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A Report Prepared for:

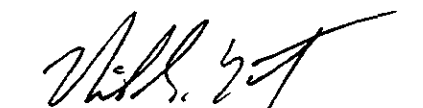
Kmart Corporation  
3100 West Big Beaver Road  
Troy, Michigan 48084-3163

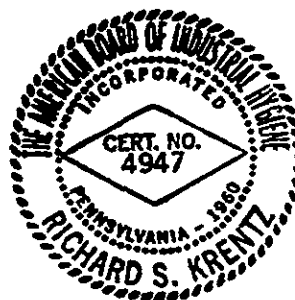
Attention: Mr. Richard G. Williams

**ADDENDUM  
SAFETY INFORMATION & CONTINGENCY PLAN  
FORMER AMERICAN NATIONAL CAN SITE  
3801 EAST EIGHTH STREET  
OAKLAND, CALIFORNIA**

**August 9, 1995**

  
James P. Dunn, R.G.  
Associate Geologist  
PES Environmental, Inc.

  
Richard S. Krentz, CIH  
Sterling & Associates



**389.0201.001**

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## 1.0 GENERAL INFORMATION

### 1.1 Background Information

This Addendum to the Safety Information and Contingency Plan<sup>1</sup> (Plan) was prepared by PES Environmental, Inc. (PES) for Kmart Corporation for the use of contractors performing activities related to redevelopment and/or construction on a portion of the subject site, located at 3801 East Eighth Street in Oakland, California (refer to Plate 1). More specifically, the addendum provides specific information for contractor activities slated for the Temporary Soil Storage Area located in the southeastern corner of the site (refer to Plate 2).

The subject site, formerly referred to as the American National Can Company (ANC) Oakland facility, has been used to manufacture food and beverage cans from approximately 1917 to 1988. Warehousing activities continued until the facility closed in 1991. The ANC facilities were demolished in mid-1994. The planned redevelopment of the site is for a Super Kmart store, a fast-food restaurant, associated parking, and landscaped areas. Construction of these new facilities is in progress.

Prior to redevelopment activities and as a result of environmental investigations conducted by ANC and its environmental consultants, contaminated soil was excavated and removed from several areas on the site under the guidance of Alameda County Department of Environmental Health (ACDEH), Cal/EPA-Department of Toxic Substances Control (DTSC), and California Regional Water Quality Control Board (RWQCB). Excavated soils from two areas (the RCRA-permitted drum storage area and the RCRA-permitted solder dross storage area) were staged in the Temporary Soil Storage Area prior to arranging for off-site transportation and disposal.

Upon removal of the excavated soils from the Temporary Soil Storage Area, the ground surface in this area was sampled and analyzed for organic and inorganic chemical constituents. The results of the analysis identified detectable concentrations of several chemicals which ANC has attributed to historical activities unrelated to the recent soil stockpiling. Further discussion of the detected chemical constituents are presented in Section 2.0.

### 1.2 Purpose and Objective

The primary objective of this Addendum is to ensure the well-being of construction personnel and other contractors that may work in the Temporary Soil Storage Area. To accomplish this objective, construction personnel and other contractors/subcontractors working in the Temporary Soil Storage Area will be provided, via this document, with an understanding of: (1) the site background conditions and potential chemical hazards from surface and potential subsurface contaminants in this area, and (2) appropriate work methods and practices specific to the Temporary Soil Storage Area to avoid chemical exposure.

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<sup>1</sup> PES Environmental, Inc., 1995. *Safety Information & Contingency Plan, Former American National Can Site, 3801 East Eighth Street, Oakland, California.* March 3.

Information regarding general work methods and practices as well as information regarding local emergency services in the event of an exposure to chemical contaminants is provided in the Plan. All such workers shall be informed of the policies and procedures established herein during an initial information meeting conducted prior to commencement of activities in the subject area and during onsite tailgate meetings to be conducted by site supervisors. The information and tailgate meetings shall follow protocols outlined in the Plan.

## 2.0 DETECTED CHEMICAL CONSTITUENTS

Chemical analysis of surface soil samples in the Temporary Soil Storage Area identified concentrations of the following chemical constituents:

- Total Petroleum Hydrocarbons (TPH) quantified as diesel;
- TPH quantified as mineral spirits;
- Tetraethyl Lead (organic lead);
- Hexavalent Chromium;
- Inorganic Lead; and
- Zinc.

The analytical results indicate that TPH quantified as diesel and mineral spirits were identified in the surface soil samples at concentrations up to 5,900 milligrams per kilogram (mg/kg) and 2,900 mg/kg, respectively. Organic lead was identified in three of the surface soil samples at concentrations ranging from 0.65 mg/kg to 9.6 mg/kg. Hexavalent chromium was identified in one duplicate sample at a concentration of 0.11 mg/kg. Total lead and zinc were identified at concentrations ranging from 6.1 to 360 mg/kg and 27 to 320 mg/kg, respectively. As indicated by ANC and its environmental consultant, the constituents are likely present in the surface soil due to: (1) oil treatment as part of historical construction of asphalt surfaces formerly present in the Temporary Soil Storage Area, or (2) other non-specific historical activities, such as former railroad spur tracks.

In addition to the aforementioned constituents, concern has been raised by the DTSC over the potential presence of semi-volatile organic chemicals (SOCs) which may be present at concentrations below laboratory detection limits but above site-specific performance standards for closure of ANCs former RCRA-permitted storage facilities. Because no listed SOC were detected in surface soil samples, selection of particular SOC for discussion of potential health effects has been based on findings of previous sampling and chemical analysis conducted in the two former RCRA-permitted storage areas (the origin of the previously stockpiled soil). In these two areas, SOC detected in one or more soil samples included naphthalene and bis(2-ethylhexyl)phthalate. Naphthalene was identified in two samples at concentrations ranging from 0.76 to 4.1 mg/kg. Bis(2-ethylhexyl)phthalate was identified in four samples at concentrations ranging from 0.37 to 4 mg/kg.

A discussion of potential health effects of the total petroleum hydrocarbons quantified as diesel and mineral spirits and inorganic metals was presented in the Plan. The following information pertains to the remaining detected constituents, organic lead and the aforementioned SOC identified in soils in one or both of the two former RCRA storage areas. In addition to the information provided below, further details on the chemical constituents identified or potentially present in Temporary Soil Storage Area are found in the Material Safety Data Sheets (Appendix A).

### Organic Lead

Organic lead is a colorless liquid usually dyed red, orange or blue and has a slightly musty odor. It has an extremely high vapor density, greater than 8 times that of air and is used primarily as a gasoline additive to prevent engine knock. Organic lead is an organometallic compound which can be readily absorbed through the skin. Toxic levels can be absorbed through the skin even if airborne levels of the chemical are within acceptable levels. Organic lead affects the central nervous system (CNS), with symptoms such as psychosis, mania, convulsions, etc. Other acute effects include: insomnia, lassitude, anxiety, tremors, heart irregularities hypotension, pallor, nausea, anorexia, hallucinations, convulsions, and coma.

### Naphthalene

Naphthalene has an aromatic odor, and in its pure form is characterized by white crystalline, volatile flakes. Naphthalene is insoluble in water. Naphthalene is a human poison by ingestion and possibly other routes, an experimental tumorigen and reproductive affector. Exposure to naphthalene can also cause nausea, headache, diaphoresis, hematuria, fever, anemia, liver damage, vomiting convulsions and coma. Naphthalene is flammable when exposed to heat or flame, and is explosive in the form of dust or vapor when exposed to heat or flame.

### Bis(2-ethylhexyl)phthalate

Bis(2-ethylhexyl)phthalate (also known as dioctyl phthalate or DOP) is a light-colored liquid with a slight odor. When heated to decomposition it emits an acrid smoke. This chemical is a suspected human carcinogen and has tetratogenic effects in laboratory animals. DOP is a mild skin and eye irritant. The inhalation of significant concentrations of DOP vapors is not likely due to its low vapor pressure.

### 3.0 POTENTIAL HAZARDS & CONTROLS

The planned future use of the Temporary Soil Storage Area is for part of a larger parking area for the new Super Kmart retail center. Construction activities in this area will include minor grading, and irrigation and electrical infrastructure installation, prior to construction of an asphalt surface cover. Based on these planned activities, worker safety issues have been divided into three categories based on the potential degree of exposure. These categories include: (1) equipment operators who will have no contact with surface soils, with the exception of ingress and egress to heavy equipment, (2) construction personnel who will work or move on the surface of the Temporary Soil Storage Area with minimal or no disturbance of the soil, and (3) construction personnel whose activities require disturbance of the surficial and near-surface soils. Control measures for each of these categories are provided in the following paragraphs. These activities and corresponding controls are specific to the Temporary Soil Storage Area. Information on general work practices and controls can be found in the Plan.

#### 3.1 Activity Type 1 - Construction Vehicle Traffic

##### Activity:

Activity Type 1 covers personnel in any type of heavy equipment or other vehicle driving or working on the surface of the Temporary Soil Storage Area.

##### Control Measures:

- Vehicular traffic in this area will be minimized whenever possible.
- Dust generation in the Temporary Soil Storage Area will be minimized whenever necessary utilizing water spray suppression techniques.
- Driving on the soils in this area should not be conducted unless the soil has been adequately moistened to minimize dust generation.
- If noticeable vapors or dusts are encountered within this area, the vehicles should drive with the windows and vents in the closed position.
- If odors persist or are sustained over a period of time (i.e., 15 minutes), air monitoring of the area may be necessary.
- Eating, smoking or drinking in the Temporary Soil Storage Area will not be allowed.
- Contractors will not park vehicles in the Temporary Soil Storage Area.

#### 3.2 Activity Type 2 - Grading Contractor Foot Traffic (Soils Not Disturbed)

##### Activity:

Activity Type 2 includes personnel walking across or working on the surface of the Temporary Soil Storage Area, but not excavating or otherwise disturbing the soil. An example of this type of activity is surveying or grade checking.



**Control Measures:**

- Pedestrian traffic in this area will be minimized whenever possible.
- Dust generation in the Temporary Soil Storage Area will be minimized whenever necessary utilizing water spray suppression techniques.
- Walking on soil surfaces which are visibly stained should be avoided.
- If soil or mud accumulates on the footwear of workers the soil should be removed at this location prior to entering vehicles or leaving the area. This gross decontamination can be accomplished by scraping the boot or using an appropriate hand tool.
- If odors persist or are sustained over a period of time (i.e., 15 minutes), air monitoring of the area may be necessary.
- Eating, smoking or drinking in the Temporary Soil Storage Area will not be allowed.
- Contractors will not park vehicles in the Temporary Soil Storage Area.

**3.3 Activity Type 3 - Trenching/Otherwise Disturbing the Soil****Activity:**

Activity Type 3 includes personnel involved in digging, moving, or otherwise disturbing soils in the Temporary Soil Storage Area. These activities may include trenching for utilities and construction of foundations for parking lot light standards.

**Control Measures:**

- Vehicular and pedestrian traffic in this area will be minimized whenever possible.
- Dust generation in the Temporary Soil Storage Area will be minimized whenever necessary utilizing water spray suppression techniques.
- Walking on soil surfaces which are visibly stained should be avoided.
- If soil or mud accumulates on the footwear of workers, the soil should be removed at this location prior to entering vehicles or leaving the area. This gross decontamination can be accomplished by scraping the boot or using an appropriate hand tool.
- Handling of the soils in this area should be avoided. If handling of soil in this area is necessary, chemical protective gloves may be necessary. Glove material composition should include, nitrile, neoprene, or butyl. Following handling of the soil, hands and other exposed skin surfaces should be washed prior to eating, drinking or smoking.
- Clothing worn during work in the Temporary Soil Storage Area shall be cleaned daily or a disposable protective coverall shall be used and disposed of on a daily basis.

- Eating, smoking or drinking in the Temporary Soil Storage Area will not be allowed.
- Contractors will not park vehicles in the Temporary Soil Storage Area.
- If odors persist or are sustained over a period of time (i.e., 15 minutes), air monitoring of the area may be necessary.

**ILLUSTRATIONS**

0 200  
 APPROXIMATE SCALE IN FEET

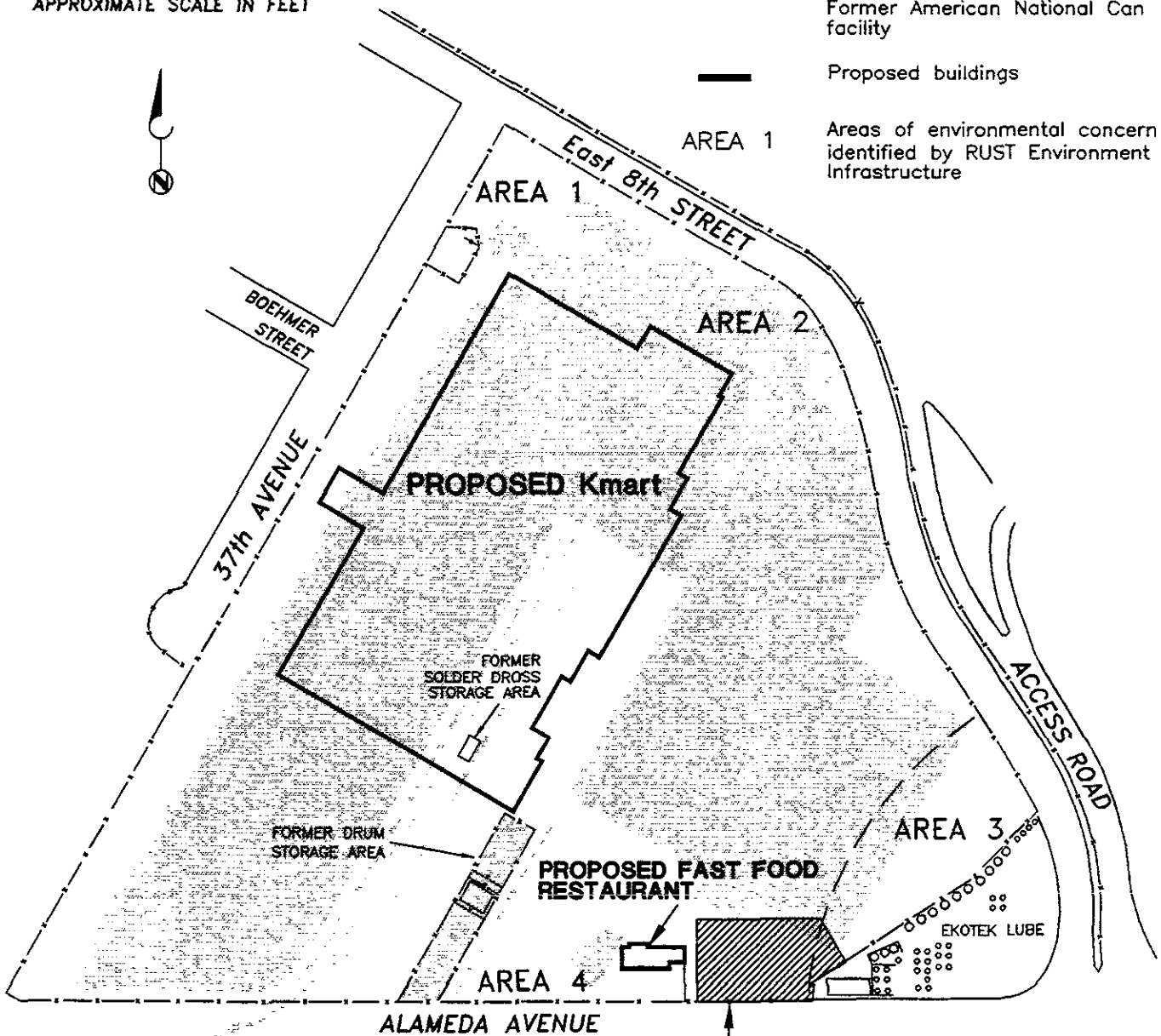


**EXPLANATION**

Former American National Can facility

Proposed buildings

Areas of environmental concern identified by RUST Environment & Infrastructure



Temporary Soil Storage Area



Site Plan  
 Former American National Can Site  
 3801 East Eighth Street  
 Oakland, California

PLATE  
**2**

**APPENDIX A**

**MATERIAL SAFETY DATA SHEETS**

# Material Safety Data Sheet

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



No. 624

NAPHTHALENE

Issued: November 1987

24



## SECTION 1. MATERIAL IDENTIFICATION

**Material Name:** NAPHTHALENE

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

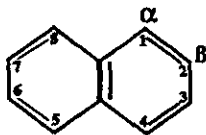
**Other Designations:** Naphthalin; Naphthene; Tar Camphor; C<sub>10</sub>H<sub>8</sub>;  
 NIOSH RTECS No. QJ0525000; CAS No. 0091-20-3

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

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

## SECTION 2. INGREDIENTS AND HAZARDS

Naphthalene, CAS No. 0091-20-3



\*Immediately dangerous to life and health

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

## EXPOSURE LIMITS

ca 100

IDLH\* Level: 500 ppm

ACGIH TLVs, 1987-88  
 TLV-TWA: 10 ppm, 50 mg/m<sup>3</sup>  
 OSHA PEL  
 8-Hr TWA: 10 ppm, 50 mg/m<sup>3</sup>  
 Toxicity Data\*\*  
 Child, Oral, LD<sub>50</sub>: 100 mg/kg  
 Man, Unknown, LD<sub>50</sub>: 74 mg/kg  
 Rat, Oral, LD<sub>50</sub>: 1250 mg/kg

## SECTION 3. PHYSICAL DATA

**Boiling Point:** 424°F (218°C)  
**Vapor Density (Air = 1):** 4.4  
**Vapor Pressure:** 0.087 Torr at 77°F (25°C)  
**Water Solubility:** Insoluble

**Specific Gravity (H<sub>2</sub>O = 1):** 1.162 at 68°F (20°C)  
**Melting Point:** 176°F (80°C)  
**Molecular Weight:** 128 Grams/Mole  
**% Volatile by Volume:** ca 100

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

## SECTION 4. FIRE AND EXPLOSION DATA

LOWER UPPER

Flash Point and Method

Autoignition Temperature

Flammability Limits in Air

174°F (79°C) OC; 190°F (88°C) CC

979°F (526°C)

% by Volume

0.9

5.9

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

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

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

## SECTION 5. REACTIVITY DATA

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

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

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

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

**SECTION 6. HEALTH HAZARD INFORMATION**

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

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

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

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

**FIRST AID**

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

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

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

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

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

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

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

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

**OSHA Designations**

Air Contaminant (29 CFR 1910.1000, Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U165

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

**SECTION 8. SPECIAL PROTECTION INFORMATION**

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

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

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

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

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

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

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

**Transportation Data (49 CFR 172.101-2)**

DOT Shipping Name: Naphthalene

DOT Hazard Class: ORM-A

IMO Class: 4.1

DOT ID No. UN1334

IMO Label: Flammable Solid

DOT Label: None

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

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Approvals

Indust. Hygiene/Safety

Medical Review

15



Section 1. Material Identification

**Tetraethyl Lead [(C<sub>2</sub>H<sub>5</sub>)<sub>4</sub>Pb]** Description: Derived by alkylation of lead-sodium alloy with excess ethyl chloride in a nitrogen atmosphere or electrolysis of an ethyl Grignard reagent with an anode of lead pellets. Used as anti-knock agent in gasoline aviation fuel. Formerly used in organomercury fungicides and in the manufacture of other metal alkyls such as ethyl mercury compounds. Since 1974 its use in gasoline was largely replaced by methyl tert butyl ether [(MTBE), see Genium MSDS No. 735] after the USEPA issued regulations requiring its gradual reduction in gasoline. Du Pont was the last known company to produce TEL in the US and stopped production in 1990. There are still US companies with branches in Canada that continue to manufacture tetraethyl lead since it is still widely used in gasoline there and in Europe.

R 3  
I 4  
S -\*  
K 1  
\* Skin absorption



HMIS  
H 3†  
F 2  
R 3  
PPE-Sec. 8  
† Chronic effects

Other Designations: CAS No. 78-00-2, TEL, NCI-C54988, tetraethyl plumbane.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*<sup>(73)</sup> for a suppliers list.

Cautions: Tetraethyl lead is highly toxic to the central nervous system (CNS). The liquid and vapor are easily absorbed through the skin because of TEL's lipid solubility. It is a combustible liquid and can decompose explosively if exposed to air.

Section 2. Ingredients and Occupational Exposure Limits

Tetraethyl lead, ca 98%. Impurities include ethylene dibromide, ethylene dichloride, dye (red, blue, orange), and kerosene.

1991 OSHA PEL (Skin) 8-hr TWA: 0.075 mg/m <sup>3</sup>	1992-93 ACGIH TLV* (Skin) TWA: 0.1 mg/m <sup>3</sup>	1985-86 Toxicity Data† Human, unreported route, TD <sub>Lo</sub> : 1.47 mg/kg; toxic effects not yet reviewed. Rat, oral, LD <sub>50</sub> : 12.3 mg/kg caused aggression, altered sleep time, and convulsions or effect on seizure threshold. Rat, inhalation, LC <sub>50</sub> : 850 mg/m <sup>3</sup> /1 hr; toxic effects not yet reviewed Rat, oral, TD <sub>Lo</sub> : 7.5 mg/kg administered from 12 to 14 days of pregnancy caused post-implantation mortality or effects on the developing fetus.
1990 IDLH Level 40 mg/m <sup>3</sup>	1990 DFG (Germany) MAK (Skin) TWA: 0.01 ppm (0.075 mg/m <sup>3</sup> ) Category II: substances with systemic effects Half-Life: < 2 hr Peak Exposure Limit: 0.02 ppm, 30 min average value, 4/shift	
1990 NIOSH REL (Skin) 10-hr TWA: 0.075 mg/m <sup>3</sup>		

\* Biologic monitoring is essential for personnel control.  
† See NIOSH, RTECS (TP4550000), for additional reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data

Boiling Point: ~ 392 °F (200 °C); decomposes	Water Solubility: Insoluble, 0.29 mg/L at 77 °F (25 °C)
Freezing Point: -214.2 °F (-136.8 °C)	Other Solubilities: Soluble in benzene, diethyl ether, gasoline, and petroleum ether. Slightly soluble in alcohol.
Molecular Weight: 323.45	Vapor Pressure: 0.2 mm Hg at 68 °F (20 °C); 1 mm Hg at 101.12 °F (38.4 °C)
Specific Gravity: 1.59 at 51.8 °F (11 °C)	Saturated Vapor Density (Air = 1.2 kg/m <sup>3</sup> ): ~ same as air
Ionization Potential: 11.10 eV	Relative Evaporation Rate: 0.032 g/m <sup>2</sup> at 68 °F (20 °C) and wind speed of 4.5 meter /second
Surface Tension: 28.5 dyne/cm	Refraction Index: 1.5198 at 68 °F (20 °C/D)
Viscosity: 0.864 mPa.s at 68 °F (20 °C)	

Appearance and Odor: Colorless liquid which may be dyed orange, red, blue or other color and has a slight musty odor.

Section 4. Fire and Explosion Data

Flash Point: 200 °F (93.3 °C), CC; 185 °F (85 °C), OC	Autoignition Temperature: None reported	LEL: 1.8% v/v	UEL: None reported
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Extinguishing Media: A Class III B combustible liquid. For small fires, use dry chemical, carbon dioxide, water spray, or regular foam. For large fires, use water spray, fog, or regular foam.

Unusual Fire or Explosion Hazards: Container may explode in heat of fire (> 80 °C). Tetraethyl lead burns as an orange flame with a green margin and gives off extremely poisonous lead fumes.

Special Fire-fighting Procedures: 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. Structural firefighters' protective clothing is not effective for tetraethyl lead fires. Use clothing specifically recommended by manufacturer (be aware that these may or may not provide thermal protection). Apply cooling water to sides of fire-exposed containers until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use monitor nozzles or unmanned hose holders; if this is impossible, withdraw and let fire burn. Do not release runoff from fire control methods to sewers or waterways. Evacuate 1/3 mile radius if fire becomes uncontrollable.

Section 5. Reactivity Data

**Stability/Polymerization:** TEL decomposes slowly at room temperature and rapidly at 125 to 150 °C. It also decomposes when exposed to sun or allowed to evaporate in air. Exposure to air for several days can cause explosive decomposition. Hazardous polymerization cannot occur.

**Chemical Incompatibilities:** TEL solubilizes fatty materials and has solvent action on rubber. It is incompatible with strong oxidizers, sulfuryl chloride, potassium permanganate, and rust.

**Conditions to Avoid:** Exposure to heat, ignition sources, sunlight, air, strong oxidizers, and other incompatibles.

**Hazardous Products of Decomposition:** Thermal oxidative decomposition of TEL can produce carbon dioxide (CO<sub>2</sub>) and toxic lead (Pb) fumes.

Section 6. Health Hazard Data

**Carcinogenicity:** The IARC,<sup>(164)</sup> NTP,<sup>(169)</sup> and OSHA<sup>(164)</sup> do not list tetraethyl lead as a carcinogen. One study showed liver and blood tumors (Hodgkins disease) in mice, termed unreliable because these tumors tend to occur spontaneously at times in this particular strain of mice.

**Summary of Risks:** Do not confuse the effects of tetraethyl lead (TEL) with those caused by inorganic lead exposure. TEL is organic and while both are water insoluble, TEL is lipid soluble and easily enters the as brain while inorganic lead compounds can't. Neurologic symptoms are more prevalent than any others. Tetraethyl lead has a latency period from exposure time to onset of symptoms as it must first be metabolized to triethyl lead before toxicity results. The greater the exposure concentration, the faster symptoms develop. TEL's ability to produce chronic toxicity has been debated for years as is the efficacy of chelation therapy. Chronic toxicity was thought not to occur with organic lead compounds because they did not accumulate in the bone like inorganic lead.

Continue on next page



**Section 6. Health Hazard Data**

Recently, studies showed that TEL is first metabolized to triethyl lead, then over a period of months, converted to inorganic lead which is then deposited in bone. At this point chronic effects could resemble those caused by direct exposure to inorganic lead. If victim survives an acute exposure, recovery may take weeks to months. It is questionable whether all changes are reversible following heavy or long-term exposures. Teratogenic effects may occur; 'a syndrome with severe mental retardation has been seen among children of heavy gasoline sniffers'.<sup>(136)</sup> **Medical Conditions Aggravated by Long-Term Exposure:** Mental disorders and hypertension. **Target Organs:** CNS, cardiovascular system, eyes, liver, kidneys. **Primary Entry Routes:** Eye, skin, inhalation, ingestion. **Acute Effects:** The primary target organ is the brain, and CNS effects occur in three categories; mild, moderate, and severe. Mild effects include anxiety, irritability, insomnia, lurid dreams, vomiting, metallic taste, paleness, cerebellar ataxia, and diarrhea. Moderate effects are disorientation, hyperexcitability, tremors, chorea (involuntary incoordination of face and limbs), bradycardia (slow heart action), hypotension (abnormally low blood pressure), and hypothermia (lowered body temperature). Severe symptoms include delusions, hallucinations, mania, convulsions, cerebellar edema (fluid in the brain), coma, and death. Ringing in the ears, impaired vision (due to weakening of the eye muscles), elevated liver enzymes, and anemia may also occur. **Chronic Effects:** May occur once TEL is metabolized to inorganic lead. Symptoms include anemia, appetite loss, weakness, insomnia, muscle and joint pain, and colic accompanied by severe abdominal pain. See *Genium* MSDS No. 713.

**FIRST AID** **Eyes:** Do not allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately. **Skin:** Quickly remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center unless otherwise advised, have that *conscious and alert* person drink 1 to 2 glasses of water to dilute. Induce vomiting *only* if large amounts are ingested. **Note to Physicians:** Urine lead levels are better indicators of exposure than blood lead levels. Blood lead levels may not reflect exposure until toxicity is severe where as urine directly reflects amount of exposure. In severe acute toxicity, urine lead levels are usually > 350 µg/L but blood levels are < 50 µg/L. Chelation therapy can be useful for chronic exposure but not for acute. If blood levels are greater than 50 µg/dL begin chelation therapy with BAL, calcium EDTA, or D-penicillamine

**Section 7. Spill, Leak, and Disposal Procedures**

**Spill/Leak:** Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Shut off ignition sources. For small spills, take up with earth, sand, vermiculite or charcoal absorbent (decreases evaporation) and place in suitable containers. Dike far ahead of large spill, neutralize with agricultural (slaked) lime, sodium bicarbonate, or crushed limestone and adjust to pH 7. Investigate reclamation or disposal. Follow applicable OSHA regulations (29 CFR 1910.120). **Ecotoxicity Values:** Bluegill, TLM = 2, 1.4, and 0.2 mg/L at 24, 48, and 96 hr, respectively. **Environmental Degradation:** In the atmosphere, TEL rapidly degrades by reaction with photochemically produced hydroxyl radicals and ozone molecules. The half-life is ~ 1.5 to 5 hr depending on solar intensity. In water, volatilization is expected. Half-life from a model river is 5.3 hr and 3 days in a model pond. It is also subject to hydrolysis and direct photolysis. Some TEL may degrade into dialkyl and trialkyl lead which may be more resistant in water than TEL itself. Bioaccumulation may occur in aquatic organisms. If released to soil, some TEL is expected to degrade to water soluble compounds and leach, although some may volatilize or undergo direct photolysis if exposed to sunlight. **Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

**EPA Designations**

Listed (as lead compounds) as a SARA Toxic Chemical (40 CFR 372.65)  
Listed as a SARA Extremely Hazardous Substance (40 CFR 355), TPQ: 100 lbs  
Listed as a RCRA Hazardous Waste (40 CFR 261.33): P110  
Listed as a CERCLA Hazardous Substance\* (40 CFR 302.4): Final Reportable Quantity (RQ), 10 lb (4.54 kg) [\* per RCRA, Sec. 3001 & CWA, Sec. 311 (b)(4)]

**OSHA Designations**

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

**Section 8. Special Protection Data**

**Goggles:** Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** 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. For < 0.75 mg/m<sup>3</sup>, use any supplied-air respirator (SAR) or SCBA. For < 1.875 mg/m<sup>3</sup>, use any SAR operated in continuous-flow mode. For < 3.75 mg/m<sup>3</sup>, use any SCBA or SAR with a full facepiece or a SAR with a tight fitting facepiece operated in continuous-flow mode. For < 40 mg/m<sup>3</sup>, use any SAR operated in pressure-demand or other positive pressure mode. 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 respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent skin contact. Do not use rubber as material for PPE (TEL may degrade rubber). **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below OSHA PEL (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into work area by controlling it at the source.<sup>(103)</sup> **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes and launder before reuse. Remove this material from your shoes and clean PPE. **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. Special Precautions and Comments**

**Storage Requirements:** Store in a cool, dry, dark, well-ventilated area (equipped with an automatic sprinkler system) away from heat, ignition sources, and incompatibles (Sec. 5). Keep containers tightly closed; exposure to air can lead to explosive decomposition. **Engineering Controls:** To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. Use nonsparking tool for any maintenance procedures. **Administrative Controls:** Consider preplacement and periodic medical exams of exposed workers with emphasis on the CNS, including personality changes. For greater assurance of individual protection, monitor urinary output of exposed workers.

**Transportation Data (49 CFR 172.101)**

**DOT Shipping Name:** Tetraethyl lead, liquid  
**DOT Hazard Class:** 6.1  
**ID No.:** NA1649  
**DOT Packing Group:** I  
**DOT Label:** Poison, Flammable liquid  
**Special Provisions (172.102):** —

**Packaging Authorizations**  
a) Exceptions: None  
b) Non-bulk Packaging: 173.201  
c) Bulk Packaging: None

**Quantity Limitations**  
a) Passenger Aircraft or Railcar: Forbidden  
b) Cargo Aircraft Only: Forbidden  
**Vessel Stowage Requirements**  
a) Vessel Stowage: E  
b) Other: 40

**MSDS Collection References:** 23, 73, 89, 101, 103, 124, 126, 127, 132, 136, 140, 148, 149, 153, 159, 162, 163, 164, 167, 174, 175  
**Prepared by:** M Gannon, BA; **Industrial Hygiene Review:** PA Roy, MPH, CIH; **Medical Review:** AC Darlington, MPH, MD



Section 1. Material Identification

Di(2-ethylhexyl)phthalate (C<sub>24</sub>H<sub>38</sub>O<sub>2</sub>) Description: Prepared by acid-catalyzed reaction of 2-ethylhexanol with phthalic anhydride. Used in plasticizing a variety of polymeric materials such natural rubber, synthetic rubber, nitrocellulose, ethyl cellulose, cellulose acetate butyrate, polymethyl methacrylate, polyvinyl butyral, polyvinylidene chloride, and polystyrene; as an organic pump fluid; as a testing agent for air filtration systems, a component of dielectric fluids in electrical capacitors, an inert ingredient in pesticide formulations; in liquid soaps, detergents, rubbing alcohol, decorative inks, lacquers, photographic film, wire and cable, adhesives, industrial and lubricating oils, munitions, and defoaming agents used during paper and paperboard manufactures.

R	0	NFPA 1 0 0 HMIS H 0 F 1 R 0 PPG* * Sec.
I	2	
S	2	
K	1	

Other Designations: CAS No. 0117-81-7, 1, 2-benzenedicarboxylic acid bis(2-ethylhexyl) ester, DEHP, di-sec-octyl phthalate, dioctyl phthalate, DOP, octyl phthalate.  
Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*<sup>(7)</sup> for a suppliers list.  
Cautions: Di(2-ethylhexyl)phthalate is a possible human carcinogen. Di(2-ethylhexyl)phthalate is a mild skin, eye, and mucous membrane irritant. It affects the gastrointestinal (GI) tract.

Section 2. Ingredients and Occupational Exposure Limits

Di(2-ethylhexyl)phthalate, ca 100%

<b>1989 OSHA PEL</b> 8-hr TWA: 5 mg/m <sup>3</sup>	<b>1990-91 ACGIH TLVs</b> TWA: 5 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup>	<b>1985-86 Toxicity Data*</b> Man, oral, TD <sub>01</sub> : 143 mg/kg ingested produces gastrointestinal effects Rat, oral, LD <sub>50</sub> : 30600 mg/kg Rabbit, skin, LD <sub>50</sub> : 25 gm/kg; toxic effects not yet reviewed
<b>1988 NIOSH REL</b> Reduce to lowest feasible limit		

\* See NIOSH, RTECS (TI0350000), for additional irritative, mutative, reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data

<b>Boiling Point:</b> 446 °F (230 °C) at 5 mm Hg	<b>Molecular Weight:</b> 390.54
<b>Melting Point:</b> -58 °F (-50 °C)	<b>Specific Gravity (20°C/20°C):</b> 0.9861
<b>Vapor Pressure:</b> 1.32 mm Hg at 392 °F (200 °C)	<b>Water Solubility:</b> <0.01% in water at 77 °F (25 °C)
<b>Vapor Density (Air = 1):</b> 16	<b>Viscosity:</b> 81.4 centipoise at 20 °C
<b>1 ppm = ~15.94 mg/m<sup>3</sup></b>	<b>Pour Point:</b> -50.8 °F (-46 °C); 8.2 lb/gal at 20 °C
<b>Appearance and Odor:</b> Light colored liquid with a slight odor.	

Section 4. Fire and Explosion Data

**Flash Point:** 420 °F (215 °C), OC | **Autoignition Temperature:** 735 °F (390 °C) | **LEL:** 0.3% v/v at 474 °F (245 °C) | **UEL:** None reported  
**Extinguishing Media:** Use dry powder, carbon dioxide, or foam to fight a fire involving di(2-ethylhexyl)phthalate. Water or foam may cause frothing.  
**Unusual Fire or Explosion Hazards:** This material offers no unusual fire hazards beyond those encountered with ordinary combustible materials.  
**Special Fire-fighting Procedures:** Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode. Be aware of runoff from fire control methods. Do not release to sewers or waterway.

Section 5. Reactivity Data

**Stability/Polymerization:** Di(2-ethylhexyl)phthalate is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.  
**Chemical Incompatibilities:** This OSHA Class III-B combustible liquid is incompatible with strong oxidizing agents.  
**Hazardous Products of Decomposition:** Thermal oxidative decomposition of di(2-ethylhexyl)phthalate can produce acrid smoke and fumes including carbon dioxide and carbon monoxide.

**Section 6. Health Hazard Data**

**Carcinogenicity:** The NTP and IARC list di(2-ethylhexyl)phthalate as an anticipated human carcinogen and possible human carcinogen (Group 2B), respectively. Experimental studies show that di(2-ethylhexyl)phthalate has teratogenic effects in laboratory animals.

**Summary of Risks:** Di(2-ethylhexyl)phthalate is a mild skin and eye irritant. It affects the human gastrointestinal tract since it is absorbed intact from the gastrointestinal tract. However, when administered either intravenously or orally, it is rapidly metabolized to derivatives excreted mainly in urine or bile. Central nervous system (CNS) depression may occur, especially with ingestion of large amounts. Skin sensitization does not occur in humans. Inhalation of any significant amount is probably unlikely due to the low vapor pressure. Di(2-ethylhexyl)phthalate has become an environmental contaminant that may accumulate in the food chain.

**Medical Conditions Aggravated by Long-Term Exposure:** None reported.

**Target Organs:** Eyes, upper respiratory system, skin, central nervous system.

**Primary Entry Routes:** Inhalation, ingestion.

**Acute Effects:** Symptoms of overexposure include conjunctivitis, keratitis (inflammation of the eye's cornea), bronchial irritation, eczema, staggering, abdominal cramps, nausea, and diarrhea. CNS depression—lethargy, drowsiness, staggering, and sleepiness—can result from absorbing large amounts.

**Chronic Effects:** None reported.

**FIRST AID**

**Eyes:** Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

**Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.

**Inhalation:** Remove exposed person to fresh air and support breathing as needed.

**Ingestion:** Never give anything by mouth to an unconscious or convulsing person. If ingested, *do not induce vomiting*. Consult a physician immediately.

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

**Section 7. Spill, Leak, and Disposal Procedures**

**Spill/Leak:** Notify safety personnel. Contain and pick up spilled material with some noncombustible absorbent material. For large spills, dike far ahead to contain. Place in appropriate containers for disposal. Prevent losses into the environment whenever possible. Do not release to sewers or waterways. This material degrades in fresh water sediments under aerobic conditions; half-life is ~14 days. It does not degrade under anaerobic conditions. It is readily concentrated by aquatic organisms. Clean up trace residues with water and detergent. Follow applicable OSHA regulations (29 CFR 1910.120).

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

**EPA Designations**

Listed as a RCRA Hazardous Waste (40 CFR 261.33); Waste No. U028

Listed as a CERCLA Hazardous Substance\* (40 CFR 302.4), Reportable Quantity (RQ): 1 lb (0.45 kg) [\* per RCRA, Sec. 3001]

OSHA Extremely Hazardous Substance (40 CFR 355): Not listed

OSHA Toxic Chemical (40 CFR 372.65): Not listed

**OSHA Designations**

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

**Section 8. Special Protection Data**

**Goggles:** Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

**Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. 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.*

**Other:** Wear impervious gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact.

**Ventilation:** Provide general and local ventilation systems to maintain airborne concentrations below the OSHA PEL and ACGIH TLVs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.<sup>(109)</sup>

**Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

**Contaminated Equipment:** Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.

**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. Special Precautions and Comments**

**Storage Requirements:** Store in closed containers in a well-ventilated area away from oxidizing agents and heat and ignition sources. To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations in production and storage areas.

**Engineering Controls:** Avoid prolonged or repeated contact with liquid and inhalation of mist or vapors. Institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Practice good personal hygiene and housekeeping procedures.

**Transportation Data (49 CFR 172.101, .102):** Not listed

**MSDS Collection References:** 1-12, 14, 23, 38, 47, 73, 101, 103, 124, 126, 127, 132, 133, 136, 138, 143, 146

Prepared by: MJ Allison, BS; Industrial Hygiene Review: DJ Wilson, CIH; Medical Review: AC Darlington, MD; Edited by: JR Stuart, MS

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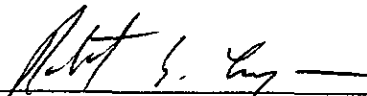
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