2021 Hazardous Waste Scanning Project

File Form Naming Convention.

(File_Type).(Program).(Site_Number).(YYYY-MM-DD).(File_Name).pdf

.pdf

Note 1: Each category is separated by a period "." Note 2: Each word within category is separated by an underscore "_"

Specific File Naming Convention Label:

Beport. HW. 932109. 2003-06-19, IRM_HASP



NEW YORK STATE ELECTRIC & GAS CORPORATION

Licensing & Environmental Operations Department Corporate Drive, Kirkwood Industrial Park, P.O. Box 5224 Binghamton, New York 13902-5224

INTERIM REMEDIAL MEASURES

NEW YORK STATE DEPARTMENT OF TRANSPORTATION PROSPECT STREET OVER ERIE CANAL PROJECT

HEALTH AND SAFETY PLAN

FOR ACTIVITIES ON AND ADJACENT TO

LOCKPORT STATE ROAD FORMER MANUFACTURED GAS PLANT SITE City of Lockport, Niagara County, New York

JANUARY 2002

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State Road Former MGP Site, Lockport, New York IRM Health and Safety Plan

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ATTACHMENTS

A	Chemicals of Concerns
	Benzene
	Coal Tar Pitch Volatiles
	Naphthalene
	2 Phenol
	BioSolve™

Project Forms

В

Safety Meetings

Hot Work Permit

Heat Stress Monitoring Form

Spill Report

Public Liability Accident Report

Employee Injury Report

Incident Report

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NYSEG

SITE EMERGENCY FORM

Do Not Endanger Your Own Life. Survey The Situation Before Taking Any Action.

DIAL 911 FIRST FOR ALL EMERGENCIES

POTENTIAL CONSTITUENTS OF CONCERN

The constituents contained in MGP process residues and at MGP sites can be categorized within five primary chemical classes:

- Polycyclic aromatic hydrocarbons (PAHs);
- Volatile aromatics;
- Phenolics;
- Metals; and
- Non-metallic inorganics.

IN THE EVENT OF ANY EMERGENCY CONTACT CONSTRUCTION SUPERVISOR (HEALTH AND SAFETY REPRESENTATIVE) AND / OR PROJECT MANAGER

Ambulance	911
Fire	911 Non Emergency (716) 439-6724
Lockport Police Bureau	911 Non Emergency (716) 433-7700
Poison Control	800-252-5655 or Syracuse (315) 476-4766
Hospital Name	Lockport Memorial Hositpal
Hospital Phone Number	Information - (716) 434-9111
NYSEG Project Manager	Bert W Finch (607) 762-8683
NYSEG Manager Health and Safety	Joseph P. Santodonato, Ph. D., CIH (607) 762-4335
NYSDOT's Contractor Site Safety Officer	(To be determined)

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NYSEG

DIAL 911 FIRST FOR ALL EMERGENCIES

ADDITIONAL RESPONSE CONTACT LIST

National Emergency Contact List		
USEPA Emergency Response Team, Region 2	(212) 340-6656	
Utilities		
Underground Utility (UFPO) 3650 James Street, Syracuse, NY	1-800-962-7962	
NYSEG (New York State Electric & Gas Corporation)	(716) 438-9803	
Bell Atlantic (Telephone Company)	(716) 890-7100	
Niagara County Public Works	(716) 439-7242	
Lockport Water Department	(716) 439-1612	
Lockport Waste Water Department	(716) 439-6678	
New York State Department of Environment	al Conservation	
NYSDEC Project Manager - David Crosby, P.E. (518) 457-9285		
Oil Spill or Hazardous Material Spill	1-800-457-7362	
New York State Department of Health		
NYSDOH Community H&S Oversight - Mathew Forucci	(716)	
Niagara County DOH - Paul Dicky	(716) 436-7460	
State and County Police Agenc	ies	
New York State Police Department	(716) 434-5588	
Niagara County Sheriffs Department	(716) 438-3390	
NYSEG - Licensing & Environmental Operation	ons Department	
Joseph M. Simone, P.E. (607) 762-7498		
Tracy L. Blazicek (607) 762-8839		
John J. Ruspantini	(607) 762-8787	

NYSEG Lockport State Road Former MGP Site, Lockport, New York Health and Safety Plan



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EMERGENCY FIRST AID

SEE ATTACH. A FOR SPECIFIC FIRST AID PROCEDURES FOR CHEMICALS OF CONCERN

FIRST AID

Ingestion:

DO NOT INDUCE VOMITING. Call Poison Control - follow instructions. Administer cardiopulmonary resuscitation (CPR), if necessary. Seek medical attention.

Inhalation:

Remove person from contaminated environment. Administer CPR if necessary. Seek medical attention. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.

Skin Contact: Brush off dry material, remove wet or contaminated clothing. Flush skin thoroughly with water. Seek medical attention if irritation persists.

Eve Contact: Flush eyes with water for 15 minutes. Seek medical attention.

Contingency Plan:

Report incident to Construction Supervisor (Health and Safety Officer) and Project Manager after emergency procedures have been implemented.

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

- 1. Survey the situation. Do not endanger your own life. DO NOT ENTER A CONFINED SPACE TO RESCUE SOMEONE WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.
- 2. Call **911** for emergency or fire **IMMEDIATELY**. Explain the physical injury, chemical exposure, fire, or release.

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

4. If the victim's condition appears to be noncritical, but seems to be more severe than minor cuts, he/she should be transported to the nearest hospital by trained Emergency Medical

Services (EMS) personnel: let the doctor assume the responsibility for determining the severity of the injury. If the condition is obviously serious, EMS must transport the victim.

5.

Notify the Construction Supervisor and Project Manager. Complete the NYSEG Incident Report within 24 hours.

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

1.0 INTRODUCTION

The Health and Safety Plan (*HASP*) is written to ensure the well-being of all field personnel and the community surrounding the site. Accordingly, project staff and approved Contractors must follow the policies and procedures established in the *HASP*. All personnel assigned to this project must sign the Agreement and Acknowledgment Sheet, Section 11.0, to confirm that they understand and agree to abide by the provisions of the plan.

All work will comply with the Occupational Safety and Health Act (OSHA) Standard, "Hazardous Waste Operations and Emergency Response," (29 CFR 1910.120) and other federal, state, and local procedures that require the development and implementation of a *HASP*. Generation of this document certifies that the workplace has been evaluated for the hazards as described. A hazard assessment has been performed and the adequacy of the personal protective equipment (PPE) selected is hereby certified per 29 CFR 1910.120(b)(1) and is duly noted by the signature(s) and date appearing on the cover page of this document.

This plan addresses the safety issues associated with this Work Plan for excavation and handling of MGP residues of varying physical and chemical characteristics involving the following site tasks:

- Excavation
- Heavy Equipment Operation
- Soil Transfer

The minimum level of protection for this site is Level D. For each task, the potential hazards for employee exposure to site contaminants and/or air monitoring results, will determine the level of protection. Modified Level D will be worn during tasks that may have the potential for skin contact with contaminated media (soil or water). Upgrade to Level C will occur when the possibility of exposure exists from the onset of site specific tasks or results of real-time monitoring exceed established action levels listed in Table 3, Air Monitoring Action Levels. This HASP must be modified or amended when circumstances or conditions develop that are beyond the scope of this plan.

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Any changes in project work scope and/or site conditions as described must be amended in writing by the Project Manager.

Table 1 presents an overview of the NYSEG health and safety programs in which all field personnel are required to participate. These include the medical surveillance and comprehensive training programs in accordance with OSHA Hazardous Waste Operations and Emergency Response standard, 29 CFR 1910.120.

1.1 Site Description/Background Information

The State road Site is located in a mixed commercial/residential area in the southwest section of Locport, New York. The closest residence is within 50 feet of the site. The site is bordered by the New York State Barge Canal to the northwest, a NYSEG gas regulator house to the southwest, State Road to the southeast, and by an open lot to the northeast. The site consist of open vegetated and gravel-covered land with the only existing structure being a partially fenced-in gas regulator. A large percentage of the site appears to be filled and rubble emplaced adjacent to the New York State Barge Canal. Former manufactured gas plant structures believed to exist on the site were a gas holder, tar tanks, plant buildings and a warehouse. All of the structures have been razed except for their foundations.

Table 1. NYSEG Health and Safety Programs

Activity	Description	Action
Medical Surveillance	The program tracks the physical condition of the Company's employees in compliance with Department of Transportation (DOT) regulations and OSHA standards	Medical examinations and consultations are completed for all employees prior to assignment, annually, upon termination, and in the event of injury and/or illness resulting from exposure at the work site.
Training	 Training requirements and programs comply with the OSHA Hazardous Waste Operations and Emergency Response standard, 29 CFR 1910.120 	 Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction. Field personnel must complete a minimum of 3 days supervised field instruction. Field personnel assigned to the site will also receive 8 hours of refresher training each year. On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations receive an additional 8 hours of supervisory training. Field personnel assigned to site also receive first aid/CPR.
Personnel Protective Equipment (PPE)	 Training requirements and programs comply with the OSHA Hazardous Waste Operations and Emergency Response standard, 29 CFR 1910.120 	 Field personnel assigned to the site will also receive 8 hours of refresher training each year. Field personnel assigned to the site will receive refresher training for donning PPE.

2.0 HAZARD IDENTIFICATION AND CONTROL

Precautions must be taken to prevent injuries and exposures to the following potential hazards.

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Table 2	
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Potential Hazards and Control

Potential Hazard	`.	Control
Exposure to Chemical Products	1. 2. 3.	Stand up-wind of chemical products whenever possible. Minimize contact and contact time with chemical products. Avoid walking through discolored areas, puddles, leaning on drums, or contacting anything that is likely to be contaminated.
(See Attach. "A")	4.	Do not eat, drink, smoke and/or apply cosmetics in the hot or warm zones.
	5.	Wear gloves when in contact with contaminated surfaces.
Benzene	6.	Safety glasses must be worn at a minimum.
PAH's	7.	Splash goggles must be worn when working with liquids.
VOC's	8.	> 2.5 ppm organic vapors in breathing zone sustained for five minutes, requires upgrade to Level C.
	9.	> 80 ppm organic vapors in breathing zone sustained for five minutes requires excavation work to stop.
· · ·	10.	If unknown materials are encountered, call the HSM.
Exposure to Surface/ Subsurface	1.	Stand up-wind whenever intrusive activities occur and generate visible signs of airborne dust and immediately implement spraying work surface
Airborne Dust	2.	Monitor air for airborne soil dust (surface or subsurface soil) with portable aerosol dust-direct reading instrument.
Heavy Metals	3.	> 0.025 mg/M ³ in breathing zone requires upgrade to Level C.
Cyanides	4.	> 0.25 mg/M ³ in the breathing zone requires work to stop.
Sulfides	4.	Utilize wet methods (spraying ground, wet drilling, etc.) when visible signs of airborne dust are generated.
Vehicular Traffic	1.	Wear traffic safety vest when vehicle hazard exists.
(Interior and	2.	Use cones, flags, barricades, and caution tape to deline work area.
Exterior)	3.	Use vehicle to block work area.
	4.	Ensure that neavy equipment is equipped with a back-up alarm.
Cleaning Equipment	1.	Wear appropriate PPE to avoid skin and eye contact with isopropyl alcohol, alconox, or other cleaning materials
Lyupmen	2	Stand upwind to minimize any potential inhalation exposure
	3.	Dispose of spent cleaning solutions and rinses appropriately.

Potential Hazards and Control (continued) Table 2

Potential Hazard	Control
Utility Lines Contact	 Contact UFPO to have utility lines marked prior to excavation/trenching Refer to site drawings or customer interviews if on private property for utility locations. Hand dig when within 2 feet of utility marker until utilities are observed to avoid breaking utility lines.
Inclement Weather	 Stop outdoor work during electrical storms and other extreme weather conditions such as extreme heat or cold temperatures. Take cover indoors or in vehicle. Listen to local forecasts for warnings about specific weather hazards such as tornados, hurricanes, and flash floods.
Noise	 Wear hearing protection when equipment such as a drill rig, jackhammer, cut saw, air compressor, blower or other heavy equipment is operating on the site. Wear hearing protection whenever you need to raise your voice above normal conversational speech due to a loud noise source; this much noise indicates the need for protection. Hearing protection is required when measured sound pressure levels (SPL) exceed 85 dB(A) where employees stand or conduct work. Conduct noise monitoring of suspected high noise operations at the beginning of the workday or start up of new operations to verify noise control/hearing protection requirements.
Electric Shock	 Maintain appropriate distance from overhead utilities; 10-foot minimum clearance from power lines required; 1-foot minimum clearance from shielded power lines. Use ground-fault circuit interrupters as required. Perform lockout/tagout procedures. Use three-pronged plugs and extension cords. Contact your local underground utility-locating service. Follow code requirements for electrical installations in hazardous locations.
Ladders	 Make sure ladder rungs are sturdy and free of cracks. Use ladders with secure safety feet. Pitch ladders at a 4:1 ratio. Secure ladders at the top when possible. Use non-conductive ladders near electrical wires.

Table 2

Potential Hazards and Control (continued)

Potential Hazard	Control
Physical Injury	 Wear hard hats and safety glasses when on-site. Maintain visual contact with the equipment operator and wear orange safety vest when heavy equipment is used on-site. Avoid loose-fitting clothing (driller and driller's helper). Prevent slips, trips, and falls; keep work area uncluttered. Keep your hands away from moving parts (i.e., augers). Test the emergency shut-off switch on the drill rig daily.
Back Injury	 Use a mechanical lifting device or a lifting aid where appropriate. If you must lift, plan the lift before doing it. Check your route for clearance. Bend at the knees and use leg muscles when lifting. Use the buddy system when lifting heavy or awkward objects. Do not twist your body while lifting.
Heat Stress	 Increase water intake while working. Increase number of rest breaks and/or rotate workers in shorter work shifts; take breaks in shaded areas. Watch for signs and symptoms of heat exhaustion and fatigue. Plan work for early morning or evening during hot months. Use ice vests when necessary. Rest in cool, dry areas. In the event of heat stroke, bring the victim to a cool environment and initiate first aid procedures (Section 9.0).
Cold Stress	 Take breaks in heated shelters when working in extremely cold temperatures. Remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration, upon entering the shelter. Drink warm liquids to reduce the susceptibility to cold stress (Section 10.0).
Insects	 Tuck pants into socks, if necessary. Wear long sleeves, if necessary. Use insect repellent.
Poisonous Plants (Such as Poison Ivy, Oak or Sumac)	 Don't enter areas infested with poisonous plants. Immediately wash any areas that come into contact with poisonous plants.



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Table 2

Potential Hazards and Control (continued)

Control
 Smoke only in designated areas. Keep flammable liquids in closed containers. Keep site clean; avoid accumulating combustible debris such as paper. Follow Hot Work Safety Procedures when welding or performing other activities requiring an open flame. Isolate flammable and combustible materials from ignition sources. Ensure fire safety integrity of equipment installations.
 Do not create static discharge in flammable atmospheres. Electrically bond and ground pumps transfer vessels, tanks, drums, bailers and probes, when moving liquids. Electrically bond and ground vacuum trucks and the tanks they are emptying. Do not splash fill containers with flammable liquids.
 Wear appropriate PPE to avoid skin, eye, and inhalation contact with contaminated soil. Stand upwind when conducting tasks and minimize possible inhalation exposure. Conduct air monitoring to determine level of respiratory protection. Utilize engineering controls such as portable venturi air movers to draw away or blow away chemical vapors.
 Conduct fire safety evaluation. Complete Hot Work Permit (Attachment B). Ensure flammable materials are protected from hot work, sources of ignition. Ensure fire watch/fire extinguisher is on standby by hot work location.

and absorbent pads will be located on-site either in the decontamination zone, or in the Construction Trailer. 7

3.0 AIR MONITORING

3.1 Air Monitoring

Air monitoring must be performed on site in accordance with Section 5 of NYSEG's *Interim Remedial Measures (IRM) Work Plan New York State Department of Transportation Prospect Street Over Erie Canal for Activities Adjacent to Lockport State Road Former Manufactured Gas Plant (MGP) Site.* Organic vapor compounds, and total suspended particulates, are monitored in the field with a photoionization detector (PID) with an 10.2 Ev lamp. Airborne dust/particulate concentrations are measured with a real-time aerosol monitor (using a scattered light photometric sensing cell) when there are visible signs of airborne dust. Detector tube grab sampling is conducted for benzene, when results of non-specific real-time monitor action levels are reached or when their presence is suspected. Perimeter of Work Zone Area air monitoring readings are to be taken to characterize site activities. All air monitoring results will be recorded in the Sampling Technician's field notebook.

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Calibration and maintenance of air monitoring equipment must follow manufacture specifications and be documented. Recalibration and adjustment of air monitoring equipment must be completed when site conditions and equipment operation reveal the need. Record all air monitoring equipment calibration and adjustment information in the Sampling Technician's field notebook.

Air monitoring action levels (Table 3) have been approved by the NYSEG Manager Health and Safety, to indicate the chemical concentrations in the breathing zone that require an upgrade in level of PPE. All workers on-site must have been properly fitted with PPE (i.e., respirators) and have been trained in their use (i.e., donning and doffing). Air monitoring measurements will be taken in the breathing zone of the worker most likely to have the highest exposure. Transient peaks will not automatically trigger action. Action will be taken when levels are consistently exceeded in a 5-minute period. Similarly, if chemical odors are detected that are a nuisance, bothersome, or irritating, an upgrade in respiratory protection can provide an extra level of comfort or protection when conducting site activities. Job tasks that require air monitoring, the applicable action levels that apply for those tasks, and the frequency of air monitoring are described in Table 3 and Table 4. Additional guidelines for frequency of air monitoring are presented in Table 5.

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Air Monitoring Action Levels Table 3.

Instrument*	Function	Measurement	Action
Photoioniztion dete	ector (PID) (10	.2 Ev lamp) - Measu	res Total Organic Vapors
Conduct air monitoring for volatile organic compounds during activities where contaminated media are present		> 0 - 2.5 ppm	Level D / Modified Level D required. If PID measures > 3 ppm, check for benzene with detector tubes.
:		> 2.5 - 80 ppm	Upgrade to Level C.
		> 80 ppm	Secure Work Area and then leave Work Area. Stop Work, Contact PM and HSM.
Dust / Particulate	Monitor	· ·	
Conduct air monitoring for dust particulate when sustained (> 5 minute) levels of visible dust are generated and engineering controls such as wet methods are ineffective.		0 - 0.15 mg/M ³	Level D required.
		> 0.15 mg/M ³	Upgrade to Level C and implement engineering controls.
		Consistently > 0.15 mg/M ³	Secure Work Area and then leave Work Area. Stop Work, Contact PM and HSM.
Benzene Detector Tubes			
Conduct grab sampling for benzene		0 - 0.5 ppm	Level D/Modified Level D required.
when sustained PID detected in the breath) readings are ing zone.	> 0.5 - 50 ppm	Upgrade to Level C required.
		> 50 ppm	Secure Work Area and then leave Work Area. Stop Work, Contact PM and HSM for guidance.

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Table 4.	Air Monitoring	Requirements
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WORK ZONE SAMPLING REQUIREMENTS		
Job Task	Instrument	Frequency
Intrusive Work Soil Transportation Decontamination Soil Sampling	PID, DT, DM	Start up of work, then 60 minutes to continuously based on sampling results and sample location. Continuously if action level is exceeded.
Instruments:	PID DT DM	Photoionization Detector Benzene Detector Tube Dust/Particulate Monitor

Note: "Start up of work at each new task location" means to monitor the air quality at each new operation on the site. The breathing zone is the area inside a 1-foot radius around the head.

Table 5.Air Monitoring Frequency Guidelines

Conduct periodic monitoring when:

- 1. It is possible that an immediately dangerous to life or health (IDLH) condition or a flammable atmosphere has developed, or
- 2. There is an indication that exposures may have risen over permissible exposure limits or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with these situations:
 - **Change in site area** work begins on a different section of the site.
 - Change in contaminants handling contaminants other than those first identified.
 - Visible signs of particulate exposure from intrusive activities such as drilling/boring and excavation.
 - Perceptible chemical odors or symptoms of exposure.
 - Change in on-site activity one operation ends and another begins.
 - Handling leaking drums or containers.
 - Working with obvious liquid contamination (e.g., a spill or lagoon).

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NYSEG

Table 6.Specific Criteria and Protocol for Specifying Health and Safety for ProjectsInvolving Specific Chemical Agents or Other Industrial-Specific Conditions

Potential Chemical Exposure or Exposure Scenario	Criteria and Protocol for Health and Safety Specification
Coal Tar	 Coal Tar can contain up to 160 aromatic compounds such as phenol, pyrol, and pyridine plus additional poly aromatic hydrocarbons (PAHs). It is listed as a carcinogenic substance by IARC, NTP, and OSHA.
	 Coal tar is toxic by inhalation, ingestion and skin contact. The range of toxicity depends on the exposure, concentration and duration. Effects may include irritation to skin, mucous membranes and respiratory system upon exposure from direct contact short term contact to respiratory and skin diseases from repeated long term exposure. Symptoms include redness and itching to skin leading to a dermatitis from skin contact, severe eye irritation when contacted in the eye, and trouble breathing from inhalation. Precautions to take to avoid exposure to Coal Tar are wearing
	appropriate PPE to avoid skin and eye contact when working with contaminated soil and water. Minimize breathing in contaminated soil by using wet methods to control dust or wear a cartridge respirator with HEPA filter. In the event of contact or suspected exposure, rinse the affected area with water. and seek medical attention.
Aromatic Hydrocarbons	1. Health hazards associated with aromatic hydrocarbons are central nervous system depression by inhalation exposure and irritating to skin, eyes, and mucous membranes.
Benzene	2 Potential for exposure can be controlled by setting appropriate action levels and following general safe work practices. Verification of specific aromatic hydrocarbons can be accomplished using colorimetric detector tubes when PID readings are in excess of 2.5 PPM
	3.' Precautions to take to avoid exposure to Benzene are wearing appropriate PPE to avoid skin and eye contact when working with contaminated soil and water. Minimize breathing in contaminated soil by using wet methods to control dust or wear a cartridge respirator with HEPA filter. In the event of contact or suspected exposure, rinse the affected area with water. and seek medical attention.

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Potential Chemical Exposure or Exposure Scenario	Criteria and Protocol for Health and Safety Specification
Polynuclear Aromatic Hydrocarbons (PAHs)	 PAHs are a class of compounds containing closed hydrocarbon rings. PAHs cause irritation to skin, eyes, and respiratory tract when direct contact occurs or inhalation of vapors or contaminated soil occurs. Some PAHs are probable human carcinogens while others are considered animal carcinogens and mutagens.
	2. Avoid direct contact from PAHs to skin and eyes. This could be in the form of coal gasification by-products and associated contaminated soils. Avoid breathing off-gassing vapors of coal gasification by-products and associated contaminated soil.
	3. Wear appropriate PPE when potential to skin, eye, or inhalation exposure can occur. This includes modified Level D, with upgrade to Level C depending on air monitoring results. Use cartridge respirator with organic vapor/HEPA cartridges. For supplied air, full face positive pressure demand type must be worn. Utilize wet methods to minimize PAH contaminated dust generation when excavating/mixing processes are underway.
	4. PAHs are combustible. Avoid contact with open flames or other direct heating sources.
	5. Ensure proper personal decontamination is conducted after site activities. Wash/rinse face/hands and any other exposed skin. Immediately rinse affected skin or eyes if contact occurs, and seek medical attention. Move to fresh air when inhalation exposure occurs and seek medical attention.
Heavy Metals	1. Main concern with heavy metals is inhalation exposure to the dust, as well as ingestion of heavy metals on food or from hand to mouth contact.
	2. If the predicted exposure is in excess of 50% of the PEL, utilization of Level C should occur.

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Potential Chemical Exposure or Exposure Scenario	Criteria and Protocol for Health and Safety Specification
Cyanide	 Cyanide gas may be formed when organocyanide or ferrocyanide compounds in coal gasification by-products are in highly acidic soil or come in contact with acidic solutions/water. Avoid direct contact with coal gasification by-products or contaminated soils and or waters and cyanide gas. Wear appropriate PPE - a minimum Modified Level D with polyethylene coated tyvek. suits is required where contact with cyanide compounds is suspected.
	 Cyanide is a highly toxic, lethal gas. It can cause death in minutes. Conduct air monitoring with detector tubes or cyanide real time monitor when cyanide gas is suspected. Supplied air respirators with positive pressure demand are required to work at the action level of 2.5 mg/M³.

4.0 CHEMICAL HAZARD CONTROL

4.1 PPE

Based upon the hazards that may be encountered during site activities, PPE as follows was selected. Only PPE that meets the following American National Standards Institute (ANSI) standards are to be worn.

- Eye protection ANSI Z87.1-1989
- Head protection ANSI Z89.1-1997
- Foot protection ANSI Z41-1991

Employees must maintain proficiency in the use and care of PPE that is to be worn.

Level D is the minimum acceptable level for this site. Levels of protection are based on the activity of task to be conducted. State Road Former MGP Site, Lockport, New York IRM Health and Safety Plan

Table 7. PPE

Level	Requirements
Level D	 Work Clothes will require, as a minimum, short sleeve shirts and long pants (NO shorts and/or tank tops) Steel-toed boots Approved safety glasses or goggles Hard hat Fluorescent vest, when vehicular traffic is on or adjacent to the site Nitrile gloves for water sampling or handling
Modified Level D	 One or more of the following: Chemical resistance (acid or solvent) boot covers PE-coated Tyvek® suit, NBR outer and nitrile inner gloves if skin contact with contaminants is possible. Hearing protection (muffs and/or plugs).
Level C	 Level D and Modified Level D National Institute for Occupational Safety and Health (NIOSH)-approved half-face respirator with organic vapor/HEPA cartridge (mercury vapor/organic vapor/HEPA cartridge during Work Plan Section 4.3.3 Former Building Crawl Space excavation).
Pric	by to use, all equipment must be inspected to ensure proper working condition.

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4.2 Site Control: Work Zones

Work zones will be established in order to:

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

Employees entering the work zone must wear the proper PPE for that area. Work and support zones will be established based on ambient air monitoring data, necessary security measures, and site-specific conditions. Work zones will be identified as either Hot Zone/Exclusion Zone; Decontamination Zone /Contamination Reduction Zone; or Clean Zone/Support Zone.

The following PPE requirements apply for Work Zones

 Hot Zone/Exclusion Zone requires Level D/Modified Level D/Level C PPE

Decontamination Zone/Contamination Reduction Zone requires Level
 D/Modified Level D PPE

Clean Zone/Support Zone requires none

Listed are general guidelines for delineation of work zones. Contamination Reduction Zone will be developed for decontamination procedures listed in Section 4.4.

- 1. The Hot Zone/Exclusion Zone is identified as the Excavation Areas and inside transporter's trailer and/or roll off container.
- 2. The Decontamination Zone/Contamination Reduction Zone will be the areas where trucks will be loaded, the area for cleaning equipment and all other areas excluding the Hot Zone/Exclusion Zone within the chainlink fence.

3. Clean Zone/Support Zone will be the Construction Trailer and areas outside the chain linked fence.

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able 8.	Site Security	Measures



4.3 Personal Decontamination Procedures

Operations conducted at this site have the potential to contaminate field equipment and PPE. To prevent the transfer of contamination to vehicles, administrative offices and personnel, the procedures presented in Table 10 must be followed. Specific decontamination requirements will be followed by utilizing the equipment for that purpose. Employees then must wash up and change into street clothes, leaving any contaminated clothing on-site for appropriate disposal. Level D/ Modified Level D PPE must not be brought to employee residences.

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Item	Examples	Procedure
Disposable PPE	Tyvek® suits, inner latex gloves, respirator cartridges	 Place PPE in lined 55 gallon barrels in the personal contamination reduction shed.
		 Change out respirator cartridges on a daily basis and place cartridges in lined 55 gallon barrels in the personal contamination reduction shed.
Nondisposablè PPE	Respirators	 Wipe out respirator with disinfecting pad prior to donning. Decontaminate on-site at the close of each day with a solution of an approved sanitizing powder and water.
	Boots and gloves	 Decontaminate in the personal contamination reduction area with a solution of detergent and water; rinse with water prior to leaving area.

Table 9.Personal Decontamination Procedures

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

4.4 Example Decontamination Diagram

If Level C or Level B PPE is required, a Contamination Reduction Zone will be constructed in a centralized common area with a travel path from the Exclusion Zone demarcated with three-foot high cones. The decontamination procedure for this project site is a two-stage process.

ST.	AGE	1

Gross contamination removal with a brush.

- Decontaminate boots with a solution of detergent and water.
- Rinse boots with water and remove boots
- Remove Tyvek suit and dispose in lined drum.
- Remove outer gloves and dispose in a drum.
- Walk to Stage 2.

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STAGE 2

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



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5.0 CONTINGENCY PLANS

Table 10 (Sections 5.1 - 5.4) presents contingency plans for potential emergency situations.

Table 10.	Contingency	Plans for	Site	Emergencies
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Situation	Action
5.1 Evacuation	 Immediately notify all on-site personnel of an emergency requiring evacuation. Leave the dangerous area and report to a designated rally point. Notify EMS, as appropriate. Account for all personnel. Contact the Project Manager and the Program Manager as soon as possible. Maintain site security and control measures for community safety until emergency responders arrive.
5.2 Medical Emergency	 Survey the situation: <u>Do Not Enter An Area That May Jeopardize Your Safety.</u>
	 Establish the patient's level of consciousness. Call for help. Contact EMS and inform them of patient's condition.
· · · · · · · · · · · · · · · · · · ·	 Primary assessment (patient unconscious) Arousal Airway Breathing Circulation
	Only Trained Personnel Should Perform CPR or First Aid.
	 Secondary assessment (patient conscious) Check for bleeding: Control with direct pressure. Do not move patient (unless location is not secure). Monitor vital signs. Provide First Aid to the level of your training. Contact the Project Manager and Program Manager as soon as possible. Document the accident on either the NYSEG's Public Liability Accident Report or NYSEG's Report of Employee Injury Form

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Situation	Action	
5.3 Fire Emergency	 Evacuate the area. Call 432-2222 to notify fire department. Extinguish small fires with an all-purpose extinguisher. Contact the Project Manager and Manager Health and Safety Document the incident on NYSEG's Incident Report. 	
5.4 Spill/ Release	 Evacuate the area. Call 432-2222 to notify fire department. Extinguish small fires with an all-purpose extinguisher. Contact the Project Manager and Manager Health and Safety Document the incident on NYSEG's Incident Report. Prevent problems by documenting the location of underground lines (e.g., product, sewer, telephone) before starting site work. If you drill through a line or tank or another leak occurs, document the spill/release in writing. Include dates, times, actions taken, agreements reached and names of people involved. In the event of a spill/release, follow this plan. Wear appropriate PPE; stay upwind of the spill/release. Turn off equipment and other sources of ignition. Turn off pumps and shut valves to stop the flow/leak. Plug the leak or collect drippings in a bucket, when possible. Place sorbent pads to collect product, if possible. Call Fire Department immediately if fire emergency develops. Inform Project Manager about the situation. Determine damage can be repaired or if an emergency repair contractor is needed. Based on agreements, contact emergency spill contractor for containment of free product. Advise the Project Manager of spill discharge notification requirements and determine who will complete and submit forms. Do not submit or report to agencies without NYSEG's consent. Document each interaction with the NYSEG and regulators and note, in writing; name, title authorizations, refusals, decisions, and commitments to actions. Do not transport or approve transportation of contaminated soils or product until proper manifests have been completed and approved. Be aware that soils/product may meet criteria for hazardous waste.	
Notifications - a spill/release requires completion of a Former MGP Site Spill Report (Attachment		

Notifications - a spill/release requires completion of a Former MGP Site Spill Report (Attachment B) & immediate notification to the Project Manager (within one (1) hour).

NYSEG is under obligation to report to the proper government agencies. If the spill extends into waterways, the DEC (800-457-7362) and the Coast Guard's National Response Center (800) 424-8802 must be notified immediately.

6.0 PROJECT PERSONNEL

The following management structure will be instituted for the purpose of successfully and safely completing this project.

Title	General Description	Responsibilities
Project Manager	Reports to Program Manager. Has authority to direct response operations. Assume total control over site activities.	 Prepares and organizes background review of the project, the work plan, the HASP, and the field team. Obtains permission for site access and coordinates activities with appropriate officials. Sees that the work plan is properly carried out and on schedule. Briefs the field personnel on specific assignments. Together with the SHSO sees that health and safety requirements are met. Prepares final report.
Construction Supervisor	Reports to Project Manager. Has authority to direct response operations. Assumes total control over site activities.	 Manages field operations. Executes the work plan and schedule. Enforces safety procedures. Enforces site control. Documents field activities and sample collection. Notifies when necessary, local public emergency officials. Submits NYSEG Public Liability Accident Report, NYSEG Report of Employee Injury, or NYSEG Incident Report and initiates follow up with Project Manager.

Table 11. Responsibilities of On-Site Personnel

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Title	General Description	Responsibilities
Site Health & Safety Officer Construction	Advises the Project Manager on all aspects of health and safety on site. Stops work if site operations threaten	 Refreshes field personnel for donning PPE. Notifies field personnel when to upgrade their PPE
Supervisor	worker or public health and safety. Informs health and safety specialist of any changes in site conditions or project status.	 Periodically inspects protective clothing and equipment. Sees that protective clothing and equipment are properly stored and maintained.
		 Monitors the workers for signs of stress, including heat stress, cold exposure, and fatigue. Controls entry and exit at the
		 access control points. Implements the HASP. Conducts periodic inspections to assess whether the HASP is being
		followed. Enforces the "buddy" system. Informed of emergency procedures, evacuation routes,
		and telephone number of local hospital, poison control center, fire department, and police department.
		 Notifies, when necessary, local public emergency officials. Maintains communication with health and safety representative
		 on site activities. Coordinates emergency medical care. Sets up decontamination lines and care.
		 decontamination solutions appropriate for the chemical contaminants encountered. Controls the decontamination of oquiomont personnel and
		 samples from contaminated areas. Facilitates the proper disposal of contaminated clothing and materials
		 Maintains the availability of required equipment.

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Title	General Description	Responsibilities
Site Health & Safety Officer (continued)		 Advises NYSEG health services and medical personnel of potential exposures. Notifies emergency response personnel in the event of an emergency.
Work Team	Reports to Construction Supervisor for on-site activities. Work parties must comprise at least two people for high hazard operations.	 Safely completes on-site tasks required to fulfill the work plan. Complies with the HASP. Notifies SHSO or supervisor of suspected unsafe conditions.

7.0 VISITOR/TRAINEE GUIDELINES

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

7.1 Visitors

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

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

7.2 Trainees

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

Trainees will be permitted to visit NYSEG sites as observers as long as the following conditions are met:

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

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

8.0 JOB SAFETY ANALYSIS

Table 12Heavy Equipment

TASK - JOB STEPS	JOB HAZARD	CONTROL AND SAFEGUARD
Heavy Equipment Operations: a. Excavators b. Loaders c. Trucks d. Dozers e. Etc.	 Employee run over or hit by moving equipment 	 1a. back up signals on equipment; 1b. traffic safety vest for all field personnel 1c. foot traffic restricted in areas of operation; 1d. establish standard hand signals for laborers assisting in equipment
	 Physical hazards; a. hit in head b. foreign body in eye c. foot injury Overhead utilities/overhead obstacles 	operations. 2a. hard hat; 2b. Safety glasses 2c. Steel_toe shoes 3. Minimum 10' distance, 1' distance if insulated

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Table 13	Excavation of Contaminated S	oils

JOB STEPS	JOB HAZARDS	SAFEGUARD AND PRECAUTIONS
Operate excavator or	1. Underground utilities	1. Contact Underground Facility Protection Organization (UFPO)
remove contaminated soil	2. Vehicle/equip. traffic	 Audible alarms (back-up, etc.) for heavy equipment
	3. Toxic or hazardous	3a. Competent person supervising
·	environments	3b. Level D personal protective equipment
		3c. Test for LEL (10% LEL action level) and PPM (2.5 PPM on PID for action level to Level C)
		3d. Prevent all skin contact
· .	4. Cave In	4a. Slope and shore per specification in OSHA standard 1926.650-652
	5. Fall hazard	5a. Secure opening of excavation when fall hazard exists (e.g. barricade openings)

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Table 14Soil Transportation

JOB STEPS	JOB HAZARDS	SAFEGUARD AND PRECAUTIONS
Soil Transfer and Soil Consolidation	 Employee run over or hit by moving equipment. 	 1a. Back-up signals on equipment. 1b. Traffic safety vest for all field personnel. 1c. Restricted foot traffic in area. 1d. Establish hand signals for laborers assisting in equipment operations.
	2. Physical Hazards (hit in head, foreign body in eye, foot injury, etc.)	2a. Hard hat, safety glasses, steel toe shoes, and work gloves
·	3. Overhead utilities / overhead obstruction	 Minimum 10' distance, 1' distance if insulated.
	4. Dust problems	4a. Monitor for ambient dust per Work Plan.
		4b. Wearing Level D PPE 4c. Spray dust with water
	5. Noise levels exceeding the OSHA PEL	5. Earmuffs and/or ear plugs effectively reduce noise levels
	6. Toxic vapors	 Monitor for contaminants using real time air monitoring per Work Plan
•		

9.0 CONFINED SPACE

Entry into confined spaces is not an activity covered by this document. If persons expect to perform a confined space entry, they must do so in accordance with the requirements of OSHA Standard 29 CFR 1910.146.

When working in "permit required confined space", as defined by OSHA Standard 29 CFR 1910.146(b)(23), extreme caution shall be exercised.

The definition of a "confined space" is a space which by design has limited openings for entry and exit: unfavorable natural ventilation which could contain or produce

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dangerous air contaminants, and which is not intended for continuous worker occupancy.

The following guidelines shall be followed when performing confined space work:

- A permit shall be prepared by the contractor where required under OSHA Standard 29 CFR 1910.146. The permit shall be in a standardized format and shall identify all conditions which must be evaluated to ensure safe entry.
- There shall be no smoking in confined spaces and workers shall avoid, as far as practical, open flames or torches in or near confined spaces.
 - Before entering, the air inside the confined space shall be monitored for combustible gases and oxygen levels, preferable with a combination of O2/LEL meter. The air shall be intermittently monitored to verify a safe stable working atmosphere. If there is a possibility that toxic vapors or gases may be present, their concentration must be measured prior to entry into the confined space.

A minimum of two people will be required for confined space work with one of those persons remaining outside to be alert to the needs of the workers inside, as well as to keep others out of the work area.

10.0 HEAT STRESS

Heat stress is a significant potential hazard associated with the work task performed and the type and degree of protective equipment used in hot weather environments. Local weather conditions may produce conditions which will follow one of two protocols depending on whether impermeable clothing (Tyvek, saranex, rain gear, etc.) or permeable clothing (cotton coveralls) is worn. This section will apply to both hazardous and non-hazardous waste workers at the site.

10.1 Workers Wearing Permeable Clothing

The American Conference of Governmental Industrial Hygienes (ACGIH) have set Threshold Limit Values (TLVs) for worker exposure to heat stress in which it is believed that nearly all workers may be repeatedly exposed without adverse health effects. The TLVs assume that workers are acclimatized, fully clothed in permeable clothing with adequate water and salt intake, and capable of functioning effectively under given working conditions without exceeding a deep body temperature of 100.4 degree Fahrenheit (F). Measurement of wet bulb globe temperature (WBGT) has been found to be the most adequately measurable environmental factor in which to correlate with deep body temperature and other physiological responses to heat. The following table reviews the work/rest regimen to be followed by all permeably clothed workers based upon routinely measured WBGT.

Table 15 Heat Stress - Work/Rest Regimen

	Workload			
Work/Rest Regimen	• Light	Moderate	Heavy	
Continuous Work	86 (76)	80 (70) ,	77 (67)	
75% work - 25% rest, each hour	87 (77)	82 (72)	78 (68)	
50% work - 50% rest, each hour	89 (79)	85 (75)	82 (72)	
25% work - 75 % rest, each hour	90 (80)	88 (78)	86 (76)	

Values are given in degree F WBGT.

Rest means minimal physical activity. Rest should be accomplished in the shade. Any activity requiring only minimum activity can be performed during rest period.

() Parentheses indicate the 10 degree adjustment for working in impermeable protective clothing

10.2 Workers Wearing Impermeable Clothing

Workers who must wear impermeable clothing are held at a higher risk of suffering heat stress. Impermeable clothing impedes sweat evaporation, one of the body's major cooling mechanisms. It is the duty of each employee to alert or notify the Construction Supervisor (Site Safety & Health Officer) if symptoms of heat stress occur to their respective site personnel. Physiological and environmental monitoring of personnel wearing an impermeable protective equipment ensemble will commence when the ambient temperature rises above 70 degrees F. Environmental monitoring will be conducted continuously for as long as the ambient temperature stays above 70 degree F and physiological monitoring will be conducted immediately before and after each work period. Frequency of physiological

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monitoring will increase as the ambient temperature increases or if slow recovery rates are indicated. The break time must be sufficient to allow workers to recover from the effects of heat stress. This will be accomplished by measuring the recovery heat rate and oral temperature. The break time duration will be determined using the following methodology and criteria:

Seat person being monitored,

Measure pulse in the following sequence;

- Pulse #1: 30 seconds to 1 minute after sitting, and
- Pulse #2: $2\frac{1}{2}$ to 3 minutes after sitting,

An excessive heat stress condition exists when any of the following conditions exists:

- Oral or ear temperature exceeds 99.5 degrees F,
- If pulse #2 is greater than 90 beats/minute, or
- Pulse #1 is greater than 100 beats/minute.

Worker cannot return to work until:

- Oral or ear temperature is below 99.5 degrees F.
- Pulse rate is below 90 beats/minute, and
- Recovery heart rate for workers with heart rates over 90 beats/minute is less than 10 beats/minute less than the original heart rate.

Adhering to the guidelines for heat stress prevention and monitoring will greatly minimize the possibility of the occurrence of heat stress. Site personnel must also be aware of the symptoms of heat-related disorders and be prepared to administer the appropriate treatments.

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10.2.1 Heat Stress Prevention

- A. Provide plenty of fluids. A 50 percent solution of fruit juice or similar solution in water, or plain water will be available. For workers performing work inside an exclusion zone, fluid intake may occur in the contamination reduction zone. Workers must first perform a partial decontamination process which will include removal of gloves and washing of hands and face prior to consumption of fluids.
- **B.** Work in pairs. No activity where personnel are in Level C will be conducted alone.
- C. Provide cooling undergarments. The amount and type of undergarments worn will be left to the preference of each individual unless prone to heat stress, especially heat rash. In this case, the worker can wear "long john" cotton type underwear to keep skin separated from chemical resistant clothing.
- **D.** Adjustment of the work schedule. When practicable, the most laborintensive tasks should be carried out during the coolest part of the day.
- E. Shaded or cooled rest areas. Shaded or cooled rest areas will be provided when site environmental and/or workers physiological responses warrant.

10.2.2 Heat Stress Monitoring

Physiological monitoring of personnel wearing an impermeable protective ensemble will be conducted at regular intervals at the beginning and conclusion of the work period. Heart rate must be periodically measured for all site personnel when heat stress conditions (climate or wearing impermeable clothing) exist. Additional physiological monitoring such as body temperature and body water temperature (BWT) monitoring can be measured for extreme temperatures and when impermeable clothing is worn.

A. Heart rate must be measured by the radial pulse for 30 seconds as early as possible in the resting period and repeated approximately 3 minutes into the rest period.

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The heart rate at the beginning of the rest period should not exceed 100 beats/minute. The heart rate also should not exceed 90 beats/minute after approximately 3 minutes of rest. If the heart rate does exceed the criteria, the next work period will be shortened by 33 percent, while the length of the rest period will remain the same. If heart rate still exceeds the criteria at the beginning of the next rest period, the following work will be shortened by 33 percent.

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B. Body temperature can be measured orally with a clinical or disposable thermometer, in accordance with manufacturer's instructions, as early as possible in the rest period (before drinking liquid). Oral or ear temperature at the beginning of the rest period should not exceed 99.5 degrees F. If it does, the next work period will be shortened by 33 percent while the length of the rest period will remain the same. However, if the oral temperature exceeds 99.5 degrees F at the beginning of the next rest period, the following work period will be shortened 33 percent. A worker will not be permitted to wear semi-permeable or impermeable protective ensemble when his/her body temperature exceeds 99.5 degrees F.

Body water loss due to perspiration can be measured by having the worker weigh him/her self at the beginning and end of each work day. Similar clothing should be worn at both weighing. Body water loss should not exceed 1.5 percent total body weight in a work day. NYSEG

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Table 16Heat Stress Monitoring

SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING FOR FIT AND ACCLIMATED WORKERS (1)					
Adjusted Temperature (2)	Normal Work Ensemble (3)	Impermeable Ensemble (4)			
90 deg. F or above	After each 45 minutes of work	After each 15 minutes of work			

87.5 deg. F - 90 deg. F	After each 60 minutes of work	After each 30 minutes of work			
82.5 deg. F - 87.5 deg. F	After each 90 minutes of work	After each 60 minutes of work			
77.5 deg. F - 82.5 deg. F	After each 120 minutes of work	After each 90 minutes of work			
72.5 deg. F - 77.5 deg. F	After each 150 minutes of work	After each 120 minutes of work			

Record monitoring on rical carees monitoring Point rates and

(1) For work levels of 250 kilocalories per hour

Calculate the adjusted air temperature (T adj) using the following equation:

T adj (degree F) = T (degree F) + (13 X percent sunshine) Measure the air temperature (T adj) using a standard mercury-in-glass thermometer with the bulb shielded from radiant heat.

(3) A normal work ensemble consists of cotton coveralls with long sleeves and pants.

(4) An impermeable work ensemble consists of impermeable coveralls with long sleeves and pants.

10.2.3 Heat Stress Recognition and Treatment

Any person who observes any of the following forms of heat stress either in themselves or in another worker, will report this information to his or her immediate supervisor or the Construction Supervisor.

A. Heat rash (or prickly heat)

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

Treatment: Remove sources of irritation and cool skin with water or wet cloths.

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B. Heat Cramps or Heat Prostration

- Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
- Symptoms: Sudden development of pain and/or muscle spasms in the abdominal region.

Treatment: Remove the worker to the contamination reduction zone. Remove protective clothing. Decrease body temperature and allow a period of rest in a cool location.

C. Heat Exhaustion - <u>SERIOUS</u>

- Cause: Overexertion in a hot environment and profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
- Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing.

Treatment: Perform the following while simultaneously making arrangements for transport to a medical facility.

Remove the worker to the contamination reduction zone. Remove protective clothing. Lie worker down on his/her back in a cool place, and raise the feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of a salt water solution consistency of one teaspoon salt in 12 ounces of water. Transport the worker to a medical facility.

D. Heat Stroke - EXTREMELY SERIOUS

Cause:

Overexertion in a hot environment and profuse perspiration accompanied by inadequate replenishment of body water and electrolytes. NYSEG

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Symptoms: No perspiration, dry mouth, pain in the head, dizziness, nausea.

Treatment:

Perform the following while making arrangements for transport to a medical facility.

Remove the worker to the contamination reduction zone. Remove protective clothing. Lie worker down in a cool place and raise the head and shoulders slightly. Cool without chilling. Apply ice bags or cold wet cloth to the head. Sponge bare skin with cool water or rubbing alcohol. If possible, place the worker in a tub of cool water. Do not give stimulants. Transport to a medical facility.

11.0 COLD STRESS

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Localized cold exposure is generally labeled frostbite.

A. Hypothermia: Hypothermia is defined as a decrease in the patient core temperature below 96 degrees F. The body temperature is normally maintained by central (brain and spinal cord) and peripheral (skin and muscle) activity. Interferences with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered "cold" ambient temperature.

Symptoms: Shivering, apathy, listlessness, sleepiness, and unconsciousness.

B. Frostbite: Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 2 degrees F.

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Symptoms: A sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

Prevention of cold related illness can be aided by educating workers on recognizing the symptoms of frostbite and hypothermia and by identifying and limiting known risk factors. The workers should be provided with enclosed, heated environments on or adjacent to the site, dry changes of clothing and warm drinks.

To monitor the worker for cold related illness, start (oral) temperature recording at the job site:

- At the Contractor's and/or Construction Supervisor's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As screening measures, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20 degrees F, or windchill less than 30 degrees F with precipitation).
- As a screening measure whenever any one worker on the site develops hypothermia.

Workers developing moderate hypothermia (a core temperature of 92 degrees F) should not return to work for at least 48 hours.

Progressive Clinical Symptoms of Hypothermia Table 17

Core Temperature (degree F)	Symptoms
99.6	Normal rectal temperature
96.8	Metabolic increases
95.0	Maximum shivering
. 93.2	Victim conscious and responsive
91.4	Severe hypothermia
89.6 - 87.8	Consciousness clouded, blood pressure difficult to obtain, pupils dilated but react to light, shivering ceases
86.0 - 84.2	Progressive loss of consciousness, muscular rigidity increases, pulse and blood pressure difficult to get, respiratory decreases
78.8	Victim seldom conscious
64.4	Lowest accidental hypothermia victim to recover

12.0 AGREEMENT AND ACKNOWLEDGMENT SHEET

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

AGREEMENT AND ACKNOWLEDGMENT STATEMENT							
1. I have 2. I agree	 I have read and fully understand the HASP and my responsibilities. I agree to abide by the provisions of the HASP. 						
Name:	· · · · · · · · · · · · · · · · · · ·	Signature:					
Company:		Date:					
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ATTACHMENT A

CHEMICALS OF CONCERN

Benzene Pyrene Phenol Naphthalene Coal Tar Pitch Bio-Solve™

Material Safety Data Sheet Collection

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Genium Publishing Corp. 1171 RiverFront Center

Amsterdam, NY 12010 (518) 842-4111 Issue Date: 2000-07

Benzene MSDS 316 BEN2200

Section 1 - Chemical Product and Company Identification 54 Material Name: Benzene CAS Number: 71-43-2 Chemical Formula: C,H, Structural Chemical Formula: C,H, Synonyms: (6)ANNULENE; BENZELS; BENZEN; BENZENE; BENZIN; BENZINE; BENZOL, BENZOL 90; BENZOLER; BENZOLO; BICARBURET OF HYDROGEN; CARBON OIL; COAL NAPHTHA; CYCLOHEXATRIENE; EPA PESTICIDE CHEMICAL CODE 008801; FENZEN; MINERAL NAPHTHA; MOTOR BENZOL; NITRATION BENZENE; PHENE; PHENYL HYDRIDE; POLYSTREAM; PYROBENZOL; PYROBENZOLE General Use: Manufacture of chemicals including styrene, dyes, and many other organic chemicals. Has been used in artificial leather, linoleum, oil cloth, airplane dopes, lacquers; as solvent for waxes, resins, oils etc. May also be a minor component of gasoline, petrol. Exposure should be minimized by use in closed systems. Handling procedures and control measures should be evaluated for exposure before commencement of use in plant operations. 99.9 OSHA PEL NIOSH REL TWA: 1 ppm; 3 mg/m ² ; STEL: 5 ppm; 15 mg/m ² ; from Table Z-2. NIOSH REL TWA: 0.1 ppm. STEL: 1 ppm. No data found. Stote of a stard stard stard stard stard stards
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ትትትትት Emergency Overview ትትትትት Colorless liquid; sweet odor. Irritating to eyes/skin/respiratory tract. Toxic. Also causes: headache, dizziness, drowsiness. Absorbed through the skin. Chronic: dermatitis, leukemia, bone marrow damage. Carcinogen. Reproductive effects. Flammable.
Potential Health Effects Primary Entry Routes: inhalation, skin contact Target Organs: blood, central nervous system (CNS), bone marrow, eyes, upper respiratory system, skin Acute Effects Inhalation: The vapor is discomforting to the upper respiratory tract and lungs and may be harmful if inhaled. If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death. Copyright 0 2000 by Genium Publishing Corporation. Any commercial use or reproduction without the publisher's permission is prohibited. Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Publishing Corporation extends no

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Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.

Inhalation hazard is increased at higher temperatures.

The symptoms of acute exposure to high vapor concentrations include confusion, dizziness, tightening of the leg muscles and pressure over the forehead followed by a period of excitement. If exposure continues the casualty quickly becomes stupefied and lapses into a coma with narcosis.

Effects of inhalation may include nausea, vomiting headache, dizziness, drowsiness, weakness, sometimes preceded by brief periods of exhilaration, or euphoria, irritability, malaise, confusion, ataxia, staggering, weak and rapid pulse, chest pain and tightness with breathlessness, pallor, cyanosis of the lips and fingertips and tinnitus. Severe exposures may produce blurred vision, shallow, rapid breathing, delirium, cardiac arrhythmias, unconsciousness, deep anesthesia, paralysis and coma characterized by motor restlessness, tremors and hyperreflexia (occasionally preceded by convulsions). Polyneuritis and persistent nausea, anorexia, muscular weakness, headache, drowsiness, insomnia and agitation may also occur. Two-three weeks after the exposure, nervous irritability, breathlessness and unsteady gait may still persist; cardiac distress and an unusual dicoloration of the skin may be evident for up to four weeks. Hemotoxicity is not normally a feature of acute exposures although anemia, thrombocytopenia, petechial hemorrhage, and spontaneous internal bleeding have been reported. Fatal exposures may result from asphyxia, central nervous system depression, cardiac and respiratory failure and circulatory collapse; sudden ventricular fibrillation may also be fatal.

Death may be sudden or may be delayed for 24 hours. Central nervous system, respiratory or hemorrhagic complications may occur up to five days after the exposure and may be lethal; pathological findings include respiratory inflammation with edema, and lung hemorrhage, renal congestion, cerebral edema and extensive petechial hemorrhage in the brain, pleurae, pericardium, urinary tract, mucous membrane and skin. Exposure to toxic levels has also produced chromosome damage.

Eye: The liquid is highly discomforting to the eyes, may be harmful following absorption and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.

The vapor is moderately discomforting to the eyes.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: The liquid may produce skin discomfort following prolonged contact.

Defatting and/or drying of the skin may lead to dermatitis. Open cuts, abraded or irritated skin should not be exposed to this material.

Toxic effects may result from skin absorption.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Ingestion: The liquid is discomforting to the gastrointestinal tract and may be harmful if swallowed. Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Class 1, Known to be a carcinogen; IARC - Group 1, Carcinogenic to humans; OSHA - Listed as a carcinogen; NIOSH - Listed as carcinogen; ACGIH - Class A2, Suspected human carcinogen; EPA - Class A, Human carcinogen; MAK - Class A1, Capable of inducing malignant tumors as shown by experience with humans.

Chronic Effects: Liquid is an irritant and may cause burning and blistering of skin on prolonged exposure. Chronic exposure may cause headache, fatigue, loss of appetite and lassitude with incipient blood effects including anemia and blood changes.

Benzene is a myelotoxicant known to suppress bone-marrow cell proliferation and to induce hematologic disorders in humans and animals.

Signs of benzene-induced aplastic anemia include suppression off leukocytes (leukopenia), red cells (anemia), platelets (thromocytopenia) or all three cell types (pancytopenia). Classic symptoms include weakness, purpura, and hemorrhage. The most significant toxic effect is insidious and often irreversible injury to the blood forming tissue. Leukemia may develop.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.

Lay patient down. Keep warm and rested.

If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor. Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).

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Wash affected areas thoroughly with water (and soap if available).

Seek medical attention in event of irritation.

Flash Point: -11 °C Closed Cup

Ingestion: Contact a Poison Control Center.

Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to petroleum distillates or related hydrocarbons: 1.Primary threat to life from pure petroleum distillate ingestion and/or inhalation is respiratory failure.

2.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ <50 mm Hg or pCO₂ >50 mm Hg) should be intubated.

3.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.

4.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.

5. Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.

Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.

6.Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. Consider complete blood count. Evaluate history of exposure.

Section 5 - Fire-Fighting Measures

Autoignition Temperature: 562 °C LEL: 1.3% v/v UEL: 7.1% v/v 0 Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide. Water spray or fog - Large fires only. General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are highly Fire Diamond flammable Severe fire hazard when exposed to heat, flame and/or oxidizers. Vapor forms an explosive mixture with air. Severe explosion hazard, in the form of vapor, when exposed to flame or spark. Vapor may travel a considerable distance to source of ignition. Heating may cause expansion/decomposition with violent rupture of containers. On combustion, may emit toxic fumes of carbon monoxide (CO). Fire Incompatibility: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result. Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard. May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation. Fight fire from a safe distance, with adequate cover. If safe, switch off electrical equipment until vapor fire hazard removed.

Use water delivered as a fine spray to control fire and cool adjacent area.

Avoid spraying water onto liquid pools.

Do not approach containers suspected to be hot.

Cool fire-exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire.

Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.

Avoid breathing vapors and contact with skin and eyes.

Control personal contact by using protective equipment.

Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

Large Spills: Pollutant - contain spillage. Clear area of personnel and move upwind.

Contact fire department and tell them location and nature of hazard.

May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.

No smoking, bare lights or ignition sources. Increase ventilation.

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Stop leak if afte to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculte. Use oaly spark-free showls and explosion proof equipment. Collect recoverable product tind babeled containers for response. Absorb remaining product with sand, earth or vermiculte. Collect solid residues and seal in abeled drums for disposal. Wash area and prevent runoff into drains. If contamination of drains or waterways occurs, advise emergency services. Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120). Section 7 - Handling and Storage Handling Precautions: Avoid all personal contact, including inhalation. Wear protective colling when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps. Do NOT enter confined space wull atmosphere teres. Avoid sonatic with incompatible materials. Keep containers securely sealed. Avoid physical damage to containers. Always wash hands with soag and water after handling. Work clothes should be laundered separatuly. Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Recommended Storage Methods. Storage Requirements: Storing and handling. Work clothes should be laundered separatuly.	2000-07	Benzene MSDS No. 316				
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Hands/Feet: Nitrile gloves; Neoprene gloves. Safety footwear. Do NOT use this product to clean the skin. Respiratory Protection: Exposure Range >1 to 10 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >10 to 100 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >10 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face Exposure Range >100 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face Exposure Range >1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black Note: must change cartridge at beginning of each shift Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE PVA A VITON A VITON/NEOPRENE A VITON/NEOPRENE	Contact lenses pose a special hazard; soft l	enses may absorb irritants and all lenses concentrate them.				
Do NOT use this product to clean the skin. Respiratory Protection: Exposure Range >1 to 10 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >10 to 100 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >100 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face Exposure Range >100 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black Note: must change cartridge at beginning of each shift Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE PVA A PVA VITON. A VITON./NEOPRENE A VITON/NEOPRENE	Safety footwear	čS.				
Respiratory Protection: Exposure Range >1 to 10 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >10 to 100 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >100 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face Exposure Range >100 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black Note: must change cartridge at beginning of each shift Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE PVA A VITON VITON/NEOPRENE A VITON/NEOPRENE	Do NOT use this product to clean the skin.	· · ·				
Exposure Range >1 to 10 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >10 to 100 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >100 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face Exposure Range >1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black Note: must change cartridge at beginning of each shift Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE PVA A PVA VITON A VITON/NEOPRENE A VITON/NEOPRENE	Respiratory Protection:					
Exposure Range >10 to 100 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >100 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face Exposure Range >1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black Note: must change cartridge at beginning of each shift Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE PVA A PVA VITON. A VITON. A VITON/NEOPRENE A VITON.	Exposure Range >1 to 10 ppm: Air Purifyi	ng, Negative Pressure, Half Mask				
Exposure Range >1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black Note: must change cartridge at beginning of each shift Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE PVA A PVA A VITON VITON/NEOPRENE A VITON/NEOPRENE	Exposure Range >10 to 100 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >100 to 1000 ppm: Supplied Air Constant Flow/Pressure Demand Full Face					
Cartridge Color: black Note: must change cartridge at beginning of each shift Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE	Exposure Range >1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face					
Note: must change cartridge at beginning of each shift Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE PVA A PVA TEFLON A VITON. A VITON/NEOPRENE A VITON/NEOPRENE	Cartridge Color: black	•				
Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Glove Selection Index: PE/EVAL/PE PVA A B: Satisfactory; may degrade after 4 hours continuous immersion C: Poor to dangerous choice for other than short-term immersion VITON. VITON/NEOPRENE A	Note: must change cartridge at beginning of	of each shift				
PE/EVAL/PE A PVA A B: Satisfactory; may degrade after 4 hours continuous immersion TEFLON A VITON A VITON/NEOPRENE A	Other: Overalls. Eyewash unit. Barrier crea	m. Skin cleansing cream.				
PVA A TEFLON A VITON A VITON/NEOPRENE A VITON/NEOPRENE A	PE/EVAL/PE A	A: Best selection				
TEFLON A VITON A VITON/NEOPRENE A	PVA	B: Satisfactory; may degrade after 4 hours continuous immersion				
VITONA VITON/NEOPRENEA	TEFLONA	C: Poor to dangerous choice for other than short-term immersion				
VII ON/NEOPKENE	VITONA					
NIIKILE+PVCC	NITRILE+PVCC					

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2000-07

BUTYL	
NITRILEC	
NEOPRENEC	
PVCC	
NATURAL RUBBERC	
BUTYL/NEOPRENEC	

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear, highly flammable liquid; floats on water. Characteristic aromatic odor. Highly volatile. Mixes with alcohol, chloroform, ether, carbon disulfide, carbon tetrachloride, glacial acetic acid, acetone and oils.

Physical State: Liquid Vapor Pressure (kPa): 9.95 at 20 °C Vapor Density (Air=1): 2.77 Formula Weight: 78.12 Specific Gravity (H₂O=1, at 4 °C): 0.879 at 20 °C Water Solubility: 0.18 g/100 g of water at 25 °C Evaporation Rate: Fast pH: Not applicable pH (1% Solution): Not applicable. Boiling Point Range: 80.1 °C (176 °F) Freezing/Melting Point Range: 5.5 °C (41.9 °F) Volatile Component (% Vol): 100

Section 10 - Stability and Reactivity

Stability/Polymerization: Product is considered stable. Hazardous polymerization will not occur. Storage Incompatibilities: Avoid reaction with oxidizing agents.

Section 11 - Toxicological Information

Unless otherwise specified data extracted from RTECS - Registry of Toxic Effects of Chemical Substances

TOXICITY

Oral (man) LD_{Lo}: 50 mg/kg Oral (rat) LD_{so}: 930 mg/kg Inhalation (rat) LC_{so}: 10000 ppm/7h Inhalation (human) LC_{Lo}: 2000 ppm/5m Inhalation (man) TC_{Lo}: 150 ppm/1y - I Inhalation (human) TC_{Lo}: 100 ppm Reproductive effector in rats **IRRITATION**

Skin (rabbit): 20 mg/24 hr - mod Eye (rabbit): 2 mg/24 hr - SEVERE

See NIOSH, RTECS CY 1400000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil, it will be subject to rapid volatilization near the surface and that which does not evaporate will be highly to very highly mobile in the soil and may leach to groundwater. It may be subject to biodegradation based on reported biodegradation of 24% and 47% of the initial 20 ppm in a base-rich para-brownish soil in 1 and 10 weeks, respectively. It may be subject to biodegradation in shallow, aerobic groundwaters, but probably not under anaerobic conditions. If released to water, it will be subject to rapid volatilization; the half-life for evaporation in a wind-wave tank with a moderate wind speed of 7.09 m/sec was 5.23 hours; the estimated half-life for volatilization from a model river one meter deep flowing 1 m/sec with a wind velocity of 3 m/sec is estimated to be 2.7 hours at 20 °C. It will not be expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms or hydrolyze. It may be subject to biodegradation based on a reported biodegradation half-life of 16 days in an aerobic river die-away test. In a marine ecosystem biodegradation occurred in 2 days after an acclimation period of 2 days and 2 weeks in the summer and spring, respectively, whereas no degradation occurred in winter. According to one experiment, it has a half-life of 17 days due to photodegradation which could contribute to removal in situations of cold water, poor nutrients, or other conditions less conductive to microbial degradation. If released to the atmosphere, it will exist predominantly in the vapor phase. Gas-phase will not be subject to direct photolysis but it will react with photochemically produced hydroxyl radicals with a half-life of 13.4 days calculated using an experimental rate constant for the reaction. The reaction time in polluted atmospheres which contain nitrogen oxides or sulfur dioxide is accelerated with the half-life being reported as 4-6 hours. Products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid, and peroxyacetyl nitrate. It is fairly soluble in water and is removed from the atmosphere in rain.

Ecotoxicity: I.C. Clawed toad (
Debitiviterty. DC 50 Clawed toad (.	3-4 wk after hatching) 190 mg/l/48 hr /Conditions of bioassay	not specified; LC ₅₀
Morone saxatilis (bass) 5.8 to 1	0.9 ppm/96 hr /Conditions of bioassay not specified; LC ₃₀ Poet	cilia reticulata (guppy)
63 ppm/14 days /Conditions of	bioassay not specified; LC ₅₀ Salmo trutta (brown trout yearling	s) 12 mg/l/1 hr (static
bioassay); LD ₅₀ Lepomis macro	chirus (bluegill sunfish) 20 mg/l/24 to 48 hr /Conditions of bic	assay not specified;
LC ₁₀₀ Tetrahymena pyriformis (ciliate) 12.8 mmole/1/24 hr /Conditions of bioassay not specific	ed; LC_{50} Cancer magister
(crab larvae) stage 1, 108 ppm/s	96 hr /Conditions of bioassay not specified; LC ₅₀ Crangon france	ciscorum (shrimp) 20
ppm/96 nr /Conditions of bloas	say not specified	
Denry's Law Constant: 5.5 X10	· · · · ·	•
Bur: ees 5.5 Biashamiasl Orwaan Damand (\mathbf{POD} 1.2 lb/lb 10 down	
Octanol/Water Partition Coeff	BOD : 1.2 10/10, 10 days interval $K = 2.13$	
Soil Sorntion Partition Cooffici	$K_{0W} = 2.15$	
	Section 13 - Disposal Considerations	· · · · · · · · · · · · · · · · · · ·
Disposal: Consult manufacturer	for recycling options and recycle where possible.	
Follow applicable federal, state,	and local regulations.	
Incinerate residue at an approve	d site.	
Recycle containers where possil	ble, or dispose of in an authorized landfill.	
	Section 14 - Transport Information	_ · · · · · ·
D	OT Transportation Data (49 CFR 172.101):	
Shipping Name: BENZENE	Additional Shipping Information:	
Hazard Class: 3.1		•
ID No.: 1114		
Packing Group: II	·	
Label: Flammable Liquid[3]		
•	Section 15 - Degulatory Information	
CPA Regulations: RCRA 40 CFR: Listed U019 CERCLA 40 CFR 302.4: List per CAA Section 112 10 lb (4 SARA 40 CFR 372.65: Listed SARA EHS 40 CFR 355: Not	Toxic Waste; Ignitable Waste ed per CWA Section 311(b)(4); per RCRA Section 3001; per (.535 kg) listed	CWA Section 307(a);
CPA Regulations: RCRA 40 CFR: Listed U019 CERCLA 40 CFR 302.4: List per CAA Section 112 10 lb (4 SARA 40 CFR 372.65: Listed SARA EHS 40 CFR 355: Not TSCA: Listed	Toxic Waste; Ignitable Waste ed per CWA Section 311(b)(4); per RCRA Section 3001; per (.535 kg) listed	CWA Section 307(a);
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Pyrene

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Skin application resulted in hyperemia (blood engorgement), weight loss and hematopoietic (blood cell development) changes. Contact dermatitis was also evident.

Ingestion: The solid/dust is discomforting to the gastrointestinal tract and harmful if swallowed. Considered an unlikely route of entry in commercial/industrial environments.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic exposure to pyrene results increase in blood leukocytes (leukocytosis).

The so-called polycyclic aromatic hydrocarbons (PAHs) comprise a large family; some members occur in coal tar, tobacco smoke, petroleum and air pollution. Some substituted derivatives have been identified, in animal studies, as amongst the most highly active carcinogens.

Rodent species are sensitive to some PAHs with skin application producing cancerous growths. Injection produces soft tissue tumors (sarcomas) in rats and mice.

Administration of PAHs to Rhesus monkey on the other hand has not yet proved successful in yielding tumors and there is inadequate date to support the proposition that individual PAHs produce cancer in humans. There are however a number of epidemiology and mortality studies that show increased incidence of cancer in humans exposed to mixtures of PAHs. Evidence exists of lung and genito-urinary cancer mortality amongst coke-oven workers and skin tumors in workers exposed to creosote. Exposures to other chemical mixtures containing PAHs such as cigarette smoke, coal tar, coal tar pitch and bitumens, have been associated with increased incidences of lung cancer in humans. Anthracene, the basic unit on which most PAHs are built, is not carcinogenic whereas benz[a]anthracene appears to have weak carcinogenicity. Additions of other benzene rings to select positions on the benz[a]anthracene skeleton results in agents with powerful carcinogenicity (e.g. dibenz[a,h]anthracene and benz[a]pyrene). Further substitution of methyl groups in position on the rings enhances carcinogenicity (7,12 dimethylbenz[a]anthracene is one of the most powerful PAH carcinogens known). Biotransformation to produce soluble metabolites suitable for excretion appears to transform some PAHs to reactive electrophiles (as epoxides) which bind to DNA. Initiation of carcinogenesis is thought to rely upon such interactions.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.

Encourage patient to blow nose to ensure clear breathing passages. Rinse mouth with water. Consider drinking water to remove dust from throat.

Lay patient down. Keep warm and rested.

Seek medical attention if irritation or discomfort persist.

Eye Contact: Immediately hold the eyes open and flush with fresh running water.

Ensure irrigation under the eyelids by occasionally lifting upper and lower lids. If pain persists or recurs seek medical attention.

Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).

Wash affected areas thoroughly with water (and soap if available).

Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.

If more than 15 minutes from a hospital, induce vomiting, preferably using Ipecac Syrup APF. Note: DO NOT INDUCE VOMITING in an unconscious person.

After first aid, get appropriate in-plant, paramedic, or community medical support. Note to Physicians: Treat symptomatically.

Section 5 - Fire-Fighting Measures

Flash Point: Not available; probably combustible

Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.

Water spray or fog - Large fires only.

General Fire Hazards/Hazardous Combustion Products: Solid which exhibits difficult combustion or is difficult to ignite.

Avoid generating dust, particularly clouds of dust in a confined or unventilated space. Dust may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion.

Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport. Build-up of electrostatic charge may be prevented by bonding and grounding.



Fire Diamond

ZUUU-U/	Pvrene	MSDS No. 71
Powder handling equipment such as	s dust collectors, dryers and mills may require addi	tional protection measures such
as explosion venting.		-
Fire Incompatibility: Avoid contarr	nination with oxidizing agents i.e. nitrates, oxidizin	g acids, chlorine bleaches, pool
chlorine etc. as ignition may result.		
Fire-Fighting Instructions: Contact	t fire department and tell them location and nature of	of hazard.
Wear breathing apparatus plus prote	ective gloves for fire only. Prevent, by any means a	ivailable, spillage from entering
drains or waterways.		
Do not approach containers suspect	e for surrounding area.	• .
Cool fire-exposed containers with y	water spray from a protected location	
If safe to do so, remove containers	from path of fire.	
Equipment should be thoroughly de	contaminated after use.	
Sect	tion 6 - Accidental Release Measur	•es
Small Spills: Clean up all spills imm	nediately. Avoid contact with skin and eves.	<u> </u>
Wear protective clothing, gloves, sa	ifety glasses and dust respirator.	
Use dry clean-up procedures and av	oid generating dust.	
Vacuum up or sweep up. Place in cl	lean drum then flush area with water.	
Large Spills: Clear area of personne	l and move upwind.	
Contact fire department and tell the	m location and nature of hazard.	
Wear breathing apparatus plus prote	ective gloves. Prevent, by any means available, spil	llage from entering drains or
Waterways.	sources Increase ventilation	
Stop leak if safe to do so	sources. increase ventilation.	
Water spray or fog may be used to c	disperse/absorb vapor.	
Contain or absorb spill with sand, e	arth or vermiculite.	· .
Collect recoverable product into lab	eled containers for recycling.	
Collect solid residues and seal in lat	beled drums for disposal.	
Wash area and prevent runoff into d	lrains.	
After clean-up operations, decontan	ninate and launder all protective clothing and equip	ment before storing and reusing.
If contamination of drains or waterv	vays occurs, advise emergency services.	
Regulatory Requirements: Follow a	applicable OSHA regulations (29 CFR 1910.120).	
	Section 7 - Handling and Storage	· · · · · · · · · · · · · · · · · · ·
Handling Precautions: Avoid all pe	rsonal contact, including inhalation.	·
Wear protective clothing when risk	of overexposure occurs.	
Use in a well-ventilated area. Preven	nt concentration in hollows and sumps.	· .
DO NOT enter confined spaces unti	l atmosphere has been checked.	
DO NOT allow material to contact i	numans, exposed food of food utensils.	smoke Avoid contact with
avoid smoking, bare lights of ignition	on sources. when handling, DO NOT eat, drink of	Smoke. Avoid contact with
Keen containers securely sealed who	en not in used. A void physical damage to container	rs. Always wash hands with
soap and water after handling. Work	king clothes should be laundered separately.	
Launder contaminated clothing befo	re reuse.	
Use good occupational work practic	es. Observe manufacturer's storing/handling recom	mendations. Atmosphere should
be regularly checked against establis	shed exposure standards to ensure safe working cor	nditions are maintained.
Recommended Storage Methods: G	lass container; plastic container.	
Metal can; metal drum. Packing as r	ecommended by manufacturer.	
Check all containers are clearly labe	eled and free from leaks.	
Regulatory Requirements: Follow a	applicable OSHA regulations.	
Section 8	- Exposure Controls / Personal Pro	otection
Engineering Controls: Local exhaus	st ventilation usually required.	-
If risk of overexposure exists, wear	NIOSH-approved respirator.	
Correct fit is essential to obtain adeo	uate protection. NIOSH-approved self contained b	reathing apparatus (SCBA) may
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be required in some situations.	house or closed storage area.	
be required in some situations. Provide adequate ventilation in ware	5	
be required in some situations. Provide adequate ventilation in ware Personal Protective Clothing/Equip	iment	
be required in some situations. Provide adequate ventilation in ware Personal Protective Clothing/Equip Eyes: Safety glasses with side shield	ment ls; chemical goggles.	· · · · ·
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be required in some situations. Provide adequate ventilation in ware Personal Protective Clothing/Equip Eyes: Safety glasses with side shield Contact lenses pose a special hazard Hands/Feet: Wear chemical protect	ment ls; chemical goggles. d; soft lenses may absorb irritants and all lenses co ive gloves, eg. PVC. Wear safety footwear.	ncentrate them.
be required in some situations. Provide adequate ventilation in ware Personal Protective Clothing/Equip Eyes: Safety glasses with side shield Contact lenses pose a special hazare Hands/Feet: Wear chemical protect Other: Overalls. PVC apron. PVC p	bment ls; chemical goggles. d; soft lenses may absorb irritants and all lenses co ive gloves, eg. PVC. Wear safety footwear. protective suit may be required if exposure severe.	ncentrate them.

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Stability/Polymerization: Product is considered stable. Hazardous polymerization will not occur. Storage Incompatibilities: Avoid reaction with oxidizing agents.

Section 11 - Toxicological Information

TOXICITY

Oral (rat) LD_{so}: 2700 mg/kg Inhalation (rat) LC₅₀: 170 mg/m³ Oral (mouse) LD_{so}: 800 mg/kg Intraperitoneal (mouse) LD_{so}: 514 mg/kg Conjunctival irritation, excitement and muscle contraction recorded.

Skin (rabbit): 500 mg/24h - mild

Physical State: Divided solid

yellowing. Solid and solutions have slight blue fluorescence.

Eyewash unit. Ensure there is ready access to a safety shower.

Vapor Pressure (kPa): Negligible Formula Weight: 202.24 Specific Gravity (H₂O=1, at 4 °C): 1.271 Water Solubility: 0.135 mg/L (+ or - 0005 mg/L) in water **pH**: Not applicable

pH (1% Solution): Not applicable Boiling Point Range: 393 °C (739 °F) at 760 mm Hg Freezing/Melting Point Range: 156 °C (312.8 °F) Volatile Component (% Vol): Negligible

Section 10 - Stability and Reactivity

IRRITATION

damage or change to cellular DNA. See NIOSH, RTECS UR 2450000, for additional data.

Section 12 - Ecological Information

NOTE: Substance has been shown to be mutagenic in various assays, or belongs to a family of chemicals producing

Environmental Fate: Although environmental concentrations are highest near sources, its presence in places distant from primary sources indicates that it is reasonably stable in the atmosphere and capable of long distance transport. When released to air it may be subject to direct photolysis, although adsorption to particulates apparently can retard this process. Half-lives for reaction of vapor phase with atmospheric pollutants are: O3, 0.67 days, NO2, 14 days; estimated half-life for reaction with photochemically produced hydroxyl radicals is 1.12 days. If released to water, it will adsorb very strongly to sediments and particulate matter, bioconcentrate in aquatic organisms slightly to moderately, but will not hydrolyze. It may be subject to significant biodegradation, and direct photolysis may be important near the surface of waters. Evaporation may be important with a half-life of 4.8 to 39.2 days predicted for evaporation from a river 1 m deep, flowing at 1 m/sec with a wind velocity of 3 m/sec; half-life for evaporation from a model pond was 1176 days. Adsorption to sediments and particulates will limit evaporation. If released to soil it will be expected to adsorb very strongly to the soil and will not be expected to appreciably leach to the groundwater, although its presence in groundwater illustrates that it can be transported there. It will not be expected to hydrolyze or significantly evaporate from soils and surfaces. It may be subject to appreciable biodegradation in soils.

Ecotoxicity: TLm (Median threshold limit) Mosquito fish 0.0026 mg/l/96 hr at 24-27 °C in a static bioassay Henry's Law Constant: calculated at 5.42 x10⁻⁵

BCF: rainbow trout 72

Octanol/Water Partition Coefficient: log Kow = 4.88

Soil Sorption Partition Coefficient: Koc = soils 57 to 764

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible or consult manufacturer for recycling options. Follow applicable federal, state, and local regulations.

Bury residue in an authorized landfill.

Recycle containers where possible, or dispose of in an authorized landfill.

Pyrene

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless crystalline solid when pure. Contamination by tetracene results in slight

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Pyrene

MSDS No. 711

5	ecti	ion	14	-	Trans	port	Inf	forma	ition
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DOT Transportation Data (49 CFR 172.101):

Shipping Name: TOXIC SOLID, ORGANIC, Additional Shipping Information: N.O.S.

Hazard Class: 6.1(b) ID No.: 2811 Packing Group: III Label: Harmful[6]

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 5000 lb (2268 kg) SARA 40 CFR 372.65: Not listed 1000/10000 lb SARA EHS 40 CFR 355: Listed 5,000 lb TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Publishing Corporation extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Material Safety Data Sheet Collection

<u>SP</u>

Genium Publishing Corp. 1171 RiverFront Center Amsterdam, NY 12010 (518) 842-4111

Issue Date: 2000-07

Phenol MSDS 355 PHE3200



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Phenol

Pulmonary absorption may lead to systemic toxicity affecting the cardiovascular and central nervous system. Inhalation of phenol and some of its derivatives may produce profuse perspiration, intense thirst, nausea, vomiting, diarrhea, cyanosis, hyperactivity, stupor, falling blood pressure, hypernea, abdominal pain, hemolysis, convulsions, coma and pulmonary edema with pneumonia. Respiratory failure and kidney damage may follow. Inhalation of the vapor causes a sore throat, coughing, shortness of breath and labored breathing. Systemic effects include paleness, weakness, headache, sweating, ringing of the ears, shock, cyanosis, excitement, dark colored urine, frothing of the nose and mouth. Pulmonary inflammation and pneumonia, inflammation and necrosis of the myocardium, hepatic centro-lobular necrosis, renal proximal tube swelling and edema and globular degeneration and hind-limb paralysis was observed in guinea-pigs exposed 29 times for 7 hours/day, five days/week to concentrations ranging from 26 to 52 ppm. Eve: The material is highly corrosive to the eves and is capable of causing severe burns and capable of causing severe damage with loss of sight. The vapor from heated material is highly discomforting to the eyes. The vapor when concentrated has pronounced eye irritation; this gives some warning of high vapor concentrations. If eye irritation occurs seek to reduce exposure with available control measures, or evacuate area. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. Some phenol derivatives may produce mild to severe eye irritation with redness, pain and blurred vision. Permanent eye injury may occur; recovery may also be complete or partial. Skin: The solid/dust is corrosive to the skin, may cause blisters or burns or severe burns and is it is rapidly absorbed by the skin. Toxic effects may result from skin absorption. Phenol and some of its derivatives may produce mild to severe skin irritation on repeated or prolonged contact, producing second and third degree chemical burns. Rapid cutaneous absorption may lead to systemic toxicity affecting the cardiovascular and central nervous system. Absorption through the skin may result in profuse perspiration, intense thirst, nausea, vomiting, diarrhea, cyanosis (following the formation of methemoglobin), hyperactivity, stupor, falling blood pressure, hypernea, abdominal pain, hemolysis, convulsions, coma and pulmonary edema followed by pneumonia. Respiratory failure and kidney damage may follow. The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration. Contact with the skin causes a white, wrinkled discoloration followed by a severe burn or systemic poisoning if not promptly and properly removed. Intense burning and pain from skin contact may be delayed. Extreme dangers are posed by percutaneous absorption. In one case a 32 year old male who spilled a solution of phenol over his scalp, face, neck, shoulders and back, died 10 minutes later. There was coagulation necrosis of the skin, left eye and acute dermatitis veneta with acute passive congestion of the lungs, liver, spleen, kidneys. Skin absorption occurs at low vapor pressure, without apparent discomfort and proceeds with the same efficiency as absorption by inhalation. Damage to the lungs has been described following percutaneous absorption. Methemoglobinemia and hemolytic anemia are frequently documented. Ingestion: The material is corrosive to the gastrointestinal tract, may cause severe mucous membrane damage and may be fatal if swallowed. Ingestion may result in nausea, abdominal irritation, pain and diarrhea. Ingestion of phenol causes blotches on the lips and in the mouth. Some phenol derivatives may produce mild to severe damage within the gastrointestinal tract. Phenolic groups with ortho and para positions free from substitution are reactive; this is because the ortho and para positions on the aromatic ring are highly activated by the phenolic hydroxyl group and are therefore readily substituted. Severe phenol ingestions cause hypotension, coma, ventricular dysrhythmias, seizures and white coagulative chemical burns. Absorption may result in profuse perspiration, intense thirst, nausea, vomiting, diarrhea, cyanosis (following the formation of methemoglobin), hyperactivity, stupor, falling blood pressure, hypernea, abdominal pain, hemolysis, convulsions, coma and pulmonary edema followed by pneumonia. Respiratory failure and kidney damage may follow. Phenol does not uncouple oxidative phosphorylation like dinitrophenol and pentachlorophenol and thus does not cause a heat exhaustion-like syndrome. Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A4, Not classifiable as a human carcinogen; EPA - Class D, Not

classifiable as to human carcinogenicity; MAK - Not listed.

2000-07

Phenol

Chronic Effects: Prolonged exposure to some derivatives of phenol may produce dermatitis, anorexia, weight loss, weakness, muscle aches and pain, liver damage, dark urine, ochronosis, skin eruptions, diarrhea, nervous disorders with headache, salivation, fainting, increased skin and scleral pigmentation, vertigo and mental disorders. Liver and kidney damage may also ensue. Chronic phenol toxicity was first noted in medical personnel in the late 1800s when 5 and 10% phenol was used as a skin disinfectant. The term carbolic (phenol) marasmus was given to this syndrome. Chronic phenol poisoning is very rarely reported, but symptoms include vomiting, difficulty in swallowing, diarrhea, lack of appetite, headache, fainting, dizziness, dark urine, mental disturbances, and possibly skin rash. Death due to liver and kidney damage may occur.

Repeated exposure of animals to phenol vapor at concentrations ranging from 26 to 52 ppm has produced respiratory, cardiovascular, hepatic, renal and neurologic toxicity.

Administration of phenol in the drinking water of mice (2500 ppm for 103 weeks) produced an increased incidence of leukemia and lymphomas.

Phenol has been studied in initiation/promotion protocols with a number of polycyclic hydrocarbons and has been shown to have promoting activity in the two-stage skin model.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.

Lay patient down. Keep warm and rested.

If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor. **Eye Contact:** Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

- Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
- Skin Contact: If spilled on skin remove contaminated clothing, swab repeatedly with glycerin, PEG (polyethylene glycol), or PEG/ methylated spirit mixture or if necessary with methylated spirit alone.

Contamination of skin with phenol and some of its derivatives may produce rapid collapse and death. After skin contamination, keep patient under observation for at least 24-48 hours. Phenol-decontaminating fluid is more effective than water in removing phenol from the skin and retarding absorption; olive oil or vegetable oil may also be used; do not use mineral oil. Alcohols (methylated spirit, for example) may enhance absorption and their use alone may be ill-advised; some authorities, however, continue to advise the use of such treatment. Rapid water dilution of phenol burns may increase systemic absorption by decreasing the extent of the coagulum and thus allowing greater absorption. Transport to hospital (or doctor).

Ingestion: Contact a Poison Control Center.

Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: * Provide preplacement and annual medical examinations for employees exposed to phenol. Persons with a history of convulsive disorders or abnormalities of the skin, respiratory tract, liver or kidneys would be expected to be at increased risk from exposure. Examination of the liver, kidneys and respiratory tract should be stressed. A urinalysis should be performed including at a minimum, specific gravity, albumin, glucose, and a microscopic on centrifuged sediment.

For acute or short-term repeated exposures to phenols/ cresols:

1.Phenol is absorbed rapidly through lungs and skin. Massive skin contact may result in collapse and death.

2. Ingestion may result in ulceration of upper respiratory tract; perforation of esophagus and/or stomach, with attendant complications, may occur. Esophageal stricture may occur.

3.An initial excitory phase may present. Convulsions may appear as long as 18 hours after ingestion. Hypotension and ventricular tachycardia that require vasopressor and antiarrhythmic therapy, respectively, can occur.

4.Respiratory arrest, ventricular dysrhythmias, seizures and metabolic acidosis may complicate severe phenol exposures so the initial attention should be directed towards stabilization of breathing and circulation with ventilation, intubation, intravenous lines, fluids and cardiac monitoring as indicated.

5. Vegetable oils retard absorption; do NOT use paraffin oils or alcohols. Gastric lavage, with endotracheal intubation, should be repeated until phenol odor is no longer detectable; follow with vegetable oil. A saline cathartic should then be given. ALTERNATELY: Activated charcoal (1g/kg) may be given. A cathartic should be given after oral activated charcoal.

6. Severe poisoning may require slow intravenous injection of methylene blue to treat methemoglobinemia.

7.Renal failure may require hemodialysis.

8. Most absorbed phenol is biotransformed by the liver to ethereal and glucoronide sulfates and is eliminated almost completely after 24 hours

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker who has been exposed to the Exposure Standard (ES or TLV):

Exposure Standard (ES)				
Determinant	Index	Sampling Time	Comments	
Total phenol	250 mg/gm	End of shift	B, NS	

2000-07	Phenol	MSDS No. 355
in blood	creatinine	
P: Paskanound laus	le accur in specimens collected from subjects NOT exposed	
NS: Non-specific de	terminant; also seen after exposure to other materials.	
	Section 5 - Fire-Fighting Measures	
Flash Point: 79 °C C	llosed Cup	
Autoignition Tempe	rature: 715 °C	
LEL: 1.7% v/v		
UEL: 0.0% V/V Extinguishing Medi-	a: Carbon dioxide: dry chemical powder	4×0
Alcohol stable foam		
General Fire Hazar	ds/Hazardous Combustion Products: Combustible. Moderate fire ha	azard
when exposed to he	at, flame or oxidizers.	Fire Diamond
Vapor may readily I Decomposes on hea	orm an explosive mixture with air. ting and produces toxic fumes of carbon monoxide (CO) carbon dioxi	ide (CO.)
Fire Incompatibility	: Avoid reaction with strong oxidizing agents and halogens.	
Reaction with calciu	im hypochlorite is exothermic and produces toxic fumes which may ig	mite. Hot phenol is corrosive
to many metals, incl	uding aluminum, lead, magnesium and zinc.	
Do not heat phenol a	above 60 °C.	ozord
May be violently or	explosively reactive. Wear full body protective clothing with breathin	g apparatus. Prevent, by any
means available, spi	llage from entering drains or waterways. Consider evacuation.	6 - FF
Use water delivered	as a fine spray to control the fire and cool adjacent area.	
Avoid spraying wate	er onto liquid pools.	
If safe to do so, rem	ove containers from path of fire.	
	Section 6 - Accidental Release Measures	·
Wear protective clot	hing impervious gloves and safety glasses	
Avoid breathing vap	ors and contact with skin and eyes.	,
Use dry clean-up pro	ocedures and avoid generating dust.	
Place spilled materia	ıl in clean, dry, sealable, labeled container.	· ·
Wash area down wit	I harge quantity of water and prevent runoff into drains.	
Clear area of person	nel and move upwind.	
Wear full body prote	ective clothing with breathing apparatus. Prevent, by any means availa	ble, spillage from entering
drains or waterways.		
If contamination of o	lrains or waterways occurs, advise emergency services.	
Stop leak if safe to d	sources of ignition and increase ventilation.	
Use dry clean-up pro	ocedures and avoid generating dust.	
Collect recoverable	product into labeled containers for recycling.	
Collect residues and	seal in labeled drums for disposal.	· ·
After clean-up opera	tions decontaminate and launder all protective clothing and equipmer	t before storing and reusing.
Regulatory Requires	nents: Follow applicable OSHA regulations (29 CFR 1910.120).	
	Section 7 - Handling and Storage	
Handling Precaution	Atmosphere should be regularly checked against established expos	ure standards to ensure safe
working conditions a	ire maintained.	·
Use good occupation	al work practices.	
Avoid breathing vap	ors and contact with skin and eyes.	
Use in a well-ventila	ted area.	
Avoid contact with in	ncompatible materials.	
Avoid smoking, bare	lights or ignition sources.	
Vapor may travel a c	onsiderable distance to source of ignition.	
Avoid thermal shock		• .
Avoia physical dama	ige to containers.	

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Handle and open container with care. Wash hands with soap and water after handling. Work clothes should be laundeed separately: NOT at home. terommended Storage Methods: Polylined drum. Stainless steel. Steel drum. Check that containers are clearly labeled. Section 8 - Exposure Controls / Personal Protection ngineering Controls: General exhaust is adequate under normal operating conditions. Local exhaust venilation may be required in specific circumstances. If risk of overexposure exists, wear NIOSH-approved respirator. Correct fit is estimated to a specific circumstances. If risk of overexposure exists, wear NIOSH-approved respirator. Correct fit is estimated to a specific circumstances. If risk of overexposure exists, wear NIOSH-approved respirator. Correct fit is estimated to a specific circumstances. If risk of overexposure exists, wear NIOSH-approved respirator. Correct fit is estimated to a specific circumstances. If risk of overexposure exists, wear NIOSH-approved respirator. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Hand specific clothing/Equipment Syst: Chemical goggles. Full face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Hand hat with brim. Exposure Range >50 to oullimited ppm: Self-contained Breakting Apparatus, Pressure Planters Buryty. Hard hat with brim. Exposure Range >50 to a safety shower. Eyewash unit. DUTYLNEOPRENE. A NATURAL NUBPER. A NATURAL NUBPER. A NATURAL RUBPER. A NATURAL NUBPER. A NATURAL RUBPER. A NATURAL RUBPER. A NATUR	2000-07	Phenol	MSDS No. 35
When handling, DO NOT eat, drink or smoke. Wash hands with soap and water after handling. Work clothes should be laundered separately: NOT at home. Ecommended Storage Methods: Polylined drum. Stainless steel. Steel drum. Check that containers are clearly labeled. Equilatory Requirements: Follow applicable OSHA regulations. Section 8 - Exposure Controls / Personal Protection ngineering Controls: General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If sk of oversposure exists. Frovide adequate ventilation in warchouse or closed storage areas. erroual Protective Clothing/Equipment Syse: Chenical coggles. Full face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Tands/Feet: Noormen gloves; PVC gloves. Rubber boots. Respiratory Protection: Exposure Range > 50 to 30 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range > 50 to 230 ppm: Air Purifying, Negative Pressure, Hul Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dter: Add-Feets Negative Areasen and there is ready access to a safety shower. Eyewash unit.	Handle and open container with	ire.	
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tecommended Storage Methods: Polylined drum. Stainless steel. Steel drum. Check that containers are clearly labeled. tegulatory Requirements: Follow applicable OSHA regulations. Section 8 - Exposure Controls / Personal Protection ingineering Controls: General exhaust is adequate under normal operating conditions. Local exhaust ventilation in warehouse or closed storage areas. ersonal Protective Clothing/Regulpment Syss: Chemical goggles. Full face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Eands/Freet: Neoprene gloves; PVC gloves. Rubber boots. Respiratory Protection: Exposure Range >50 to 50 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to 30 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to 30 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to 30 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to 30 ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Catridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) PWC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. BUTYL_NEOPRENE: A NEOPRENE: A NEOPREN	Work clothes should be launder	separately: NOT at home.	
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tegulatory Requirements: Follow applicable OSHA regulations. Section 8 - Exposure Controls / Personal Protection ngineering Controls: General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific Circumstances. If risk of overexposure exists, wear NIOSH-approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. erronal Protective Clothing/Equipment Syse: Chemical goggles. Full face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Rubber boots. Resports Range >50 to 250 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Cartridge Color. black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dther: Acid-resistant overalls. PVC appon. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Diver Sciefcron Total MATURAL NEOPRENE A NATURAL RUBBER B PVC PVC PVC	Check that containers are clearly	abeled.	
Section 8 - Exposure Controls / Personal Protection ingineering Controls: General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. if risk of oversyosure exists, wear NIOSH approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. ersonal Protective Clothing/Equipment Syss: Chemical goggles. Full face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Ands/Feet: Neoprene gloves; PVC gloves. Rubber boots. Respiratory Protection: Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Carridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Other: Acid-resistant overalls. PVC apron. BUTYL/NEOPRENE A NATURAL+NEOPRENE A NATURAL ANEOPRENE A NATURAL RUBBER B NATURAL RUBBER NATURAL ANEOPRENE A	Regulatory Requirements: Follo	¹ applicable OSHA regulations.	
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Local exhaust ventilation may be required in specific circumstances. If risk of oversposure exists, wear NIOSH-approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. ersonal Protective Clothing/Equipment Eyses: Chemical goggles. Full face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Hands/Feet: Neoprene gloves; PVC gloves. Rubber boots. Rubber boots. Rapporter Protection: Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to asafety shower. Espewash unit. Ensure there is ready access to a safety shower. Espewash unit. BUTYL/.NEOPRENE A MTURAL+NEOPRENE A NTURAL+NEOPRENE A NTORNAL+NEOPRENE A NTORNAL+NEOPRENE A NTORNAL RUBBER B NITRILE C NATURAL RUBBER B NITRILE C PVC	Engineering Controls: General of	naust is adequate under normal operating conditions.	· .
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Provide adequate ventilation in warehouse or closed storage areas. ersonal Protective Clothing/Equipment Eyes: Chemical goggles. Full face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Hands/Feet: Neoprene gloves; PVC gloves. Rubber boots. Respiratory Protection: Exposure Range >5 to 50 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Ilove Selection Index: BUTYL/NEOPRENE. A BUTYL/NEOPRENE. A TUTON. MATURAL+NEOPRENE. A TEFLON. A VITON. MATURAL RUBBER. B NITRILE C VA. C PVC. C Section 9 - Physical and Chemical Properties Pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is tectable above 0.05 ppm. Phenol turns pink or red if contains impurites, or if is exposed to heat or light. Solud to benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, quecous alkali hydroxides. ysical State: Divided solid por Pressure (kPa): 101.33 at 181 °C por the solud solid por Pressure (kPa): 101.33 at 181 °C por and Weight: 94.11 weifte Gravity (Har-QL: 3.24 Trouble in alcohol; chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, quecous alkali hydroxides. ysical State: Divided solid por Pressure (kPa): 101.33 at 181 °C por and Weight: 94.11 weifte Gravity (Har-QL: 3.24 Trouble in alcohol; chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, 20, °C (105.62 °F) Volatile Component (% Vol): 100	Correct fit is essential to obtain a	equate protection.	
ersonal Protective Clothing/Equipment Eyes: Chemical goggles. Pull face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Hands/Feet: Neoprene gloves; PVC gloves. Rubber boots. Respiratory Protection: Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Ther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Dive Selection Index: BUTYL. MATURAL-NEOPRENE A NATURAL HNEOPRENE A NEOPRENE. A NEOPRENE. A NEOPRENE A NEOPRENE A NATURAL RUBBER B NITTRILE C NAT+NEOPR+NITRILE C PVC. C Section 9 - Physical and Chemical Properties pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is tectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Soluti b henzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. wisels State: Divided solid por Pressure (kPa): 10.1.33 at 181 °C por Boiling Point Range: 181.8 °C (359 °F) at 760 mm H Freezing/Melting Point Range: 181.8 °C (359 °F) at 760 mm H Freezing/Melting Point Range: 40.9 °C (105.62 °F) Volatile Component (% Vol): 100	Provide adequate ventilation in v	rehouse or closed storage areas.	
Eyes: Chemical goggles. Full face shield. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Hands/Feet: Neoprene gloves; PVC gloves. Rubber boots. Respiratory Protection: Exposure Range >5 to 50 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face	Personal Protective Clothing/Ed	ipment	
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Hands/Feet: Neoprene gloves; PVC gloves. Rubber boots. Respiratory Protection: Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to 250 ppm: Air Purifying, Negative Pressure, Full Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. BUTYL/NEOPRENE. MATURAL-NEOPRENE. NEOPRENE/NATURAL. NEOPRENE/NATURAL. NEOPRENE. A VITON. NEOPRENE. A VITON. NEOPRENE. A NATURAL RUBBER B NTTRLLE. C NATH-NEOPR+NITRILE C PVC. C Section 9 - Physical and Chemical Properties pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is tectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut b benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. ysical State: Divided solid por Pressure (kPa): 101.33 at 181 °C prof Density (Air=1): 3.24 Precing/Melting Point Range: 40.9 °C (105.62 °F) Volatile Component (% Vol): 100	Eyes: Chemical goggles. Full fa	shield.	
Hands/Feet: Neoprene gloves; PVC gloves. Rubber boots. Respiratory Protection: Exposure Range >5 to 50 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. BUTYL	Contact lenses pose a special ha	ard; soft lenses may absorb irritants and all lenses con	centrate them.
Rubber boots. Respiratory Protection: Exposure Range >5 to 50 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face	Hands/Feet: Neoprene gloves; I	C gloves.	
Respiratory Protection: Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. BUTYL_MEOPRENE A BUTYL/NEOPRENE A NATURAL+NEOPRENE A NEOPRENE/NATURAL A PE/EVAL/PE A VITON. MATURAL RUBBER B NITRILE C NATVRAL RUBBER B NITRILE C NATVRAL RUBBER B NITRILE C NAT+NEOPR+NITRILE C PVC. PVC. PVC. PVC. PVC. PVC. Section 9 - Physical and Chemical Properties pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is etectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut h benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. wiscal State: Divided solid por Pressure (kPa): 10: wiscal State: Divided solid por Pressure (kPa): 10: wiscal State: Divided solid por Pressure (kPa): 10: A State Component (% Vol): 100 State Component (% Vol):	Rubber boots.		
Exposure Range >5 to 50 ppm: Air Purifying, Negative Pressure, Half Mask Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range >50 to <250 ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Slove Selection Index: BUTYL/NEOPRENE MATURAL+NEOPRENE NATURAL+NEOPRENE NEOPRENE/NATURAL NEOPRENE/NATURAL NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NATURAL RUBBER B NITRILE C PVC C Section 9 - Physical and Chemical Properties Pyc. C PVC C Section 9 - Physical and Chemical Properties per ance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is stectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut 1 benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolarum, volatile and fixed oils, queous alkali hydroxides. sysical State: Divided solid typor Dressity (Air=1): 3.24 Problement Particle Carbon State: Divided solid typor Density (Air=1): 3.24 Prove State: Divided solid	Respiratory Protection:		
Exposure Range >50 to <250 ppm: Air Purifying, Negative Pressure, Full Face Exposure Range 250 to valimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Other: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Jowe Selection Index: BUTYL. MATURAL-NEOPRENE MATURAL-NEOPRENE MATURAL-NEOPRENE MATURAL-NEOPRENE MATURAL-NEOPRENE MATURAL RUBBER MATURAL RUBBE	Exposure Range >5 to 50 ppm:	ir Purifying, Negative Pressure, Half Mask	
Exposure Range 250 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Jove Selection Index: BUTYL./NEOPRENE BUTYL./NEOPRENE MATURAL+NEOPRENE PEZVAL/PE MEOPRENE/NATURAL NEOPRENE A VITON. MATVNEOPRENE MATURAL RUBBER NATURAL RUBBER NATURAL RUBBER NATURAL RUBBER MITRILE C PVA C PVC C Section 9 - Physical and Chemical Properties Section 9 - Physical and Chemical Properties section 9 - Physical and Chemical Properties pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is tectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut 1 benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, quecus alkali hydroxides. rysical State: Divided solid por Dressure (kPa): 101.33 at 181 °C por Density (Air=1): 3.24 rmula Weight: 94.11 eviffe Gravity (HaO=1 at 4 °C): 1.06 at 20 °C	Exposure Range >50 to <250 p	1: Air Purifying, Negative Pressure, Full Face	
Cartridge Color: black with dust/mist prefilter (use P100 or consult supervisor for appropriate dust/mist prefilter) Dther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Dive Selection Index: BUTYL. BUTYL./NEOPRENE MATURAL.HEOPRENE A NEOPRENE/NATURAL NEOPRENE/NATURAL PE/EVAL/PE A VITON.MEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NATURAL RUBBER B NITRILE C NATVRAL RUBBER B NITRILE C NATV-NEOPRENE A NATVRAL RUBBER B NITRILE C NATV-NEOPRENE A NEOPRENE A NEOPRENE C NATVRAL RUBBER B NITRILE C NATV-NEOPRENE A NEOPRENE A NEOPRENE C NATVRAL RUBBER B NITRILE C NATV-NEOPRENE A NEOPRENE A NEOPRENE C NATVRAL RUBBER B NITRILE C NATV-NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE A NEOPRENE C NATVRAL RUBBER B NITRILE C NATVRAL RUBBER B NITRILE C NATVRAL RUBBER B NITRILE C PVC C Section 9 - Physical and Chemical Properties Prearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is tetectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. vysical State: Divided solid typor Density (Air=1): 3.24 Freezing/Melting Point Range: 181.8 °C (105.62 °F) Volatile Component (% Vol): 100	Exposure Range 250 to unlimit	ppm: Self-contained Breathing Apparatus, Pressure I	Demand, Full Face
Dther: Acid-resistant overalls. PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Clove Selection Index: BUTYL. BUTYL. A Best selection BUTYL. A BUTYL. A BUTYL. A BUTYL. A BUTYL.NEOPRENE A NATURAL+NEOPRENE A PCEVAL/PE A NeoPRENE A NATURAL RUBBER B NATURAL RUBBER B NATURAL RUBBER B NATURAL RUBBER B NATH-NEOPR-INITRILE C PVA C PVA C PVA Depresence/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is etectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut i	Cartridge Color: black with dus	nist prefilter (use P100 or consult supervisor for appr-	opriate dust/mist prefilter)
PVC apron. Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. Correct Strength and Correct Strengtheand and Correct Strength and Strengt and Corre	Other: Acid-resistant overalls.		1 1 /
Hard hat with brim. Ensure there is ready access to a safety shower. Eyewash unit. BIUTYL	PVC apron.		
Ensure there is ready access to a safety shower. Eyewash unit. Glove Selection Index: BUTYL	Hard hat with brim.		
Eyewash unit. Slove Selection Index: BUTYL.NEOPRENE BUTYL/NEOPRENE A BUTYL/NEOPRENE A BUTYL/NEOPRENE A BUTYL/NEOPRENE A BUTYL/NEOPRENE A BUTYL/NEOPRENE A NEOPRENE/NATURAL A VITON A VITON A VITON/NEOPRENE A NATURAL RUBBER B NATURAL RUBBER B NITRILE C PVA PVC C PVA PVC Section 9 - Physical and Chemical Properties pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is tectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut 1 benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. viscal State: Divided solid Water Solubility: 1 g/15 ml water	Ensure there is ready access to a	afety shower.	
Glove Selection Index: BUTYL. A BUTYL. A BUTYL.NEOPRENE A NATURAL+NEOPRENE A NEOPRENE/NATURAL A PE/EVAL/PE A VITON A VITON. A VITON/NEOPRENE A NATURAL RUBBER B NITRILE C NATURAL RUBBER B NITRILE C PVA C PVC C PVA C PVC C PVA C PVA C PVC C Superance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is a tescable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut a benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. vysical State: Divided solid Water Solubility: 1 g/15 ml water nor Pressure (kPa): 101.33 at 181 °C Boiling Point Range: 181.8 °C (359 °F) at 760 mm H revific Gravity (HaOE) at 44 °C): 1 06 at 20 °C Volatile Component (% Vol): 100	Eyewash unit.		
BUTYL A Natural + NEOPRENE A VITON A VITON A VITON A VITON A NATURAL RUBBER B NITRILE C NATURAL RUBBER B NITRILE C PVA C PVC C Section 9 - Physical and Chemical Properties pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is a test able above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut a bezzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. vysical State: Divided solid Water Solubility: 1 g/15 ml water nor Pr	Glove Selection Index:		
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NEOPRENE/NATURAL A PE/EVAL/PE A VITON A VITON/NEOPRENE A NEOPRENE A NATURAL RUBBER B NITRILE C NAT+NEOPR+NITRILE C PVA C PVC C PVC C Pvc C pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is tetectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut 1 benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. vysical State: Divided solid upor Pressure (kPa): 101.33 at 181 °C Water Solubility: 1 g/15 ml water upor Density (Air=1): 3.24 Water Solubility: 1 g/15 ml water rmula Weight: 94.11 Volatile Component (% Vol): 100	NATURAL+NEOPRENE	C: Poor to dangerous choice for oth	her than short-term immersion
PE/EVAL/PE A VITON A VITON/NEOPRENE A NEOPRENE A NATURAL RUBBER B NITRILE C NAT+NEOPR+NITRILE C PVA C PVC C PVC C PvC C Section 9 - Physical and Chemical Properties Section 10 - Physical and Chemical Properties Section 10 - Physical and Chemical Properties Section 10 - Physical and Chemical Properties <	NEOPRENE/NATURAL		ier men snort term minersion
VITON A VITON/NEOPRENE A NEOPRENE A TEFLON A NATURAL RUBBER B NITRILE C NAT+NEOPR+NITRILE C PVC C PVC C PvC C pearance/General Info: White, crystalline solid with a characteristic sharp medicinal, sweet, tangy odor, which is etectable above 0.05 ppm. Phenol turns pink or red if it contains impurities, or if it is exposed to heat or light. Solut 1 benzene. Very soluble in alcohol, chloroform, ether, glycerol, carbon disulfide, petrolatum, volatile and fixed oils, queous alkali hydroxides. vysical State: Divided solid upor Pressure (kPa): 101.33 at 181 °C Water Solubility: 1 g/15 ml water Boiling Point Range: 181.8 °C (359 °F) at 760 mm H Freezing/Melting Point Range: 40.9 °C (105.62 °F) Volatile Component (% Vol): 100	PE/EVAL/PE		
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$- conc chavity (11) O^{-1}, at = O_{1} 1.00 at 20 C$	Specific Gravity (H2O=1. at 4 °C	1.06 at 20 °C	

Section 10 - Stability and Reactivity

Stability/Polymerization: Product is considered stable under normal handling conditions. Hazardous polymerization will not occur.

2000-07

Phenol

Storage incompanyments. Segregate non	in scioling oxidizers, natogens,	calcium hypochionic, and metals such as
aluminum, lead, zinc, magnesium.		

Section 11 - Toxicological Information

Unless otherwise specified data extracted from RTECS - Registry of Toxic Effects of Chemical Substances

TOXICITY

Oral (rat) LD_{so} : 317 mg/kg Oral (human) LD_{to} : 140 mg/kg Inhalation (rat) LC_{so} : 316 mg/m³ Dermal (rabbit) LD_{so} : 850 mg/kg IRRITATION

Skin (rabbit): 500 mg/24hr - SEVERE Skin (rabbit): 500 mg open -SEVERE Eye (rabbit): 5 mg - SEVERE Eye (rabbit): 100 mg rinse - mild

See NIOSH, RTECS SJ 3325000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to the environment, the primary removal mechanism is biodegradation which is generally rapid (days). Since it is a benchmark chemical for biodegradability studies, there is a large body of information on its degradation which concludes that it rapidly degrades in sewage, soil, fresh water and seawater. Acclimation of resident populations of microorganisms is rapid. Under anaerobic conditions degradation is slower and microbial adaptation periods longer. If released to soil, it will readily leach and biodegrade. The biodegradation in soil is generally rapid with half-lives of under 5 days even in subsurface soils. Biodegradation is sufficiently rapid that most groundwater is generally free of this pollutant. The exception would be in the cases of spills where high concentrations destroy degrading microbial populations. Biodegradation is also the primary removal process when released into water (half-lives are of the order of hours to days) although sensitized photolysis may also be important. In one study using estuarine water, the combination of biodegradation and photolysis resulted in a half-life in summer and winter of 39 and 94 hr, respectively. Since the pKa is 9.994, it will be partially dissociated at higher pHs in water and moist soils and its transport and reactivity may be pH-dependent. It does not bioconcentrate in aquatic organisms. In the atmosphere, it occurs as a vapor and reacts with photochemically-produced hydroxyl radicals resulting in a half-life of approximately 15 hours. During the nighttime, it reacts with nitrate radicals with a resulting half-life of 12 minutes. It has also been shown to be readily removed from the atmosphere by rain.

Ecotoxicity: LC₅₀ Crangon crangon 5600 mg/l 3 min, 20 mg/l 1 hr, 80 mg/l 3 hr, 40 mg/l 6-24 hr, 30 mg/l 48-72 hr, 25 mg/l 96 hr in sea water at 15 °C /Conditions of bioassay not specified; LC₅₀ Rainbow trout 5.6-11.3 mg/l/24 hr in a static bioassay; LC₅₀ Ophicephalus punctatus 46.0 mg/l/48 hr in a static bioassay; TLm Mercenaria mercenaria (hard clam) egg 5.263 x10⁴ ppb/48 hr in a static bioassay; Algae: Microcystis aeruginosa inhibition of cell multiplication noted at 4.6 mg/l /Conditions of bioassay not specified; Protozoa: Vorticella campanula perturbation level 3 mg/l /Conditions of bioassay not specified; Arthropoda: LD₀ Daphnia magna 16 mg/l/Conditions of bioassay not specified; Arthropoda: TLm Daphnia magna (young) 17/7 mg/l 25-50 hr /Conditions of bioassay not specified ; TLm Roach 15 mg/l/24 hr /Conditions of bioassay not specified

Henry's Law Constant: 3.33 x10⁷

BCF: goldfish 1.9

Biochemical Oxygen Demand (BOD): 200%, 5 days Octanol/Water Partition Coefficient: log K_{ow} = 1.46

Soil Sorption Partition Coefficient: $K_{oc} = 1$ to 3

Section 13 - Disposal Considerations

Disposal: Follow applicable federal, state, and local regulations.

Incinerate contaminated waste at an approved site.

Phenol may be recovered by charcoal absorption, solvent extraction or steam stripping. A concentration of 1% by weight is required for economical recovery.

Recycle containers wherever possible, otherwise dispose of in an authorized landfill.

2000-07

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Phenol

MSDS No. 355

Sect	non 14 - Trans	port Informatio	on	
DOT T	ransportation Da	ta (49 CFR 172.1	01):	
Shipping Name: PHENOL, SOLID Hazard Class: 6.1(a) ID No.: 1671 Packing Group: II Label: Poison[6]	Additiona	l Shipping Informati	on: CARBOLIC AC	CID, SOLID
Sect	ion 15 - Regula	tory Information	 0n	
EPA Regulations: RCRA 40 CFR: Listed U188 Toxic W CERCLA 40 CFR 302.4: Listed per (1000 lb (453.5 kg) SARA 40 CFR 372.65: Listed 500/10 SARA EHS 40 CFR 355: Listed 1,000 TSCA: Listed	Vaste CWA Section 311(b)(4 000 lb 0 lb	4); per RCRA Section	3001; per CWA Sec	tion 307(a)
Se	ection 16 - Othe	er Information		· · · · · · · · · · · · · · · · · · ·
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Material Safety Data Sheet Collection

Naphthalene

Date of Preparation: 11/87

MSDS No. 624

Revision: A, 9/97

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Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Naphthalene

Chemical Formula: C₁₀H₈

CAS Number: 91-20-3

Synonyms: Albocarbon; camphor tar; Dezodorator; Mighty 150; moth balls; moth flakes; naftalen (Polish); naphthalin; naphthaline; naphthalinum; naphthene; NTM; tar camphor; white tar

Derivation: From coal tar; from petroleum fractions after various catalytic processing operations.

General Use: Used as a moth repellent, an antiseptic, toilet bowl deodorant, heat transfer agent, fungicide, smokeless powder, cutting fluid, lubricant, wood preservative; an intermediate for naphthol, phthalic anhydride, chlorinated naphthalenes, Tertralin, Decalin, naphthyl and naphthol derivatives, and dyes; in synthetic resins, synthetic tanning, textile chemicals, scintillation counters, and emulsion breakers.

Vendors: Consult the latest Chemical Week Buyers' Guide. (73)

Section 2 - Composition / Information on Ingredients

Naphthalene, ca 100% wt. Grade: By melting point, 165 °F (74 °C) min (crude) to greater than 174 °F (79 °C) (refined); scintillation 176-177 °F (80-81 °C)

OSHA PELs

8-hr TWA: 10 ppm (50 mg/m³); Vacated 1989 Final Rule Limit: 15-min. STEL: 15 ppm (79 mg/m³)

ACGIH TLVs TWA: 10 ppm (52 mg/m³) STEL: 15 ppm (79 mg/m³)

NIOSH RELs 10-hr TWA: 10 ppm (50 mg/m³); 15-min. STEL: 15 ppm (75 mg/m³) IDLH Level 500 ppm

DFG (Germany) MAK 10 ppm (50 mg/m³)

Section 3 - Hazards Identification

ጵጵጵጵጵ Emergency Overview ጵጵጵጵጵ Naphthalene is a white crystalline solid with a 'moth ball' or coal-tar odor. It is toxic by ingestion. Irritating to skin, eyes, and respiratory system. Naphthalene is a combustible solid. Dust may form explosive mixtures in air if subjected to an ignition source.				
Potential Health Effects	S 2*			
Primary Entry Routes: Inhalation, skin absorption, skin and/or eye contact Target Organs: Blood (red blood cell effects), eyes, skin, central nervous system (CNS), liver and kidneys				
Acute Effects				
Inhalation: Vapor inhalation causes headache, confusion, nausea, sometimes vomiting, loss of appetite, extensive sweating, dysuria (painful urination), hematuria (blood in the urine), and hemolysis (destruction of red blood cells).				
Eye: Irritation, conjunctivitis, and corneal injury upon prolonged contact.				
Skin: Irritation and hypersensitivity dermatitis. Ingestion: Unlikely. However, ingestion causes irritation of the mouth and stomach, hemolytic anemia with hepatic and renal lesions and vesical congestion, kidney failure, hematuria, jaundice, depression of CNS, nausea, vomiting, abdominal pain, blue face, lips, or hands, rapid and difficult breathing, headache, confusion, Chronic Effects Issue 1 Sec. 8 Sec. 9 Sec. 9 Sec. 9				
excitement, malaise, fever, perspiration, urinary tract pain, dizziness, convulsions, coma, and death. Symptoms may appear 2 to 4 hours after exposure.				

Carcinogenicity: IARC, NTP, and OSHA do not list naphtnalene as a carcinogen. EPA-D, Not Classifiable as to Human Carcinogenicity; MAK-B, Justifiably suspected of having carcinogenic potential; TLV-A4, Not Classifiable as a Human Carcinogen.

Medical Conditions Aggravated by Long-Term Exposure: Diseases of the blood, liver and kidneys; individuals with a hereditary deficiency of the enzyme glucose-6-phosphate dehydrogenase in red blood cells are particularly susceptible to the hemolytic properties of naphthalene metabolites.

Chronic Effects: May cause optical neuritis, corneal injuries, cataracts, kidney damage.

Other: There are two reports of naphthalene crossing the placenta in humans.

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Naphthalene

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed. Contact a physician immediately if symptoms of systemic poisoning are present.

Eye Contact: Do not allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 min. Consult a physician or ophthalmologist if pain, irritation, swelling, or photophobia persist.

Skin Contact: Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area thoroughly with soap and water. For reddened or blistered skin, consult a physician. Contact a physician immediately if symptoms of systemic poisoning are present.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting. Contact a physician immediately.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Obtain baseline CBC, electrolytes, liver and renal function rests, glucose-6-phosphatase dehydrogenase level, urinalysis, and benzidine dipstick to check for hemoglobinuria. Urinary metabolite, 1-naphthol or mercapturic acid, may help confirm the diagnosis.

Section 5 - Fire-Fighting Measures

Flash Point: 174 °F (79 °C); 190 °F (88 °C)

Flash Point Method: OC; CC

Burning Rate: Data not found. Autoignition Temperature: 979 °F (526 °C)

LEL: 0.9% v/v

UEL: 5.9% v/v

Flammability Classification: Combustible solid

Extinguishing Media: Use dry chemical, foam, carbon dioxide (CO₂), or water spray. Water or foam may cause frothing. Use water spray to keep fire-exposed containers cool.

Unusual Fire or Explosion Hazards: Volatile solid that gives off flammable vapors when heated. Dust may explode in air if an ignition source is provided.

Hazardous Combustion Products: Toxic vapors including carbon monoxide.

Fire-Fighting Instructions: Move containers from the fire area if it can be done without risk. Otherwise cool fire-exposed containers until well after the fire is extinguished. *Do not* release runoff from fire control methods to sewers or waterways.
Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Wear full protective clothing (see Sec. 8). Structural clothing is permeable, remain clear of smoke, water fall out, and water run off.

Section 6 - Accidental Release Measures

Spill /Leak Procedures: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources. Isolate and ventilate area, deny entry, stay upwind. Stop leak if you can do it without risk. Use spark-proof tools and explosion proof equipment. Cleanup personnel should wear personal protective equipment to protect against exposure (see Sec. 8).
 Small Spills: Do not sweep! Carefully scoop up or vacuum (with a HEPA filter). Absorb liquid spill with an inert, noncombustible absorbent such as sand or vermiculite.

Large Spills

Containment: For large spills, dike far ahead of liquid spill for later disposal. *Do not* release into sewers or waterways. **Regulatory Requirements:** Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: To avoid vapor inhalation use only with ventilation sufficient to reduce airborne concentrations to nonhazardous levels. Avoid skin and eye contact. Wear personal protective clothing and equipment to prevent any contact with skin and eyes (see Sec. 8). Practice good personal hygiene procedures to prevent inadvertently ingesting this material.

Storage Requirements: Store in tightly closed, explosion-proof containers in a cool, well-ventilated area away from heat, ignition sources, and incompatibles (see Sec. 10). May be stored under nitrogen gas. Protect containers against physical damage. Use monitoring equipment to measure the extent of vapor present in any storage facility containing naphthalene because of potential fire and explosion hazards.

NFPA

9/97

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Where feasible, enclose operations to avoid vapor and dust dispersion into the work area. Ventilate at the site of chemical release. During the fractional distillation of naphthalene and in any operation entailing the heating or volatilization of naphthalene, enclosed apparatus should be employed.

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Educate workers about the health and safety hazards associated with naphthalene. Train in work practices which minimize exposure. Consider preplacement and periodic medical exams with emphasis on the eyes, skin, liver, kidneys, CBC (RBC count, WBC count, differential count of a stained smear, hemoglobin, and hematocrit), and urinalysis including at a minimum specific gravity, albumin, glucose, and a microscopic examination on centrifuged sediment.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent skin contact. Teflon® is recommended. *Do not* use butyl rubber, natural rubber, neoprene or polyvinyl chloride. Wear chemical dust-proof safety goggles and face shield, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area. Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove naphthalene from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline solid	Water Solubility: Insoluble [31.7 mg/L at 68 °F (20 °C)]
Appearance and Odor: White, volatile flakes, cakes, cubes,	Other Solubilities: Benzene, absolute alcohol; very soluble
spheres, or powder; strong coal-tar or moth ball odor	in ether, chloroform, carbon disulfide, hydronaphthalenes,
Odor Threshold: 0.084 ppm to 0.3 ppm	fixed and volatile oils
Vapor Pressure: 0.05 mm Hg at 68 °F (20 °C); 1.0 mm Hg	Boiling Point: 424 °F (218 °C)
at 127 °F (53 °C)	Melting Point: 176 °F (80.2 °C)
Formula Weight: 128.2	Volatility: Volatilizes appreciably at room temperature;
Density: 1.145 g/cm ³ at 68 °F (20 °C)	volatile with steam
Saturated Vapor Concentration: 100 ppm at 77 °F (25 °C)	Octanol/Water Partition Coefficient: log Kow = 3.30
(approx.)	

Section 10 - Stability and Reactivity

Stability: Naphthalene is stable at room temperature in closed containers under normal storage and handling conditions. It volatilizes at room temperature.

Polymerization: Hazardous polymerization cannot occur.

Chemical Incompatibilities: Include aluminum chloride, benzoyl chloride, chromic acid, chromium trioxide, oxidizers. Explosive reaction with dinitrogen pentaoxide. Melted naphthalene will attack some forms of plastics.

Conditions to Avoid: Exposure to heat and ignition sources, incompatibles.

Hazardous Decomposition Products: Thermal oxidative decomposition of naphthalene can produce toxic fumes including carbon monoxide.

Section 11- Toxicological Information

Toxicity Data:*

Acute Effects: Human (child), oral, LD_{Lo}: 100 mg/kg Man, unreported, LD_{Lo}: 74 mg/kg Rat, oral, LD₅₀: 490 mg/kg **Reproductive Effects:**

Rat, oral: 4500 mg/kg administered on gestational days 6-15 produced fetotoxicity and other developmental abnormalities.

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Naphthalene

Section 11- Toxicological Information, continued

Toxicity Data:*

respiration - tumors.

Tumorigenicity:

Skin Effects:

Eve Effects:

Acute Effects: continued

Mouse, oral, LD₅₀: 533 mg/kg Rat, inhalation, LC₅₀: >340 mg/m³

produced lacrimation and somnolence.

Genetic Effects:

Hamster, ovary: 15 mg/L induced sister chromatid exchange.

Rabbit, eye, standard Draize test: 100 mg produced mild irritation.

Rabbit, skin, open Draize test: 495 mg produced mild irritation.

Mouse, inhalation: 30 ppm/6 hr/2 yr administered intermittently produced toxic effects: tumorigenic - neoplastic by RTECS criteria; lungs, thorax, or

*See NIOSH RTECS (QJ0525000) for additional toxicity data.

Section 12 - Ecological Information

Ecotoxicity: Oncorhynchus gorbuscha (pink salmon): 1.37 ppm/96 hr at 39 °F (4 °C). Pimephales promelas (fathead minnow): 7.76 mg/L/24 hr.

Environmental Fate: If released to the atmosphere, naphthalene rapidly photodegrades with a half-life of 3-8 hr. Volatilization, photolysis, adsorption, and biodegradation are important loss mechanisms for naphthalene discharged into water. Depending on local conditions, the half-lives range from a couple of days to a few months. If released on land, it is adsorbed moderately to soil, undergoes biodegradation; but in some cases biodegradation may still occur if conditions are aerobic. Bioconcentration occurs to a moderate extent, but is a temporary problem since depuration and metabolism readily proceed in aquatic organisms.

Section 13 - Disposal Considerations

Disposal: Consider rotary kiln or fluidized bed incineration. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Container Cleaning and Disposal: Handle empty containers carefully as hazardous residues may still remain.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Section 15 - Regulatory Information

Shipping Name: Naphthalene, crude or Naphthalene, refined Shipping Symbols: Not listed Hazard Class: 4.1 ID No.: UN1334 Packing Group: III Label: FLAMMABLE SOLID Special Provisions (172.102): A1 Packaging Authorizations
a) Exceptions: 173.151
b) Non-bulk Packaging: 173.213
c) Bulk Packaging: 173.240

Quantity Limitations a) Passenger, Aircraft, or Railcar: 25 kg b) Cargo Aircraft Only: 100 kg

Vessel Stowage Requirements a) Vessel Stowage: A b) Other: Not listed

EPA Regulations:

Listed as a RCRA Hazardous Waste (40 CFR 261.33). Hazardous Waste Number: U165 Listed as a CERCLA Hazardous Substance (40 CFR 302.4) specific per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307(a); CAA, Sec. 112

CERCLA Final Reportable Quantity (RQ), 100 lb (45.4 kg)

Listed as a SARA Toxic Chemical (40 CFR 372.65)

SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Not listed

Section 16 - Other Information

References: 73, 99, 103, 124, 139, 140, 167, 168, 179, 190, 196, 197, 200, 220

PC-W6

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Industrial Hygiene Review	DJ Wilson, CIH

Medical Review G Kelafant, MD

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Occupational Health Guideline for Coal Tar Pitch Volatiles

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

Anthracene

- Formula: C14H10
- Synonyms: None
- Appearance and odor: Pale green solid with a faint aromatic odor.

Phenanthrene

- Formula: C14H10
- Synonyms: None
- Appearance and odor: Colorless solid with a faint aromatic odor.

Pyrene

- Formula: C16H10
- Synonyms: None
- Appearance: Bright yellow solid

Carbazole

- Formula: C₁₂H₉N
- Synonyms: None
- Appearance and odor: Colorless solid with a faint aromatic odor.

Benzo(a)pyrene

- Formula: C₂₀H₁₂
- Synonyms: BaP, 3,4-benzopyrene

• Appearance and odor: Colorless solid with a faint aromatic odor.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for coal tar pitch volatiles is 0.2 milligram of coal tar pitch volatiles per cubic meter of air (mg/m³) averaged over an eight-hour work shift. NIOSH has recommended that the permissible exposure limit for coal tar products be reduced to 0.1 mg/m³ (cyclohexane-extractable fraction) averaged over a work shift of up to 10 hours per day, 40 hours per week, and that coal tar products be regulated as occupational carcinogens. The NIOSH Criteria Document for Coal Tar Products and NIOSH Criteria Document for Coke Oven Emissions should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

• Routes of exposure

Coal tar pitch volatiles can affect the body if they are inhaled or if they come in contact with the eyes or skin.

• Effects of overexposure

Repeated exposure to coal tar pitch volatiles has been associated with an increased risk of developing bronchitis and cancer of the lungs, skin, bladder, and kidneys. Pregnant women may be especially susceptible to exposure effects associated with coal tar pitch volatiles. Repeated exposure to these materials may also cause sunlight to have a more severe effect on a person's skin. In addition, this type of exposure may cause an allergic skin rash.

Reporting signs and symptoms

A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to coal tar pitch volatiles.

• Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to coal tar pitch volatiles at potentially hazardous levels:

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES Public Health Service Centers for Disease Control National Institute for Occupational Safety and Health U.S. DEPARTMENT OF LABOR Occupational Salety and Health Administration

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1. Initial Medical Examination:

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-A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the oral cavity, respiratory tract, bladder, and kidneys should be stressed. The skin should be examined for evidence of chronic disorders, for premalignant and malignant lesions, and evidence of hyperpigmentation or photosensitivity.

-Urinalysis: Coal tar pitch volatiles are associated with an excess of kidney and bladder cancer. A urinalysis should be obtained to include at a minimum specific gravity, albumin, glucose, and a microscopic on centrifuged sediment, as well as a test for red blood cells.

-Urinary cytology: Coal tar pitch volatiles are associated with an excess of kidney and bladder cancer. Employees having 5 or more years of exposure or who are 45 years of age or older should have a urinary cytology examination.

-Sputum cytology: Coal tar pitch volatiles are associated with an excess of lung cancer. Employees having 10 or more years of exposure or who are 45 years of age or older should have a sputum cytology examination.

-14" x 17" chest roentgenogram: Coal tar pitch volztiles are associated with an excess of lung cancer. Surveillance of the lungs is indicated.

-FVC and FEV (1 sec): Coal tar pitch volatiles are reported to cause an excess of bronchitis. Periodic surveillance is indicated.

-A complete blood count: Due to the possibility of benzene exposure associated with coal tar pitch volatiles, a complete blood count is considered necessary to search for leukemia and aplastic anemia.

-Skin disease: Coal tar pitch volatiles are defatting agents and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of these agents.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis, and semi-annually for employees 45 years of age or older or with 10 or more years' exposure to coal tar pitch volatiles.

Summary of toxicology

Coal tar pitch volatiles (CTPV) are products of the destructive distillation of bituminous coal and contain 11 polynuclear aromatic hydrocarbons (PNA's). These hydrocarbons sublime readily, thereby increasing the amounts of carcinogenic compounds in working areas. Epidemiologic evidence suggests that workers intimately exposed to the products of combustion or distillation of bituminous coal are at increased risk of cancer at many sites. These include cancer of the respiratory tract, kidney, bladder, and skin. In a study of coke oven workers, the level of exposure to CTPV and the length for time exposed were related to the development of concer. Coke oven workers with the highest risk of concer were those employed exclusively at topside jobs offer 5 or more years, for whom the increased risk of

dying from lung cancer was 10-fold; all coke oven workers had a 7-1/2-fold increase in risk of dying from kidney cancer. Although the causative agent or agents of the cancer in coke oven workers is unidentified, it is suspected that several PNA's in the CTPV generated during the coking process are involved. Certain industrial populations exposed to coal tar products have a demonstrated risk of skin cancer. Substances containing PNA's which may produce skin cancer also produce contact dermatitis; examples are coal tar, pitch, and cutting oils. Although allergic dermatitis is readily induced by PNA's in guinea pigs, it is only rarely reported in humans from occupational contact with PNA's; these have resulted largely from the therapeutic use of coal tar preparations. Components of pitch and coal tar produce cutaneous photosensitization; skin eruptions are usually limited to areas exposed to the sun or ultraviolet light. Most of the phototoxic agents will induce hypermelanosis of the skin; if chronic photodermatitis is severe and prolonged, leukoderma may occur. Some oils containing PNA's have been associated with changes of follicular and sebaceous glands which commonly take the form of acne. There is evidence that exposures to emissions at coke ovens and gas retorts may be associated with an increased occurrence of chronic bronchitis. Coal tar pitch volatiles may be associated with benzene, an agent suspected of causing leukemia and known to cause aplastic anemia.

CHEMICAL AND PHYSICAL PROPERTIES

Physical data—Anthracene

1. Molecular weight: 178.2

- 2. Boiling point (760 mm Hg): 340 C (644 F)
- 3. Specific gravity (water = 1): 1.24

4. Vapor density (air = 1 at boiling point of anthracene): 6.15

5. Melting point: 217 C (423 F)

6. Vapor pressure at 20 C (68 F): Less than 1 mm Hg 7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble

8. Evaporation rate (butyl acetate = 1): Not applicable

• Physical data—Phenanthrene

1. Molecular weight: 178.2

2. Boiling point (760 mm Hg): 340 C (644 F)

3. Specific gravity (water = 1): 1.18

4. Vapor density (air = 1 at boiling point of phenanthrene): 6.15

5. Melting point: 100.5 C (213 F)

6. Vapor pressure at 20 C (68 F): Less than 1 mm Hg

7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble

8. Evaporation rate (butyl acetate = 1): Not applicable

Physical data--Pyrene

1. Molecular weight: 202.3

2. Boiling point (760 mm Hg): Greater than 360 C (greater than 680 F)
should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of coal tar pitch volatiles from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the coal tar pitch volatiles, the person performing the operation should be informed of coal tar pitch volatiles's hazardous properties.

· Employees should be provided with and required to use splash-proof safety goggles where condensed coal tar pitch volatiles may contact the eyes.

SANITATION

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· Workers subject to skin contact with coal tar pitch volatiles should wash with soap or mild detergent and water any areas of the body which may have contacted coal tar pitch volatiles at the end of each work day. • Employees who handle coal tar pitch volatiles should wash their hands thoroughly with soap or mild detergent and water before eating, smoking, or using toilet facilities.

• Areas in which exposure to coal tar pitch volatiles may occur should be identified by signs or other appropriate means, and access to these areas should be limited to authorized persons.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to coal tar pitch volatiles may occur and control methods which may be effective in each case:

Operation

Controis

Liberation from extraction and packaging from coal tar fraction of coking

Use as a binding agent in manufacture of coal briquettes used for fuel: use as a dielectric in the manufacture of battery electrodes, electric-arc furnace electrodes, and electrodes for alumina reduction

Use in manufacture of rooting felts and papers Good roofing

Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment

Process enclosure: local exhaust ventilation; general dilution ventilation: personal protective equipment

Process enclosure; local exhaust ventilation; general dilution ventilation: personal protective equipment

Operation

Use for protective coatings for pipes for underground conduits and drainage; use as a coating on concrete as waterproofing and corrosion-resistant material: use in road paving and sealing

Use in manufacture and repair of refractory brick; use in production of foundry cores; use in manufacture of carbon ceramic items

Controls

Process enclosure; local exhaust ventilation; general dilution ventilation: personal protective equipment

Process enclosure; local exhaust ventilation; general dilution ventilation: personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance. • Eye Exposure

If condensed coal tar pitch volatiles get into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation is present after washing, get medical attention. Contact lenses should not be worn when working with these chemicals.

Skin Exposure

If condensed coal tar pitch volatiles get on the skin, wash the contaminated skin using soap or mild detergent and water. Be sure to wash the hands before eating or smoking and to wash thoroughly at the close of work.

Breathing

If a person breathes in large amounts of coal tar pitch volatiles, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

• Rescue

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL AND DISPOSAL PROCEDURES

· Persons not wearing protective equipment and clothing should be restricted from areas of releases until cleanup has been completed.

• If coal tar pitch volatiles are released in hazardous concentrations, the following steps should be taken: 1. Ventilate area of spill.

2. Collect released material in the most convenient and safe manner for reclamation or for disposal in sealed containers in a secured sanitary landfill.

• Waste disposal method:

Coal tar pitch volatiles may be disposed of in sealed containers in a secured sanitary landfill.

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RESPIRATORY PROTECTION FOR COAL TAR PITCH VOLATILES

Condition

Minimum Respiratory	Protection
Required Above 0.	2 mg/m³

•	
Particulate and Vapor Concentration	
2 mg/m³ or less	A chemical cartridge respirator with an organic vapor cartridge(s) and with a fume or high-efficiency filter.
• •	Any supplied-air respirator.
· · ·	Any self-contained breathing apparatus.
il0 mg/m³ or less	A chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s) and with a fume or high-efficiency filter.
	A gas mask with a chin-style or a front- or back-mounted organic vapor canister and with a full facepiece and a fume or high-efficiency filter.
	Any supplied-air respirator with a full facepiece, helmet, or hood.
	Any self-contained breathing apparatus with a full facepiece.
200 mg/m³ or less	A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
	A powered air-purifying respirator with an organic vapor cartridge and a high- efficiency particulate filter.
400 mg/m³ or less	A Type C supplied-air respirator with a full facepiece operated in pressure- demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in continuous-flow mode.
areater than 400 mg/m³ or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure- demand or other positive pressure mode.
	A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continu- ous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure- demand or other positive pressure mode.
scape	Any gas mask providing protection against organic vapors and particulates, including pesticide respirators which meet the requirements of this class.
	Any escape self-contained breathing apparatus.

Only NIOSH-approved or MSHA-approved equipment should be used.



BioSolve[¬] InfoSheet

Petrochemical Division

Environmental / Health & Safety

Vapor Suppression Spill Response Mitigations

BioSolve is a unique blend of water-based dispersants with biodegradable surfactants that was specifically engineered as a clean-up and mitigation agent for use on a wide range of hydrocarbon products.

BioSolve in and of itself does not cause or catalyze specific chemical reactions, nor does it contain any bacteria cultures or enzymes. The basic principle of BioSolve is to emulsify the hydrocarbon into macroemulsions and encapsulate those particles in a water/oxygen solution.

Because of the unique properties of BioSolve, the applications are varied, and results effective. BioSolve desorbs the hydrocarbons while emulsifying and encapsulating them for cleanups & mitigations, and surrounds ring structures resulting in immediate and long term vapor suppression.

Vapor Suppression

BioSolve is proven effective for long term suppression of Volatile Organic Compounds (VOC) vapors. This is especially critical when dealing with Turnaround and Workover Operations. BioSolve is so effective that in most cases the first "degassing" application lasts through the entire operation.

Inert VOC's in open drain systems, tank washouts, vessel cleanups, tank entry and pipeline abandonment.

So effective is BioSolve, that it is being utilized in the South Coast Air Quality Management District for suppressing vapors on large and small environmental cleanup sites. BioSolve InfoSheer is a product of Western States BioSolve and may not be reproduced without expressed written consent. ALL RIGHTS RESERVED

Always use BioSolve in accordance with State, Federal or Local Approvals. Midlantic Environmental (800) 477-BIO-1

Clean-up Operations

In clean-up operations BioSolve has wide range applications. BioSolve's unique properties emulsify the hydrocarbon into solution, but when diluted to light concentrations (1% BioSolve) and allowed to stand, BioSolve will allow the oil to separate from solution for recovery enhancement. This unique property of BioSolve allows the oily sludge from tank bottoms to be recovered into sellable oil with a low BS&W.

Ashphaltenes

Ashphaltene's present cleaning problems due to their high molecular weight and their extremely high viscosity and adhesion. Normal cleaning procedures included the use of solvents or hot caustics. The rinsate then becomes an additional expensive problem having to be disposed of as hazardous.

Now there's BioSolve.

Following a similiar procedure as hot caustic cleaning, a 6% -solution of BioSolve takes the ashphaltene's into solution and the emulsion can then be pumped out to be separated or bioremediated with the addition of nutrients and bacteria. (Protocol availabe)

BioSolve Is used by many ERT and Haz Mat Teams in spill cleanup & mitigation

Additional uses include: Parafin Removal, Vessel Washouts, Spill Response, Cuttings Washers, Enhanced Bioremediations, Tank Washouts, and much more....

Distributed By:

Midlantic Environmental Enterprises 894 Route 52, Suite L Beacon, NY 12508 1-800-477-BIO-1

BioSolve[®] InfoSheet



Vapor Suppression Spill Response

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Always use BioSolve in accordance with State, Federal or Local Approvals. Midlantic Environmental (800) 477-BIO-1

BioSolve has an amazing ability to suppress or eliminate Volatile Organic Compounds (VOCs). Unlike a foam that suppresses vapor only as long as the blanket lasts, BioSolve's unique properties encapsulate and emulsify the hydrocarbon giving long term vapor suppression.

BioSolve, diluted to a 3% to 6% solution can be applied with any normal water applicator. There is no special equipment required. Since BioSolve is not a foam, it can be applied on high wind days as well as hillsides. For large sites, applicators can include foam eductors, water trucks and sprinkler systems, for smaller jobs, a hand pump sprayer or garden hose with a fertilizer attachment on the nozzle works quite well.

Because BioSolve applies like water, it's applications are almost endless. In Underground Storage Tanks (UST's), BioSolve is used in the "Triple Rinse" washing procedure. BioSolve eliminates the recurrence of vapor release often associated with UST removals. Because BioSolve is a surfactant, it not only suppresses the vapor but cleans the tank right down to the metal. BioSolve can be used with any pressure washer with tremendous efficiency.

Water Based Biodegradable

Fast-Suppresses VOC's within seconds!

Cost Effective--Lasts a long time

Simple -- Applies like water

Versatile – Replaces a variety of other chemicals.

Drum washers/recyclers find that BioSolve is ideal to handle a wide range of contaminated drums. 6% solution of A BioSolve is high pressure sprayed into the drums to wash them out BioSolve's double action of encapsulation and cleaning effectivly clean the drums in a one step application. BioSolve is so effective it is even used to clean out mercantan drums with little to no odor release. Because BicSolve enhances the bioremediation of organic compounds, it makes it possible to dispose of wash water to a plant's activated sludge pond.

In refinery and on oil production platforms, BioSolve is proving an effective agent for suppressing VOC vapor in open drain systems during Turnarounds and Workover Operations

BioSolve is commonly utilized by Haz Mat, Emergency Response, and Fire Departments nationwide to suppress VOC vapors and odors. Many departments report that BioSolve inducted into the sanitary sewers effectively eliminates the explosion hazard when gas leaks into the municipal sewer systems. NOTE: Always follow State and Federal guidlines and approvals before using in sewers. We have on file a variety of letters from Fire Depts. and Sanitation Districts regarding this procedure that are available upon request.

Additional uses: BioSolve is also being utilized in bilge cleaning, vessel cleanups, cutting washers, soil & sludge washing and more..... Distributed By:

MIDLANTIC ENVIRONMENTAL 894 Route 52, Suite L Beacon, NY 12508 PHONE (800) 477-BIO-1 FAX (914) 838-0175

Rev. 3/94

AN OVERVIEW

BloSolve[©] is a patented blend of water-based, biodegradable surfactants that was specifically engineered as a cleanup / mitigation agent and vapor suppressant for use on a wide range of hydrocarbon products.

BioSolve, in and of itself, does not cause or catalyze specific chemical reactions, nor does it contain any bacteria cultures. The basic principle of BioSolve is to emulsity and encapsulate hydrocarbon particles.

The addition of the BioSolve / water solution as an emulsilier, accompanied by agitation, reduces the cohesive forces between the molecules of the hydrocarbons, separates them into extremely small microscopic particles, and allows the material to become encapsulated or coated with the BioSolve solution.

The combination of emulsification and encapsulation in conjunction with the other properties of BioSolve (pH, water-based, etc.) make it a very unique and versatile product with numerous practical and cost effective applications.

- + BIOREMEDIATIONS + + SPILL CLEANUP +
 - +VAPOR SUPPRESSION +
- + UST WASHING + + BIOSURFACTANT +
 - + STORAGE TANK CLEANING +
 - + SOIL WASHING +
 - +WASTE REDUCTION +

GENERAL APPLICATION

BioSolve in concentrated form, is a viscous liquid surfactant material that must be diluted with water before use. A fluorescent red tracing dye is present so that it can be easily seen during application. Once diluted with water to the proper concentration, BioSolve looks and is applied like "pink water" rather than as a foam, so it can be applied with virtually anything that will apply water, such as a hand pump sprayer, lire hose, pressure / steam sprayer, water truck, etc. This characteristic makes BioSolve very adaptable and much more convenient to use in almost any site situation.

WATER BASED BIODEGRADABLE NON-FLAMMABLE

VAPOR SUPPRESSION

BioSolve is commonly utilized by many Environmental Firms, Fire Departments, Haz-Mat and Emergency Response Teams nationwide, to suppress hydrocarbon VOC vapor and odors. Because BioSolve emulsilies and encapsulates hydrocarbons rather than just temporarily blanketing them, it is being utilized as a vapor suppressant in place of foam for many applications.

Vapor reduction is so fast and effective that BIoSolve is commonly used to comply with the tough air emission standards of the California SCAQMD's Rule 1166 regulating VOC vapor release from soil. It provides a simple and cost effective method of controlling VOC vapor release during excavation, stockpiling, loading, transporting, etc. of soil. The application is quick and easy and the effect is long lasting.

✓ FAST -- Suppress VOC vapor Within Seconds

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- ✓ COST EFFECTIVE -- A Single Application in Many Cases
- SIMPLE -- Applies Like Water Not A Foam
- ✓ VERSATILE Applicable To Most Site Situations
- ✓ LONG LASTING -- Often Lasts For Weeks
- ✓ INCREASE SAFETY --- Minimize Exposure To VOC's (Benzene)

SPILL CLEANUP

Because of the unique combination of cleaning ability and vapor suppression, BioSolve is used by numerous Fire Departments, Haz-Mat and Emergency Response Teams, Industries, etc., when dealing with hydrocarbon splits.

BioSolve emulsifies and encapsulates hydrocarbons almost instantly, helping to greatly reduce the danger of ignition, while at the same time cleaning up the spilled material, and stopping damage to asphalt, concrete or painted surfaces. Hydrocarbon spills can be quickly and easily picked up for recycling / disposal with a vacuum or other mechanical means when BioSolve is applied property.

UST WASHING

During the removal of Underground Storage Tanks, washing the inside of the tank with a BioSolve solution through a pressure washer can virtually eliminate the recurrence of VOC vapors (LEL) in tanks that were used for gasoline, diesel or jet fuel storage.

When used to wash oil and waste oil tanks, the BioSolve solution will clean with amazing efficiency. Because the oil is emulsified into the solution, it will not stick to the walls of the tank, the hoses, or the pumps, extending equipment life, reducing cleaning and maintenance time, as well as rendering cleaned surfaces inert and free of hydrocarbon.

Listing Notes

BioSolve[®] is on the U.S. Environmental Protection Agency's NCP Product Schedule. This listing does NOT mean that the EPA approves, recommends, licenses, certifies, or authorizes the use of BioSolve on an oil discharge. This listing means only that data have been submitted to EPA as required by subpart F of the National Contingency Plan § 309,915

New York State Department of Environmental Conservation Listing Notes

The NYSDEC Bureau of Spill Prevention and Response (BSPR), the NYS Department of Health, The US Coast Guard, 4 the NYSDEC Division of Marine Resources, and the NYSDEC Division of Fish and Wildlife have formed the Spill Product Evaluation Group, a review group to evaluate the acceptability of spill cleanup products, used in immediate emergency response applications.

The review by the DSM (Division of Spill Management) and the SPEG does not constitute approval, endorsement, or recommendation of any commercial product or proprietary process. The review results only in the consideration of a product for use in spill cleanups on a case-by-case basis depending on the sensitivity of the environmental resources affected, and the appropriateness of its use under the physical circumstances of the spill. No implied or implicit endorsement by New York State Department of Environmental Conservation is to be made by any sales promotion or on any label, advertisement, or technical literature.

" U.S.D.A. Listing Notes

(NPLD BioSolve) is acceptable as a general cleaning agent on all surfaces, or for use with steam or mechanical cleaning devices in all departments of official establishments operating under the Federal meat, poultry, shell egg grading, and egg products inspection programs.

Acceptance of compounds by this Department is in no way to be construed as an endorsement of the compounds or of any claims made for them.

"BioSolve[®] Is Making A Difference"

BIOSOLVE SHOULD ONLY DE USED WITH THE PROPER PERMITS,

IN STORAGE TANKS

In addition to emulsifying or water solubilizing fuels, oils and crudes for removal, BioSolve has been proven effective in eliminating or reducing VOC vapors in large storage tanks as well.

When properly applied, the BloSolve solution added to the studge will create a sturry that can be removed and processed through an oilwater separator. Recoverable hydrocarbons can be separated and recovered from the solids present in most tank bottoms, greatly reducing the amount of solid waste to be disposed.

BIOREMEDIATION

BioSolve is also very effective and has produced excellent results when used as a biosurfactant for the remediation of hydrocarbon contaminated soil and ground water.

During the blodegradation process of hydrocarbons, only the surface area exposed to the bacteria is subject to the optimum conditions. The • addition of the BioSolve and water solution as an emulsilier, accompanied by agitation results in a much greater surface area exposed to the proper elements for biological degradation.

BIOSOIVE AND THE PRINCIPLE OF DESORPTION The surfactants in BioSulve desorb or strip the hydrocarbon from the soil particles by converting it to an emulsion and moving it into the pore space of the soil. The advantages of desorption are numerous:

- The Emulsion Separates And Reduces The Size Of The Hydrocarbon Particles.
- A Dramatic increase Of Surface Area is Exposed To The Bacteria.
- BioSolve Increases Permeability By "Making Water Wetter" Resulting In A More Rapid And Even Penetration Of Molsture And Biotreatment Products.

All of these factors combine to create conditions that are very favorable for bacteria to degrade the hydrocarbon at a greatly accelerated rate. Whether BioSulve is used with Indigenous bacteria, or in conjunction with commercial bacteria cultures, the end result is that the time and costs involved in soil biotreatment are greatly reduced.



ATTACHMENT B

PROJECT FORMS

Safety Meeting Hot Work Permit Heat Stress Monitoring Form Spill Report Public Liabiity Accident Report Employee Injury Report Incident Report

Licensing & Environmental Operations Department

SAFETY MEETINGS

Project / Site: /			Date:	
Presented By:			Time:	
Topic(s) / Information Reviewed:		• 		
Comments / Follow-up Actions:				
	. *			

	ATTENDEES	
NAME	SIGNATURE	COMPANY
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Instructions:

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- Conduct a daily meeting prior to beginning each day's site activities
- Complete form and file with HASP
- Follow-up on any noted items and document resolution of any action items

Licensing & Environmental Operations Department

HOT WORK PERMIT

Project / Site:

Date: _____

Hot Work Description:

Welder Conducting Hot Work: ______ Fire Watch Representative:

PERMIT MUST BE COMPLETED IN ITS ENTIRETY AND POSTED BEFORE WORK BEGINS

ACTION ITEM	YES	NO	N/A
Has Construction Supervisor been notified of intended hot work?			
Hazardous materials involved? Name:			
Will hot work impact the general public and/or on-site workers?			
Will the intended hot work need to be coordinated with other Contractors who may be working on the Site to make them aware of any hazards and the scope of work to be performed?			
Have hazardous energy sources been identified, isolated, and locked out/tagged out before start of project?	·		
Will hot work be conducted within confined space?			
All testing equipment (i.e., combustible gas indicator, oxygen meter, etc.) and fire fighting equipment (i.e., extinguisher, etc.) have been checked to ensure proper operation and calibration before start of this project?			x
Does task require a designated fire watch (30 minutes after work)?			
Flammable and combustible materials within 35 feet have been cleared or shielded.			
All fuel sources have been identified and protected (Uts, ASTs, sewers, piping, etc.)			
The area has been restricted with proper barriers and signs.			
The Areas has been tested to be certain that atmosphere is 0% LEL before starting hot work.			
Flame sensitive areas and equipment (including cylinders and gas delivery lines) exposed to slag, heat, and sparks are protected by a flame resistant blanket, shield, or remcord from the area?			
Escape routes have been identified before starting work?			
Is ventilation equipment needed? Type need:			

PROTECTIVE EQUIPMENT REQUIRED					
EQUIPMENT	YES	NO	EQUIPMENT YES NO		
Welding Goggles / Shield	-		Hearing Protection		
Safety Shoes			Head Protection		
Leather gloves			Safety Harness		
Supplied Air Respirator			Welding Leather - Top		
APR Cartridge			Welding Leather - Bottom		

APPROVAL:

Construction Supervisor

Licensing & Environmental Operations Department

HEAT STRESS MONITORING FORM

Project / Site:

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Date:

	HEAT STRESS MONITORING FORM							
Date	Ambient Temp.	WBGT	Work/ Rest Regimen	Employee/ Location	Puisa Rate	Body Temp.	Body Water Loss	Comments
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Construction Supervisor / Site Safety and Health Officer:

Licensing & Environmental Operations Department

SPILL REPORT

Date of Spill Actual or Estimate	Time of Spill	Actual or Estimated
(circle one)		(circle one)
Date of Discovery Time	Discovered By	
Location: Road	Town/Village	
MGP Site		
Describe spill location and extent of visible Traces: _		·
	·	· · · · · · · · · · · · · · · · · · ·
(Draw sketch on back of this report. Include area visibly co	ntaminated and the center, landma	rks, distances, etc.)
Spilled Container type and size		
Cause of Spill		······
What was Spilled ?		
Estimated Quantity Spilled gallons or p	ounds (Circle one)	
Weather Conditions: Temp Degree F	Rain/Snow	Wind Conditions
Any discharge to water ? Describe	<u> </u>	
Depth of soil/stone, etc. removed	Quantitiy	_
Name NYSEG Employee Notified		· · ·
Date Notified Time Notified	d	
ist government agencies notified, (name, person, da	ate, time) Spill No.	·
	` <u>`</u>	
Write in see back and List on back if reqired)		
Describe restoration of site to original condition	· · · · · · · · · · · · · · · · · · ·	
Cleanup Completed: Date	Time	
		·
hereby certify that the clean-up has been performed a eport is true to the best of my know!sdge.	s described above and that the	information contained on th
Signature of Construction Supervisor		·
Name (print)		Date
	· .	· ·
and easy of both sides of report to the Drainet Mana	DAT NYSEG PO Box 5224 B	inghamton NIV 12002

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EMPLOYEE INJURY REPORT

Name of Injured Employee Number Social Security No. CA/CC Division Department Job Classification Date of Employment Home Street Address Home Phone City State Zip Date of Accident Day of week Time Where did the accident occur? County County Outside weather condition County Outside weather condition Homeowner's name Who was employee working with? Witnesses to accident When was Salaried Supervisor first notified of injury? House the specified. Decore nature of Way / Eless and fit all inforced body part.) What areas of the body were indirectly affected by injury/illness described above? (were none if exploration, ec.) What task was employee performing when injured? (enter descriptor: Le., waiting. Main Tie to Cours am instatistion, ec.) Was first-aid provided by someone other than yourself? If yes, what was done? Name and address of provider			CTION I	
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Was first-aid provided by someone other than yourself? If yes, what was done? Name and address of provider	.	· · · · · · · · · · · · · · · · · · ·	·	
If yes, what was done?		Was first-aid provided by someone other than yourself?		
Name and address of provider		If use what was done?		
Name and address of provider		It yes, what was done?	•••••	· · · · · · · · · · · · · · · · · · ·
Name and address of provider	-			
· · ·		Name and address of provider		
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<u> </u>	EMPLOYEE INJU	TION II		
	When was medical attention received?	Date Time		
	Medica! treatment rendered	· · ·		
		· · · · · · · · · · · · · · · · · · ·		
	Name and address of doctor/hospital		<u> </u>	
				<u></u>
	Were prescription drugs given? yes		_	
-	Started disability Date			
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	SE Injured Employee's Signature indicates they have of Fraudulent Workers' Compensatio	CTION III completed this report and disc n claims are subject to	ussed it with the criminal p	their supervisor. Denaities
	SE Injured Employee's Signature indicates they have of Fraudulent Workers' Compensatio under Section 114 of the New Yo Injured Employee Signature	CTION III completed this report and disc n claims are subject to ork State Workers' Con	ussed it with the criminal popper sation popper sation Date	their supervisor. Denaities 1 Law.
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INCIDENT REPORT

INSTRUCTIONS: This form is to be used for reporting all incidents, damages or losses involving Company property and/or employees (other than accidental personal injury and motor vehicle damages). Send completed report to the Security Department within 24 hours of the occurrence. (Incidents of a serious nature shall be reported immediately by telephone or personal contact to the Security Department, and the Risk Management Department when applicable.)

	·	
WHEN/WHERE Date of Incident	Time	AM PM
Location		
Street Address	Cay/Town/Village	County
PROPERTY INVOLVED		
Describe property damaged or stulen		
and give Serial/Model/NYSEG Capital		· ·
ESTIMATED LOSS \$		
INCIDENT Give brief summary:		
·····		
	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
Police Agency notified:	Officer:	Date:
Risk Management Department notified?	Yes No	
Submitte	d Bv	Ext.
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Date sub	11nuco	

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