

**HEALTH AND SAFETY PLAN
FOR
MELVILLE NORTH LANDFILL
NAVAL EDUCATION AND TRAINING CENTER
NEWPORT, RHODE ISLAND**

Prepared for:

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed for United States Navy, LANTDIV, Delivery Order entitled Melville North Landfill, Naval Education and Training Center, Newport RI. The Delivery Order will be executed per the requirements stated in the Final Statement of Work (SOW) for Service Delivery Order per Contract No. N62470-93-D-3032, Delivery Order 0025, in cooperation with the Navy. This Delivery Order will also be executed in accordance with Naval Facilities Engineering Command (NAVFAC).

This HASP documents the policies and procedures which protect workers and the public from potential hazards posed by work at this site. OHM considers safety the highest priority during work at a site containing potentially hazardous materials and has established a goal of zero accidents for all projects. All projects will be conducted in a manner which minimizes the probability of injury, accident, or incident occurrence. This HASP is a key element in the proper planning of project work which is necessary to assure the goal of zero accidents. The HASP Acknowledgment (Appendix A) will be signed by all who actively participate at this project.

Although the plan focuses on the specific work activities planned for this site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations may arise that require deviations from the original plan. This flexibility allows modification by the OHM supervisors and health and safety officials with approval from the project CIH.

1.1 SITE HISTORY/BACKGROUND

The Melville North Landfill is located on privately owned property at the northern end of the Newport Naval Base. The site is approximately eight acres in size and is situated between Defense Highway and Narragansett Bay. The Penn Central Railroad tracks run along the eastern side of the former landfill site. The railroad tracks are oriented in an approximate north-south direction. Access to the site is off of Defense Highway through a gate and along a paved entrance way. The paved entrance way leads approximately 180 feet down a small hill and across the railroad tracks to the site.

In general, the site is relatively flat across the central to northern portions. In the southern portion of the site, a slight ridge runs along the eastern half of the site. Ground elevations across the main portion of the site vary between approximately 10 and 20 feet above mean sea level. Along the western edge of the site, the grade of the site is nearly level with the shoreline of Narragansett Bay. The site is vegetated with grass, weeds, and some small trees. A strip of small trees is present along the edge of the bay in the west-central portion of the site. A small, more densely wooded area is present along the edge of the bay in the southern portion of the site. Just off of the site, a small wooded area is also present along the central to southern edge of the site, between the site and Defense Highway.

The Melville North site was used as a landfill for at least the period following World War II until 1955. The Melville North Landfill wastes reportedly included soil and construction debris intermixed with spent acids, waste paints, solvent waste oil (diesel fuel, lube) and PCBs. The quantity of these wastes disposed of in the landfill is unknown.



1.2 SCOPE OF WORK

These activities have been analyzed for potential hazards for which hazard control measures are provided in Section 3.4 Activity Hazard Analysis:

- Site Preparation
- Clearing and Grubbing
- Install Sediment Control Devices
- Strip Topsoil/Remove Gravel Roadway
- Excavation
- Backfilling
- Re-vegetation of Disturbed Areas
- Restoration of Gravel Road



INTRODUCTION

Figure 1.1, Site Map

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Site Supervisor (SS), Certified Industrial Hygienist (CIH) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP. Reporting relationships are shown in Figure 2.1

2.1 PROJECT MANAGER (PM)

The PM has the overall responsibility for the project and to assure that the goals of the construction remedial action are attained in a manner consistent with the HASP requirements. The PM will coordinate with the SS and the SSO to assure that the remedial action goals are completed in a manner consistent with the HASP. The PM will conduct a monthly health and safety audit of the project using the Management Health and Safety Report Form. The PM reports to the Program Manager.

2.2 SITE SUPERVISOR (SS)

The SS is responsible for field implementation of the HASP. The SS will be the main contact in any on-site emergency situation. The SS will conduct periodic inspection of the work site to confirm compliance with all health and safety requirements. The SS is also responsible for coordinating remedial actions for all deficiencies and for enforcing the OHM "Cardinal Safety Rules". The SS reports to the Project Manager.

2.3 SITE SAFETY OFFICER (SSO)

The SSO has responsibility for administering the HASP relative to site activities, and will be in the field full-time while site activities are in progress. The SSO's primary operational responsibilities include personal and environmental monitoring, coordination of job safety analyses, personal protective equipment maintenance, and assignment of protection levels. The SSO will direct all field activities involved with safety and is authorized to stop work when an imminent health or safety risk exists. The SSO is responsible for assuring that all on-site personnel understand all safety requirements. The SSO reports jointly to the CIH and the Project Manager.

2.4 CERTIFIED INDUSTRIAL HYGIENIST (CIH)

The CIH is responsible for the contents of the HASP and will ensure that the HASP complies with all federal, state and local health and safety requirements. If necessary, the CIH can modify specific aspect of the HASP to adjust for on-site changes that affect safety. The CIH will coordinate with the SSO on all modifications to the HASP and will be available for consultation when required. The CIH will not necessarily be on site during OHM activities. The CIH reports to the Regional Vice President / General Manager and the Program Manager.

2.5 EMPLOYEE SAFETY RESPONSIBILITY

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use all equipment provided in a safe and responsible manner as directed by the SS. All OHM personnel will follow the policies set forth in the OHM Health and Safety Procedures Manual, with particular emphasis on the OHM "Cardinal Safety Rules." A copy of this manual will be kept on site for reference.



KEY PERSONNEL AND MANAGEMENT

2.6 KEY SAFETY PERSONNEL

The following individuals share responsibility for health and safety at the site.

Project Manager	William L. Snow, P.E. (508) 435-9561 (office)
Site Supervisor	Brad Coats (site phone)
Site Safety Officer	TBD (site phone)
Program Manager for LANTDIV	George Krauter, P.E. 609-588-6477 (office)
ER Health and Safety Director/Project CIH	Kevin McMahon, M.S., CIH 609-588-6375 (office) 609-421-7523 (pager)
Vice President, Health and Safety	Fred Halvorsen, Ph.D., PE, CIH 800-231-7031



KEY PERSONNEL AND MANAGEMENT

Figure 2.1
Health and Safety Organization

3.0 JOB HAZARD ANALYSIS

This section outlines the potential chemical and physical hazards which workers may be exposed to during work on this project. Table 3.1 lists significant contaminant identified at the site. An MSDS list is included in Appendix C.

3.1 CHEMICAL HAZARDS

3.1 CHEMICAL HAZARDS			
CHEMICAL	EXPOSURE ROUTES	PEL/TLV	HEALTH HAZARDS/ PHYSICAL HAZARDS
Trimethyl-benzene	Inhalation, skin, ingestion, eyes	25 ppm	Skin and eye irritant; may cause central nervous system depression, anemia, bronchitis.
			Flammable when exposed to heat, flame, and oxidizers; emits acrid smoke and fumes when heated to decomposition
Xylene	Inhalation, skin, ingestion, eyes	100 ppm	Dizziness, excitement, drowsiness, lack of coordination, staggered gait; irritation of eyes, nose and throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
			Flammable liquid; keep away from strong oxidizers.
Particulate Polynuclear Aromatic Hydrocarbons	Inhalation, skin, ingestion	0.1 mg/m ³	Carcinogen; dermatitis; bronchitis.
Arsenic	Inhalation, ingestion	0.2 mg/m ³	Carcinogen, ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin.
Lead	Inhalation, ingestion	0.15 mg/m ³	Weakness, lassitude, insomnia; facial pallor; anorexia, weight loss, malnutrition, constipation, abdominal pain, anemia; gingival lead lines; tremors; paralysis of wrist, ankles; encephalopathy; nephropathy; eye irritation; hypotension.

3.1 CHEMICAL HAZARDS			
CHEMICAL	EXPOSURE ROUTES	PEL/TLV	HEALTH HAZARDS/ PHYSICAL HAZARDS
Copper	Inhalation, ingestion	0.2 mg/m ³	Irritated nasal mucous membrane, pharynx; nasal perforation; eye irritation; metallic taste; dermatitis.
Zinc	Inhalation, ingestion,	10 mg/m ³	Sweet metallic taste; dry throat, cough; chills, fever; tight chest, dyspnea, reduced pulmonary function; headaches; blurred vision; muscle cramps, lower back pain; nausea, vomiting; fatigue, lassitude, malaise.

The following general symptoms may indicate exposure to a hazardous material. Personnel will be removed from the work site and provided proper medical attention immediately if the following symptoms occur:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria
- Chest pains and coughing
- Rashes or burns

3.2 PHYSICAL HAZARDS

To minimize physical hazards, OHM has developed standard safety protocols which will be followed at all times. Failure to follow safety protocols will result in expulsion of an employee from the site and appropriate disciplinary actions.

The SS and SSO will observe the general work practices of each crew member and equipment operator, and enforce safe procedures to minimize physical hazards. Hard hats, safety glasses, and steel-toe safety boots are required in all areas of the site. Site-specific hazards and all necessary precautions will be discussed at the daily safety meetings. The Health and Safety Procedures Manual for LANTDIV will be maintained at the project site as a reference document.

3.3 ENVIRONMENTAL HAZARDS

Environmental factors such as weather, wild animals, insects, and irritant plants pose a hazard when performing outdoor work. The SSO and SS will take all necessary measures to alleviate these hazards should they arise.

3.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing result in the potential for heat stress. Heat stress disorders include:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

Heat stress prevention is outlined in procedure No. 22 of the OHM Corp. LANTDIV Health and Safety Procedures manual. This information will be reviewed during safety meetings. Workers will be encouraged to increase consumption of water and electrolyte-containing beverages eg. Gatorade.

It is recommended that workers break approximately every 2 hours for 10 to 15 minute rest periods when temperatures rise above 72.5 degrees F. and protective clothing is worn. In addition, workers are encouraged to take rests whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased upon worker recommendation to the SSO and SS. Heat stress can be prevented by assuring an adequate work/rest schedule; guidelines are printed below.

AMBIENT TEMPERATURE	NO CHEMICAL PROTECTIVE CLOTHING (LEVEL D PPE)	CHEMICAL PROTECTIVE CLOTHING (D+/C/B/A)
90° F or above	After 45 minutes of work	After 15 minutes of work
87.5 F-90 F	After 60 minutes of work	After 30 minutes of work
82.5-87.5 F	After 90 minutes of work	After 60 minutes of work
77.5-82.5 F	After 120 minutes of work	After 90 minutes of work
72.5-77.5 F	After 150 minutes of work	After 120 minutes of work

The work/rest schedule can be calculated based on heat stress monitoring results. Monitoring consists of taking the radial pulse of a worker for 30 seconds immediately after exiting the work area. The frequency of monitoring is provided herein.

If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by 1/3 and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, increase the following rest period by 1/3. The initial rest period should be at least 10 minutes.



Monitoring for heat stress will begin when the ambient temperature reaches or exceeds 70 degrees Fahrenheit when wearing chemical protective clothing, or 80 degrees Fahrenheit for site activities performed with no chemical protective clothing (Level D). Monitoring will include pulse rate, weight loss, oral temperature and signs and symptoms of heat stress. See Procedure 22 LANTDIV Health and Safety Procedures Manual.

3.3.3 Biological Hazards

- POISON IVY (Rhus Radicans)

Poison Ivy may be found at the site. It is highly recommended that all personnel entering into an area with poison ivy wear a minimum of a tyvek coverall, to avoid skin contact.

The majority of skin reactions following contact with offending plants are allergic in nature and characterized by:

- General symptoms of headache and fever
- Itching
- Redness
- A rash

Some of the most common and most severe allergic reactions result from contact with plants of the poison ivy group, including poison oak and poison sumac. Such plants produce severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim may develop a high fever and feel very ill. Ordinarily, the rash begins within a few hours after exposure, but may be delayed 24 to 48 hours.

Distinguishing Features of Poison Ivy Group Plants

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. Both plants have greenish-white flowers and berries that grow in clusters.

First Aid

- a. Remove contaminated clothing; wash all exposed areas thoroughly with soap and water, followed by rubbing alcohol.
- b. Apply calamine or other soothing lotion if rash is mild.
- c. Seek medical advice if a severe reaction occurs, or if there is a known history of previous sensitivity.

- TICKS

Heavily vegetated areas of a site may have ticks. It is highly recommended that all personnel walking through such areas wear a tyvek coverall and latex boot covers taped at all joints. The ticks will stand out against the light colors. A tick or insect repellent containing DEET is recommended.

Ticks can transmit several diseases, including Rocky Mountain spotted fever, a disease that occurs in the eastern portion of the United States as well as the western portion, and Lyme disease. Ticks adhere tenaciously to the skin or scalp. There is some evidence that the longer an infected tick remains attached, the greater is the chance that it will transmit disease.

First Aid

- a. Carefully (slowly and gently) remove the tick with tweezers, taking care that all parts are removed.
- b. With soap and water, thoroughly, but gently, scrub the area from which the tick has been removed, because disease germs may be present on the skin; also wipe the bite area with an antiseptic.
- c. If you have been bitten, place the tick in a jar labeled with the date, location of the bite, and the location acquired. If any symptom appears, such as an expanding red rash, contact a physician immediately.

- LYME DISEASE

Lyme disease may cause a number of medical conditions, including arthritis, that can be treated if you recognize the symptoms early and see your doctor. Early signs may include a flu-like illness, an expanding skin rash and joint pain. If left untreated, Lyme disease can cause serious nerve and heart problems as well as a disabling type of arthritis.

You are more likely to spot early signs of Lyme disease rather than see the tick or its bite. This is because the tick is so small (about the size of the head of a common pin or a period on this page and a little larger after they fill with blood), you may miss it or signs of a bite. However, it is also easy to miss the early symptoms of Lyme disease.

In its early stage, Lyme disease may be a mild illness with symptoms like the flu. It can include a stiff neck, chills, fever, sore throat, headache, fatigue, and joint pain. But this flu-like illness is usually out of season, commonly happening between May and October when ticks bite.

Most people develop a large, expanding skin rash around the area of the bite. Some people may get more than one rash. The rash may feel hot to the touch and may be painful. Rashes vary in size, shape, and color, but often look like a red ring with a clear center. The outer edges expand in size. It's easy to miss the rash and the connection between the rash and the tick bite. The rash develops from three days to as long as a month after the tick bite. Almost one third of those with Lyme disease never get the rash.

Joint or muscle pain may be another early sign of Lyme disease. These aches and pains may be easy to confuse with the pain that comes from other types of arthritis. However, unlike many other types of arthritis, this pain seems to move or travel from joint to joint.

In later stages, Lyme disease may be confused with other medical problems. These problems can develop months to years after the first tick bite.

Early treatment of Lyme disease symptoms with antibiotics can prevent the more serious medical problems of later stages. If you suspect that you have symptoms of Lyme disease, contact your doctor.

Lyme disease can cause problems with the nervous system that look like other diseases. These include symptoms of stiff neck, severe headache, and fatigue usually linked to meningitis. They may also include pain and drooping of the muscles on the face, called Bell's Palsy. Lyme disease can also mimic symptoms of multiple sclerosis or other types of paralysis.

Lyme disease can also cause serious but reversible heart problems, such as irregular heart beat. Finally, Lyme disease can result in a disabling, chronic type of arthritis that most often affects the knees. Treatment is more difficult and less successful in later stages. Researchers think these more serious problems may be linked to how the body's defence or immune system responds to the infection.

3.3.4 Noise

Hearing protection is required for workers operating or working near heavy equipment, where the noise level is greater than 85 dbA (TWA) as well as personnel working around heavy equipment. The SSO will determine the need for and appropriate testing procedures, i.e., sound level meter and/or dosimeter for noise measurement.

ACTIVITY HAZARD ANALYSIS FOR SITE PREPARATION		
TASK BREAKDOWN	POTENTIAL HAZARDS	HAZARD CONTROL MEASURES
Clearing/ Grubbing/	Struck By/ Against Heavy Equipment	<ul style="list-style-type: none"> ● Use reflective warning vests worn when exposed to vehicular traffic ● Avoid equipment swing areas ● Make eye contact with operators before approaching equipment ● Understand and review hand signals
	Slips, Trips, Falls	<ul style="list-style-type: none"> ● Clear, walkways of equipment, tools, vegetation, excavated material, and debris ● Mark, identify, or barricade other obstructions
	Handling Heavy Objects	<ul style="list-style-type: none"> ● Observe proper lifting techniques ● Obey sensible lifting limits (60 lb. maximum per person manual lifting) ● Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Sharp Objects	<ul style="list-style-type: none"> ● Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects ● Maintain all hand and power tools in a safe condition ● Keep guards in place during use
	Insect/ Snake Bites	<ul style="list-style-type: none"> ● Review injury potential and types of snakes with workers ● Avoid insect nests areas, likely habitats of snakes outside work areas ● Emphasize The Buddy System where such injury potential exists ● Use insect repellent, wear PPE to protect against sting/bite injuries
	Contact Dermatitis	<ul style="list-style-type: none"> ● Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants ● Identify and review poisonous plants with workers
	High Noise Levels	<ul style="list-style-type: none"> ● Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)
	High/Low Ambient Temperature	<ul style="list-style-type: none"> ● Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures Manual

ACTIVITY HAZARD ANALYSIS FOR SITE PREPARATION		
TASK BREAKDOWN	POTENTIAL HAZARDS	HAZARD CONTROL MEASURES
Grading (Continued)	Struck By/ Against Heavy Equipment	<ul style="list-style-type: none"> ● Use reflective warning vests worn when exposed to vehicular traffic ● Avoid equipment swing areas ● Make eye contact with operators before approaching equipment ● Understand and review hand signals
	Sharp Objects	<ul style="list-style-type: none"> ● Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects ● Maintain all hand and power tools in a safe condition ● Keep guards in place during use
	Insect/ Snake Bites	<ul style="list-style-type: none"> ● Review injury potential and types of snakes with workers ● Avoid insect nests areas, likely habitats of snakes outside work areas ● Emphasize The Buddy System where such injury potential exists ● Use insect repellent, wear PPE to protect against sting/bite injuries.
	Contact Dermatitis	<ul style="list-style-type: none"> ● Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants ● Identify and review poisonous plants with workers
	High Noise Levels	<ul style="list-style-type: none"> ● Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)
	High/Low Ambient Temperature	<ul style="list-style-type: none"> ● Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures Manual
Equipment/ Facility Set-up	Slips, Trips, Falls	<ul style="list-style-type: none"> ● Clear walkways work areas of equipment, tools, vegetation, excavated material and debris ● Mark, identify, or barricade other obstructions
	Handling Heavy Objects	<ul style="list-style-type: none"> ● Observe proper lifting techniques ● Obey sensible lifting limits (60 lb. maximum per person manual lifting) ● Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads

ACTIVITY HAZARD ANALYSIS FOR SITE PREPARATION		
TASK BREAKDOWN	POTENTIAL HAZARDS	HAZARD CONTROL MEASURES
Equipment Facility Set-Up (Continued)	Sharp Objects	<ul style="list-style-type: none"> ● Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects ● Maintain all hand and power tools in a safe condition ● Keep guards in place during use
	High Noise Levels	<ul style="list-style-type: none"> ● Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)
	High/Low Ambient Temperature	<ul style="list-style-type: none"> ● Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures Manual

ACTIVITY HAZARD ANALYSIS FOR SOIL EXCAVATION		
TASK BREAKDOWN	POTENTIAL HAZARDS	HAZARD CONTROL MEASURES
Clearing/ Grubbing/	Struck By/ Against Heavy Equipment	<ul style="list-style-type: none"> ● Use reflective warning vests worn when exposed to vehicular traffic ● Avoid equipment swing areas ● Make eye contact with operators before approaching equipment ● Understand and review hand signals
	Slips, Trips, Falls	<ul style="list-style-type: none"> ● Clear, walkways of equipment, vegetation, excavated material, tools and debris ● Mark, identify, or barricade other obstructions
	Handling Heavy Objects	<ul style="list-style-type: none"> ● Observe proper lifting techniques ● Obey sensible lifting limits (60 lb. maximum per person manual lifting) ● Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Sharp Objects	<ul style="list-style-type: none"> ● Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects ● Maintain all hand and power tools in a safe condition ● Keep guards in place during use
	Insect/ Snake Bites	<ul style="list-style-type: none"> ● Review injury potential and types of snakes with workers ● Avoid insect nests areas, likely habitats of snakes outside work areas ● Emphasize "Buddy System" where such injury potential exists ● Use insect repellent, wear PPE to protect against sting/bite injuries.
	Contact Dermatitis	<ul style="list-style-type: none"> ● Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants ● Identify and review poisonous plants with workers
	High Noise Levels	<ul style="list-style-type: none"> ● Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)
	High/Low Ambient Temperature	<ul style="list-style-type: none"> ● Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures Manual

ACTIVITY HAZARD ANALYSIS FOR SOIL EXCAVATION		
TASK BREAKDOWN	POTENTIAL HAZARDS	HAZARD CONTROL MEASURES
Excavation of Soil	Underground Utilities	<ul style="list-style-type: none"> ● Identify all underground utilities around the excavation site before work commences ● Cease work immediately if unknown utility markers are uncovered
	Struck By/ Against Heavy Equipment	<ul style="list-style-type: none"> ● Use reflective warning vests when exposed to vehicular traffic ● Avoid equipment swing areas ● Make eye contact with operators before approaching equipment ● Understand and review hand signals
	Sharp Objects	<ul style="list-style-type: none"> ● Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects ● Maintain all hand and power tools in a safe condition ● Keep guards in place during use
	High Noise Levels	<ul style="list-style-type: none"> ● Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)
Excavation of Soil	Excavation Wall Collapse	<ul style="list-style-type: none"> ● Construct diversion ditches or dikes to prevent surface water from entering excavation ● Provide good drainage of area adjacent to excavation ● Collect ground water/rain water from excavation and dispose of properly ● Store excavated material at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face ● Provide sufficient stairs, ladders, or ramps when workers enter excavations over 4 feet in depth ● Place ladders no more than 25 feet apart laterally ● Treat excavations over 4 feet deep as confined spaces ● Complete confined space permit entry procedure ● Monitor atmosphere for flammable/toxic vapors, and oxygen deficiency ● Slope, bench, shore, or sheet excavations over 5 feet deep if worker entry is required ● Assign a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting ● Inspect excavations (when personnel entry is required) daily, any time conditions change ● Provide at least two means of exit for personnel working in excavations

ACTIVITY HAZARD ANALYSIS FOR SOIL EXCAVATION		
TASK BREAKDOWN	POTENTIAL HAZARDS	HAZARD CONTROL MEASURES
Excavation of Soil (Continued)	Slips, Trips, Falls	<ul style="list-style-type: none"> ● Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris ● Mark, identify, or barricade other obstructions
	Handling Heavy Objects	<ul style="list-style-type: none"> ● Observe proper lifting techniques ● Obey sensible lifting limits (60 lb. maximum per person manual lifting) ● Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Inhalation and Contact with Hazardous Substances	<ul style="list-style-type: none"> ● Provide workers proper skin, eye and respiratory protection based on the exposure hazards present. ● Review contaminant chemical MSDSs with workers before operations begin ● Dampen soil using light water spray to prevent fugitive dust emissions ● Cover stockpiled soil with plastic sheeting to prevent fugitive dust emissions
	High/Low Ambient Temperature	<ul style="list-style-type: none"> ● Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures Manual
Backfilling	Slips, Trips, Falls	<ul style="list-style-type: none"> ● Clear walkways, work areas of equipment, vegetation, excavated material, tools, and debris ● Mark, identify, or barricade other obstructions
	Struck By/ Against Heavy Equipment	<ul style="list-style-type: none"> ● Use reflective warning vests worn when exposed to vehicular traffic ● Avoid equipment swing areas ● Make eye contact with operators before approaching equipment ● Understand and review hand signals
	Sharp Objects	<ul style="list-style-type: none"> ● Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects ● Maintain all hand and power tools in a safe condition ● Keep guards in place during use

4.0 WORK AND SUPPORT AREAS

To prevent migration of contamination caused through tracking by personnel or equipment, work areas and personal protective equipment will be clearly specified prior to beginning operations. OHM has designated work areas or zones as suggested by the NIOSH/OSHA/USCG/EPA'S document titled, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities." Each work area will be divided into three zones as follows:

- An Exclusion or "Hot" Zone (EZ)
- A Contamination Reduction Zone (CRZ)
- A Support Zone (SZ)

4.1 EXCLUSION ZONE

The EZ is the area suspected of contamination and presents the greatest potential for worker exposure. Personnel entering the area must wear the mandated level of protection for that area. In certain instances, different levels of protection will be required depending on the tasks and monitoring performed within that zone. The EZ for this is indicated in Figure 1.1, Site Map.

4.2 CONTAMINATION REDUCTION ZONE

The CRZ or transition zone will be established between the EZ and SZ. In this area, personnel will begin the sequential decontamination process required to exit the EZ. To prevent off-site migration of contamination and for personnel accountability, all personnel will enter and exit the EZ through the CRZ. The CRZ for this project is indicated in Figure 1, Site Map.

4.3 SUPPORT ZONE

The SZ serves as a clean, control area. Operational support facilities are located within the SZ. Normal work clothing and support equipment are appropriate in this zone. Contaminated equipment, or clothing will not be allowed in the SZ. The support facilities should be located upwind of site activities. There will be a clearly marked controlled access point from the SZ into the CRZ and EZ that is monitored closely by the SSO and the SS to ensure proper safety protocols are followed. The SZ is indicated in Figure 1, Site Map.

4.4 SITE CONTROL LOG

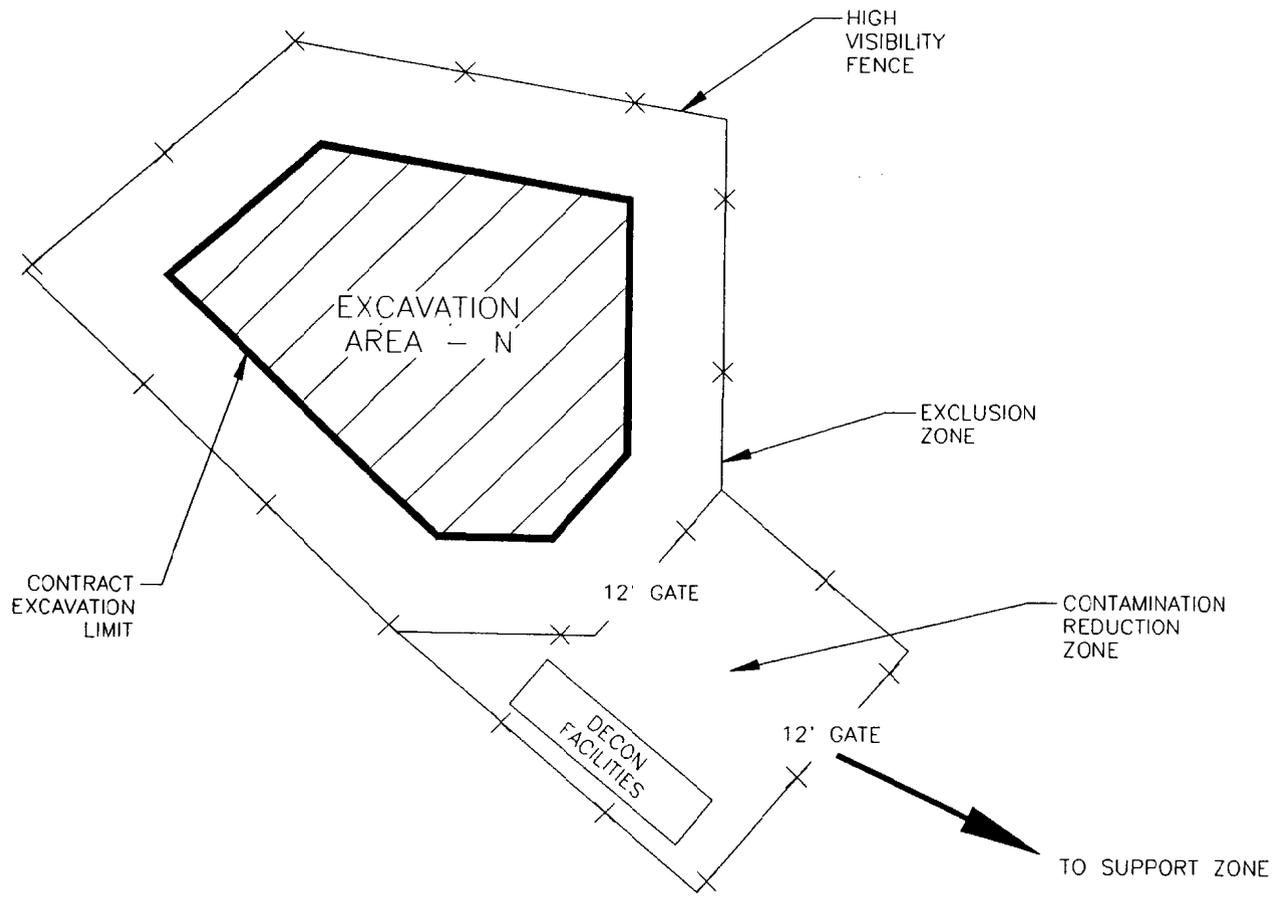
A log of all personnel visiting, entering or working on the site shall be maintained in the main office trailer location. The log will record the date, name, company or agency, and time entering or exiting the site.

No visitor will be allowed in the EZ without showing proof of training and medical certification. Visitors will supply their own boots and respiratory equipment, if required. Visitors will attend a site orientation given by the SSO and sign the HASP.

4.5 GENERAL

The following items are requirements to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the site.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the EZ and CRZs.
- Hands and face must be washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco and smoking or other activities which may result in ingestion of contamination.
- A buddy system will be used. Hand signals will be established to maintain communication.
- During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel provide emergency assistance. All personnel will be aware of dangerous situations that may develop.
- Visual contact will be maintained between buddies on site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the SSO or the SS, will be immediately dismissed from the site.
- Proper decontamination procedures must be followed before leaving the site.
- All employees and visitors must sign in and out of the site.



*FIGURE 1
WORK ZONES*

*MELVILLE NORTH LANDFILL
NAVAL EDUCATION & TRNG CENTER
NEWPORT, RHODE ISLAND*

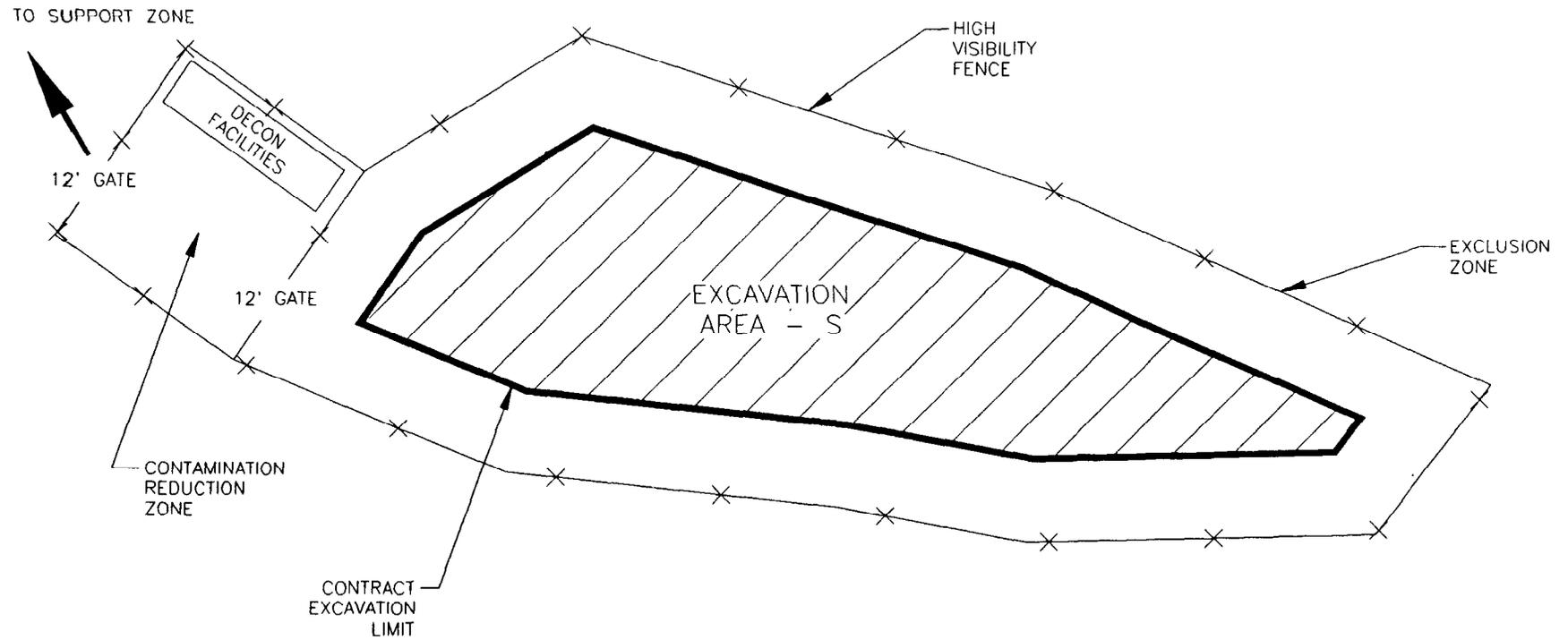


FIGURE 2
WORK ZONES

*MELVILLE NORTH LANDFILL
NAVAL EDUCATION & TRNG CENTER
NEWPORT, RHODE ISLAND*

5.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of personal protective equipment (PPE) which are or may be required at this job site. OHM personnel are trained in the use of all PPE utilized.

5.1 ANTICIPATED PROTECTION LEVELS

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Site Preparation	D	
Clearing and Grubbing	D	Use protective chaps, face shield and hearing protection when operating a chain saw; use a face shield when operating a "weed-wacker"; long-sleeved shirts required
Install sediment control devices	D	Wear hooded-Tyvek when handling hay
Strip topsoil/Remove gravel roadway	D	
Excavate/Sample/Screen Stage	C/D+	Downgrade as per Section 7.0
Backfill	C/D+	Downgrade as per Section 7.0 or after first lift
Re-vegetate	D	Long-sleeved shirts required
Restore gravel road	D	
CRZ Workers	D	
SZ Workers	D	

5.2 PROTECTION LEVEL DESCRIPTIONS

This sections lists the minimum requirements for each protection level. Modification to these requirements will be noted above.

5.2.1 Level D

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work clothing as prescribed by weather



PROTECTIVE EQUIPMENT

5.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, latex or PVC overboots
- Outer nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)
- Tyvek coverall [Polyethylene-coated Tyveks required when workers have a potential to be exposed to contaminated liquids or sludges.]

5.2.3 Level C

Level C consists of the following:

- Full-face, air-purifying respirator with appropriate cartridges
- Hooded Tyvek Coveralls [Polyethylene-coated Tyveks required when workers have a potential to be exposed to contaminated liquids or sludges].
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, latex or PVC overboots
- Nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)

5.2.4 Level B

Level B protection consists of the items required for Level C protection with the exception that an air-supplied respirator is used in place of the air-purifying respirator. The use of Level B protection is not anticipated on this project.

5.2.5 Level A

Level A protection consists of the items required for Level B protection with the addition of a fully-encapsulating, vapor-proof suit capable of maintaining positive pressure. The use of Level A protection is not anticipated on this project.

5.3 SUPPLIED-AIR RESPIRATORS

If air monitoring shows that Level B protection is needed, OHM personnel will wear Survivair 9881-02 Hippack Airline respirators with 5-minute egress bottles. Personnel requiring Level "B" protection and high mobility will wear Survivair Mark 2 SCBA units.

5.11 CORRECTIVE LENSES

Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the respirator's sealing surfaces. For workers requiring corrective lenses, special spectacles designed for use with respirators will be provided.

5.12 CONTACT LENSES

Contact lenses will not be worn with any type of respirator.

5.13 MEDICAL CERTIFICATION

Only workers who have been certified by a physician as being physically capable of respirator usage will be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on site that require respiratory protection. Employees receive a written physicians opinion that they are fit for general hazardous waste operations as per 29 CFR 1910.120(f)(7).

5.14 SITE-SPECIFIC RESPIRATORY PROTECTION PROGRAM

The primary objective of respiratory protection is to prevent employee exposure to atmospheric contamination. When engineering measures to control contamination are not feasible, or while they are being implemented, personal respiratory protective devices will be used.

The criteria for determining respirator need have been evaluated based on the site contaminants and expected levels of protection are outlined in Section 5.1. Air monitoring will be conducted to confirm that respiratory protection levels are adequate (Section 7.0). All respirator users are OSHA trained in proper respirator use and maintenance. The SS and SSO will observe workers during respirator use for signs of stress. The SS, CIH, and SSO will also evaluate this HASP periodically to determine its continued effectiveness with regard to respiratory protection. All persons assigned to use respirators will have medical clearance to do so.

6.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

6.1 PERSONNEL DECONTAMINATION

Decontamination procedures will ensure that material which workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the site. This sequence describes the general decontamination procedure. The specific stages will vary depending on the site, the task, the protection level, etc.

1. Go to end of EZ
2. Wash outer boots and gloves in detergent solution
3. Rinse outer boots and gloves in water
4. Cross into CRZ
5. Remove outer gloves and discard
6. Remove poly-coated Tyvek suit and discard
7. Remove outer sample gloves and discard
8. Remove and wash respirator
9. Rinse respirator and hang to dry
10. Remove inner sample gloves and discard

6.1.1 Suspected Contamination

Any employee suspected of sustaining skin contact with chemical materials will first use the emergency shower. Following a thorough drenching, the worker will proceed to the decontamination facility. Here the worker will remove clothing, shower, don clean clothing, and immediately be taken to the first-aid station. Medical attention will be provided as determined by the degree of injury.

6.1.2 Personal Hygiene

Before any eating, smoking, or drinking, personnel will wash hands, arms, neck and face.

6.2 EQUIPMENT DECONTAMINATION

All contaminated equipment will be decontaminated before leaving the site. Decontamination procedures will vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steaming the exterior of the equipment. Personnel performing this task will wear the proper PPE as prescribed by the SSO.

6.3 DISPOSAL

All decontamination liquids and disposable clothing will be treated as contaminated waste unless determined otherwise by accepted testing methods. Wastes will be disposed of according to state and federal regulations.

7.0 AIR MONITORING

Air monitoring will be conducted in order to determine airborne contamination levels. This ensures that respiratory protection is adequate to protect personnel against the chemicals that are encountered. The following air monitoring efforts will be used at this site. Additional air monitoring may be conducted at the discretion of the SSO.

The following chart describes the air monitoring required and appropriate action levels.

<i>Monitoring Device</i>	<i>Action Level</i>	<i>Action</i>
LEL/O ₂	<10% LEL	Continue
	>10% LEL	Evacuate area, ventilate, upgrade to Level B if necessary, continue to monitor
	20.9% O ₂	Continue
	19.5% - 20.8% O ₂ or 21.0% - 23.0% O ₂	SO will determine cause of the oxygen deficiency/enrichment before work may continue
	<19.5% O ₂	Exit areas; evaluate oxygen deficiency; upgrade to Level B; ventilate
PID	>23.0% O ₂	Cease operations; exit area; evaluate situation
	0-10 ppm	Level D
	10-250 ppm	Level C
	250-500 ppm	Level B
Mini-Ram (total dust)	>500 ppm	Level A
	≥ 1.0 mg/m ³ - ≤ 10.0 mg/m ³ >10.0 mg/m ³	Level C Level B
Personal sampling	<TLV	Level D
	≥ TLV	Level C
Lead	25 X TLV	Level B
PCBs		



7.1 LOWER EXPLOSIVE LIMIT/OXYGEN (LEL/O₂) METER

Prior to entering a confined-space area or hot work involving welding, cutting, or other high heat-producing operations where flammable or combustible vapors may be present, LEL/O₂ measurements will be taken.

7.2 PHOTOIONIZATION DETECTOR (PID)

A PID will be used to monitor total ionizable organic content of the ambient air. A PID will prove useful as a direct reading instrument to aid in determining if respiratory protection needs to be upgraded and to define the EZ.

For known contaminants only, to determine a protection level from PID data, the SSO will multiply the TLV of the known compound by 25. This will be the limit for Level C protection for that compound. If PID readings exceed 25 times the TLV, Level B protection will be required. Also, regardless of the TLV, a PID reading of 1,000 ppm or more will indicate that the GMC-H cartridges may become overloaded and will necessitate Level B protection. (Note: PID readings do not always indicate the actual air concentration of a compound. Consult the manual, HNU, or the CIH for clarification.)

The SSO will take measurements before operations begin in an area to determine the amount of organic compounds naturally occurring in the air. This is referred to as a background level.

Levels of volatile organic compounds will be measured in the air at active work sites once every hour and at the support zone once every hour when levels are detected above background in the exclusion zone. If levels exceed background at any time in the support zone, work in the exclusion zone will cease and corrective actions will be taken, e.g., cover soil with polyethylene sheeting. Work will not resume until levels reach background in the support zone.

7.3 PORTABLE TOTAL DUST MONITOR

A Mini-ram will be used to monitor the general respirable dust levels on this site. The air sampling will be performed at designated locations at the site perimeter upwind and downwind of the active work areas in the EZ. Site conditions will determine the frequency and duration of dust monitoring. Mini-ram readings will trigger dust abatement actions and PPE upgrades.

7.3.1 Type and Operational Aspects

- Real-Time Aerosol Monitor (Mini-ram Model PDM-3)
 - Principal of Operation
 - 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

7.3.2 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 the zero check, the sampled air passes through the purge air filter and dryer to effect a self-cleaning of the optical chamber.

7.3.3 Preventative Maintenance

Maintenance of the Mini-ram consists of replacement of filters and desiccant, battery replacement, and cleaning of the optical detection assembly.

7.4 INTEGRATED AIR MONITORING PROGRAM

7.4.1 Principle of Operation

- An air sampling pump is calibrated to draw a specified air flow rate (liters per minute) for a designated period of time (usually 8 hours).
- Volume of air sampled is calculated as follows:
$$\text{Flow rate (liter/minute)} \times \text{sample time (minute)} = \text{sample volume (liters)}$$
- Use a bubble meter to calibrate air sampling pump; pump is equipped with a rotameter that shows the flow rate during the sampling period.
- Collection Media:
 - Lead - mixed cellulose ester filter (MCEF)
 - PCBs - glass fiber filter, Florisil sorbent tube
- Connect collection media/holder to air sampling pump using Tygon tubing; this comprises the sampling train that must be assembled to calibrate the pump.

7.4.2 Calibration Methods/Frequencies

Flow rate calibration can be accomplished by using primary standard soap and the Gilibrator (or equivalent). The calibrator allows rapid flow rate determination with direct read-out on the built-in display.



Simply 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.

7.4.3 Preventative Maintenance

The Gilian constant flow air sampler was designed for both mechanical and electronic reliability. The 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 of the Gilian air sampler consist of filter replacement, installation and removal of battery packs, storage conditions, and electronic control assembly.

7.5 AIR MONITORING LOG

The SSO will ensure that all air-monitoring data is logged into a monitoring notebook. Data will include all information identified in Procedure 12 of the ER Safety Procedures Manual. The Project CIH will periodically review this data

7.6 CALIBRATION REQUIREMENTS

The PID, LEL/O₂ meter and sampling pumps required with fixed-media air sampling will be calibrated daily prior to use. A separate log will be kept detailing date, time, span gas, or other standard, and name of person performing the calibration.

7.7 AIR MONITORING RESULTS

Air monitoring results will be posted for personnel inspection, and will be discussed during morning safety meetings.

8.0 EMERGENCY RESPONSE

8.1 PRE-EMERGENCY PLANNING

Prior to engaging in construction/remediation activities at the site, OHM will plan for possible emergency situations and have available adequate supplies and manpower to respond. In addition site personnel will receive training during the site orientation concerning proper emergency response procedures.

The following situations would warrant implementation of the ERCP:

Fire/Explosion	<ul style="list-style-type: none"> ● The potential for human injury exists. ● Toxic fumes or vapors are released. ● The fire could spread on site or off site and possibly ignite other flammable materials or cause heat-induced explosions. ● The use of water and/or chemical fire suppressants could result in contaminated run-off. ● An imminent danger of explosion exists.
Spill or Release of Hazardous Materials	<ul style="list-style-type: none"> ● The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard. ● The spill could cause the release of toxic liquids or fumes in sufficient quantities or in a manner that is hazardous to or could endanger human health.
Spill or Release of High Temperature Liquid or Vapor	<ul style="list-style-type: none"> ● The spill can be contained on site, but the potential exists for ground-water contamination. ● The spill cannot be contained on site, resulting in off-site soil contamination and/or ground-water or surface water pollution. ● The spill quantity is greater than the reportable quantity limit for the material.
Natural Disaster	<ul style="list-style-type: none"> ● A rain storm exceeds the flash flood level. ● The facility is in a projected tornado path or a tornado has damaged facility property. ● Severe wind gusts are forecasted or have occurred and have caused damage to the facility.
Medical Emergency	<ul style="list-style-type: none"> ● Overexposure to hazardous materials. ● Trauma injuries (broken bones, severe lacerations/bleeding, burns). ● Eye/skin contact with hazardous materials. ● Loss of consciousness. ● Heat stress (Heat stroke). ● Cold stress (Hypothermia). ● Heart attack. ● Respiratory failure. ● Allergic reaction.

The following measures will be taken to assure the availability of adequate equipment and manpower resources:

- Sufficient equipment and materials will be kept on site and dedicated for emergencies only. The inventory will be replenished after each use.
- On-site emergency responders will be current in regards to training and medical surveillance programs. Copies of all applicable certificates will be kept on file for on-site personnel required to respond.
- It will be the responsibility of the emergency coordinator to brief the on-site response team on anticipated hazards at the site. The emergency coordinator shall also be responsible for anticipating and requesting equipment that will be needed for response activities.
- Emergency response activities will be coordinated with the Local Emergency Planning Committee (LEPC) in compliance with SARA Title III requirements.

Communications will be established prior to commencement of any activities at the remediation site. Communication will be established so that all responders on site have availability to all pertinent information to allow them to conduct their activities in a safe and healthful manner. The primary communication device will be two-way radios. Air horns may be used to alert personnel of emergency conditions. A telephone will be located at the command post to summon assistance in an emergency.

Primary communication with local responders in the event of an emergency will be accomplished using commercial telephone lines.

8.2 EMERGENCY RECOGNITION AND PREVENTION

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the Site Supervisor and Site Safety Officer (SSO), through daily site inspections and employee feedback (Safety Observation Program, daily safety meetings, and activity hazard analyses) to recognize and identify all hazards that are found at the site. These may include:

Chemical Hazards	<ul style="list-style-type: none"> ● Materials at the site ● Materials brought to the site
Physical Hazards	<ul style="list-style-type: none"> ● Fire/explosion ● Slip/trip/fall ● Electrocutation ● Confined space ● IDLH atmospheres ● Excessive noise
Mechanical Hazards	<ul style="list-style-type: none"> ● Heavy equipment ● Stored energy system ● Pinch points ● Electrical equipment ● Vehicle traffic



EMERGENCY RESPONSE

Environmental Hazards	<ul style="list-style-type: none">● Electrical Storms● High winds● Heavy Rain/Snow● Temperature Extremes (Heat/Cold Stress)● Poisonous Plants/Animals
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Once a hazard has been recognized, the Site Supervisor and/or the SSO will take immediate action to prevent the hazard from becoming an emergency. This may be accomplished by the following:

- Daily safety meeting
- Task-specific training prior to commencement of activity
- Lock-out/tag-out
- Personal Protective Equipment (PPE) selection/use
- Written and approved permits for hot work, confined space
- Trenching/shoring procedure
- Air monitoring
- Following all OHM standard operating procedures
- Practice drills for fire, medical emergency, and hazardous substances spills

TABLE 8.1
EMERGENCY TELEPHONE NUMBERS

<u>Local Agencies All services</u>	<u>On-Base/Off-Base</u>
Fire Department	401-841-3333/401-846-2211
Police	401-841-3241/401-846-1212
<u>Hospital</u>	
Newport Hospital, Newport RI	401-864-6400
Regional Poison Control Center	800-442-6305
<u>State Agencies</u>	
Rhode Island Department of Environment Management	401-277-3434
Dig Safe	800-225-4977
<u>Federal Agencies</u>	
EPA Environmental Response Team	201-321-6660
Agency for Toxic Substances and Disease Registry	404-639-0615 (24 HR)
<u>Navy ROICC / NTR</u>	
U.S. Coast Guard - Atlantic Strike Team	609-724-0008 / 0396
National Response Center	800-424-8802
Project Manager - Bill Snow	508-435-9561
Director, Health and Safety Kevin McMahon	609-588-6375
OHM Corporation (24 hour)	800-537-9540
Additional Phone #'s in Section 2 this HASP	

8.3 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS

This section of the ERCP describes the various roles, responsibilities, and communication procedures that will be followed by personnel involved in emergency responses.

The primary emergency coordinator for this site is the Site Supervisor. In the event an emergency occurs and the emergency coordinator is not on site, the Site Safety Officer or the highest ranking employee on site will serve as the emergency coordinator until he arrives. The emergency coordinator will determine the nature of the emergency and take appropriate action as defined by this ERCP.



EMERGENCY RESPONSE

The emergency coordinator will implement the ERCP immediately as required. The decision to implement the plan will depend upon whether the actual incident threatens human health or the environment. Immediately after being notified of an emergency incident, the emergency coordinator or his designee will evaluate the situation to determine the appropriate action.

8.3.1 Responsibilities and Duties

This section describes the responsibilities and duties assigned to the emergency coordinator.

It is recognized that the structure of the "Incident Command System" will change as additional response organizations are added. OHM will follow procedures as directed by the fire department, LEPC, State and Federal Agencies as required. OHM will defer to the local Fire Department chief to assume the role of Incident Commander upon arriving on site. Additional on-site personnel may be added to the Site Emergency Response Team as required to respond effectively.

8.3.2 On-site Emergency Coordinator Duties

The on-site emergency coordinator is responsible for implementing and directing the emergency procedures. All emergency personnel and their communications will be coordinated through the emergency coordinator. Specific duties are as follows:

- Identify the source and character of the incident, type and quantity of any release. Assess possible hazards to human health or the environment that may result directly from the problem or its control.
- Discontinue operations in the vicinity of the incident if necessary to ensure that fires, explosions, or spills do not recur or spread to other parts of the site. While operations are dormant, monitor for leaks, pressure build-up, gas generation, or ruptures in valves, pipes, or other equipment, where appropriate.
- Notify local Emergency Response Teams if their help is necessary to control the incident. Table 8.1 provides telephone numbers for emergency assistance.
- Direct on-site personnel to control the incident until, if necessary, outside help arrives.
- Ensure that the building or area where the incident occurred and the surrounding area are evacuated and shut off possible ignition sources, if appropriate. The Emergency Response Team is responsible for directing site personnel such that they avoid the area of the incident and leave emergency control procedures unobstructed.
- If fire or explosion is involved, notify Base Fire Department.
- Notify LANTDIV ROICC
- Notify OHM Project Manager



EMERGENCY RESPONSE

- Have protected personnel, in appropriate PPE, on standby for rescue.

If the incident may threaten human health or the environment outside of the site, the emergency coordinator should immediately determine whether evacuation of area outside of the site may be necessary and, if so, notify the Police Department and the Office of Emergency Management.

When required, notify the National Response Center. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility.

The emergency telephone number for the National Response Center is 800-424-8802.

If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained.
- Containers of waste are removed or isolated from the immediate site of the emergency.
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.
- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.
- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.
- Notify the USEPA Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility. The USEPA Regional Administrator's telephone number is included in the Emergency Contacts.
- Record time, date, and details of the incident, and submit a written report to the USEPA Regional Administrator. Report is due to USEPA within 15 days of the incident.

8.4 SAFE DISTANCES AND PLACES OF REFUGE

The emergency coordinator for all activities will be the SS. No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies which could occur. Safe distances can only be determined at the time of an emergency based on a combination of site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), workers in the affected area will report initially to the contamination reduction zone. Small spills or leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent of the release and potential hazards, the emergency coordinator or his designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to secure the boundaries.

In the event of a major hazardous material release (large spills of high toxicity/greater than 55 gallons), workers will be evacuated from the building/site. Workers will assemble at the entrance to the site for a head count by their foremen and to await further instruction.

If an incident may threaten the health or safety of the surrounding community, the public will be informed and, if necessary, evacuated from the area. The emergency coordinator, or his designee will inform the proper agencies in the event that this is necessary. Telephone numbers are listed in Table 8.1.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incidents:

- Chemical release
- Fire/explosion
- Power loss
- Medical emergency
- Hazardous weather

In general, evacuation will be made to the crew trailers, unless the emergency coordinator determines otherwise. It is the responsibility of the emergency coordinator to determine when it is necessary to evacuate personnel to off-site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the site until a head count establishes that all are present and accounted for. No one is to leave the site without notifying the emergency coordinator.

8.5 EVACUATION ROUTES AND PROCEDURES

All emergencies require prompt and deliberate action. In the event of an emergency, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible. However, in specific emergency situations, the emergency coordinator may deviate from the procedures to provide

a more effective plan for bringing the situation under control. The emergency coordinator is responsible for determining which situations require site evacuation.

8.5.1 Evacuation Signals and Routes

Two-way radio communication and an air horn will be used to notify employees of the necessity to evacuate an area or building involved in a release/spill of a hazardous material. The evacuation signal is three long blasts of at least fifteen seconds each on the air horn. Each crew supervisor will have a two way radio. A base station will be installed in the OHM office trailer to monitor for emergencies. Total site evacuation will be initiated only by the emergency coordinator, however, in his absence, decision to preserve the health and safety of employees will take precedence. Evacuation routes will be posted in each outside work area. Signs inside buildings will be posted on walls or other structural element of a building. Periodic drills will be conducted to familiarize each employee with the proper routes and procedures.

8.5.2 Evacuation Procedures

In the event evacuation is necessary, the following actions will be taken:

- The emergency signal will be activated.
- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the site will cease in order to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery if safe to do so.
- ALL on-site personnel, visitors, and contractors in the support zone will assemble at the entrance to the site for a head count and await further instruction from the emergency coordinator.
- ALL persons in the exclusion zone and contamination reduction zone will be accounted for by their immediate crew leaders (e.g., foreman). Leaders will determine the safest exits for employees and will also choose an alternate exit if the first choice is inaccessible.
- During exit, the crew leader should try to keep the group together. Immediately upon exit, the crew leader will account for all employees in his crew.
- Upon completion of the head count, the crew leader will provide the information to the emergency coordinator.
- Contract personnel and visitors will also be accounted for.
- The names of emergency response team members involved will be reported to the emergency spill control coordinator.

- A final tally of persons will be made by the emergency coordinator or designee. No attempt to find persons not accounted for will involve endangering lives of OHM or other employees by re-entry into emergency areas.
- In all questions of accountability, immediate crew leaders will be held responsible for those persons reporting to them. Visitors will be the responsibility of those employees they are seeing. Contractors and truck drivers are the responsibility of the Site Supervisor. The security guard will aid in accounting for visitors, contractors, and truckers by reference to sign-in sheets available from the guard shack.
- Personnel will be assigned by the emergency coordinator to be available at the main gate to direct and brief emergency responders.
- Re-entry into the site will be made only after clearance is given by the emergency coordinator. At his direction, a signal or other notification will be given for re-entry into the facility.
- Drills will be held periodically to practice all of these procedures and will be treated with the same seriousness as an actual emergency.

8.6 EMERGENCY SPILL RESPONSE PROCEDURES AND EQUIPMENT

In the event of an emergency involving a hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation. Emergency contacts found in Table 8.1 provide a quick reference guide to follow in the event of a major spill.

8.6.1 Notification Procedures

If an employee discovers a chemical spill or process upset resulting in a vapor or material release, he or she will immediately notify the on-site emergency coordinator.

On-site Emergency Coordinator will obtain information pertaining to the following:

- The material spilled or released.
- Location of the release or spillage of hazardous material.
- An estimate of quantity released and the rate at which it is being released.
- The direction in which the spill, vapor or smoke release is heading.
- Any injuries involved.
- Fire and/or explosion or possibility of these events.
- The area and materials involved and the intensity of the fire or explosion.

This information will help the on-site emergency coordinator to assess the magnitude and potential seriousness of the spill or release.

8.6.2 Procedure for Containing/Collecting Spills

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If for some reason a chemical spill is not contained within a dike or sump area, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and involves a tank or a pipeline rupture, an initial isolation of at least 100 ft. in all directions will be used. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe will require evacuation of at least 50 ft. in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be enforced. In general an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. (Consult the DOT Emergency Response Guide for isolation distances for listed hazardous materials.)

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The on-site emergency coordinator will inform the proper agencies in the event this is necessary. (Refer to Table 8.1)

As called for in regulations developed under the Comprehensive Environmental Response Compensation Liability Act of 1980 (Superfund), OHM's practice is to report a spill of a pound or more of any hazardous material for which a reportable quantity has not been established and which is listed under the Solid Waste Disposal Act, Clean Air Act, Clean Water Act, or TSCA. OHM also follows the same practice for any substances not listed in the Acts noted above but which can be classified as a hazardous waste under RCRA.

Clean up personnel will take the following measures:

- Make sure all unnecessary persons are removed from the hazard area.
- Put on protective clothing and equipment.
- If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material.
- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.
- If wastes reach a storm sewer, try to dam the outfall by using sand, earth, sandbags, etc. If this is done, pump this material out into a temporary holding tank or drums as soon as possible.

- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site.
- Spray the spill area with foam, if available, if volatile emissions may occur.
- Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids.
- For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.

8.6.3 Emergency Response Equipment

The following equipment will be staged in the support zone and throughout the site, as needed, to provide for safety and first aid during emergency responses.

- ABC-type fire extinguisher
- First-aid kit, industrial size
- Eyewash/safety shower
- Emergency signal horn

In addition to the equipment listed above, OHM maintains direct reading instrumentation that may be used in emergency situations to assess the degree of environmental hazard. This equipment will only be used by the Site Safety Officer or other specially trained personnel. This equipment will be stored, charged and ready for immediate use in evaluating hazardous chemical concentrations. The equipment will be located at the OHM office trailer.

<i>EQUIPMENT NAME</i>	<i>APPLICATION</i>
Portable H-NU Photoionization Meter	Measures selected inorganic and organic chemical concentrations
Oxygen and Combustible Gas Meter	Measures oxygen and combustible gas levels

8.6.4 Personal Protective Equipment

A supply of two (minimum) SCBAs will be located in the support zone for use in emergency response to hazardous materials releases. They will be inspected at least monthly, according to OSHA requirements. In addition, all emergency response personnel will have respirators available for use with cartridge selection determined by the Site Safety Officer based on the results of direct reading instruments. Emergency response personnel will also be provided with protective clothing as warranted by the nature of the hazardous material and as directed by the Site Safety Officer.



8.6.5 Emergency Spill Response Clean-Up Materials and Equipment

A sufficient supply of appropriate emergency response clean-up and personal protective equipment will be inventoried and inspected, visually, on a weekly basis.

The materials listed below will be kept on site for spill control, depending on the types of hazardous materials present on site. The majority of this material will be located in the support zone, in a supply trailer or storage area. Small amounts will be placed on pallets and located in the active work areas.

- Sand or clay to solidify/absorb liquid spills.
- Appropriate solvents e.g. CITRIKLEEN, for decontamination of structures or equipment.

The following equipment will be kept on site and dedicated for spill cleanup:

- Plastic shovels for recovering corrosive and flammable materials.
- Sausage-shaped absorbent booms for diking liquid spills, drains, or sewers.
- Sorbent sheets (diapers) for absorbing liquid spills.

*NOTE: All contaminated soils, absorbent materials, solvents and other materials resulting from the clean-up of spilled or discharged substances shall be properly stored, labelled, and disposed of off-site.

8.7 EMERGENCY CONTINGENCY PLAN

This section of the ERCP details the contingency measures OHM will take to prepare for and respond to fires, explosions, spills and releases of hazardous materials, hazardous weather, and medical emergencies.

8.8 MEDICAL EMERGENCY CONTINGENCY MEASURES

The procedures listed below will be used to respond to medical emergencies. The SSO will contact the local hospital and inform them of the site hazards and potential emergency situations. A minimum of two First-Aid/CPR trained personnel will be maintained on site.

8.8.1 Response

The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The work crew supervisor will be summoned.

The work crew supervisor will immediately make radio contact with the on-site emergency coordinator to alert him of a medical emergency situation. The supervisor will advise the following information:

- Location of the victim at the work site
- Nature of the emergency



EMERGENCY RESPONSE

- Whether the victim is conscious
- Specific conditions contributing to the emergency, if known

The Emergency Coordinator will notify the Site Safety Officer. The following actions will then be taken depending on the severity of the incident:

- Life-Threatening Incident--If an apparent life-threatening condition exists, the crew supervisor will inform the emergency coordinator by radio, and the local Emergency Response Services (EMS) will be immediately called. An on-site person will be appointed who will meet the EMS and have him/her quickly taken to the victim. Any injury within the EZ will be evacuated by OHM personnel to a clean area for treatment by (EMS) personnel. No one will be able to enter the EZ without showing proof of training, medical surveillance and site orientation.
- Non Life-Threatening Incident--If it is determined that no threat to life is present, the Site Safety Officer will direct the injured person through decontamination procedures (see below) appropriate to the nature of the illness or accident. Appropriate first aid or medical attention will then be administered.

*NOTE: The area surrounding an accident site must not be disturbed until the scene has been cleared by the Site Safety Officer.

Any personnel requiring emergency medical attention will be evacuated from exclusion and contamination reduction zones if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving first aid. Decontamination will be performed if it does not interfere with essential treatment.

If decontamination can be performed, observe the following procedures:

- Wash external clothing and cut it away.

If decontamination cannot be performed, observe the following procedures:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel.
- Alert emergency and off-site medical personnel to potential contamination, instruct them about specific decontamination procedures.
- Send site personnel familiar with the incident and chemical safety information, e.g. MSDS, with the affected person.



EMERGENCY RESPONSE

All injuries, no matter how small, will be reported to the SSO or the Site Supervisor. An accident/injury/illness report will be completely and properly filled out and submitted to the Regional Health and Safety Director/Project CIH, in accordance with OHM's reporting procedures.

A list of emergency telephone numbers is given in Table 8.1.

8.8.2 Notification

The following personnel/agencies will be notified in the event of a medical emergency:

- Local Fire Department or EMS
- On-site Emergency Coordinator
- Workers in the affected areas
- Client Representative

8.8.3 Directions To Hospital

Written directions to the hospital and a map will be posted in all trailers in the staging area. Directions to the hospital are as follows:

8.9 FIRE CONTINGENCY MEASURES

OHM personnel and subcontractors are not trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the emergency coordinator by radio and vacate the structure or area. The emergency coordinator will immediately notify the local Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.
- The air will be monitored for explosivity before and during hot work and periodically where flammable materials are present. Hot work permits will be required for all such work.

- “No smoking” signs will be conspicuously posted in areas where flammable materials are present.
- Fire extinguishers will be placed in all areas where a fire hazard may exist.
- Before workers begin operations in an area the foreman will give instruction on egress procedures and assembly points. Egress routes will be posted in work areas and exit points clearly marked.

8.9.1 Response

The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify their supervisor who will then contact the Emergency Coordinator by radio. The emergency coordinator will activate the emergency air horns and contact the local Fire Department.
- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.
- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at a predetermined rally point for a head count.
- When a small fire has been extinguished by a worker, the emergency coordinator will be notified.

8.10 HAZARDOUS WEATHER CONTINGENCY MEASURES

Operations will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains/Snow
- High Winds

8.10.1 Response

- Excavation/soil stock piles will be covered with plastic liner.
- All equipment will be shut down and secured to prevent damage.
- Personnel will be moved to safe refuge, initially crew trailers. The emergency coordinator will determine when it is necessary to evacuate personnel to off-site locations and will coordinate efforts with fire, police and other agencies.



8.10.2 Notification

The emergency coordinator will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. Notifications will include:

- OHM employees and subcontractors
- Client Representative
- Local Civil Defense Organization

8.11 SPILL/RELEASE CONTINGENCY MEASURES

In the event of release or spill of a hazardous material the following measures will be taken:

8.11.1 Response

Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.

First aid will be administered to injured/contaminated personnel. Unsuspecting persons/vehicles will be warned of the hazard. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons. Attempt to stop the spill at the source, if possible. Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as uprighing a drum, closing a valve or temporarily sealing a hole with a plug.

Utilizing radio communications, the emergency coordinator will be notified of the spill/release, including information on material spilled, quantity, personnel injuries and immediate life threatening hazards. Air monitoring will be implemented by the emergency coordinator and SSO to determine the potential impact on the surrounding community. Notification procedures will be followed to inform on-site personnel and off-site agencies. The emergency coordinator will make a rapid assessment of the spill/release and direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include:

- construction of a temporary containment berm utilizing on-site clay absorbent earth
- digging a sump, installing a polyethylene liner and
- diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground
- transferring the material from its original container to another container

EMERGENCY RESPONSE

The emergency coordinator will notify the LANTDIV ROICC, Ens. Price-Thurlow of the spill and steps taken to institute clean-up. Emergency response personnel will clean-up all spills following the spill clean-up plan developed by the emergency coordinator. Supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to:

- Shovel, rake
- Clay absorbent
- Polyethylene liner
- Personal safety equipment
- Steel drums
- Pumps and miscellaneous hand tools

The major supply of material and equipment will be located in the Support Zone. Smaller supplies will be kept at active work locations. The emergency coordinator will inspect the spill site to determine that the spill has been cleaned up to the satisfaction of the ROICC. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort. The emergency coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is prevented. The emergency coordinator will review the cause with the ROICC and obtain his concurrence with the remedial action plan.

9.0 TRAINING REQUIREMENTS

As a prerequisite to employment at OHM, all field employees are required to take a 40-hour training class and pass a written examination. This training covers all forms of personal protective equipment, toxicological effects of various chemicals, hazard communication, bloodborne pathogens, handling of unknown tanks and drums confined-space entry procedures, and electrical safety. This course is in full compliance with OSHA requirements in 29 CFR 1910.120. In addition, all employees receive annual 8-hour refresher training and three day on-site training under a trained experienced supervisor. Supervisory personnel receive an additional 8-hour training in handling hazardous waste operations.

All personnel entering the exclusion zone will be trained in the provisions of this site safety plan and be required to sign the Site Safety Plan Acknowledgment in Appendix A.

Site-specific training, which will include potential site contaminants, site physical and environmental hazards, emergency response and evacuation procedures, and emergency telephone numbers will be held at the site location by the SS and SSO before any site work activities begin.

10.0 MEDICAL SURVEILLANCE PROGRAM

All OHM personnel participate in a medical and health monitoring program. This program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis. A listing of OHM's worker medical profile is shown below. This program was developed in conjunction with a consultant toxicologist and OHM's occupational health physician. Other medical consultants are retained when additional expertise is required.

The medical surveillance program meets the requirements of the OSHA Standard 29 CFR 1910.120 (f).

TABLE 10.1 WORKER MEDICAL PROFILE		
<i>Item</i>	<i>Initial</i>	<i>Annual</i>
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 Examination	X	X
Electrocardiogram/Stress Test	X	X (based on age)

Specific Tests (as required):

(PCB blood or fat, urine mercury, urine arsenic, urine phenol, urine halomethanes, blood cyanide, cholinesterase-pseudo-cholinesterase, nerve conduction velocity tests, blood lead, urine lead.)

10.1 EXAMINATION SCHEDULE

Employees are examined initially upon start of employment, 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 or hazardous materials
- At the discretion of the client, the CIH, SSO, or OHM occupational physician after known or suspected exposure to toxic or hazardous materials
- At the discretion of the OHM occupational physician

All nonscheduled medical examinations will include, as a minimum, all items specified above for periodic surveillance examination, with the exception of the chest X-ray, which will be conducted at the discretion of the occupational physician performing the examination.

APPENDIX A

**HEALTH AND SAFETY PLAN
CERTIFICATION**

APPENDIX B

OHM HAZARD COMMUNICATION PROGRAM

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

1. OBJECTIVE

A Hazard Communication (Employee Right-To-Know) Program will be instituted at all OHM Remediation Services Corp. (OHM) facilities and job-sites. A copy of the written Hazard Communication Program contained in this procedure will be present at all OHM job-sites, shops, and facilities.

2. PURPOSE

The purpose of Hazard Communication (Employee Right-to-Know) is to ensure that the hazards of all chemicals located at field project sites, shops, and facilities are transmitted (communicated), according to 29 CFR 1910.1200 and 29 CFR 1926.59 to all OHM personnel and OHM subcontractors.

3. PROGRAM REQUIREMENTS

- 3.1** It is the responsibility of site supervisors, shop supervisors, and facilities managers to ensure that the Hazard Communication Program for the area under their supervision is updated as necessary.
- 3.2** Container Labeling--OHM personnel will ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced by on site operations. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party.
- 3.3** Material Safety Data Sheets (MSDSs)--There will be an MSDS located on site for each hazardous chemical known to exist or which is being used on site. All MSDSs will be located in the site health and safety plan which can be found in the office trailer. MSDS's for products in use may be stored in a separate binder.
- 3.4** Employee Information and Training--Training employees on chemical hazards is accomplished through an ongoing corporate and regional training program. Additionally, chemical hazards will be communicated to employees through daily safety meetings held at OHM field projects and by an initial site orientation program.

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

3.5 OHM employees will be instructed on the following:

- Chemicals and their hazards in the work area
- How to prevent exposure to these hazardous chemicals
- What the company has done to prevent workers' exposure to these chemicals
- Procedures to follow if they are exposed to these chemicals
- How to read and interpret labels and MSDSs for hazardous substances
- Emergency spill procedures
- Proper storage and labeling

3.6 Before any new hazardous chemical is introduced on site, each employee will be given information in the same manner as during the initial safety class. The site supervisor will be responsible for seeing that the MSDS on the new chemical is available. During the mandatory morning safety briefing, information on each new chemical will be presented.

Should any new chemical be brought on site, the appropriate MSDSs will be added and reviewed with the employees.

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

4.0. GENERAL

The following written Hazard Communication Program has been established for OHM Remediation Services Corp. (OHM). The purpose of this program is to transmit information to the workers about the chemical hazards in the work place using various media. The transmittal of information will be accomplished by means of a comprehensive Hazard Communication Program, which will include container labeling and other forms of warning, material safety data sheets (MSDSs), and employee training in accordance with 29 CFR 1910.1200 and 29 CFR 1926.59.

Upon mobilization at the job site the Hazard Communication Program will be reviewed with all employees. Upon reading the Hazard Communication Program employees will be asked to sign the "Worker Hazard Communication Acknowledgment Form". The Hazard Communication Program will also be reviewed with new employees and visitors as they arrive on site. These persons will also be asked to sign the acknowledgment form. The Hazard Communication Program shall be available for review by anyone on site any time during normal work hours. OHM will accomplish the hazard communication requirements through formal safety training, departmental safety meetings, and job-site safety meetings.

The Health and Safety Department shall update the Hazard Communication Program when personnel responsibilities change, a new non-routine task is introduced, or an extremely hazardous material needs particular attention. This new program will then be distributed throughout the company.

5.0 RESPONSIBILITIES

Overall responsibility for compliance with the Hazard Communication Program rests with officers, managers, and supervisors of OHM. A brief outline of responsibilities for those persons directly involved with the program will follow. These responsibilities are not all inclusive, but are designed to give guidance in initial and long-term program development. Since each area is different, these responsibilities may vary.

This program is intended to cover those employees who are directly involved with the handling of hazardous chemicals or supervision of activities that involve the use of hazardous chemicals.

5.1 Health and Safety Department Responsibilities

- Review operations with site supervisors to determine what tasks require hazard communication training.
- Advise supervisory people as to which materials may need to be considered hazardous initially and eventually to ensure that hazard task determination is being done according to the written policy.
- Follow up through safety meetings and safety audits to ensure that supervisors are carrying out pre-scribed company policy.
- Notify supervisors immediately of any operating changes affecting the hazardous chemicals being used.
- Periodically audit the Hazard Communication Program's progress using the Hazard Communication Program audit sheet found at the end of this procedure.

5.2 Training Department Responsibilities

- Ensure that up-to-date records are maintained on training of all employees required to handle hazardous chemicals. The supervisor should keep copies of these records and should also send copies of the initial training to the corporate training secretary for the training file.
- Educate personnel upon initial 40-hour OSHA training to the requirements of the Hazard Communication Standard.

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

5.3 Site Supervisors' Responsibilities

- Identify jobs requiring the use of hazardous chemicals and provide a list of those jobs and chemicals to the health and safety department.
- Provide the training required by the Hazard Communication Standard and document training of employees in the safe handling of hazardous chemicals.
- Ensure inspection of engineering controls and personal protective equipment before each use. The health and safety department shall help determine a suitable inspection plan for each application as needed.
- Make daily surveys of the work area to ensure that safe practices are being followed. Advise employees of and document unsafe work practices on the first occasion and consider further unsafe work practices as disciplinary violations. Use documentation as topics of safety meetings.
- Ensure required labeling practices are being followed. Labels should be affixed to the container when it arrives. If the contents are transferred to another container, then all label information (manufacturer, manufacturer's telephone number, product name, target organ(s) and product number) must also be affixed to the new container, so that all containers of the material, regardless of size, are labeled. Contact the health and safety department for proper labels.
- Enforce all applicable safety and health standards through periodic documented audits.
- Before ordering a material, determine if a MSDS exists on file. Request a MSDS from the manufacturer for all new products.
- Contact the health and safety department upon receiving new MSDSs to ensure that they have a copy. If they do not, then the site supervisor shall forward a copy to them.

5.4 Employee Responsibilities

- Read and understand entire Hazard Communication Program.
- Obey established safety rules and regulations.
- Use all safety procedures and personal protective equipment as required by company procedures.
- Notify supervisor of the following:
 - Any symptoms or unusual effects that may be related to the use of hazardous chemicals.
 - Any missing, incomplete, or unreadable labels on containers.
 - Missing, damaged, or malfunctioning safety equipment.
- Use approved labels on containers; do not remove labels (labels are available from the health and safety department).
- Use only approved containers for hazardous chemicals. (Is chemical and container compatible and appropriate?)
- Know where emergency equipment and first-aid supplies are located.

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

- Know location of MSDSs. These will be located in the break/decon area and the job-site office trailer.
- Know what you are expected to do in case of an emergency. Before the commencement of any task, emergency considerations shall be made.

5.5 Shipping/Receiving Personnel Responsibilities

- The Project Control Technician (PCT) or other persons assigned by the site supervisor shall ensure MSDSs are received with initial shipment of a hazardous chemical; if not, contact purchasing to request the appropriate MSDS and also call the health and safety department to determine if there is a MSDS available until the requested MSDS arrives.
- Ensure labels with required information are affixed to all containers.
- Store hazardous materials in designated locations.
- Use proper personal protective equipment when handling hazardous chemicals.
- Report damaged containers or spills to the site supervisor and the site safety officer immediately.

6.0 HAZARD DETERMINATION

OHM will rely on MSDSs from chemical suppliers and manufacturers to meet hazard determination requirements. Other relevant data from laboratory analyses, chemical reference materials, and chemical manufacturers' written evaluation procedures will be utilized when warranted. No other method shall be used to determine a chemicals' hazards unless approved by the health and safety department.

7.0 LABELING

The site supervisor will be responsible for seeing that all containers arriving at OHM job sites are properly and clearly labeled. Site supervisors shall also check all labels for chemical identity and appropriate hazard warnings. If the hazardous chemical is regulated by OSHA in a substance specific health standard (29 CFR 1910), the site supervisor shall ensure that the labels or other forms of warning used are in accordance with the requirements of that standard. Any container that is not labeled shall be immediately labeled after initial discovery with the required information.

The site supervisor, general foreman, or foreman shall be responsible for seeing that all portable containers used in their work area are properly labeled with chemical identity and hazard warning. (Refer to MSDS for required labeling information.)

The site supervisor, general foreman, or foreman shall also ensure that labels on hazardous chemical containers are not removed or defaced unless the container is immediately marked with the required information and that all labels are legible in English and prominently displayed on the container or readily available in the work area throughout each shift.

If any container is found and the contents cannot be identified, the site supervisor shall be contacted immediately. When proper identification is made, a label shall be affixed to the container immediately. If it is discovered that no MSDS is available, the manufacturer and the health and safety department shall be contacted to assist in locating the proper MSDS. If there is no means of identifying the material in the container, the container shall be taken out of service, away from all personnel until it can be tested by the health and safety department or laboratory personnel. The site supervisor shall communicate their findings or awareness of such containers to all personnel working in the area and to the regional health and safety manager.

8.0 MATERIAL SAFETY DATA SHEETS (MSDS)

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

The site supervisor at OHM job sites will be responsible for maintaining a current MSDS relevant to the hazardous chemicals used on their job sites. The health and safety department will be responsible for compiling the initial MSDS file for the job site and aiding all job sites with the completion and maintenance of their respective MSDS files.

All MSDSs shall be readily available for review by all employees during each work shift. Each job site will designate a clearly marked "Employee Right-to-Know" station where employees can immediately obtain a MSDS and the required information in an emergency. MSDSs shall also be made available, upon request, to designated OHM representatives, other employer's employees, and to any OSHA inspector in accordance with the requirements of 29 CFR 1910.1200(e).

Although manufacturers are required to provide employers with MSDSs on an initial chemical shipment, OHM purchasing agents (and site supervisors purchasing their own material) shall request MSDSs and updates to MSDSs on all purchase orders. Site supervisors that are without proper MSDSs shall be responsible for requesting this information from chemical manufacturers. The site supervisor shall maintain a file of follow-up letters for all hazardous chemical shipments they receive without MSDSs.

9.0 EMPLOYEE INFORMATION AND TRAINING

It is the responsibility of the supervisor in charge of each employee to ensure that the employee is properly trained. Training employees on chemical hazards and chemical handling is accomplished at the time of initial employment at OHM, whenever a new chemical (or physical) hazard is introduced into the work area, and through ongoing formal and informal training programs. Additionally, chemical hazards are communicated to employees through weekly and morning, job-site safety meetings, which shall be documented according to topic, major points discussed, and names of those attending (attendance is mandatory). Records of all formal training conducted at OHM are coordinated and maintained by the Training Department secretary.

At a minimum, OHM will inform employees on the following:

- The requirements of 29 CFR 1910.1200--Hazard Communication--Evaluating the potential hazards of chemicals and communicating information concerning hazards and appropriate protective measures to employees. OHM shall accomplish employee training in several different ways including, but not limited, to 40-hour OSHA Hazardous Waste Worker Training (29 CFR 1910.120), shop safety meetings, job-site safety meetings, Health and Safety Department safety meetings, and formal and informal training about specific chemical hazards.
- The location and availability of the written Hazard Communication Program, list of hazardous chemicals, and MSDSs will be periodically posted on the employee bulletin boards providing the location of the above material.
- Any operations in their work area where hazardous chemicals are present.
- How to work safely with chemicals present in the workplace and minimize potential exposure.

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

Employee training shall include the following:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (monitoring instruments, visual appearance or odor, and acute and chronic health effects).
- The physical, chemical, and health hazards of the chemicals in the work area.
- The methods of preventing exposure to hazardous chemicals including the measures OHM has taken to protect the employees.
- Procedures to follow if OHM employees are exposed to hazardous chemicals (location of the nearest phone, emergency eyewash, and shower will be included). These discussions shall include proper operating procedures for all emergency equipment.
- The details of the OHM written Hazard Communication Program, including an explanation of the labeling system and the MSDSs, and how employees can obtain and use the appropriate hazard information.
- Standard operating procedures within each respective shop. OHM company policy determines what is considered standard operating procedures.
- Procedures for workers involved in non-routine tasks.

Each site supervisor shall ensure that the above training is emphasized to OHM employees. The health and safety department will ensure that each job site is properly informing and training all employees through group meetings and individual discussions. Whenever a new hazardous chemical is placed into use, the site supervisor shall inform the employees of the hazards said chemical may pose. The site supervisor shall also be responsible for obtaining and making available a MSDS for the new chemical.

10.0 HAZARDOUS NON-ROUTINE TASKS

Occasionally, employees at OHM are required to perform tasks which are considered to be non-routine. All tasks OHM considers non-routine shall be carefully discussed among the supervisor and those performing the task. This safety briefing shall include all possible hazards an employee may encounter while completing the task, including:

- Hazard recognition
- Chemicals involved and their hazardous properties
- Physical hazards
- Methods of avoiding hazards (monitoring instruments, proper personal protective equipment, etc.)

The following is a list of some of the non-routine tasks which may occur at OHM job sites. These tasks are all covered in detail in various OHM standard operating Procedures.

- 7.1 Confined Space Entry
- 7.2 Excavation, Trenching, and Shoring
- 7.3 Decontamination of Equipment
- 7.4 Laboratory Spills

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

7.5 High-Pressure Washer (Laser) Operation

7.6 Line Entry Procedure

7.7 Hot Work

11.0 INFORMING CONTRACTORS

It shall be the responsibility of the OHM site supervisor to provide subcontractors with the following information:

- Hazardous chemicals to which they may be exposed while performing a task including the following:
 - Chemical properties
 - Physical properties
 - Acute/Chronic health effects
- Location of "Employee Right-to Know" station which includes the following:
 - MSDS for work area
 - Hazard Communication Program
 - Other relevant safety material such as Project Health and Safety Plan (HASP)
- Precautionary measures to be taken to protect employees from chemical and physical hazards.
- Location of nearest emergency equipment (fire extinguisher, eyewash, shower, phone, first-aid kit, etc.)
- Procedures to follow in the event of employee exposure.

APPENDIX B - OHM HAZARD COMMUNICATION PROGRAM

12. LIST OF HAZARDOUS CHEMICALS

The following is a list of hazardous chemicals used on this OHM job site. Further information on each hazardous chemical listed below can be found in the MSDS which are included in the site specific health and safety plan.

- Typical OHM Job-Site Hazardous Chemical Inventory List

<u>Available On Site</u>	<u>Chemicals</u>
_____	Acetone
_____	Acetylene
_____	Activated Charcoal, Powder
_____	Alum (Aluminum Sulfate)
_____	Anti-fog Bausch & Lomb
_____	Argon/Methan (95%/5%)
_____	Brake Fluid
_____	Calcium Hydroxide (Hydrated Lime)
_____	Calibration Check Gas
_____	Carbon
_____	Caustic Soda (Sodium Hydroxide)
_____	Citrikleen
_____	Coal Fly Ash
_____	Compressed Air
_____	Diatomaceous Earth
_____	Diesel Fuel
_____	Dry Ice (Solid Carbon Dioxide)
_____	Ethylene Glycol
_____	Ferric Chloride
_____	Freon
_____	Gear Grease - Delta
_____	Helium
_____	Hexane
_____	Hydraulic Fluid
_____	Hydrochloric Acid
_____	Hydrogen
_____	Isobutylene
_____	Kiln Dust
_____	Methanol
_____	Nitrogen
_____	Nitrous Oxide
_____	Oxygen
_____	Penetone
_____	Pentane
_____	Polymers (Flocculants)
_____	Premium Unleaded Gasoline
_____	PVC Solvent Cleaner
_____	PVC Cement
_____	Regular Leaded Gasoline
_____	Starting Fluid
_____	Stoddard Solvent
_____	Sulfuric Acid
_____	10W-40 Motor Oil - Shell

APPENDIX C

MSDS LIST

Material Safety Data Sheet

From Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855



No. 636

MESITYLENE

Issued: November 1987

SECTION 1. MATERIAL IDENTIFICATION

24

Material Name: MESITYLENE

Description (Origin/Uses): Used as a raw material in chemical synthesis and as an ultraviolet stabilizer.

Other Designations: 1,3,5-Trimethylbenzene; 1,3,5-Trimethyl Benzol; TMB; *sym*-Trimethylbenzene;
C₉H₁₂; NIOSH RTECS No. DC3220000; CAS No. 0108-67-8

Manufacturer/Supplier: Contact your supplier or distributor. Consult the latest edition of the
Chemicalweek Buyers' Guide (Genium. ref. 73) for a list of suppliers.


HMIS
H 1
F 2 R 1
R 0 I 3
PPG* S 2
*See sect. 8 K 2

SECTION 2. INGREDIENTS AND HAZARDS

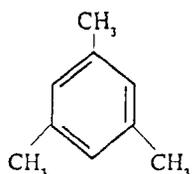
%

EXPOSURE LIMITS

Mesitylene, CAS No. 0108-67-8

ca 100

ACGIH TLV, 1987-88
TLV-TWA: 25 ppm, 125 mg/m³



Toxicity Data*
Human, Inhalation, TC_{Lo}: 10 ppm

*See NIOSH, RTECS, for additional data.

SECTION 3. PHYSICAL DATA

Boiling Point: 328.3°F (164.6°C)

Vapor Pressure at 20°C, mm Hg: 1.86

Water Solubility: Negligible

Vapor Density (Air = 1): 4.15

Evaporation Rate: Not Found

Specific Gravity (H₂O = 1): 0.8652

Melting Point: -48.6°F (-44.8°C)

% Volatile by Volume: ca 100

Molecular Weight: 120.19 Grams/Mole

Appearance and odor: A clear, colorless liquid; peculiar aromatic odor.

SECTION 4. FIRE AND EXPLOSION DATA

LOWER

UPPER

Flash Point and Method

Autoignition Temperature

Flammability Limits in Air

112°F (44°C) TCC

970°F (521°C)

% by Volume (Calculated)

1.47%

Not
Found

Extinguishing Media: Use dry chemical, foam, carbon dioxide, or water fog. Do not use a solid stream of water because the stream will scatter the fire and spread it. Use water spray to cool fire-exposed tanks/containers and to disperse vapors.

Unusual Fire/Explosion Hazards: This OSHA class II combustible liquid is a moderate fire hazard when exposed to heat, sparks, or open flame. It can react vigorously with oxidizing materials. **Warning:** When mesitylene is heated, its vapors may form explosive mixtures with air.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Mesitylene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Mesitylene is incompatible with strong oxidizing agents.

Conditions to Avoid: Prevent contact with heat, sparks, and open flame.

Hazardous Products of Decomposition: Thermal decomposition or burning may produce carbon dioxide and/or carbon monoxide.

SECTION 6. HEALTH HAZARD INFORMATION

Mesitylene is not listed as a carcinogen by the NTP, IARC, or OSHA.

Summary of Risks: Mesitylene vapor is somewhat unpleasant and may cause irritation of the eyes, nose, and throat. Overexposure to high concentrations of vapor may cause narcosis and central nervous system depression. The liquid is irritating to the eyes and may cause irritation of the skin, especially if contact is repeated or prolonged. **Warning:** Aspiration of liquid into lungs can cause chemical pneumonitis.

Medical Conditions Aggravated by Long-Term Exposure: None reported. **Target Organs:** Central nervous system.
Primary Entry: Inhalation, skin and eye contact. **Acute Effects:** Central nervous system depression, skin and eye irritation.
Chronic Effects: None reported.

FIRST AID: Eye Contact. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. **Skin Contact.** Immediately wash the affected area with soap and water. **Inhalation.** Remove victim to fresh air; restore and/or support his breathing as needed.
Ingestion. Call a poison control center. Never give anything by mouth to someone who is unconscious or convulsing. If the victim is responsive, give him one or two glasses of milk or water to drink. Do not induce vomiting because of possible aspiration hazards.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel of large mesitylene spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Evacuate the spill area and limit access to necessary personnel only. Remove leaking containers to a safe place, if feasible. Those involved in cleanup need protection against contact with liquid and inhalation of vapor (see sect. 8). Absorb small spills with paper toweling or vermiculite. Contain large spills and collect them, if feasible, or absorb them with an inert material such as sand, earth, or vermiculite. Place waste liquid or absorbent into closable containers for reclamation or disposal, using nonsparking tools. Water spray may be used to flush spills away from sensitive exposures. Keep waste out of sewers, watersheds, or waterways.

Waste Disposal: Consider reclamation, recycling, or destruction rather than disposal in a landfill. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. **Gloves:** Wear impervious gloves.

Respirator: Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow the respirator guidelines in 29 CFR 1910.134. IDLH or unknown concentrations require an SCBA, full facepiece, and pressure-demand/positive-pressure modes. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Ventilation:** Install and operate ventilation systems of sufficient power to maintain airborne levels of mesitylene below the cited exposure limit set by the ACGIH in section 2.

Safety Stations: Make eyewash stations, washing facilities, and safety showers available in areas of use and handling.

Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Remove and launder contaminated clothing before wearing it again; clean material from shoes and equipment.

Comments: Practice good personal hygiene. Keep material off of your clothing and equipment. Avoid transferring material from hands to mouth while eating, drinking, or smoking.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage Segregation: Store mesitylene in closed containers in a cool, dry, well-ventilated area away from oxidizing agents, heat, sparks, and open flame.

Special Handling/Storage: Storage area must meet OSHA requirements for class II combustible liquids. Protect containers from physical damage.

Engineering Controls in the Workplace: All bulk storage facilities must have an explosion-proof design. Ground and bond metal containers and equipment when transferring them to prevent static sparks.

Other Precautions: Do not smoke in areas where this material is handled or stored. Emptied containers retain product residues; handle them accordingly!

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: 1,3,5-Trimethylbenzene

DOT Hazard Class: Flammable Liquid

IMO Class: 3.3

DOT ID No. UN2325

IMO Label: Flammable Liquid

DOT Label: Flammable Liquid

References: 1, 2, 5, 7, 9, 12, 37, 59, 73, 81, 82, 84-94, 103. CR/PJI

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Approvals

Indust. Hygiene/Safety

Medical Review

[Handwritten signatures and initials over the approval labels]

Material Safety Data Sheet

From Genium's Reference Collection
 Genium Publishing Corporation
 1145 Catalyn Street
 Schenectady, NY 12303-1836 USA
 (518) 377-8855



No. 318

XYLENE (Mixed Isomers)
 (Revision D)
 Issued: November 1980
 Revised: August 1988

SECTION 1. MATERIAL IDENTIFICATION

26

Material Name: XYLENE (Mixed Isomers)

Description (Origin/Uses): Used as a raw material for the production of benzoic acid, phthalic anhydride, isophthalic and terephthalic acids and their dimethyl esters in the manufacture of polyester fibers; in sterilizing catgut; with Canadian balsam as oil-immersion in microscopy; and as a cleaning agent in microscopic techniques.

Other Designations: Dimethylbenzene; Xylol; C₈H₁₀; CAS No. 1330-20-7

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek*

Buyers' Guide (Genium ref. 73) for a list of suppliers.

Comments: Although there are three different isomers of xylene (*ortho*, *meta*, and *para*), the health and physical hazards of all three isomers are very similar. This MSDS is written for a xylene mixture of all three isomers, which is usually commercial xylene.



NFPA

HMIS

H 2	R 1
F 3	I 3
R 0	S 2
PPG*	K 3

*See sect. 8

SECTION 2. INGREDIENTS AND HAZARDS

%

EXPOSURE LIMITS

Xylene (Mixed Isomers), CAS No. 1330-20-7*

**

IDLH*** Level: 1000 ppm

**o*-Xylene, CAS No. 0095-47-6

m-Xylene, CAS No. 0108-38-3

p-Xylene, CAS No. 0106-42-3

**Check with your supplier to determine if there are additions, contaminants, or impurities (such as benzene) that are present in reportable quantities per 29 CFR 1910.

***Immediately dangerous to life and health.

**** See NIOSH, *RTECS* (No. ZE2100000), for additional data with references to reproductive, irritative, and mutagenic effects.

OSHA PEL
 8-Hr TWA: 100 ppm, 435 mg/m³
 ACGIH TLVs, 1987-88
 TLV-TWA: 100 ppm, 435 mg/m³
 TLV-STEL: 150 ppm, 655 mg/m³

Toxicity Data****
 Human, Inhalation, TC₅₀: 200 ppm
 Man, Inhalation, LC₅₀: 10000 ppm/6 Hrs
 Rat, Oral, LD₅₀: 4300 mg/kg

SECTION 3. PHYSICAL DATA

Boiling Point: 275°F to 293°F (135°C to 145°C)*

Melting Point: -13°F (-25°C)

Evaporation Rate: 0.6 Relative to BuAc = 1

Specific Gravity (H₂O = 1): 0.86

Water Solubility (%): Insoluble

Molecular Weight: 106 Grams/Mole

% Volatile by Volume: Ca 100

Vapor Pressure: 7 to 9 Torrs at 68°F (20°C)

Vapor Density (Air = 1): 3.7

Appearance and Odor: A clear liquid; aromatic hydrocarbon odor.

*Materials with wider and narrower boiling ranges are commercially available.

SECTION 4. FIRE AND EXPLOSION DATA

LOWER

UPPER

Flash Point and Method

Autoignition Temperature

Flammability Limits in Air

81°F to 90°F (27°C to 32°C)

867°F (464°C)

% by Volume

1%

7%

Extinguishing Media: Use foam, dry chemical, or carbon dioxide. Use water sprays to reduce the rate of burning and to cool containers.

Unusual Fire or Explosion Hazards: Xylene vapor is heavier than air and may travel a considerable distance to a low-lying source of ignition and flash back.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Xylene is stable in closed containers during routine operations. It does not undergo hazardous polymerization.

Chemical Incompatibilities: This material may react dangerously with strong oxidizers.

Conditions to Avoid: Avoid any exposure to sources of ignition and to strong oxidizers.

Hazardous Products of Decomposition: Carbon monoxide (CO) may be evolved during xylene fires.

SECTION 6. HEALTH HAZARD INFORMATION

Xylene is not listed as a carcinogen by the IARC, NTP, or OSHA.

Summary of Risks: Liquid xylene is a skin irritant and causes erythema, dryness, and defatting; prolonged contact may cause blistering. Inhaling xylene can depress the central nervous system (CNS), and ingesting it can result in gastrointestinal disturbance; and possibly hematemesis (vomiting blood). Effects on the eyes, kidneys, liver, lungs, and the CNS are also reported. **Medical Conditions aggravated by Long-Term Exposure:** Problems with eyes, skin, central nervous system, kidneys, and liver may be worsened by exposure to xylene. **Target Organs:** CNS, eyes, gastrointestinal tract, blood, liver, kidneys, skin. **Primary Entry:** Inhalation, skin contact/absorption. **Acute Effects:** Dizziness; excitement; drowsiness; incoordination; staggering gait; irritation of eyes, nose, and throat; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; and dermatitis. **Chronic Effects:** Reversible eye damage, headache, loss of appetite, nervousness, pale skin, and skin rash.

FIRST AID: **Eyes.** Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. **Skin.** Immediately wash the affected area with soap and water. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have a trained person administer oxygen. **Ingestion.** Never give anything by mouth to someone who is unconscious or convulsing. Vomiting may occur spontaneously, but do not induce it. If vomiting should occur, keep exposed person's head below his or her hips to prevent aspiration (breathing the liquid xylene into the lungs). Severe hemorrhagic pneumonitis with grave, possibly fatal, pulmonary injury can occur from aspirating very small quantities of xylene.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid. If exposure is severe, hospitalization for at least 72 hours with careful monitoring for delayed onset of pulmonary edema is recommended.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of xylene vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U239

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), section 311 (b) (9)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield as a supplementary protective measure. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine use (leaks or cleaning reactor vessels and storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will not protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specifics of the work operation to prevent prolonged or repeated skin contact with xylene. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of xylene below the OSHA PEL standard cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of xylene into general work areas by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. **Safety Stations:** Make eyewash stations, safety/quick-drench showers, and washing facilities available in areas of use and handling. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do not wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean xylene from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do not eat, drink, or smoke in any work area. Do not inhale xylene vapor.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store xylene in a cool, dry, well-ventilated area away from sources of ignition and strong oxidizers. Protect containers from physical damage.

Special Handling/Storage: Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. Ground and bond all containers, pipelines, etc., used in shipping, transferring, reacting, producing, and sampling operations.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Xylene

DOT ID No. UN1307

DOT Label: Flammable Liquid

DOT Hazard Class: Flammable Liquid

IMO Label: Flammable Liquid

IMO Class: 3.2 or 3.3

References: 1, 2, 12, 73, 84-94, 100, 103.

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Prepared by PJ Igoe, BS

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Material Safety Data Sheet

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No. 624

NAPHTHALENE

Issued: November 1987

SECTION 1. MATERIAL IDENTIFICATION

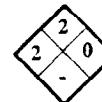
24

Material Name: NAPHTHALENE

Description (Origin/Uses): Used as a moth repellent and in many industrial processes.

Other Designations: Naphthalin; Naphthene; Tar Camphor; C₁₀H₈;
 NIOSH RTECS No. QJ0525000; CAS No. 0091-20-3

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyer's Guide* (Genium ref. 73) for a list of suppliers.



HMIS
 H 2
 F 2 R 1
 R 0 I 4
 PPG* S 1
 *See sect. 8 K 2

SECTION 2. INGREDIENTS AND HAZARDS

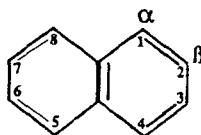
%

EXPOSURE LIMITS

Naphthalene, CAS No. 0091-20-3

ca 100

IDLH* Level: 500 ppm



ACGIH TLVs, 1987-88

TLV-TWA: 10 ppm, 50 mg/m³

OSHA PEL

8-Hr TWA: 10 ppm, 50 mg/m³

Toxicity Data**

Child, Oral, LD₅₀: 100 mg/kg

Man, Unknown, LD₅₀: 74 mg/kg

Rat, Oral, LD₅₀: 1250 mg/kg

*Immediately dangerous to life and health

**See NIOSH RTECS for additional data with references to irritative, mutagenic, reproductive, and tumorigenic effects.

SECTION 3. PHYSICAL DATA

Boiling Point: 424°F (218°C)

Vapor Density (Air = 1): 4.4

Vapor Pressure: 0.087 Torr at 77°F (25°C)

Water Solubility: Insoluble

Specific Gravity (H₂O = 1): 1.162 at 68°F (20°C)

Melting Point: 176°F (80°C)

Molecular Weight: 128 Grams/Mole

% Volatile by Volume: ca 100

Appearance and Odor: White crystalline flakes; strong coal tar odor.

SECTION 4. FIRE AND EXPLOSION DATA

LOWER

UPPER

Flash Point and Method

Autoignition Temperature

Flammability Limits in Air

174°F (79°C) OC; 190°F (88°C) CC

979°F (526°C)

% by Volume

0.9

5.9

Extinguishing Media: Use water spray, dry chemical, or carbon dioxide to fight fires involving naphthalene. **Caution:** Foam or direct water spray applied to molten naphthalene may cause extensive foaming.

Unusual Fire or Explosion Hazards: Naphthalene is a volatile solid that gives off flammable vapor when heated (as in fire situations). This vapor is much denser than air and will collect in enclosed or low-lying areas like sumps. In these areas an explosive air-vapor mixture may form, and extra caution is required to prevent any ignition sources from starting an explosion or fire.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Naphthalene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Naphthalene is incompatible with strong oxidizing agents, chromic anhydride, and mixtures of aluminum trichloride and benzoyl chloride.

Conditions to Avoid: Ignition sources like open flame, unprotected heaters, excessive heat, lighted tobacco products, and electric sparks must not occur in work areas where naphthalene vapor may become concentrated.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide are produced during fire conditions. Irritating, flammable vapor forms below the melting point because even solid naphthalene has a significant vapor pressure.

SECTION 6. HEALTH HAZARD INFORMATION

Naphthalene is not listed as a carcinogen by the NTP, IARC, or OSHA.

Summary of Risks: Renal shutdown (kidney failure), hemolytic effects (breakdown of red blood cells), hematuria (blood in the urine), oliguria (low volume of urine), jaundice, eye damage, and depression of the central nervous system (CNS) are the primary health concerns associated with exposure to naphthalene. The ACGIH TLVs in section 2 are set to prevent eye damage. These recommended exposure limits may not be low enough to prevent blood changes in genetically hypersensitive individuals.

Medical Conditions Aggravated by Long-Term Exposure: Diseases of the blood, liver, and kidneys. Administer medical exams emphasizing these organs. **Target Organs:** Eyes, skin, kidneys, liver, blood (red blood cell effects), and CNS.

Primary Entry: Inhalation, skin contact. **Acute Effects:** Inhalation of naphthalene vapor causes excitement, confusion, headache, nausea, and loss of appetite. **Chronic Effects:** Increased incidence of cataracts.

FIRST AID

Eye Contact: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes to remove particles.

Skin Contact: Immediately wash the affected area with soap and water.

Inhalation: Remove victim to fresh air; restore and/or support his breathing as needed.

Ingestion: Call a poison control center. Never give anything by mouth to someone who is unconscious or convulsing. Administer a gastric lavage followed by saline catharsis. Monitor blood and electrolytic balance. Other sources recommend giving the victim several glasses of water to drink.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all ignition sources immediately. Cleanup personnel need protection against contact and inhalation of vapor (see sect. 8). Contain large spills and collect waste. Use nonsparking tools to place naphthalene into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

Waste Disposal: Consider reclamation, recycling, or destruction rather than disposal in a landfill. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations

Air Contaminant (29 CFR 1910.1000, Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U165

CERCLA Hazardous Substance, Reportable Quantity: 100 lbs (45.4 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Follow the eye- and face-protection guidelines of 29 CFR 1910.133. **Respirator:** Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* (Genium ref. 88) for the maximum-use concentrations and/or the exposure limits cited in section 2. Respirator usage must be in accordance with the OSHA regulations of 29 CFR 1910.134. IDLH or unknown concentrations require an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres.

Other Equipment: Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specific work environment to prevent skin contact. **Ventilation:** Install and operate general and local maximum explosion-proof ventilation systems of sufficient power to maintain airborne levels of naphthalene below the OSHA PEL standard cited in section 2. **Safety Stations:** Make eyewash stations, washing facilities, and safety showers available in areas of use and handling. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove and launder contaminated clothing before wearing it again; clean this material from shoes and equipment.

Comments: Practice good personal hygiene; always wash thoroughly after using this material. Keep this material off of your clothing and equipment. Avoid transferring this material from hands to mouth while eating, drinking, or smoking. Do *not* smoke, eat, or drink in any immediate work area. Avoid inhalation of vapor!

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage Segregation: Store naphthalene in a cool, dry, well-ventilated area away from chemical incompatibles (see sect. 5).

Special Handling/Storage: Protect containers from physical damage. All bulk storage facilities must be built with an explosion-proof design. All containers used in shipping/transferring operations must be electrically grounded to prevent static sparks. Use monitoring equipment to measure the extent of vapor present in any storage facility containing naphthalene because of potential fire and explosion hazards.

Comments: All operations with naphthalene must be done carefully to prevent accidental ignition of its flammable/explosive vapor. If the weather is warm, more naphthalene vapor forms and the potential for explosion increases. Do *not* smoke in any use or storage area!

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Naphthalene

DOT Hazard Class: ORM-A

IMO Class: 4.1

DOT ID No. UN1334

IMO Label: Flammable Solid

DOT Label: None

References: 1, 2, 12, 73, 84-94, 103. PJI

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Approvals

Indust. Hygiene/Safety

Medical Review

Material Safety Data Sheet

From Genium's Reference Collection
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No. 194

ARSENIC TRIOXIDE

Issued: June 1986

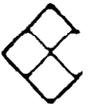
SECTION 1. MATERIAL IDENTIFICATION

MATERIAL NAME: ARSENIC TRIOXIDE

OTHER DESIGNATIONS: Arsenic Oxide, Arsenic Sesquioxide, Arsenous Oxide, Arsenous Acid Anhydride, White Arsenic, As_2O_3 , CAS #1327-53-3.

MANUFACTURER/SUPPLIER: Available from several suppliers, including:
 Atomergic Chemicals Corp., 100 Fairchild Ave., Plainview, NY 11803;
 Telephone: (516) 349-8800
 Sharpe Chemicals Co., 1116 S. Varney St., Burbank, CA 91502;
 Telephone: (818) 841-7605

HMIS	Not Four
H 3	
F 0	R 1
R 0	I 4
PPE*	S 2
*See Sect. 8	K 0



SECTION 2. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
Arsenic Pentoxide, CAS #1327-53-3 • Current (1985-86) ACGIH TLV for arsenic and soluble compounds, as As. •• Current OSHA PEL for inorganic arsenic compounds, as As. ••• Concentration that triggers certain provisions of the OSHA Arsenic Standard (29 CFR 1910.1018).	>99	ACGIH TLV* 8-hr TWA: 0.2 mg/m^3 OSHA PEL** 8-hr TWA: 0.01 mg/m^3 OSHA Action Level*** 8-hr TWA: 0.005 mg/m^3 Max. Oral LD ₅₀ : 1.43 mg/kg Rat Oral LD ₅₀ : 15.1 mg/kg Woman Oral TDLo: 600 mg/kg (Reproductive Effect)

SECTION 3. PHYSICAL DATA

Melting Point ... 275°F (135°C) (Sublimes)*
 Specific Gravity ... 3.865*
 Vapor Pressure @ 20°C ... Essentially Zero
 Solubility in Water, @ 2°C ... 1.2 g/100cc
 @ 100°C ... 11.46 g/100cc
 Molecular Weight ... 197.84
 Appearance and odor: White amorphous lumps or powder.

 * Values are for arsenolite. Amorphous arsenic trioxide melts at 599°F (315°C).

SECTION 4. FIRE AND EXPLOSION DATA

			LOWER	UPPER
Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	Not Found	Not Found
Not Found	Not Found	Not Found	Found	Found

EXTINGUISHING MEDIA: Arsenic trioxide is noncombustible. Use extinguishing agents (dry chemical, CO_2 , water spray, or foam) that are suitable for extinguishing the surrounding fire.

UNUSUAL FIRE/EXPLOSION HAZARDS: Highly toxic fumes and gases may be evolved from this material in a fire situation.

SPECIAL FIRE-FIGHTING PROCEDURES: Fire fighters need self-contained positive-pressure breathing apparatus and full protective gear. Minimize the runoff of fire-control water to prevent pollution.

SECTION 5. REACTIVITY DATA

Arsenic trioxide is stable at room temperature. It does not polymerize.

INCOMPATIBILITIES: Arsenic trioxide may react violently on contact with chlorine trifluoride, fluorine, hydrogen fluoride, oxygen difluoride, sodium chlorate, and other strong oxidizers. Arsenic gas (arsenic hydride) can be generated when arsenic compounds come in contact with nascent (freshly formed) hydrogen. This can occur by contact of acid, alkalis, or water with arsenic compounds in the presence of an active metal (zinc, aluminum, magnesium, manganese, sodium, iron, etc.). Arsenic is an extremely poisonous (lethal) gas with a garlic odor.

HAZARDOUS DECOMPOSITION PRODUCTS: Arsenic trioxide sublimes when heated. Poisonous arsenic gas may also form on decomposition.

SECTION 6. HEALTH HAZARD INFORMATION

CARCINOGENIC ASSESSMENT: Exposure to arsenic compounds is associated with skin, lung, and possibly liver cancer. The NTP, IARC, and OSHA have identified arsenic compounds as human carcinogens. **ROUTES OF ENTRY:** Arsenic trioxide can enter the body if it is inhaled or swallowed. **EFFECTS OF OVEREXPOSURE:** Skin contact can cause dermatitis characterized by erythema (abnormal redness of skin caused by capillary congestion) with burning, itching, swelling, and skin eruptions. Chronic skin effects include cracking, thickening, pigmentation, and drying of the skin. Eye contact can cause conjunctivitis and redness, swelling, and pain. Acute inhalation exposure can cause severe nose and respiratory tract irritation and pulmonary edema. Prolonged or repeated exposure can cause necrosis and perforation of the nasal septum. Other effects of chronic arsenic poisoning by inhalation or ingestion may include gastrointestinal disturbances (diarrhea, vomiting); nervous system effects involving the extremities (numbness, tingling, burning pain, weakness, incoordination); blood disorders (anemia); liver and kidney injury; and skin and lung cancer. Acute ingestion of arsenic trioxide causes burning of the mouth and throat, vomiting, watery or bloody diarrhea, convulsions, paralysis, coma, and death. A dose of 120 mg of arsenic trioxide can be fatal. **FIRST AID: EYE CONTACT:** Flush eyes, including under eyelids, with a gentle flow of running water for at least 15 minutes. Get medical help. **SKIN CONTACT:** Thoroughly wash affected area with mild soap and water. Prevent further exposure. If inhaled or other symptoms persist, get medical help. **INHALATION:** Remove victim from exposure. Keep him warm and at rest. If breathing has stopped, administer oxygen under low pressure. Get medical help promptly. **INGESTION:** Immediately give victim a large quantity (2-4 glasses) of water to drink; induce vomiting. Keep him warm and at rest. Get medical help immediately! (Note: Never give anything by mouth or induce vomiting if victim is unconscious or convulsing.) **GET MEDICAL ASSISTANCE** - In place, permanent, continuity. Get medical help for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

CLEANUP PROCEDURES: Notify safety/environmental personnel of large arsenic trioxide spills. Ventilate spill area. Cleanup personnel should wear protective clothing (gloves, coveralls, goggles, etc.) and use protective respiratory equipment. Carefully vacuum up spilled material (vacuum must have high-efficiency filters to prevent redistribution of dust). Do not sweep or brush it up. Place the waste into a suitable container for recalcination or disposal. Minimize dust generation and prevent skin/eye contact throughout the cleanup process. Wash spill area to remove all residues from environmental surfaces. Use swipe tests to verify cleanliness.

DISPOSAL: This material requires disposal as a hazardous (toxic) waste. Contact supplier or a licensed chemical waste disposal contractor for treatment, packaging, and disposal instructions. Follow Federal, state, and local regulations. Reportable Spill Quantity: 5000 lbs (2270 kg) (40 CFR 117.3) EPA Hazardous Waste Number: P012 (40 CFR 261.33)

SECTION 8. SPECIAL PROTECTION INFORMATION

Use local exhaust ventilation when handling this material. Ventilation rates should be sufficient to maintain airborne levels below the PEL. NIOSH-approved respirators should be worn when airborne concentrations exceed the PEL and during maintenance and emergency operations. Half-mask air-purifying respirators with high-efficiency filters are acceptable for concentrations not greater than 0.1 mg/m³ (0.5 mg/m³ with full facepiece). For concentrations above 0.5 mg/m³, powered air-purifying respirators, positive-pressure supplied air respirators, or self-contained breathing apparatus are required, depending on the concentration of the material. Respirator usage must be in accordance with appropriate provisions of the OSHA Inorganic Arsenic Standard (29 CFR 1910.1018). Dust-splash-proof safety goggles should be worn when handling this material. Protective clothing and equipment such as coveralls, gloves, hats, and shoes should be worn when airborne levels exceed the PEL or where the possibility of skin and eye contact exist. Provide clean, body-covering work clothing weekly to workers who are exposed to above the PEL (daily if exposed to above 0.1 mg/m³) and arrange for special handling and laundering of contaminated clothing. **OTHER CONTROLS:** Changing rooms with separate storage facilities for street and work clothing and showers are required for employees who are exposed to above the PEL. Prevent dust from being transported to the lunchroom through the ventilation system or on contaminated clothing. Consult the OSHA Inorganic Arsenic Standard (29 CFR 1910.1018) for detailed requirements. Eyewash stations, washing facilities, and safety showers should be readily accessible. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Store arsenic trioxide in a cool, dry location in tightly closed containers away from incompatibles (see sect. 5). Protect containers from physical damage. Keep this material away from food products and feed. Maintain good housekeeping practices to prevent accumulation of arsenic trioxide dust. Use procedures that minimize dust generation such as vacuuming (with appropriate filter) or wet cleanup. Brushing or sweeping should be used only where vacuuming or other relevant methods are ineffective. All handling should be done in a careful manner and with appropriate controls (enclosure, ventilation) to prevent dust generation and dispersion. Practice good personal hygiene. Wash face and hands thoroughly before eating, drinking, and smoking. Showering after the workshift is required for employees exposed to above the PEL. Do not eat, drink, use tobacco, chew gum, or apply cosmetics in the work area. Remove contaminated clothing promptly. Launder it before it is worn again. Do not shake clothing to remove dust; use a vacuum cleaner. Avoid inhalation and skin/eye contact. **DO NOT INGEST THIS MATERIAL!**

DOT Class: Poison B DOT ID No. UN1561 DOT Label: Poison
Data Source(s) Code: 2, 4, 9, 12, 14, 30, 44, 49, 55, 58, 61, 62, 84, CV

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Approvals: J. O. [Signature], 1/87.
Indust. Hygiene/Safety [Signature] 11-86
Medical Review [Signature] 11-86

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Material Safety Data Sheet

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No. 38

LEAD MONOXIDE
(Revision B)

Issued: November 1979

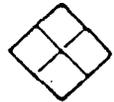
Revised: February 1986

SECTION 1. MATERIAL IDENTIFICATION

19

MATERIAL NAME: LEAD MONOXIDE

OTHER DESIGNATIONS: Lead (II) Oxide, Plumbous Oxide, Litharge, Massicot, PbO, CAS # 1317-36-8



MANUFACTURER/SUPPLIERS: Available from several suppliers, including:
NL Baroid, Inc., PO Box 1675, Houston, TX 77251; Telephone: (713) 527-1100
Eagle-Picher Industries, Inc., Chemicals Division, 580 Walnut Street, Cincinnati, OH 45202;
Telephone: (513) 721-7010

HMIS	Not Found
H: 2	
F: 0	R 0
R: 0	I 4
PPE: *	S 0
* See Sect. 8	X 0

SECTION 2. INGREDIENTS AND HAZARDS

	%	HAZARD DATA
LEAD MONOXIDE, PbO	>99	ACGIH TLV*: 8-hr TWA: 0.15 mg/m ³ ----- OSHA PEL**: 8-hr TWA: 0.05 mg/m ³ ----- Rat. Inoperational, LDLo: 430 mg/kg ----- Dog. Oral, LDLo: 1400 mg/kg
<p>* Current (1985-86) ACGIH TLV, as Pb</p> <p>** Current OSHA PEL (as Pb) with an action level of 0.03 mg/m³ (29 CFR 1910.1025)</p>		

SECTION 3. PHYSICAL DATA

Melting Point ... 1646.6°F(897°C) (Begins to sublime before melting)

Boiling Point ... 2681.6°F(1472°C) (Decomposes)

Molecular Weight ... 223.2

	Litharge	Massicot
Density	9.53 g/cc	9.6 g/cc
Solubility in Water (@ 25°C)	0.0504 g/L	0.1065 g/L

Appearance and odor: Lead monoxide exists in two crystalline forms: litharge and massicot. The reddish litharge transforms to yellow massicot at 912.2°F(489°C). Lead monoxide is odorless.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
NA	NA	NA		

This material is nonflammable. Use whatever extinguishing agents are appropriate for the surrounding fire.

When hot, lead monoxide can act as an oxidizing agent and may intensify combustion.

Toxic dust and fumes may be generated in a fire situation. Fire fighters should wear self-contained breathing apparatus and full protective gear.

SECTION 5. REACTIVITY DATA

Lead monoxide is stable at room temperature. It does not polymerize. When heated and cooled in air it can undergo transitions between crystalline and oxide forms.

Mixtures of lead oxide and chlorinated rubber may react violently when heated. A lead oxide-glycerol mixture (used as cement/jointing compound) can ignite when exposed to fluorine gas and may explode after exposure to perchloric acid fumes. Violent reactions can occur when lead monoxide is heated with aluminum, sodium, zirconium, titanium, boron, or silicon. Other incompatibles include hydrogen trisulfide, metal acetylides, and peroxyformic acid.

Toxic lead fumes can form at high temperatures.

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SECTION 6. HEALTH HAZARD INFORMATION | TLV

Lead compounds are toxic when inhaled or ingested. Lead is a cumulative poison. The chief effects of excessive lead intake are anemia, neurological disorders, and kidney damage. Symptoms of the neurological effects may include irritability, headaches, insomnia, delirium, convulsions, muscular tremors, and palsy of the extremities. Excessive lead exposure may also have adverse effects on human reproduction. Symptoms of acute lead poisoning by ingestion include headache; abdominal pain; nausea; vomiting; diarrhea; and, in severe cases, coma and death. The IARC concludes that the evidence for carcinogenicity of lead and lead compounds to humans is inadequate. The NTP does not list lead monoxide in its third annual report on carcinogens.

FIRST AID: Any worker who experiences symptoms of lead poisoning should be removed from exposure and receive prompt medical care. **EYE CONTACT:** Flush eyes (including under the eyelids) with running water for at least 15 minutes. Obtain medical attention. **SKIN CONTACT:** Flush affected area with plenty of water. If irritation persists, seek medical attention. **INHALATION:** Remove victim from exposure. Get medical attention for treatment of symptoms. **INGESTION:** If person is conscious, give him/her plenty of milk or water to drink. Induce vomiting. Keep victim warm and at rest. Get medical assistance immediately.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety/environmental personnel of large spills. Ventilate spill area. Cleanup personnel should wear respiratory protection, gloves, and protective clothing. Carefully vacuum up spilled material. Place collected material in a suitable container that can be tightly sealed for reclaim or disposal. Avoid dusting conditions at all stages of handling.

DISPOSAL: Salvage material when possible. PbO requires disposal as a hazardous waste. Contact supplier or a licensed chemical waste disposal contractor for treatment, packaging, and disposal requirements. Follow Federal, state, and local regulations.

EPA Hazardous Waste No.: D008 (EP TOXC; 40 CFR 261.24)

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide local exhaust ventilation and/or other engineering controls to meet the PEL requirement. NIOSH-approved respirators should be worn where engineering controls and work practices do not reduce exposures to or below the PEL. Half-mask air-purifying respirators with high-efficiency filters are acceptable for concentrations up to 0.5 mg/m³ (2.5 mg/m³ with full facepiece). Protective clothing and equipment such as coveralls, gloves, hats, and shoes should be worn when exposures exceed the PEL or where the possibility of skin and eye contact exist. Provide clean body-covering work clothing weekly to workers exposed to above the PEL (daily if exposed above 0.2 mg/m³) and arrange for special handling and laundering of contaminated clothing. Changing rooms (with separate storage facilities for street and work clothing) and showers are required for employees exposed to above the PEL. Prevent dust from being transported to lunchroom by way of the ventilation system or contaminated clothing. Consult the OSHA lead standard (29 CFR 1910.1025) for detailed requirements.

Contact lenses pose a special hazard; soft lenses may absorb and all lenses concentrate irritants.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Store in tightly closed containers away from incompatibles. Protect containers from physical damage. Keep away from food or feed. Use good housekeeping procedures (vacuuming and/or wet cleanup) to prevent accumulation of dust. DO NOT use compressed air for cleaning surfaces or clothing (use vacuum). Follow good personal hygiene practice. Wash face and hands thoroughly after handling and before eating, drinking, or smoking. Do not eat, drink, or use tobacco in areas where this material is used.

Exposure monitoring, biological monitoring, and medical surveillance should be provided in accordance with the OSHA Lead Standard (29 CFR 1910.1025).

Prevent dust generation. Use with adequate ventilation. Avoid inhalation and contact. Do not ingest!

DOT Classification: Not listed in Hazardous Materials Table, 49 CFR 172.101.

Data Source(s) Code: 2, 4, 5, 12, 14, 25, 55, 57, 58, 61, 62, 82, 84, CV

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Approvals	J.C. [Signature]
Indust. Hygiene/Safety	J.W. 6/86
Medical Review	[Signature]

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SECTION 6. HEALTH HAZARD INFORMATION	TLV See Section 2
<p>Copper scrap is poorly absorbed through the skin or alimentary tract, and while in the solid state it is not considered a hazard. Operations such as welding, dust generation, or fume generation could allow exposure to copper dusts and fumes. Therefore, it is important to maintain exposure levels below the regulated levels as noted in Section 2. Determine actual exposures by industrial hygiene monitoring.</p> <p>Short-term exposure to copper dusts or fumes may cause irritation of the upper respiratory tract and "metal fume fever," a transient condition with symptoms of fever and chills. Chronic or long-term exposure may result in lung X-ray changes not associated with harmful effects.</p> <p>FIRST AID:</p> <p>EYE CONTACT: Protect eyes from particles or fumes. Wash exposed eyes with copious amounts of water for at least 15 minutes.</p> <p>SKIN CONTACT: Protect skin from molten metal and radiant heat when melting scrap. Skin contamination from powder may be cleaned with soap and water. Machine turnings may present a laceration hazard.</p> <p>INHALATION: Move to fresh air, restore or support breathing as required.</p> <p>INGESTION: NA</p> <p>Copper has not been identified as a carcinogen by NTP, IARC or OSHA.</p>	
SECTION 7. SPILL, LEAK AND DISPOSAL PROCEDURES	
<p>Copper scrap is normally recycled or sold as scrap or landfilled if recycling cannot be justified. Clean up dust/powder spills promptly by vacuum and wet cleaning methods. Treat as an inert solid. Dispose of in accordance with OSHA, EPA, state, or local regulations.</p>	
SECTION 8. SPECIAL PROTECTION INFORMATION	
<p>RESPIRATORY PROTECTION: Use NIOSH/MSHA-approved dust/fume respirator or air-supplied respirator if concentrations of copper in air exceed the regulated standards. Use air-supplied or self-contained breathing apparatus (SCBA) in confined spaces.</p> <p>VENTILATION: Use only with adequate ventilation where respirable dusts/mists/fumes are possible. Use local exhaust ventilation when cutting, grinding, welding, or remelting.</p> <p>EYE PROTECTION AND PROTECTIVE CLOTHING: Protect skin from cuts and from hot procedures and processes. Eye and face protection required when grinding, welding, cutting or remelting. Maintain good hygiene and safe work processes. Scrap from machining may be contaminated with cutting oils. When handling oil-contaminated copper, wear rubber gloves to prevent skin contact.</p> <p>Contact lenses pose a special hazard; soft lenses may absorb and all lenses concentrate irritants.</p>	
SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS	
<p>Always maintain exposures below the PEL/TLV. Use industrial hygiene air monitoring to ensure that your use of this material does not create a hazard. Always use exhaust ventilation when feasible.</p>	
DATA SOURCE(S) CODE (See Glossary) 1-12, 14, 19, 20, 30, 31, 40, 59, OW	
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	INDUST. HYGIENE/SAFETY <i>DW 3-86</i>
	MEDICAL REVIEW: <i>[Signature] Mar 86</i>

Material Safety Data Sheet

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No. 197

ZINC CHLORIDE,
 SOLID

Issue: June 1986

SECTION 1. MATERIAL IDENTIFICATION

21

MATERIAL NAME: ZINC CHLORIDE, SOLID

DESCRIPTION: Inorganic salt

OTHER DESIGNATIONS: CAS #7646-85-7, ZnCl₂, Zinc Butter

MANUFACTURER/SUPPLIER: Available from several suppliers, including:
 Mallinckrodt, Inc., PO Box M, Paris, KY 40361; Telephone: (606) 987-7000

HMIS

H: 1

F: 0

R: 0

PPE*

*See Sect. 8

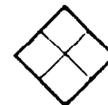
Not Found

R -

I 3

S 3

K 0



SECTION 2. INGREDIENTS AND HAZARDS

%

HAZARD DATA

Zinc Chloride, Solid, CAS #7646-85-7

100

8-hr. TWA:
 1 mg/m³*

* Current OSHA PEL and ACGIH (1985-86) TLV for zinc chloride fumes.

Rat, Oral, LD₅₀:

350 mg/kg

Man, Inhalation, TCLo:

4800 mg/m³/30 min.

Mouse, Intraperitoneal, TDLo:

12500 µg/kg (11 Days Pregnant)

SECTION 3. PHYSICAL DATA

Boiling Point ... 1349.6°F (732°C)

Vapor Pressure, mm Hg @ 428°C ... 1.0

Water Solubility @ 25°C, g/100g H₂O ... 423

Vapor Density (Air=1) ... Not Found

Evaporation Rate ... Not Found

Specific Gravity (H₂O = 1) ... 2.91

Melting Point ... 554°F (290°C)

Percent Volatile by Volume ... Not Found

Molecular Weight ... 136.3

pH (Aqueous Solution) ... 4.0

Appearance and odor: White crystalline granules. Odorless.

SECTION 4. FIRE AND EXPLOSION DATA

LOWER

UPPER

Flash Point and Method

Autoignition Temp.

Flammability Limits in Air

Not
 Found

Not
 Found

Noncombustible

Not Found

Not Found

EXTINGUISHING MEDIA: Zinc chloride is a noncombustible solid. Use suitable extinguishing media for surrounding fire.

UNUSUAL FIRE/EXPLOSION HAZARDS: This material is not considered to be an explosion hazard.

SPECIAL FIRE-FIGHTING PROCEDURES: Use water spray to cool fire-exposed containers and surrounding combustibles. Fire fighters should use self-contained breathing apparatus and wear fully protective clothing.

SECTION 5. REACTIVITY DATA

Zinc chloride is stable. Hazardous polymerization cannot occur.

This material is incompatible with cyanides and sulfides. An explosion on impact is possible when it has been mixed with potassium.

Thermal decomposition products of zinc chloride may include toxic fumes of chlorine and zinc oxide.

SECTION 6. HEALTH HAZARD INFORMATION

Zinc chloride is not listed as a carcinogen by the IARC, NTP, or OSHA.

SUMMARY OF RISKS: Inhalation of zinc chloride dust may be corrosive to the respiratory tract. Zinc chloride is deliquescent. Contact with skin and mucous membranes can be corrosive. Sensitization may occur in the form of eczematoid dermatitis. Eye contact may cause redness and pain. Ingestion may cause corrosive effects to the esophagus and stomach. Delayed complications can involve esophageal and/or pyloric strictures. **TARGET ORGANS:** Respiratory tract, skin, eyes, and gastrointestinal tract. **PRIMARY ENTRY:** Inhalation, ingestion. **ACUTE EFFECTS:** Inhalation may cause sore throat and coughing. Ingestion may cause abdominal pain and vomiting. Eye or skin contact may cause severe irritation or burns. **CHRONIC EFFECTS:** Not found.

FIRST AID: **EYE CONTACT:** Flush eyes thoroughly with running water, including under the eyelids, for at least 15 minutes. Get medical help.* **SKIN CONTACT:** Remove contaminated clothing. Flush affected area with water; wash with soap and water. Get medical help.* **INHALATION:** Remove victim to fresh air. Restore and/or support his breathing as required. Get medical help.* **INGESTION:** Rinse victim's mouth with water. Give him 2 to 3 glasses of water to drink to dilute material. Do not induce vomiting. Vomiting may occur spontaneously. Never give anything by mouth to someone who is unconscious or convulsing. Get medical help.*

* GET MEDICAL ASSISTANCE = In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel of zinc chloride spills. Provide adequate ventilation. Cleanup personnel need protection against inhalation of zinc chloride dust or mist. Sweep up or vacuum waste (avoid generating dust) and place it in an appropriate container for reclamation or disposal. Absorb liquid spills on vermiculite or dry sand. Neutralize the material with slaked lime or sodium bicarbonate. Flush residue with a lot of water.

DISPOSAL: Bury scrap in an approved landfill. Follow Federal, state, and local regulations.

EPA, Clean Water Act, Reportable Spill Quantity: 5,000 lbs.

SECTION 8. SPECIAL PROTECTION INFORMATION

Wear chemical safety goggles for dusty conditions and rubber gloves.

Where dusty conditions occur, use a NIOSH-approved respirator.

Where dusty conditions prevail, provide local exhaust.

Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them.

Wear body-protective clothing appropriate to the work situation to minimize skin contact with this material. Prevent eye contact by wearing chemical safety goggles and/or a full face shield where splashing of solutions is possible. Soiled clothing must be laundered before it is worn again. Eyewash stations and washing facilities should be available to areas of use and handling.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Store zinc chloride in tightly closed containers in a cool, dry, well-ventilated area. Protect containers from physical damage.

Practice good housekeeping to prevent accumulation of dust.

Avoid breathing zinc chloride dust. Minimize skin contact by wearing proper gloves and suitable work clothing appropriate to the work situation. Practice good personal hygiene. Wash thoroughly after handling. **DO NOT INGEST THIS MATERIAL!**

Zinc chloride is designated as a hazardous substance by EPA (40 CFR 116).

DOT Classification: ORM-E

DOT No. UN2331

Label: None

Data Source(s) Code: 1, 2, 4-7, 9, 10, 12, 25, 26, 43, 58, 63, 75, 81, 82, 84. CK

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Approvals *JO. R. Rocco, 1/87.*

Indust. Hygiene/Safety *JW 1/87*

Medical Review *[Signature]*