Detector	Continuous during intrusive activities	<5 ppm ≥5 ppm <50 ppm ≥50 <1000 ppm > 1,000 ppm	Level D Level C Level B Stop work required
EZ excavation areas; EO, RT	Mini-Ram (total dust)	Continuous during intrusive activities	0- 2.5 mg/m^3 (TWA) ≥2.5 mg/m^3 ≤12.0 mg/m^3 (TWA) >12.0 mg/m^3 (TWA)	Level D Level C; Initiate dust suppression controls Stop work required
Site Perimeter	Photoionization Detector/Site perimeter VOC monitors	Continuous during intrusive activities	<5 ppm ≥5 ppm < 25 ppm >25 ppm max >10 ppm max within 20 ft zone	Normal operations Stop intrusive activities until below 5 ppm at EZ or 200' down and Initiate Vapor Emission Response Plan Stop work and initiate Vapor Emission Response Plan (Major Vapor Emissions) Initiate Major Vapor Emission Response Plan
Site Perimeter	Mini-Ram (total dust)	Continuous during intrusive activities	>150 ug/m^3 (TWA) down wind ≥100 ug/m^3 (TWA) above background ≥150 ug/m^3 (TWA) above background	Review upwind background levels Initiate dust suppression an continue work if <150ug/m^3 above background. Stop work and reevaluate activities initiated. Submit report to Division of Air within 5 days with actions taken.

*Action level refers to sustained readings for a minimum of 15 minutes unless otherwise stated.

3.1.1 Integrated Air Sampling

Integrated air sampling for personnel exposure characterization and EZ perimeter confirmation sampling will be performed during excavation of soils within the EZ work areas. Samples for VOCs will be collected on the most at risk Field Technician and/or Equipment Operator. Sampling will be performed daily during all intrusive activities. The initial group of samples will be submitted to the laboratory for analysis within 72 hours to determine worker exposure. Four (4) sets of confirmatory samples will be taken from the perimeter air monitoring locations. These samples will be submitted to the laboratory for analysis within 72 hours. Sampling will be increased or decreased based on data obtained and in consultation with the Project Certified Safety Professional. A summary of air monitoring information is given in the table below.

TABLE 3 INTEGRATED AIR SAMPLING

Monitoring Location/ Personnel	Monitoring Device	Monitoring Frequency	Action Level*	Minimum Protection Level/Action
Breathing Zone/ EO, RT	Air Sampling Pump Volatile Organic Compounds	Daily during intrusive activities	<5 ppm ≥5 ppm <50 ppm >100 – 1000 ppm	Level D Level C Level B
EZ/Site Perimeter	Air Sampling Pump Volatile Organic Compounds	Daily during intrusive activities	<5.0 ppm xylenes ≥ 5.0 ppm xylenes	Normal Operations Initiate Vapor Suppression Controls

*Action level refers to sustained readings for a minimum of 15 minutes unless otherwise stated.

3.2 INSTRUMENTATION

The following is a description of the air monitoring equipment to be used at this site.

3.2.1 Lower Explosive Limit/Oxygen (LEL/O_2) Meter

3.2.1.1 Types and Operational Aspects

MSA Watchman LEL/O_2 Meter or equivalent

Principle of Operation

- Oxygen detector uses an electrochemical sensor; produces a minute electric current proportional to the oxygen content.
- Combustible gas indicators use a combustion chamber containing a filament that ignites flammable vapors; filament is heated or coated with a catalyst (platinum) to facilitate combustion.
- Filament is part of a balanced resistor circuit; combustion in the chamber causes the filament temperature to increase; results in increased filament resistance.
- Change in the filament's resistance causes an imbalance in the circuit proportional to the percent of the lower explosive limit (% LEL).
- Concentrations greater than the LEL and lower than the upper explosive limit (UEL) will read 100% LEL; combustible atmosphere present.
- Concentrations greater than the UEL will read above 100% LEL then return to zero. (NOTE: Some devices have catchment mechanisms, which will cause the needle to remain at 100% until the meter is reset.) This type of response indicates the gas mixture is too rich to burn and is not combustible. The danger is that the addition of air to the gas mixture could bring it into the flammable range (less than the UEL).
- Oxygen meter set at the factory to alarm at 19.5% (oxygen deficient atmosphere) combustible gas meter set by the user to alarm at 10% LEL.

3.2.1.2 Calibration Methods/Frequencies

Before the calibration of the combustible gas indicator can be checked, the unit must be in operating condition. The combustible gas indicator (LEL) is normally calibrated on pentane as being representative of the flammability characteristics of most commonly encountered combustible gases. The meter scale is calibrated from zero to 100% LEL, which corresponds in actual volume concentrations of 0 to approximately 14% pentane in air. A booklet of response curves is supplied with the Watchman Meter. These curves may be used to interpret meter readings when sampling combustible gases other than pentane.

It is recommended that calibration be checked before and after using each time. The Site Safety Officer (SSO) will record and log such calibration information into an air-monitoring notebook. The O_2-meter is calibrated by adjusting the O_2 control knob to 20.8% while the meter is operated in a fresh air atmosphere.

3.2.1.3 Preventative Maintenance (PM)

The primary maintenance of unit is the rechargeable 2.4-volt nickel cadmium battery. Recommended charging time is 16 hours. It may be left on charge for longer periods without damaging the battery .The battery sometimes will not supply full power capacity after repeated partial use between charging. Therefore, it is recommended that the battery be exercised at least once a month by running for eight to 10 hours and recharged. If the instrument has not been used for 30 days, the battery should be charged prior to use.

3.2.2 Photoionization Detector (PID)

3.2.2.1 Type and Operational Aspects

Pill Model PI 101 or equivalent

Principle of Operation

- Ionization potential (IP) -The energy required to remove the outermost electron from a molecule; measured in electron volts (eV); characteristic property of a specific chemical.
- Photoionization -Using ultraviolet (UV) light to remove the outermost electron from a molecule.
- Energy of UV light (10.2,9.5, 11.7 eV) must be equal to or greater than the IP to photoionize the molecule.
- Fan or pump is used to draw air into the detector where the contaminants are exposed to a UV light source (lamp).
- Ions are collected on a charged plate and produce a current directly proportional to the number of ionized molecules; current is amplified and displayed on the meter.

3.2.2.2 Calibration Method/Frequencies

The PID Model PI 101 is designed for trace gas analysis in ambient air and is calibrated at HNU with certified standards of benzene, vinyl chloride, and isobutylene. Other optional calibrations are available (e.g., ammonia, ethylene oxide, H2S, etc.).

SMC will use a PID with a 10.2 eV lamp. This lamp has been determined to be most responsive to the contaminants on site. Optional probes containing lamps of 9.5 and 11.7 eV are interchangeable in use within individual read-out assemblies for different applications.

The approximate span settings for the probe that would give different readings of the amounts of trace gas of a particular species in a sample are based upon the relative photoionization sensitivities of various gases twice daily (beginning and end of shift).

It is recommended that calibration be checked twice each day (beginning and end. of shift). The SSO will record and log such calibration information into an air-monitoring notebook.

3.2.2.3 Preventative Maintenance

Maintenance of the Pill Model PI 101 consists of cleaning the lamp and ion chamber, and replacement of the lamp or other component parts or sub-assemblies.

3.2.3 Real- Time Aerosol Monitor (Miniram Model Pr100 Data Ram)

3.2.3.1 Type And Operational Aspects

Detection of light in the near infrared region back scattered to a sensor (photovoltaic detector) by airborne particulate in a sensing volume.

The higher the dust concentration the more back scattering of light to the sensor, resulting in increased readings.

Device calibrated at the factory against an air sampling filter/gravimetric analysis reference method.

3.2.3.2 Calibration Methods/Frequencies

There is no calibration method or procedure for calibrating the Mini-RAM monitor. However, it is recommended that the Mini-RAM monitor be re-zeroed once a week. During a zero check, the sampled air passes through the purge air filter and dryer to effect a self-cleaning of the optical chamber.

3.2.3.3 Preventative Maintenance

Maintenance of the Mini-RAM consists of replacement of filters and desiccant; battery replacement; and cleaning of the optical detection assembly.

3.2.4 Gilian Air Sampling Pump (or equivalent)

3 .2.4.1 Type and Operational Aspects

- Air sampling pump is calibrated to draw a specified airflow rate (liters per minute) for a designated period of time.
- Volume of air sampled is then calculated as follows:
  Flow rate (liter/min.) x sample time (min.) = sample volume (liters)
- Use a bubble meter to calibrate air sampling pump; pump equipped with a rotameter that shows the flow rate during the sampling period.
- Equipped with a rechargeable battery for 8-hour average sampling times; must be recharged for at least 16 hours.
- Collection Media: 37 mm MCE cassette.

3.2.4.2 Calibration Methods/Frequencies

Flow rate calibration can be accomplished by using primary standard soap and the Gilibrator Calibrator (or equivalent). The Gilibrator calibrator allows rapid flow rate determination with direct read-out on the built-in display.

Connect the sampler to the calibrator, press the ON push button, and then push the plunger to start a bubble up the flow cell. The flow rate is automatically calculated and shown on the display. Subsequent readings are averaged with the previous readings. It is recommended that calibration of the sampler be checked prior to the start of and after each sampling period.

3.2.4.3 Preventative Maintenance

The Gilian air-sampling pump should not require special maintenance or adjustments under normal conditions. However, as with all instruments, the sampling pump does require some basic care. Basic maintenance consists of filter replacement, installing and removing battery packs, storage conditions, and electronic control assembly.

3.2.5 Colorimetric Detector Tubes

3.2.5.1 Type and Operational Aspects

- Drager Multi Glass Detector Mode121/31

  Principle of Operation

  - Colorimetric indicator tubes (detector tubes) consist of a glass tube impregnated with an indicating chemical
  - Tube is connected to a piston or bellow pump to draw a know volume of air through the tube.
  - Contaminant reacts with the indicator chemical in the tube, producing a change in color whose length is proportional to the contaminant concentration; glass tube has degradations in ppm to match the length of stain.
  - Preconditioning filter may precede the detector tube to remove interfering contaminants (benzene, vinyl chloride).

3.2.5.2 Calibration Method/Frequencies

There is no method or procedure for calibrating any colorimetric detector tube. However, it is important to read the instructions provided with a specific detector tube to determine number of pump strokes, interfering chemicals, proper color change, and shelf life. It is important that the number of strokes is not exceeded on the first measurement, as this may overload the tube and overshoot the standard range of measurement.

The sampling pump can be checked but not calibrated using the bubble tube. All bellows pumps draw in a specific amount of air during each stroke. This amount should correspond to a specific amount on the bubble tube (i.e., if one stroke equals 100 cc, then the bubble should move 100 cc in the bubble tube). Also, activating a pump stroke, then inserting an unopened colorimetric tube in the pump inlet can conduct a leak check. The pump should not move, if it does, then there is a leak. If the pump fails either the leak test or the volume test, return it back to the manufacturer for repair.

3.2.5.3 Preventative Maintenance

Generally speaking, the reagent of the colorimetric tubes cannot be stored for unlimited periods. The shelf life of the Drager tubes are, therefore, limited to two years (for storage at room temperature).

3.3 AIR MONITORING RECORDKEEPING

The SSO will ensure that all air-monitoring data is logged according to the SMC Employee Notification of Industrial Hygiene Monitoring Results (HS 104) and the SMC Associate Exposure and Medical Records (HS 102). Data will include instrument used, wind direction, work process, etc. The SMC Project CSP may periodically review this data.

3.4 CALIBRATION REQUIREMENTS

The Pill, LEL 0_2 meter and sampling pumps required with fixed-media air sampling will be calibrated daily before and after use. A log will be kept detailing date, time, span gas, or other standard, and name of person performing the calibration.

3.5 AIR MONITORING RESULTS

Air monitoring results will be posted for personnel inspection, and will be discussed during morning safety meetings. Personal air sampling results will be forwarded to the Project CSP.

4.0 PERIMETER AND REAL- TIME MONITORING ACTIVITIES

4.1 Overview

The project site is bounded on the North and West by private residences and public roads. The southern and eastern boundaries of the site remain undeveloped.

The site work is proposed to mainly occur in the western half of the 120-acre site.

The site work is expected to encompass 12 acres. The landfill site work area is 530 feet from the northern and 320 feet from the western and 520 feet from the southern property boundaries.

Seven fixed air-monitoring stations are located along the perimeter of the property. The monitoring stations are along each of the four property lines (west-3, north-2, east-1, south-1). One meteorological data collection station (met. station) is on the roof of the new groundwater treatment building.

Each fixed air monitoring station contains a VOC sensor to monitor concentrations (in ppm) within the ambient atmosphere at the property line. Four stations (one positioned on each property line) contain a personal dataram to monitor particulate concentrations.

Table 2 provides some of the chemical specific characteristics and associated action level concentrations of the VOC and airborne particulates.

TABLE 4
VOC AND AIRBORNE INFORMATION

					Action Level Concentration		
Compound	Odor Threshold Concentration	Permissible Exposure Limit (PEL) Conc.	Boiling Point	Vapor Pressure	Work Area	Exclusion Zone (EZ) Perimeter	Property Perimeter
Xylene	1 ppm (odor)	100 ppm (435 mg/m^3)	279-284^{0}F	6.72 mm Hg @ 70^{0}F	5 ppm total VOC as registered by PID	5 ppm total VOC as registered by PID	5 ppm as registered on the VOC sensor
Airborne Particulate	5 mg/m^3 (visible dust)	Varies	NA	NA	2.5mg/m^3	150 $\mu g/m^3$	150 $\mu g/m^3$
VOCs	1 ppm	NA	NA	NA	5 ppm total VOC as registered by PID	5 ppm total VOC as registered by PID	5 ppm as registered on the VOC sensor

Values are a 15-minute TWA

NOTE: The HSM does not have the flexibility to relax any of the action levels without health and safety professional and NYS DOH approval. The HSM does have the authority to implement more stringent action levels if deemed appropriate. Airborne particles will be monitored continuously at the work area and twice daily at the EZ perimeter.

4.2 Perimeter Equipment

Perimeter air monitoring equipment includes:

- Seven (7) VOC sensors with a 4-20ma output for recording data
- Four (4) MIE personal DataRams Dust monitors with data loggers

Seven air monitoring stations are positioned along the property lines (west-3, north-2, east-1, south-1). Each station contains a VOC sensor and one station along each property line also contains a particulate monitor. The sensors monitor the ambient air for VOC concentrations and have a 4-20ma output, which sends data to a data logger. The logger documents each real time VOC concentration so that they can be stored on-site as historical data and for simple referencing. The dust monitors provide direct and continuous readout of air borne particulate matter. The data collected will be saved and downloaded for easy referencing. The air monitoring stations are each enclosed in a weatherproof housing.

4.3 Meteorological Station

One AutoMet meteorological monitoring station (Met One Instruments Inc.) is positioned on the roof of the groundwater treatment building. The met station provides real-time data and stores 200+ days of historical data including:

- Wind speed,
- Wind direction,
- Relative humidity,
- Temperature, and
- Barometric pressure.

Also visual weather observations (i.e. cloudy, sunny etc.) and inches of rainfall will be entered into the field log.

4.4 Fence Line VOC & Dust Real-Time Monitoring Equipment

Real-time monitoring will be accomplished using several pieces of equipment as per the HASP. Monitoring of VOCs requires the use of a photo-ionization detector (PID) with a 10.2-eV lamp, which will be calibrated daily using an isobutylene standard at 98.2 ppm. VOCs will be monitored in the work area within the EZ zone in accordance with the HASP.

In addition, VOC and dust monitoring will also occur at established fence line monitoring stations. Seven air monitoring stations are located around the site perimeter where work activities will occur. Air Monitoring stations are shown on attached drawing D-3 "Air Monitoring Locations". All perimeter air monitoring stations (#1 through #7) monitor for VOC, Stations #1, #3, #5 & #7 also monitor for dust. VOC monitors will detect VOC concentrations from 1 ppm to 100 ppm. VOC monitoring stations are set to alarm if VOC concentrations reach 5 ppm. VOC concentrations are constantly monitored at each station. Calibration of the VOC monitors occurs weekly per the manufacturers recommendation utilizing a calibration standard established by the manufacturer. VOC concentration data is stored in a data logger, the data logged data is down loaded to a computer and the data is archived for the project duration. Site experience has shown that

the VOC monitors are subject to "false positive" indications from off-site sources such as auto exhaust, gas powered equipment exhaust, etc. Therefore, to assure the integrity and quality of the data obtained with the data loggers. SMC will utilize a hand held PID field calibrated which will monitor the air in the vicinity of the air monitoring station in the event of an alarm from an air monitoring station.

VOC air monitoring data will be used by the HSM to determine effects of on-site activities to the surrounding community. The vapor emission response plan in Section 6 of this document will be implemented if VOC concentrations are in exceedance of the exclusion zone action limits shown in Table 2. For example, if VOC monitor indicate VOC concentrations exceed 5 ppm in the work area monitoring zone, monitoring will be conducted at the exclusion zone (EZ) perimeter. If the exclusion zone perimeter or property perimeter monitoring station results exceed 5 ppm VOC's, work will be halted and monitoring continued in accordance with the vapor emissions response plan. Mitigation efforts for the VOC excursions include ceasing excavation activities, tarping stockpiles, excavation areas and other appropriate engineering controls. VOC concentrations are logged at a frequency of 1 sample per 15 minutes 24 hours per day seven days per week at each station.

Dust monitors will detect dust concentrations from 1 $\mu g/m^3$ to 400 mg/m^3. Dust concentrations are logged at a frequency of 1 sample per 5 minutes 24 hours per day seven days per week at each station. Additional dust suppression will be initiated if dust concentration is in exceedance of 100 $\mu g/m^3$ above background. Action limits for dust evaluation are shown on table Table 2. Calibration of the dust monitors occurs weekly per the manufacturers recommendation utilizing a calibration standard established by the manufacturer. Dust concentration data is stored in a data logger and on the on-site computer, the data logged data is down loaded to a computer and the data is archived for the project duration.

The alarms discussed in this section are currently being installed. The perimeter monitoring is in addition to the Work Area monitoring discussed in section 3.0.

An oxygen/lower explosive limit (O_2/LEL) combustible gas meter will be used on-site in the vicinity of work activities such as drum operations, confined space entry or in cases when VOCs exceed the limits of the PID.

4.5 Inspections and Data Transfer

The seven perimeter air monitoring stations operation will be inspected daily during site remedial excavation activities. The VOC and dust monitors will be calibrated in accordance with the manufacturers recommendations. VOC and dust alarm set point will be programmed into the monitors at the levels specified in Section 4.4. Alarms occurring during site activities will be investigated to confirm the source or potential cause of the alarm. Alarm validation will be performed in accordance with procedures specified in Section 4.4. Alarms occurring during periods of time when work is not occurring at the site will be considered "false alarms". Monitoring data will be stored in the on-site computer and will be kept for the duration of the project in a data historian database. For non-emergency response alarms as defined in Section 4.4 and Section 6, SMC will report results monthly to the NYSDEC. Monthly reports will be submitted only during site excavation remedial activities. The monthly summary reports will include a list of all alarms, the suspected cause of the alarm, corrective action taken to prevent future alarms and the average monitoring levels per monitoring station for VOC and dust levels. Detailed data sets will be available for review at the site by NYSDEC personnel upon request.

4.5 Perimeter Contingence Monitoring

In the event one or more perimeter air monitoring stations malfunction the following Perimeter Monitoring Contingency Plan will be followed. Scenarios that are anticipated to impact the operation of the perimeter air monitoring station, and the corrective actions required are shown on Table 5. The perimeter air monitoring program is performed as a supplement to the air monitoring program at the exclusion zone.

When perimeter monitoring equipment failures are identified during operational hours, the Site Health and Safety Officer (SHSO) will be notified and actions initiated to investigate and correct the problem. During off hours, equipment failures will be reported to the SHSO prior to starting intrusive work the following day. If the perimeter monitoring station problem has not been corrected prior to initiating intrusive work, the SHSO will initiate the appropriate contingence monitoring frequency outline in the following Section 4.5.1.

Table 5
Perimeter Monitoring Station Fault Scenarios

Scenario	Possible Cause	Impact to Perimeter Monitoring Program	Corrective Action	Contingence Monitoring Frequency
Electrical Power Failure at Site	Lighting strike, utility pole or transformer failure.	Failure of all perimeter monitoring equipment and data logging after approximately 30 minutes (life of battery back up) .	Determine cause and restore power as soon as possible. Document corrective action. If applicable, the power authority will be notified to correct the situation.	See Section 4.5.1
Loss of Electrical Power to Individual Unit	Local fuse failure, electrical wiring interrupted due to excavation activity or other damage.	Failure of individual perimeter monitoring equipment and loss of data logging.	Investigate, correct and document corrective action.	See Section 4.5.1
Loss of Recording Data Logging to Data Historian and Monitoring Panel	Fault in analog signal wiring, circuit board or computer failure.	Loss of data logging at remote panel and computer. Local xylene and dust monitoring still operational.	Investigate, correct and document corrective action.	See Section 4.5.1
Individual Monitoring Instrumentation Failure	Element within unit fails due to electrical storm, physical damage or monitor failure	Loss of readings and data logging for specific parameter i.e. xylene or dust.	Investigate, correct and document corrective action.	See Section 4.5.1

4.5.1 Contingence Perimeter Monitoring Frequency

Since the exclusion zone (EZ) monitoring is conducted during intrusive work, the perimeter contingency monitoring frequency will be based on the status of intrusive work and the air monitoring readings and wind direction at the EZ.

In the event a perimeter monitoring station is not functioning or data is not being computer logged, a portable PID and dust monitor will be used to measure the required parameters **at the non-functioning monitoring station** at the following frequencies (refer to Table 6):

1. If no intrusive work is being conducted at the site, perimeter contingency monitoring will not typically be performed. As part air monitoring associated with potential sources at the site, the staging/excavation areas are checked for appropriate tarping/cover and staging/excavation areas will be monitored with handheld instruments for dust/VOC levels. The Site Health and Safety Officer (SHSO) will determine if perimeter contingency monitoring is required based on the area air monitoring results.
2. If intrusive work is being conducted and the EZ dust monitoring reading is below 100 $\mu g/m^3$ and the PID reading is below 0.5 ppm, contingency monitoring at the non-operational perimeter stations will not be performed. Under this condition, the EZ air monitoring report will be supplemental for the period the perimeter air monitoring station is not functioning
3. During intrusive work, if the upwind perimeter air monitoring station to the EZ becomes non-functional, no additional contingency perimeter monitoring will be performed. Under this condition the EZ air monitoring report will be supplemental for the period the perimeter station is not functioning.
4. If the PID reading at the EZ is 0.5ppm or greater, but less than 5 ppm, monitoring will be performed twice daily at 10 am and 2 pm at any of the non-operational monitoring stations down wind of the EZ. Based on the perimeter monitoring results the SHSO may increase the perimeter monitoring frequency.
5. If the dust monitor reading at the EZ is 100 $\mu g/m^3$ or greater, but less than 100 $\mu g/m^3$ above background, perimeter monitoring will be performed twice daily at 10 am and 2 pm at the non-operational monitoring stations down wind of the EZ. Based on the perimeter monitoring results the SHSO may increase the perimeter monitoring frequency and include upwind monitoring at non functioning stations.
6. A PID reading in excess of 5 ppm (TWA) or a dust reading in excess of 100 $\mu g/m^3$ above background at the EZ will initiate the Emission Response Plan in Section 6.0. Under this condition, down wind non-functioning perimeter air monitoring stations will be monitored every two hourly until modified by the SHSO.

➢ If no predominant wind direct is apparent at the EZ, the SHSO will determine if contingency perimeter air monitoring at a non-functioning station is required. This determination is required under items 4 and 5 above.

TABLE 6
Perimeter Contingency Monitoring Frequency

Site Activity	EZ monitoring results	Non-Functional Monitor Location	Perimeter Monitoring Frequency
None Intrusive Work	General site maintenance and air monitoring.	Any station	Not required unless specified by the SHSO
Intrusive Work	PID < 0.5 ppm Dust < 100 μ/m^3	Not applicable	Not required unless specified by the SHSO
Intrusive Work	PID > 0.5 ppm Dust > 100 $\mu m/m^3$	Up wind of EZ	Not required unless specified by the SHSO
Intrusive Work	PID > 0.5 ppm Dust > 100 $\mu m/m^3$	Down wind of EZ	Twice daily. 10 am and 2 pm.
Intrusive Work	PID > 5 ppm Dust > 100 $\mu m/m^3$ b/ground	Down wind of EZ	Every 2 hours

5.0 BASELINE MONITORING

Baseline monitoring will be conducted in non-contaminated areas when work activities are being conducted and during off hours. This will consist of operating the fixed monitoring stations through the night, throughout the weekends and also during work hours which non-contaminated material is handled. This baseline data will be collected over a one-week period prior to the start of construction activities.

Collection of the data will allow for the comparison of particulate and VOC concentrations within the ambient atmosphere during different periods of site activities and the off hours. Interpretation of this data will provide insight as to the effects of the different work activities on the surrounding community as compared to periods of no work activities.

6.0 EMISSION RESPONSE PLANS

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring with opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals; continuous monitoring may be required during sampling activities.

Monitoring of ambient air VOC concentrations within the work area monitoring zone will be conducted continuously during excavation activities. If ambient VOC concentrations in the work area monitoring zone are detected above the action level, monitoring of the down wind work area exclusion zone perimeter will begin. Note that the down wind property perimeter stations monitor continuously. If the organic vapor concentrations at the exclusion zone perimeter are 5 ppm above background work activities will be halted and monitoring conducted under the provisions of the Vapor Emissions Reponses Plan. If the down wind exclusion zone perimeter organic vapors exceed 5 ppm, then it may be practical to increase the exclusion zone, but not to exceed the limits of the property. The maximum the exclusion zone can be increase will be where the exclusion zone perimeter and the property perimeter monitoring stations are equivalent.

6.1 Vapor Emission Response Plan (VERP)

If VOC concentrations at the exclusion zone perimeter are 5ppm above background, work will be halted and monitoring continued. If perimeter concentrations fall to below 5ppm below background concentrations, work may resume. If perimeter monitoring indicates that VOC levels are between 5 ppm and 25 ppm above background concentrations, then work can be resumed provided the following:

- Monitoring of VOC concentrations 200' downwind of the exclusion zone, property perimeter monitor stations or half the distance to the nearest commercial or residential structure, whichever is less, indicates that VOC levels are no more than 5 ppm above background concentrations.

- Evaluate available resources and utilize appropriate resources to abate the emission source including tarping stockpiles, excavation areas and other appropriate engineering controls.

6.1.1 Major Vapor Emission

If any organic levels greater than 25 ppm over background at the exclusion zone perimeter or greater than 5 ppm are identified 200' downwind from the exclusion zone, property perimeter monitoring station or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted and the following steps will be taken

- Monitor VOC concentrations after work stoppage. If VOC concentrations return to acceptable levels, work may resume with an increased sampling frequency.
- If, following work stoppage, levels persist 5 ppm above background, monitor VOC concentrations for 30 minutes within 20' of the perimeter of the nearest residential or commercial structure (20 foot zone).
- If efforts to abate the emission source are unsuccessful and if the organic vapor level is approaching 5 ppm above background persist for more than 30 minutes in the 20 foot zone, then the Major Vapor Emission Response Plan shall be placed into effect. However, the Major Vapor remission Response Plan shall be placed into effect if the organic vapor levels are greater than 10 ppm above background.

6.1.2 Major Vapor Emission Response Plan (MVERP)

Upon activation, the following activities shall apply:

- All appropriate emergency response contacts as listed in the HASP will be notified.
- The local police and fire authorities will immediately be contacted and advised of the situation by the HSM.
- Frequent air monitoring will be conducted at 30-minute intervals within the 20' zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Health and Safety Manager (HSM),
- Utilize all available resources to abate the emission source including tarping stockpiles, excavation areas and other appropriate engineering controls.

6.1.3 Particulate Monitoring, Response Levels, and Actions

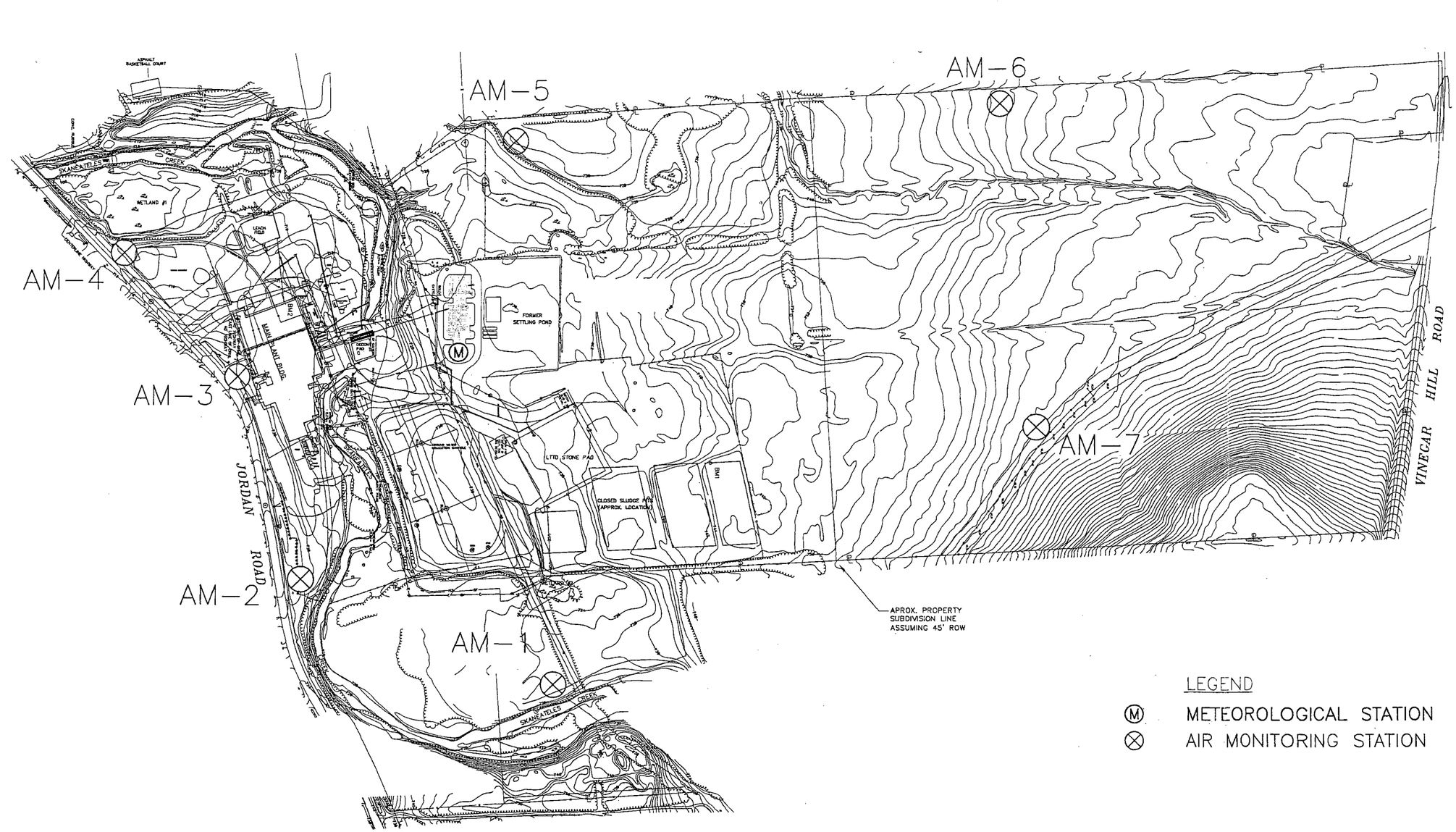
Particulate concentrations will be monitored at the upwind and downwind perimeters of the exclusion zone (EZ) at temporary particulate monitoring stations or as otherwise specified. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15-minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not

exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will stop and a reevaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and available for State (DEC and DOH) personnel to review



LEGEND

Ⓜ METEOROLOGICAL STATION

⊗ AIR MONITORING STATION

150 0 75 150 300 600

(IN FEET)
1 inch = 150 ft.

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. INACCURACIES IN THE STATED SCALE MAY BE INTRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS. USE THE GRAPHIC SCALE BAR IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SCALE OF THIS DRAWING.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

REFERENCE:
BASE MAP SOURCE: O'BRIEN & GERE

SPEC PROJECT #99-004

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1	RRD REVISIONS	9/17/02	J.B.	

W.O. No.

DESIGN	W	3/25/02	APPROVED
DRAWN	JB	3/26/02	
CHECKED	KT	3/25/02	
APPROVED	W	3/25/02	DATE

STAUFFER MANAGEMENT COMPANY SITE
SKANEATELES FALLS, NEW YORK
SOILS REMEDIATION
AIR MONITORING LOCATIONS

SCALE: 1"=150'-0" | DRAWING No. 0.3 | SHEET No. 3 of 35 | REV. No. —