

**APPENDIX A
ACTIVITY HAZARD ANALYSES**

ACTIVITY HAZARD ANALYSIS
Backfilling and Compaction

Activity	Potential Hazards	Recommended Controls
Backfilling	Heavy equipment operations	Before any machinery or mechanized equipment is placed into service, a competent mechanic must inspect, test and certify to be in safe operating condition.
	Areas on or adjacent to contaminated material	Implement appropriate level of protection.
		Implement dust control measures.
		Inspect equipment before placing into service and at the beginning of each shift.
		Follow preventive maintenance procedures recommended by the manufacturer.
		Use lockout-tagout procedures for equipment found to be faulty or undergoing maintenance.
		Ensure that only designated personnel operate machinery and mechanized equipment.
		Ensure that no personnel get off or on any equipment while it is in motion.
		Do not allow machinery or equipment requiring an operator to run unattended.
		Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
		Shut down all machinery or equipment and take positive means to prevent its operation while repairs or manual lubrications are being completed.
		Make all repairs on machinery or equipment at a location that provides protection from traffic for repair persons.
		Fully lower or block bulldozer and scraper blades, end-loader buckets, and similar equipment when being repaired or when not in use.
		Ensure that all self-propelled construction equipment is equipped with a back-up alarm.
	Overhead power lines	Follow Program Health and Safety Plan guidelines.
Fire	Ensure that each bulldozer, backhoe, or other similar equipment is equipped with at least one dry chemical fire extinguisher having a minimum UL rating of I A513C.	
Open excavations	Adhere to IT Policy and Procedure HS307 "Excavation and Trenching" at all times.	
	Backfill excavations as soon as possible.	
Contact with moving equipment	Ensure that ground personnel wear reflective vests.	
Noise	The use of hearing protection is mandatory for noise levels above 85 dBA.	

ACTIVITY HAZARD ANALYSIS
Backfilling and Compaction (Continued)

Activity	Potential Hazards	Recommended Controls
Final grading	Contaminated borrow material	Check historical and analytical data on borrow material.
	Noise hazards	Use hearing protection (mandatory) for noise levels above 85 dBA.
	Use qualified operators	Ensure that all grounding is in place.
	Heavy equipment travel	Use qualified operators.
	Mechanical moving parts, pinch, paint, etc.	Ensure that all grounding is in place.
Nuclear density gauge	Radiation	Ensure that all emergency stop switches are working.
		Ensure that trained and qualified operators operate equipment.
		Ensure that equipment operators are aware of gauge location.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Heavy equipment 	<ul style="list-style-type: none"> • Pre-/postmaintenance • Visual prior to use • CESP Form 150 R 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication

**ACTIVITY HAZARD ANALYSIS
Baseline Field Measurement**

Activity	Potential Hazards	Recommended Controls
Free product/groundwater measurement	Contact with contaminated materials	Use proper PPE as detailed in Section 5.0 of this SHSP.
	Biological hazards	Inspect wellheads carefully before inserting hands.
		Check area for poison oak and summac.
Slips, trips ,falls	Use care when working on uneven ground surfaces.	
Equipment to be Used	Inspection Requirements	Training Requirements
Oil/water level probe	Prior to sue	
Photo-ionization detector		

**ACTIVITY HAZARD ANALYSIS
Collection Trench Installation**

Activity	Potential Hazards	Recommended Controls
Excavation	Open excavations	Adhere to IT Policy and Procedure HS 307 "Excavation and Trenching" at all times.
	Confined spaces	Adhere to IT Policy and Procedure HS 300 "Confined Spaces" at all times.
	Contact with potentially contaminated materials	Use real time air monitoring. If necessary, use proper personal protective clothing and equipment.
	Heavy equipment operations	Shut down all machinery and take positive means to prevent its operation while not in use.
Excavation trench	Traffic	Barricade off work area.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • Heavy equipment • Dump trucks • PPE 	<ul style="list-style-type: none"> • Pre- and postmaintenance • CESP Form 150 R 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations

**ACTIVITY HAZARD ANALYSIS
Concrete Pouring Operations**

Activity	Potential Hazards	Recommended Controls
Concrete pouring operations	Heavy equipment operations	Inspect equipment before placing into service and at the beginning of each shift.
		Follow preventive maintenance procedures recommended by the manufacturer.
		Use lockout-tagout procedure for equipment found to be faulty or under going maintenance.
		Ensure that machinery and mechanized equipment is operated only by designated personnel.
		Ensure that no personnel get off or on any equipment while it is motion.
		Ensure that machinery or equipment requiring an operator is not run unattended.
		Do not operate machinery or equipment in a manner that will endanger persons or property; do not exceed safe operating speeds or loads.
		Shut down all machinery or equipment and take positive means to prevent its operation while repairs or manual lubrications are being done.
		Make repairs on machinery or equipment at a location which provides protection from traffic for repair persons.
	Fully lower or block compactors, loader buckets, and similar equipment when being repaired or when not in use.	
	Noise	When noise levels above 85 dBA use hearing protection (mandatory).
	Dust	If concrete is to be mixed on-site use dust suppression measures to reduce exposure of site personnel.
	Contact to potentially hazardous materials	Ensure that concrete arrives onsite premixed within trucks ready for pouring operations. Wear gloves and any other personal protective equipment when there is potential contact with cement.
Staging equipment	Contact with moving equipment/vehicles	Lay out equipment in an area free of traffic flow.
		Barricade/demarcate work area.
		Use signal persons, traffic cones, and other diversion equipment when work activities expose workers to street traffic.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Heavy equipment • Traffic control equipment • Concrete delivery trucks 	<ul style="list-style-type: none"> • Pre-post maintenance • Visual prior to use • CESP Form 150 R 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation, NIOSH ALERT • Hazard communication

ACTIVITY HAZARD ANALYSIS
Concrete Core Sampling

Activity	Potential Hazards	Recommended Controls
Concrete core sampling	Rotating hole saw	Beware of contact points.
		Keep hands, feet, and any loose fitting clothing clear of rotating saw blades.
		Remain alert while around rotating equipment.
	Pinch point/cuts	Wear adequate hand protection and observe all contact points.
	Electrical shock	Ensure that all equipment is GFCI equipment.
	Hazard communication	Maintain hazard communication program and proper labeling; ensure that MSDSs are available on site.
	Slips, trips, and falls	Maintain good housekeeping in and around work area.
	Flammable and combustible liquids	Store in a no smoking area 50 feet from combustible construction materials.
		Ensure that fire extinguishers are readily available at the site.
		Ensure that equipment is properly bonded and grounded.
	Contact with drilled materials	Wear proper personal protective equipment and clothing to protect against contact with wet concrete.
	Flying debris	Wear safety glasses and faceshield while coring is ongoing.
		Ensure that the eyewash station is available and maintained in good working order.
	Lighting	Provide adequate lighting to ensure a safe working environment.
	Contact with personnel and equipment	Barricade/demarcate work area.
Dust	Use wet methods for all concrete coring to be done.	
Heavy lifting	Use proper lifting techniques. Use mechanical devices or team lifting during heavy lifts.	
Noise	For all noise levels above 85 dBA, wear hearing protection (mandatory).	
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Coring equipment • Hand tools 	<ul style="list-style-type: none"> • Visual prior to use 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication

ACTIVITY HAZARD ANALYSIS

Construction and Checkout of Aboveground Extraction System

Activity	Potential Hazards	Recommended Controls
Berm construction	Contact with heavy equipment	Ensure that unauthorized personnel remain outside of work area.
		Ensure that all equipment have back up alarms.
Pipe and hose connection	Cuts	Wear hand protection.
	Lower back strain	Get help with heavy items.
	Contact with adhesives	Wear hand protection.
Electrical connection	Electrocution	Adhere to IT Lock T&O/Out Policy.
		Use Assured Equipment Grounded Program.
		Use only qualified electricians.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Heavy equipment • Hand tools 	<ul style="list-style-type: none"> • Prior to use 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific training

**ACTIVITY HAZARD ANALYSIS
Dual Vacuum Extraction Well Test**

Activity	Potential Hazards	Recommended Controls
Sampling vapors in process line Reconnecting hoses Pumping liquids	Possible toxic and hazardous amounts	Use appropriate PPE.
	Respiratory – no smoking in areas	
	Pinch/crush/cuts	Use hand protection.
	Faulty equipment	Inspect before use.
	Spills/contamination	Assure sound flow of liquids.
	Fittings on equipment	Obtain training on usage.
		Use proper field safety protocols.
Equipment to be Used	Inspection Requirements	Training Requirements
DVE Blower	Prior to use	
Generator	Electrical connections	Qualified operator

**ACTIVITY HAZARD ANALYSIS
Piezometer Installation and Monitoring**

Activity	Potential Hazards	Recommended Controls
Surveying/utility clearance	Slips, trips, falls	Inspect work areas when working on uneven surfaces; take care when stepping.
	Biological hazards	Inspect work areas. Be aware of hazardous plants and insects.
	Vehicle traffic	Wear high visibility vest.
		Use traffic control devices on active roadways.
Drilling	Faulty or damaged equipment	Inspect equipment before each shift.
		Do not use unsafe equipment.
	Noise	Wear hearing protection (mandatory) when noise levels are above 85 decibels, A-scale (dBA).
	Inexperienced operator	Only trained personnel are allowed to operate drill rig.
	Contact with moving parts	Operator must verbally alert crew before engaging equipment.
	Pinch/crust	Use hand protection.
		Maintain contact with operator.
Contact with utilities	Conduct drilling in cleared areas only.	
Equipment to be Used	Inspection Requirements	Training Requirements
Survey equipment	Before use	Equipment operation
Drill rigs	CSEPD Form 150-R	Tailgate safety meeting
Support vehicles		40-hour, 8-hour hazardous waste emergency response (HAZWOPER) training

ACTIVITY HAZARD ANALYSIS
Soil/Water Sampling

Activity	Potential Hazards	Recommended Controls
Staging equipment	Slip, trip, and fall hazards	Determine best access route before transporting equipment.
		Maintain good housekeeping, and keep work area picked up and as clean as feasible. Continually inspect the work area for slip, trip, and fall hazards.
		Look before you step, to ensure safe and secure footing.
	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment; size-up the lift.
	Falling objects	Stay alert and clear of materials suspended overhead. Use steel-toed boots and hard-hat.
	Flying debris, dirt, dust etc.	Use safety glasses/goggles. Ensure that eye wash is in good working order.
	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Insects, spiders, and snakes	Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Fire	Suitably place fire extinguishers that are distinctly marked, readily accessible, and maintained in a fully charged and operable condition. See Table 3-6.
	Fire/chemical exposure	Transport all solvents in UL/FM-approved containers and avoid any sources of ignition.
		Initial real time air monitoring will take place.
	Contact with moving equipment/vehicles	Barricade/demarcate work area .
Lay out equipment in an area free of traffic flow.		
Work in excavations	Adhere to IT Policy and Procedure HS 307 - "Excavation and Trenching," at all times.	
Hazard communication	Label all containers as to contents and dispose of properly.	
	Obtain Material Safety Data Sheets for solvents and other hazardous materials that are being used.	
Noise	Use hearing protection for noise levels above 85 dBA (mandatory).	
Sample collection	Working at elevated heights/falls	Secure ladders by top, bottom, and intermediate fastenings, as required.
		Secure personnel working at heights of 6 feet or more with fall protection (safety belt/lanyard).
	Electrical shock	Deenergize and lock out all electrical circuits .

ACTIVITY HAZARD ANALYSIS
Soil/Water Sampling (Continued)

Activity	Potential Hazards	Recommended Controls
Sample collection (continued)	Insects, spiders, and snakes	Inspect work areas carefully and avoid placing hands and feet into concealed areas.
	Cross-contamination and contact with potentially contaminated materials	Ensure that sampling technicians wear proper protective clothing and equipment to safeguard against potential contamination.
		Ensure that only essential personnel are in the work area.
		Use initial real-time air monitoring before and during sampling activities.
		Follow good hygiene practices.
		Proper decontamination procedures will be followed.
		Contain and dispose all liquids and materials used for decontamination in accordance with federal, state, and local regulations.
	Cut hazards	Use care when handling glassware.
		Wear adequate hand protection.
	Hazard communication	Label all containers as to contents.
	Strains/sprains	Use the proper tool for the job being performed.
		Get assistance if needed.
	Strains/sprains	Avoid twisting/turning while pulling on tools, grates, utility access covers, etc.
	Spills/residual materials	Keep absorbent material and containers available where leaks or spills may occur.
	Lighting	Provide adequate lighting to insure a safe working environment.
	Unattended worker	Use the "Buddy System." Maintain visual contact with the sampling technician during sampling activities.
Confined spaces	Adhere to IT Policy and Procedure HS300 - "Confined Spaces at all times.	
Contact with potentially contaminated materials	Use real-time air monitoring. Use appropriate PPE.	
	Maintain good housekeeping to safeguard against cross-contamination of nearby areas and to eliminate safety hazards.	
	Practice good personal hygiene by using the decon facility on site.	
	Demarcated the work area . Ensure that all unnecessary personnel are kept out of the work area and in an upwind location.	
	Adhere to IT Policy and Procedure HS601 - "Respiratory Protective Devices" at all times.	
	Maintain MSDS's for any preservatives such as HCl acid. Follow protection procedures.	
Equipment decontamination	Chemical exposure	Maintain MSDS's for all chemicals such as methanol or hexane and follow protection procedures.

ACTIVITY HAZARD ANALYSIS
Soil/Water Sampling (Continued)

Activity	Potential Hazards	Recommended Controls
On-site sample analysis	Various	Ensure that on-site laboratory develops and adheres to a site-specific chemical hygiene plan (CHP). The CHP must be submitted to the Program CIH for review and acceptance.
Moving and shipping collected samples	Heavy lifting	Use proper lifting techniques. Lifts greater than 60 lbs require assistance or mechanical equipment; size-up the lift.
Moving and shipping collected samples	Pinch points	Keep hands, fingers, and feet clear of moving/suspended materials and equipment.
		Beware of contact points.
		Stay alert at all times!
	Cut hazards	Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	Label all containers as to contents and associated hazards.
Equipment to be Used	Inspection Requirements	Training Requirements
<ul style="list-style-type: none"> • Hand tools • PPE • Sampling equipment 	<ul style="list-style-type: none"> • Pre and postmaintenance • Visual prior to use 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazardous waste operations • Hazard communication

ACTIVITY HAZARD ANALYSIS
Utility Clearance/Surveying

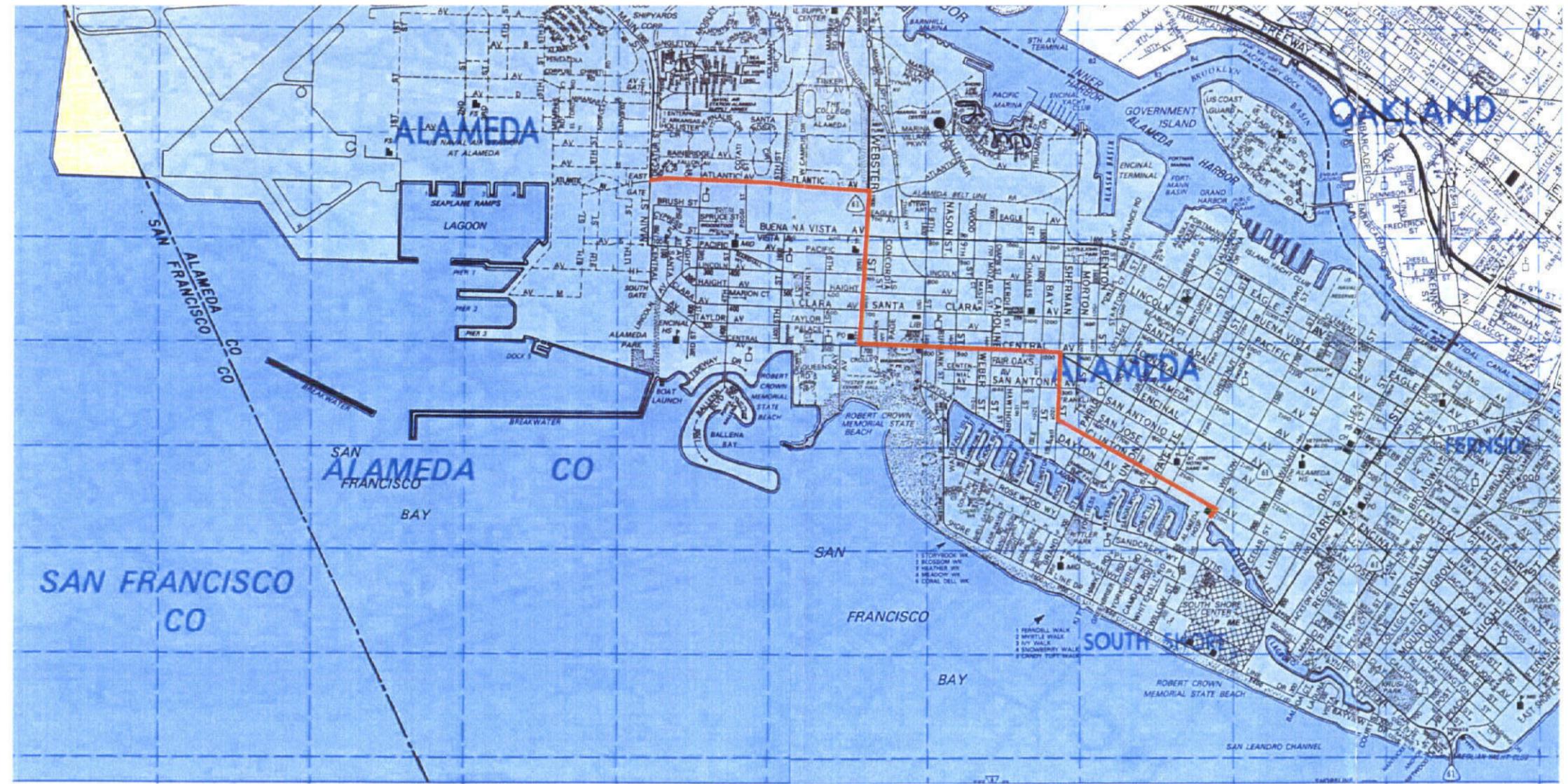
Activity	Potential Hazards	Recommended Controls	
Surveying	Slips, trips, and falls	Maintain good housekeeping. Keep work area picked up and as clean as feasible. Continually inspect the work areas for slip, trip, and fall hazards. When working on uneven surfaces, take care when stepping. Watch where you walk.	
	Moving vehicles	Wear high-visibility vests in areas where vehicle traffic may be encountered (required). Use flaggers and traffic control devices such as cones and barricades as needed when working in traffic.	
	Equipment to be Used	Inspection Requirements	Training Requirements
	<ul style="list-style-type: none"> • Survey Equipment • PPE 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Tailgate safety meeting • Site-specific orientation • Hazard communications

**ACTIVITY HAZARD ANALYSIS
Waste Handling/Demobilization**

Activity	Potential Hazards	Recommended Controls
Drum handling	Lower back strain	Get help when "breaking" drums.
		Use drum dolly or other devices when possible.
	Pinch/crush hazards	Use leather gloves.
		Watch location of hands.
Liquid transfers	Contact with liquids	Use proper PPE.
Pressure washing	Inexperienced operator	Ensure that only trained personnel operate pressure washer.
	Cuts/burns	Do not use pressure washer to decon personnel.
Equipment to be Used	Inspection Requirements	Training Requirements
Drum dolly	Prior to use	Tailgate safety meeting
Pumps		Site-specific orientation
Pressure washer		Pressure washer training

APPENDIX B
SITE MAP AND ROUTE TO NEAREST HOSPITAL

IMAGE X-REF OFFICE DRAWN BY CHECKED BY APPROVED BY DRAWING NUMBER
 PH1.JPG PH2.JPG Concord R. LANGSTON 7/30/01 NH 7/30/01 DLS 7/30/01 807181-B37



DIRECTIONS TO ALAMEDA HOSPITAL

FROM THE MAIN GATE,
 TAKE MARINER SQUARE LOOP TO WEBSTER ST.
 (HWY 61) AND TURN RIGHT AFTER APPROXIMATELY
 8 BLOCKS TURN LEFT (EAST) ON CENTRAL AVE.
 CONTINUE ON CENTRAL AVE., TURN RIGHT ON SHERMAN ST.
 (SOUTH) FROM SHERMAN ST., TURN LEFT ON CLINTON AVE.
 CONTINUE ON WILLOW ST., TURN RIGHT TO HOSPITAL,
 CORNER OF CLINTON AND WILLOW ST.

ALAMEDA HOSPITAL
 2070 CLINTON AVE.
 (510) 523-4357

REFERENCE
 THOMAS EROS. MAPS
 NOT TO SCALE



ALAMEDA POINT
 ALAMEDA, CA

SITE AND HOSPITAL
 ROUTE MAP

ALAMEDA POINT
 ALAMEDA, CALIFORNIA

DRAWING NUMBER 807181-B26

APPROVED BY DLS 7/30/01

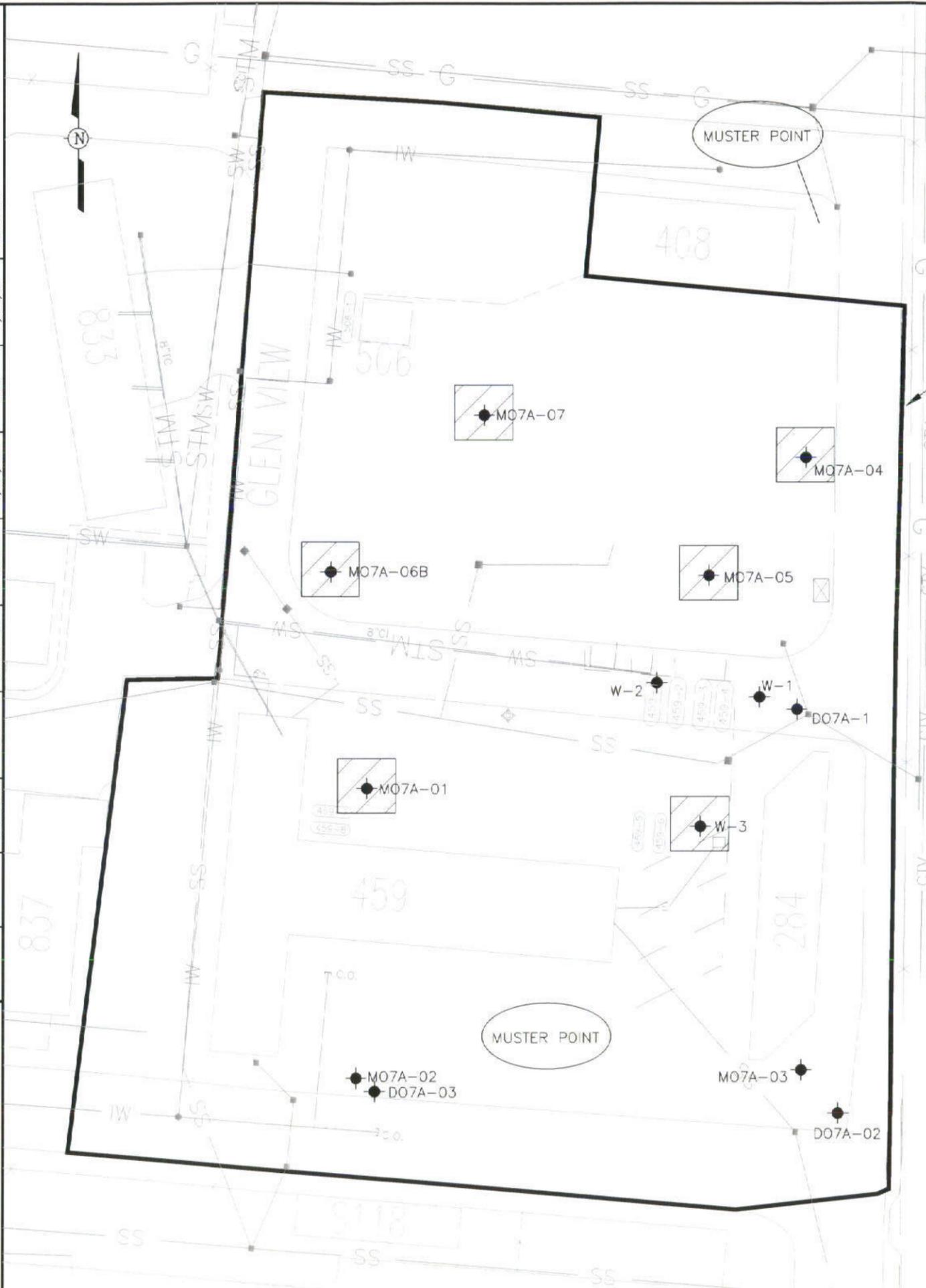
CHECKED BY NH 7/30/01

DRAWN BY BJ 9-29-00

OFFICE CONCORD

X-REF

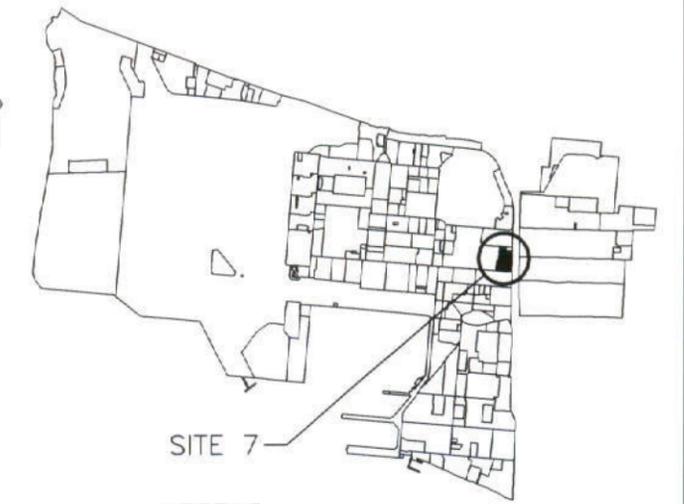
FORMAT REVISION 2/26/98



SITE 7 BOUNDARY

MAIN STREET

NOTE: WELL AND UTILITY LOCATIONS ARE APPROXIMATE.



LEGEND

- MONITORING WELL
- ▨ EXCLUSION ZONE
- E — ELECTRICAL LINES
- S/M — STEAM LINES
- G — GAS LINES
- F — FUEL LINES
- SW — SANITARY SEWER LINE
- SS — STORM SEWER LINE
- IW — INDUSTRIAL WASTE LINE
- T — TELEPHONE LINE
- CTV — CABLE TV LINE
- SANITARY SEWER MANHOLE
- STORM DRAIN MANHOLE
- CATCH BASIN
- INDUSTRIAL WASTE MANHOLE
- ▭ FORMER UST (REMOVED)
- CI — CAST IRON
- RC — REINFORCED CONCRETE
- ◆ — HYDRANT
- ⊠ — TRANSFORMER

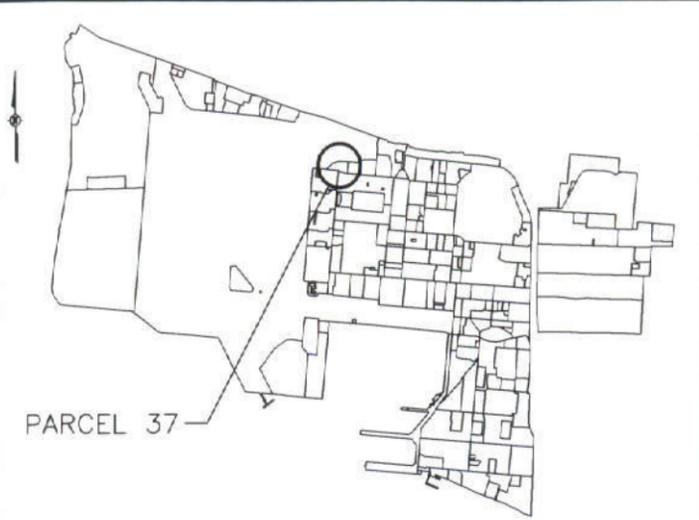


DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

FIGURE 1A
SITE MAP
SITE 7
ALAMEDA POINT CTO-13
ALAMEDA, CALIFORNIA

REV	DATE	BY	CHK	APPROV	DESCRIPTION/REVISION
0	3/1/01	NH	NH	RC	ISSUED FOR REVIEW

IMAGE X-REF OFFICE CONC DRAWN BY R. LANGSTON 2/28/01 CHECKED BY NH 7/30/01 APPROVED BY DLS 7/30/01 DRAWING NUMBER 807181-B25



- LEGEND**
- EXCLUSION ZONE
 - FORMER JET FUEL PIPELINE
 - COMMUNICATION LINES
 - ELECTRICAL LINES
 - STEAM LINES
 - GAS LINES
 - FUEL LINES
 - SANITARY SEWER LINE
 - STORM SEWER LINE
 - WATER
 - SANITARY SEWER MANHOLE
 - STORM DRAIN MANHOLE
 - CATCH BASIN
 - INDUSTRIAL WASTE MANHOLE
 - CAST IRON
 - REINFORCED CONCRETE
 - IRRIGATION
 - HYDRANT



IT CORPORATION

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION NAVAL
ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

NOTE:
WELL AND UTILITY LOCATIONS ARE APPROXIMATE.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
0	3/1/01	NH	NH	RC	ISSUED FOR REVIEW

FIGURE 1B

SITE MAP

FORMER FUEL LOADING STATION PARCEL 37
ALAMEDA POINT CTO 13
ALAMEDA, CALIFORNIA

**APPENDIX C
EMERGENCY PHONE NUMBERS**

Emergency Phone Numbers

Contact	Phone Number
Alameda Fire Department Non-Emergency Emergency	(510) 748-4601 911
Alameda Point Police/Security Department Non-Emergency Emergency	(510) 748-4680 911
Alameda Point HAZMAT Response Non-Emergency Emergency	(510) 748-4601 911
Hospital: Alameda Hospital General information Emergency room Directions To Medical Care: Alameda Hospital, 2070 Clinton Ave. Exit Main Gate, take Mariner Square Loop to Webster St. (Hwy 61) and turn right. After approximately 8 blocks, turn left (east) on Central Ave., turn right on Willow St. and go approximately four blocks. Hospital is on the corner of Clinton and Willow.	(510) 522-3700 (510) 523-4357

Key Project and IT Personnel

IT Program Manager: Stewart Bornhoft	(925) 288-2081
Program CIH: Fred Mlakar, CIH	(925) 288-2150 Pager: (888) 665-9529
Project Manager: Tim Ault	(916) 928-3300
Site Health & Safety Specialist: Lynn Norman	Pager: (888) 653-5906
Site Health & Safety Specialist Alternate:	TBD
Health & Safety Administrator: Carey Von Williams	(925) 288-2378 Pager: (888) 537-9657
Occupational Physician: Health Resources	(800) 350-4511
Medical Incident Reporting: Health Resources	(800) 350-4511
Navy Contact ROICC: Shirley Ng Bob Perricone	(510) 749-5939 (510) 749-5942
Base Safety Officer: Cornell Brown	(510) 749-5967
Navy On-Scene Coordinator: Steve Edde	(510) 749-5952

ROICC denotes Resident Officer in Charge of Construction.

APPENDIX D
PROPOSITION 65 NOTICE AND MATERIAL SAFETY DATA SHEETS

Proposition 65 Warning and Notification

As required under the Safe Drinking Water and Toxic Enforcement Act of 1986 (also known as Proposition 65), on February 27, 1987, the Governor published a listing of those chemicals determined by the State of California to cause cancer, birth defects, or other reproductive harm. Proposition 65 requires that businesses that handle any of the listed chemicals notify people in the affected area of that fact. IT Corporation anticipates handling some of the listed chemicals at the Alameda Point Field Sampling Investigation in Alameda, California.

The chemicals present on site that have been determined to cause cancer include:

- Benzene
- Arsenic
- Beryllium
- Cadmium
- Benzo(a)pyrene (PAH)
- Diesel engine exhaust
- Gasoline engine exhaust

The following contaminants on site have been determined by the State to cause reproductive harm:

- Arsenic
- Cadmium
- Toluene

International Chemical Safety Cards

ARSENIC

ICSC: 0013

ARSENIC Grey arsenic Metallic arsenic As Atomic mass: 74.9 CAS # 7440-38-2 RTECS # CG0525000 ICSC # 0013 UN # 1558 EC # 033-001-00-X			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with strong oxidizers. NO contact with hot surfaces.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Risk of fire and explosion is slight if in the form of fine powder or dust when exposed to hot surfaces or flames.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION	Cough. Diarrhoea. Shortness of breath. Sore throat. Vomiting. Weakness. Grey skin.	Closed system and ventilation.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
• EYES	Redness.	or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Diarrhoea. Nausea. Sore throat. Unconsciousness. Vomiting (further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Evacuate danger area! Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment (extra personal protection: complete protective clothing including self-contained breathing apparatus).		Provision to contain effluent from fire extinguishing. Separated from strong oxidants, acids, halogens, food and feedstuffs. Well closed. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. T symbol R: 23/25 S: (1/2-)20/21-28-45 UN Hazard Class: 6.1 UN Packing Group: II Marine pollutant.
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0013		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

International Chemical Safety Cards

ARSENIC

ICSC: 0013

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.
	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens causing fire and explosion hazard. Reacts with nitric acid, hot sulfuric acid. Toxic arsine gas may be formed in contact with acid or acidic substances and certain metals, such as galvanized or light metals.	EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the eyes, the skin and the respiratory tract. The substance may cause effects on the circulatory system, nervous system, kidneys and gastrointestinal tract, resulting in convulsions, kidney impairment, severe hemorrhage, losses of fluids, and electrolytes, shock and death. Exposure may result in death. The effects may be delayed. Medical observation is indicated.
	OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV: ppm; 0.01 mg/m ³ (as TWA) A1 (ACGIH 1994-1995).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. Repeated or prolonged contact may cause skin sensitization. The substance may have effects on the mucous membranes, skin, kidneys, liver, resulting in neuropathy, pigmentation disorders, perforation of nasal septum and tissue lesions. This substance is carcinogenic to humans.
	PHYSICAL PROPERTIES	Sublimation point: 613°C Relative density (water = 1): 5.7
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. It is strongly advised not to let the chemical enter into the environment because it persists in the environment.	
NOTES		
The substance is combustible but no flash point is available in literature. Depending on the degree of exposure, periodic medical examination is indicated. Do NOT take working clothes home. Refer also to cards for specific arsenic compounds, e.g., Arsenic pentoxide (ICSC # 0377), Arsenic trichloride (ICSC # 0221), Arsenic trioxide (ICSC # 0378), Arsine (ICSC # 0222).		
ADDITIONAL INFORMATION		
ICSC: 0013		ARSENIC
© IPCS, CEC, 1993		
IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	

MATERIAL SAFETY DATA SHEET



BENZENE (AMOCO/TOTAL)

MSDS No. 11697000 ANSI/ENGLISH

1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: BENZENE (AMOCO/TOTAL)**MANUFACTURER/SUPPLIER:**Amoco Oil Company
200 East Randolph Drive
Chicago, Illinois 60601 U.S.A.**EMERGENCY HEALTH INFORMATION:**
1 (800) 447-8735**EMERGENCY SPILL INFORMATION:**
1 (800) 424-9300 CHEMTREC (USA)**OTHER PRODUCT SAFETY
INFORMATION:**
(312) 856-3907

2.0 COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS#	Range % by Wt.
Benzene	71-43-2	99.80
Toluene	108-88-3	0.20

(See Section 8.0, "Exposure Controls/Personal Protection", for exposure guidelines)

3.0 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Danger! Extremely flammable. Causes eye and skin irritation. Inhalation causes headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness. Harmful or fatal if liquid is aspirated into lungs. Danger! Contains Benzene. Cancer hazard. Can cause blood disorders. Harmful when absorbed through the skin.**POTENTIAL HEALTH EFFECTS:****EYE CONTACT:** Causes mild eye irritation.**SKIN CONTACT:** Causes mild skin irritation. Causes skin irritation on prolonged or repeated

contact. Harmful when absorbed through the skin.

INHALATION: Cancer hazard. Can cause blood disorders. Inhalation causes headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness. See "Toxicological Information" section (Section 11.0).

INGESTION: Harmful or fatal if liquid is aspirated into lungs. See "Toxicological Information" section (Section 11.0).

HMIS CODE: (Health:2) (Flammability:3) (Reactivity:0)

NFPA CODE: (Health:2) (Flammability:3) (Reactivity:0)

4.0 FIRST AID MEASURES

EYE: Flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.

SKIN: Wash exposed skin with soap and water. Remove contaminated clothing, including shoes, and thoroughly clean and dry before reuse. Get medical attention if irritation develops.

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

INGESTION: If swallowed, drink plenty of water, do NOT induce vomiting. Get immediate medical attention.

5.0 FIRE FIGHTING MEASURES

FLASHPOINT: 12°F(-11°C)

UEL: 8.0%

LEL: 1.5%

AUTOIGNITION TEMPERATURE: 928°F (498°C)

FLAMMABILITY CLASSIFICATION: Extremely Flammable Liquid.

EXTINGUISHING MEDIA: Agents approved for Class B hazards (e.g., dry chemical, carbon dioxide, foam, steam) or water fog.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Extremely flammable liquid. Vapor may explode if ignited in enclosed area.

FIRE-FIGHTING EQUIPMENT: Firefighters should wear full bunker gear, including a positive pressure self-contained breathing apparatus.

PRECAUTIONS: Keep away from sources of ignition (e.g., heat and open flames). Keep container closed. Use with adequate ventilation.

HAZARDOUS COMBUSTION PRODUCTS: Incomplete burning can produce carbon monoxide and/or carbon dioxide and other harmful products.

6.0 ACCIDENTAL RELEASE MEASURES

Remove or shut off all sources of ignition. Remove mechanically or contain on an absorbent material such as dry sand or earth. Increase ventilation if possible. Wear respirator and spray with water to disperse vapors. Keep out of sewers and waterways.

7.0 HANDLING AND STORAGE

HANDLING: Use with adequate ventilation. Do not breathe vapors. Keep away from ignition sources (e.g., heat, sparks, or open flames). Ground and bond containers when transferring materials. Wash thoroughly after handling. After this container has been emptied, it may contain flammable vapors; observe all warnings and precautions listed for this product.

STORAGE: Store in flammable liquids storage area. Store away from heat, ignition sources, and open flame in accordance with applicable regulations. Keep container closed. Outside storage is recommended.

8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE: Do not get in eyes. Wear eye protection.

SKIN: Do not get on skin or clothing. Wear protective clothing and gloves.

INHALATION: Do not breathe mist or vapor. If heated and ventilation is inadequate, use supplied-air respirator approved by NIOSH/MSHA.

ENGINEERING CONTROLS: Control airborne concentrations below the exposure guidelines.

EXPOSURE GUIDELINES:

Component	CAS#	Exposure Limits
Benzene	71-43-2	OSHA PEL: 1 ppm OSHA STEL: 5 ppm ACGIH TLV-TWA: 10 ppm
Toluene	108-88-3	OSHA PEL: 100 ppm (1989); 200 ppm (1971) OSHA STEL: 150 ppm (1989); Not established. (1971) OSHA Ceiling: 300 ppm (1971) ACGIH TLV-TWA: 50 ppm (skin)

9.0 CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE AND ODOR: Liquid. Colorless. Sweet odor.

pH: Not determined.

VAPOR PRESSURE: 74.6 mm Hg at 20 °C

VAPOR DENSITY: Not determined.

BOILING POINT: 176°F(80°C)

MELTING POINT: 42°F(6°C)

SOLUBILITY IN WATER: Slight, 0.1 to 1.0%.

SPECIFIC GRAVITY (WATER=1): 0.88

10.0 STABILITY AND REACTIVITY

STABILITY: Stable.

CONDITIONS TO AVOID: Keep away from ignition sources (e.g. heat, sparks, and open flames).

MATERIALS TO AVOID: Avoid chlorine, fluorine, and other strong oxidizers.

HAZARDOUS DECOMPOSITION: None identified.

HAZARDOUS POLYMERIZATION: Will not occur.

11.0 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY DATA:

EYE IRRITATION: Testing not conducted. See Other Toxicity Data.

SKIN IRRITATION: Testing not conducted. See Other Toxicity Data.

DERMAL LD50: Testing not conducted. See Other Toxicity Data.

ORAL LD50: 3.8 g/kg (rat).

INHALATION LC50: 10000 ppm (rat)

OTHER TOXICITY DATA: Acute toxicity of benzene results primarily from depression of the central nervous system (CNS). Inhalation of concentrations over 50 ppm can produce headache, lassitude, weariness, dizziness, drowsiness, or excitation. Exposure to very high levels can result in unconsciousness and death.

Long-term overexposure to benzene has been associated with certain types of leukemia in humans. In addition, the International Agency for Research on Cancer (IARC) and OSHA consider benzene to be a human carcinogen. Chronic exposures to benzene at levels of 100 ppm and below have been reported to cause adverse blood effects including anemia. Benzene exposure can occur by inhalation and absorption through the skin.

Inhalation and forced feeding studies of benzene in laboratory animals have produced a carcinogenic response in a variety of organs, including possibly leukemia, other adverse effects on the blood, chromosomal changes and some effects on the immune system. Exposure to benzene at levels up to 300 ppm did not produce birth defects in animal studies; however, exposure to the higher dosage levels (greater than 100 ppm) resulted in a reduction of body weight of the rat pups (fetotoxicity). Changes in the testes have been observed in mice exposed to benzene at 300 ppm, but reproductive performance was not altered in rats exposed to benzene at the same level.

Aspiration of this product into the lungs can cause chemical pneumonia and can be fatal. Aspiration into the lungs can occur while vomiting after ingestion of this product. Do not siphon by mouth.

12.0 ECOLOGICAL INFORMATION

Ecological testing has not been conducted on this product.

13.0 DISPOSAL INFORMATION

Disposal must be in accordance with applicable federal, state, or local regulations. Enclosed-controlled incineration is recommended unless directed otherwise by applicable ordinances. Residues and spilled material are hazardous waste due to ignitability.

14.0 TRANSPORTATION INFORMATION

U.S. DEPT OF TRANSPORTATION

Shipping Name	Benzene
Hazard Class	3
Identification Number	UN1114
Packing Group	II
RQ	RQ

INTERNATIONAL INFORMATION:

Sea (IMO/IMDG)

Shipping Name Not determined.

Air (ICAO/IATA)

Shipping Name Not determined.

European Road/Rail (ADR/RID)

Shipping Name Not determined.

Canadian Transportation of Dangerous Goods

Shipping Name Not determined.

15.0 REGULATORY INFORMATION

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR Part 302.4): This product is reportable under 40 CFR Part 302.4 because it contains the following substance(s):

Component/CAS Number	Weight %	Component Reportable Quantity (RQ)
Benzene 71-43-2	99.80	10 lbs.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR Part 355): This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

SARA TITLE III SECTIONS 311/312 HAZARDOUS CATEGORIZATION (40 CFR Part 370): This product is defined as hazardous by OSHA under 29 CFR Part 1910.1200(d).

SARA TITLE III SECTION 313 (40 CFR Part 372): This product contains the following substance(s), which is on the Toxic Chemicals List in 40 CFR Part 372:

Component/CAS Number	Weight Percent
Benzene 71-43-2	99.80

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

OSHA HAZARD COMMUNICATION STANDARD: Flammable liquid. Carcinogen. Irritant. CNS Effects. Target organ effects.

EC INVENTORY (EINECS/ELINCS): In compliance.

JAPAN INVENTORY (MITI): Not determined.

AUSTRALIA INVENTORY (AICS): Not determined.

KOREA INVENTORY (ECL): Not determined.

CANADA INVENTORY (DSL): Not determined.

PHILIPPINE INVENTORY (PICCS): Not determined.

16.0 OTHER INFORMATION

Prepared by:

Environment, Health and Safety Department

Issued: November 14, 1995

This material Safety Data Sheet conforms to the requirements of ANSI Z400.1.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.

PAH Contaminated Soil
17974

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

MSDS Name: PAH Contaminated Soil

Catalog Numbers:

SRS103 100, SRS103100

Synonyms:

API separator sludge

Company Identification: Fisher Scientific
1 Reagent Lane
Fairlawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

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

CAS#	Chemical Name	%	EINECS#
50-32-8	Benzo(a)pyrene	0-2	200-028-5
56-55-3	1,2-Benzanthracene	0-2	200-280-6
83-32-9	Acenaphthene	0-2	201-469-6
85-01-8	Phenanthrene	0-2	201-581-5
86-73-7	Fluorene	0-2	201-695-5
87-86-5	Pentachlorophenol	0-2	201-778-6
91-20-3	Naphthalene	0-2	202-049-5
91-57-6	2-methylnaphthalene	0-2	202-078-3
120-12-7	Anthracene	0-2	204-371-1
129-00-0	Pyrene	0-2	204-927-3
132-64-9	Dibenzofuran	0-2	205-071-3
205-99-2	Benzo(b)fluoranthene	0-2	205-911-9
206-44-0	Fluoranthene	0-2	205-912-4
208-96-8	Acenaphthylene	0-2	205-917-1
218-01-9	1,2-benzphenanthrene	0-2	205-923-4
Not available	Soil	78-99	unlisted

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

EMERGENCY OVERVIEW

Appearance: not available.

Caution! Causes skin irritation. Causes eye irritation. May cause allergic skin reaction. Causes digestive tract irritation. May cause digestive tract irritation with nausea, vomiting, and diarrhea. May cause cancer based on animal studies.

Target Organs: None.

Potential Health Effects

Eye:

May cause eye irritation.

Skin:

May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.

Ingestion:

May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

Naphthalene can cause cataracts, optical neuritis, and cornea injuries. Ingestion of large quantities may cause severe hemolytic anemia and

Inhalation:

Causes respiratory tract irritation. May cause effects similar to those described for ingestion.

Chronic:

May cause cancer according to animal studies. Prolonged exposure to respirable crystalline quartz may cause delayed lung injury/fibrosis (silicosis).

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

Eyes:

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

Skin:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

Ingestion:

If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation:

Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:

Treat symptomatically and

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

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media:

For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.

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

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

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

Handling:

Wash hands before eating. Use with adequate ventilation. Avoid contact with skin and eyes. Keep container tightly closed. Avoid ingestion and inhalation.

Storage:

Store in a cool, dry place.

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

Engineering Controls:

Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs

Benzo(a)pyrene	as benzene solubles: 0.2 mg/m3 (listed under ** no name **).	none listed	benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene) (listed under ** no name **).
1,2-Benzanthracene	none listed	none listed	none listed
Acenaphthene	none listed	none listed	none listed
Phenanthrene	as benzene solubles: 0.2 mg/m3 (listed under ** no name **).	none listed	benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene) (listed under ** no name **).
Fluorene	none listed	none listed	none listed
Pentachlorophenol	0.5 mg/m3; skin - potential for cutaneous absorption	0.5 mg/m3 TWA 2.5 mg/m3 IDLH	0.5 mg/m3 TWA
Naphthalene	10 ppm; 15 ppm STEL; skin - potential for cutaneous absorption	10 ppm TWA; 50 mg/m3 TWA 250 ppm IDLH	10 ppm TWA; 50 mg/m3 TWA
2-methylnaphthalene	none listed	none listed	none listed
Anthracene	as benzene solubles: 0.2 mg/m3 (listed under ** no name **).	none listed	benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene) (listed under ** no name **).
Pyrene	as benzene solubles: 0.2 mg/m3 (listed under ** no name **).	none listed	benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene) (listed under ** no name **).
Dibenzofuran	none listed	none listed	none listed
Benzo(b)fluoranthene	none listed	none listed	none listed

e			
Fluoranthene	none listed	none listed	none listed
Acenaphthylene	none listed	none listed	none listed
1,2-benzphenanthrene	as benzene solubles: 0.2 mg/m3 (listed under ** no name **).	none listed	benzene soluble fraction: 0.2 mg/m3 TWA (includes anthracene, BaP, phenanthrene, acridine, chrysene, and pyrene) (listed under ** no name **).

OSHA Vacated PELs:

Benzo(a)pyrene:

benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
phenanthrene, acridine, (listed under ** no name **))

1,2-Benzanthracene:

No OSHA Vacated PELs are listed for this chemical.

Acenaphthene:

No OSHA Vacated PELs are listed for this chemical.

Phenanthrene:

benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
phenanthrene, acridine, (listed under ** no name **))

Fluorene:

No OSHA Vacated PELs are listed for this chemical.

Pentachlorophenol:

0.5 mg/m3 TWA

Naphthalene:

10 ppm TWA; 50 mg/m3 TWA

2-methylnaphthalene:

No OSHA Vacated PELs are listed for this chemical.

Anthracene:

benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
phenanthrene, acridine, (listed under ** no name **))

Pyrene:

benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
phenanthrene, acridine, (listed under ** no name **))

Dibenzofuran:

No OSHA Vacated PELs are listed for this chemical.

Benzo(b)fluoranthene:

No OSHA Vacated PELs are listed for this chemical.

Fluoranthene:

No OSHA Vacated PELs are listed for this chemical.

Acenaphthylene:

No OSHA Vacated PELs are listed for this chemical.

1,2-benzphenanthrene:

benzene soluble fraction: 0.2 mg/m3 TWA (anthracene, BaP,
phenanthrene, acridine, (listed under ** no name **))

Personal Protective Equipment

Eyes:

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

Skin:

Wear appropriate gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin
exposure.

Respirators:

Follow the OSHA respirator regulations found in 29CFR
1910.134 or European Standard EN 149. Always use a

NIOSH or European Standard EN 149 approved respirator
when necessary.

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

Physical State: Solid
Appearance: not available
Odor: None reported
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Autoignition Temperature: Not applicable.
Flash Point: Not applicable.
NFPA Rating: Not published.
Explosion Limits, Lower: Not available.
Upper: Not available.
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density: Not available.
Molecular Formula: Mixture
Molecular Weight: 0

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

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
High temperatures.
Incompatibilities with Other Materials:
None reported.
Hazardous Decomposition Products:
No data available.
Hazardous Polymerization: Has not been reported.

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

RTECS#:

CAS# 50-32-8: DJ3675000
CAS# 56-55-3: CV9275000
CAS# 83-32-9: AB1000000
CAS# 85-01-8: SF7175000
CAS# 86-73-7: LL5670000
CAS# 87-86-5: SM6300000
CAS# 91-20-3: QJ0525000
CAS# 91-57-6: QJ9635000
CAS# 120-12-7: CA9350000
CAS# 129-00-0: UR2450000
CAS# 132-64-9: HP4430000
CAS# 205-99-2: CU1400000
CAS# 206-44-0: LL4025000
CAS# 208-96-8: AB1254000
CAS# 218-01-9: GC0700000

LD50/LC50:

Not available.
Not available.
Not available.
CAS# 85-01-8: Oral, mouse: LD50 = 700 mg/kg.
CAS# 86-73-7.
CAS# 87-86-5: Inhalation, mouse: LC50 =225 mg/m3; Inhalation, rat:
LC50 =355 mg/m3; Oral, mouse: LD50 = 117 mg/kg; Oral, rat: LD50 = 27
mg/kg; Skin, rat: LD50 = 96 mg/kg.
CAS# 91-20-3: Oral, mouse: LD50 = 533 mg/kg; Oral, rat: LD50 = 490
mg/kg; Skin, rabbit: LD50 = >20 gm/kg; Skin, rat: LD50 = >2500 mg/kg.
CAS# 91-57-6: Oral, mouse: LD50 = 1279 mg/kg; Oral, rat: LD50 = 1630
mg/kg.
CAS# 120-12-7.
CAS# 129-00-0: Inhalation, rat: LC50 =170 mg/m3; Oral, mouse: LD50 =

800 mg/kg; Oral, rat: LD50 = 2700 mg/kg.
CAS# 132-64-9.
CAS# 205-99-2.
CAS# 206-44-0: Oral, rat: LD50 = 2 gm/kg; Skin, rabbit: LD50 = 3180 mg/kg.
CAS# 208-96-8.
CAS# 218-01-9.

Carcinogenicity:

- Benzo(a)pyrene -
 - ACGIH: A2 - suspected human carcinogen
 - California: carcinogen; initial date 7/1/87
 - NIOSH: occupational carcinogen (listed as ** undefined **)
 - NTP: Suspect carcinogen
 - OSHA: Possible Select carcinogen
 - IARC: Group 2A carcinogen
- 1,2-Benzanthracene -
 - ACGIH: A2 - suspected human carcinogen
 - California: carcinogen; initial date 7/1/87
 - NTP: Suspect carcinogen
 - OSHA: Possible Select carcinogen
 - IARC: Group 2A carcinogen
- Acenaphthene -
 - Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
- Phenanthrene -
 - ACGIH: Benzene solubles: A1-confirmed human carcinogen (listed as ** undefined **)
 - NIOSH: occupational carcinogen (listed as ** undefined **)
 - OSHA: Select carcinogen (listed as ** undefined **).
 - IARC: Group 3 carcinogen
- Fluorene -
 - IARC: Group 3 carcinogen
- Pentachlorophenol -
 - ACGIH: A3 - Animal Carcinogen
 - California: carcinogen; initial date 1/1/90
- Naphthalene -
 - ACGIH: A4 - Not Classifiable as a Human Carcinogen
- 2-methylnaphthalene -
 - Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
- Anthracene -
 - ACGIH: Benzene solubles: A1-confirmed human carcinogen (listed as ** undefined **)
 - NIOSH: occupational carcinogen (listed as ** undefined **)
 - OSHA: Select carcinogen (listed as ** undefined **).
 - IARC: Group 3 carcinogen
- Pyrene -
 - ACGIH: Benzene solubles: A1-confirmed human carcinogen (listed as ** undefined **)
 - NIOSH: occupational carcinogen (listed as ** undefined **)
 - OSHA: Select carcinogen (listed as ** undefined **).
 - IARC: Group 3 carcinogen
- Dibenzofuran -
 - Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
- Benzo(b)fluoranthene -
 - ACGIH: A2 - suspected human carcinogen
 - California: carcinogen; initial date 7/1/87
 - NTP: Suspect carcinogen
 - OSHA: Possible Select carcinogen
 - IARC: Group 2B carcinogen
- Fluoranthene -
 - IARC: Group 3 carcinogen
- Acenaphthylene -
 - Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
- 1,2-benzphenanthrene -
 - ACGIH: A3 - Animal Carcinogen
 - California: carcinogen; initial date 1/1/90
 - NIOSH: occupational carcinogen (listed as ** undefined **)
 - OSHA: Select carcinogen (listed as ** undefined **).
 - IARC: Group 3 carcinogen

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

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

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste.

US EPA guidelines for the classification determination are listed in 40 CFR Part 261. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: CAS# 50-32-8: waste number U022. CAS# 56-55-3: waste number U018. CAS# 91-20-3: waste number U165. CAS# 206-44-0: waste number U120. CAS# 218-01-9: waste number U050.

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

US DOT

No information available

Canadian TDG

No information available.

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

US FEDERAL

TSCA

CAS# 50-32-8 is listed on the TSCA inventory.
CAS# 56-55-3 is listed on the TSCA inventory.
CAS# 83-32-9 is listed on the TSCA inventory.
CAS# 85-01-8 is listed on the TSCA inventory.
CAS# 86-73-7 is listed on the TSCA inventory.
CAS# 87-86-5 is listed on the TSCA inventory.
CAS# 91-20-3 is listed on the TSCA inventory.
CAS# 91-57-6 is listed on the TSCA inventory.
CAS# 120-12-7 is listed on the TSCA inventory.
CAS# 129-00-0 is listed on the TSCA inventory.
CAS# 132-64-9 is listed on the TSCA inventory.
CAS# 205-99-2 is not listed on the TSCA inventory.
It is for research and development use only.
CAS# 206-44-0 is listed on the TSCA inventory.
CAS# 208-96-8 is listed on the TSCA inventory.
CAS# 218-01-9 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 91-20-3: Effective Date: June 1, 1987; Sunset Date: June 1, 1997

CAS# 129-00-0: Effective Date: June 1, 1987; Sunset Date: June 1, 1997

Chemical Test Rules

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

Section 12b

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

TSCA Significant New Use Rule

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

SARA

Section 302 (RQ)

CAS# 50-32-8: final RQ = 1 pound (0.454 kg)
CAS# 56-55-3: final RQ = 10 pounds (4.54 kg)
CAS# 83-32-9: final RQ = 100 pounds (45.4 kg)
CAS# 85-01-8: final RQ = 5000 pounds (2270 kg)
CAS# 86-73-7: final RQ = 5000 pounds (2270 kg)
CAS# 87-86-5: final RQ = 10 pounds (4.54 kg)
CAS# 91-20-3: final RQ = 100 pounds (45.4 kg)
CAS# 120-12-7: final RQ = 5000 pounds (2270 kg)
CAS# 129-00-0: final RQ = 5000 pounds (2270 kg)
CAS# 205-99-2: final RQ = 1 pound (0.454 kg)
CAS# 206-44-0: final RQ = 100 pounds (45.4 kg)
CAS# 208-96-8: final RQ = 5000 pounds (2270 kg)
CAS# 218-01-9: final RQ = 100 pounds (45.4 kg)

Section 302 (TPQ)

CAS# 129-00-0: TPQ = 1000/10,000 pounds; RQ = 5000 pounds (calculated TPQ changed after technical review as described in the technical support document)

SARA Codes

CAS # 50-32-8: acute, chronic.

CAS # 83-32-9: acute.

CAS # 85-01-8: acute.

CAS # 91-20-3: flammable.
CAS # 91-57-6: acute.
CAS # 120-12-7: acute.
CAS # 129-00-0: acute, chronic.
CAS # 206-44-0: acute.

Section 313

This material contains Benzo(a)pyrene (CAS# 50-32-8, 0.2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.
This material contains 1,2-Benzanthracene (CAS# 56-55-3, 0.2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.
This chemical is not at a high enough concentration to be reportable under Section 313.
This material contains Pentachlorophenol (CAS# 87-86-5, 0.2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.
This chemical is not at a high enough concentration to be reportable under Section 313.
This chemical is not at a high enough concentration to be reportable under Section 313.
This chemical is not at a high enough concentration to be reportable under Section 313.
This material contains Benzo(b)fluoranthene (CAS# 205-99-2, 0.2%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.
This chemical is not at a high enough concentration to be reportable under Section 313.

Clean Air Act:

CAS# 87-86-5 is listed as a hazardous air pollutant (HAP).
CAS# 91-20-3 is listed as a hazardous air pollutant (HAP).
CAS# 132-64-9 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 87-86-5 is listed as a Hazardous Substance under the CWA.
CAS# 91-20-3 is listed as a Hazardous Substance under the CWA.
CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 56-55-3 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 83-32-9 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 86-73-7 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 87-86-5 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 91-20-3 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 120-12-7 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 129-00-0 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 205-99-2 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 208-96-8 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 83-32-9 is listed as a Toxic Pollutant under the Clean Water Act.
CAS# 87-86-5 is listed as a Toxic Pollutant under the Clean Water Act.
CAS# 91-20-3 is listed as a Toxic Pollutant under the Clean Water Act.
CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

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

STATE

Benzo(a)pyrene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

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

Acenaphthene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

Phenanthrene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as ** no name **), Massachusetts.

Fluorene can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

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

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

2-methylnaphthalene is not present on state lists from CA, PA, MN, MA, FL, or NJ.

Anthracene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as ** no name **), Massachusetts.

Pyrene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as ** no name **), Massachusetts.

Dibenzofuran can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

Benzo(b)fluoranthene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

Fluoranthene can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

Acenaphthylene can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

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

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzo(a)pyrene, a chemical known to the state of California to cause cancer.

WARNING: This product contains 1,2-Benzanthracene, a chemical known to the state of California to cause cancer.

WARNING: This product contains Pentachlorophenol, a chemical known to the state of California to cause cancer.

WARNING: This product contains Benzo(b)fluoranthene, a chemical known to the state of California to cause cancer.

WARNING: This product contains 1,2-benzphenanthrene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level:

CAS# 50-32-8: no significant risk level = 0.06 ug/day

CAS# 87-86-5: no significant risk level = 40 ug/day

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 50-32-8: No information available.

CAS# 56-55-3: No information available.

CAS# 83-32-9: No information available.

CAS# 85-01-8: No information available.

CAS# 86-73-7: No information available.

CAS# 87-86-5: 3

CAS# 91-20-3: 2

CAS# 91-57-6: No information available.
CAS# 120-12-7: 2
CAS# 129-00-0: No information available.
CAS# 132-64-9: No information available.
CAS# 205-99-2: No information available.
CAS# 206-44-0: No information available.
CAS# 208-96-8: No information available.
CAS# 218-01-9: No information available.

United Kingdom Occupational Exposure Limits

CAS# 87-86-5: OES-United Kingdom, TWA 0.5 mg/m3 TWA
CAS# 87-86-5: OES-United Kingdom, STEL 1.5 mg/m3 STEL
CAS# 87-86-5: OES-United Kingdom, STEL 1.5 mg/m3 STEL

Canada

CAS# 50-32-8 is listed on Canada's DSL/NDSL List.
CAS# 83-32-9 is listed on Canada's DSL/NDSL List.
CAS# 85-01-8 is listed on Canada's DSL/NDSL List.
CAS# 86-73-7 is listed on Canada's DSL/NDSL List.
CAS# 87-86-5 is listed on Canada's DSL/NDSL List.
CAS# 91-20-3 is listed on Canada's DSL/NDSL List.
CAS# 91-57-6 is listed on Canada's DSL/NDSL List.
CAS# 120-12-7 is listed on Canada's DSL/NDSL List.
CAS# 129-00-0 is listed on Canada's DSL/NDSL List.
CAS# 132-64-9 is listed on Canada's DSL/NDSL List.
CAS# 218-01-9 is listed on Canada's DSL/NDSL List.
This product has a WHMIS classification of D2A.
CAS# 50-32-8 is not listed on Canada's Ingredient Disclosure List.
CAS# 56-55-3 is not listed on Canada's Ingredient Disclosure List.
CAS# 83-32-9 is not listed on Canada's Ingredient Disclosure List.
CAS# 85-01-8 is not listed on Canada's Ingredient Disclosure List.
CAS# 86-73-7 is not listed on Canada's Ingredient Disclosure List.
CAS# 87-86-5 is not listed on Canada's Ingredient Disclosure List.
CAS# 91-20-3 is not listed on Canada's Ingredient Disclosure List.
CAS# 91-57-6 is not listed on Canada's Ingredient Disclosure List.
CAS# 120-12-7 is not listed on Canada's Ingredient Disclosure List.
CAS# 129-00-0 is not listed on Canada's Ingredient Disclosure List.
CAS# 132-64-9 is not listed on Canada's Ingredient Disclosure List.
CAS# 205-99-2 is not listed on Canada's Ingredient Disclosure List.
CAS# 206-44-0 is not listed on Canada's Ingredient Disclosure List.
CAS# 208-96-8 is not listed on Canada's Ingredient Disclosure List.
CAS# 218-01-9 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 50-32-8: OEL-AUSTRALIA;Carcinogen
OEL-BELGIUM;Carcinogen
OEL-FINLAND:TWA 0.01 mg/m3;Skin;Carcinogen
OEL-FRANCE;Carcinogen
OEL-GERMANY;Carcinogen
OEL-RUSSIA:STEL 0.00015 mg/m3;Carcinogen
OEL-SWEDEN:TWA 0.005 mg/m3;STEL 0.03 mg/m3;Skin
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 56-55-3: OEL-FRANCE;Carcinogen
CAS# 83-32-9: OEL-RUSSIA:STEL 10 mg/m3
CAS# 85-01-8 (listed as ** undefined **): OEL-UNITED KINGDOM:TWA 0.14 mg/m3 JANUARY 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 86-73-7: Not available.
CAS# 87-86-5: OEL-AUSTRALIA:TWA 0.5 mg/m3;Skin
OEL-BELGIUM:TWA 0.5 mg/m3;Skin
OEL-DENMARK:TWA 0.05 ppm (0.5 mg/m3);Skin
OEL-FINLAND:TWA 0.5 mg/m3;STEL 1.5 mg/m3;Skin
OEL-FRANCE:TWA 0.5 mg/m3;Skin
OEL-GERMANY:TWA 0.005 ppm (0.05 mg/m3);Skin
OEL-HUNGARY:TWA 0.2 mg/m3;STEL 0.4 mg/m3;Skin
OEL-JAPAN:TWA 0.5 mg/m3;Skin
OEL-THE NETHERLANDS:TWA 0.5 mg/m3;Skin
OEL-THE PHILIPPINES:TWA 0.5 mg/m3;Skin
OEL-RUSSIA:STEL 0.1 mg/m3;Skin
OEL-SWEDEN:TWA 0.5 mg/m3;STEL 1.5 mg/m3;Skin JAN9
OEL-SWITZERLAND:TWA 0.05 ppm (0.5 mg/m3);STEL 0.1 ppm;Skin

OEL-TURKEY:TWA 0.5 mg/m3;Skin
OEL-UNITED KINGDOM:TWA 0.5 mg/m3;STEL 1.5 mg/m3;Skin
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 91-20-3: OEL-ARAB Republic of Egypt:TWA 10 ppm (50 mg/m3)
OEL-AUSTRALIA:TWA 10 ppm (50 mg/m3);STEL 15 ppm (75 mg/m3)
OEL-BELGIUM:TWA 10 ppm (52 mg/m3);STEL 15 ppm (79 mg/m3)
OEL-DENMARK:TWA 10 ppm (50 mg/m3)
OEL-FINLAND:TWA 10 ppm (50 mg/m3);STEL 20 ppm (10 mg/m3)
OEL-FRANCE:TWA 10 ppm (50 mg/m3)
OEL-GERMANY:TWA 10 ppm (50 mg/m3)
OEL-HUNGARY:TWA 40 mg/m3;STEL 80 mg/m3;Skin
OEL-THE NETHERLANDS:TWA 10 ppm (50 mg/m3)
OEL-THE PHILIPPINES:TWA 10 ppm (50 mg/m3)
OEL-POLAND:TWA 20 mg/m3
OEL-RUSSIA:STEL 20 mg/m3
OEL-SWITZERLAND:TWA 10 ppm (50 mg/m3)
OEL-UNITED KINGDOM:TWA 10 ppm (50 mg/m3);STEL 15 ppm (75 mg/m3)
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 91-57-6: OEL-RUSSIA:STEL 20 mg/m3
CAS# 120-12-7 (listed as ** undefined **): OEL-UNITED KINGDOM:TWA 0.14
mg/m3 JANUARY 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 129-00-0 (listed as ** undefined **): OEL-UNITED KINGDOM:TWA 0.14
mg/m3 JANUARY 1993
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV
CAS# 205-99-2: OEL-FRANCE;Carcinogen
OEL-GERMANY;Carcinogen
CAS# 206-44-0: Not available.
CAS# 208-96-8: Not available.
CAS# 218-01-9: OEL-AUSTRALIA;Carcinogen
OEL-BELGIUM;Carcinogen
OEL-GERMANY;Carcinogen
OEL-SWITZERLAND;Carcinogen
OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

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

MSDS Creation Date: 9/02/1997 Revision #2 Date: 8/02/2000

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

International Chemical Safety Cards

BERYLLIUM

ICSC: 0226

BERYLLIUM Glucinium (powder) Be Atomic mass: 9.0 CAS # 7440-41-7 RTECS # DS1750000 ICSC # 0226 UN # 1567 EC # 004-001-00-7			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION	Cough. Shortness of breath. Sore throat. Weakness. Symptoms may be delayed (see Notes).	Local exhaust. Breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
• EYES	Redness. Pain.	Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Evacuate danger area! Consult an expert! Carefully collect the spilled substance into containers; if appropriate moisten first, then remove to safe place. Do NOT let this chemical enter the environment (extra personal protection: complete protective clothing including self-contained breathing apparatus).	Separated from strong acids, bases, chlorinated solvents, food and feedstuffs.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. T+ symbol R: 49-25-26-36/37/38-43-48/23 S: 53-45 Note: E UN Hazard Class: 6.1 UN Subsidiary Risks: 4.1 UN Packing Group: II	
SEE IMPORTANT INFORMATION ON BACK			
Prepared in the context of cooperation between the International Programme on Chemical Safety & the			

ICSC: 0226

Commission of the European Communities © IPCS CEC 1993

International Chemical Safety Cards

BERYLLIUM

ICSC: 0226

I M P O R T A N T N O T I C E	PHYSICAL STATE; APPEARANCE: GREY TO WHITE METAL OR POWDER.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.
D A T A	CHEMICAL DANGERS: Reacts with strong acids and strong bases forming combustible gas (HYDROGEN - see ICSC # 0001). Forms shock sensitive mixtures with some chlorinated solvents, such as carbon tetrachloride and trichloroethylene.	EFFECTS OF SHORT-TERM EXPOSURE: The aerosol of this substance irritates the respiratory tract. Inhalation of dust or fumes may cause chemical pneumonitis. Exposure may result in death. The effects may be delayed. Medical observation is indicated.
	OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV (as TWA): ppm; 0.002 mg/m ³ A2 (Suspected Human Carcinogen) (ACGIH 1994-1995).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact may cause skin sensitization. Lungs may be affected by repeated or prolonged exposure to dust particles, resulting in chronic beryllium disease (cough, weight loss, weakness). This substance is carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: above 2500°C Melting point: 1287°C	Relative density (water = 1): 1.9 Solubility in water: none
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms.	
NOTES		
Depending on the degree of exposure, periodic medical examination is indicated.		
Transport Emergency Card: TEC (R)-61G10 NFPA Code: H3; F1; R0		
ADDITIONAL INFORMATION		
ICSC: 0226		BERYLLIUM
© IPCS, CEC, 1993		
IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	

International Chemical Safety Cards

CADMIUM

ICSC: 0020

CADMIUM (powder) Cd Molecular mass: 112.4 CAS # 7440-43-9 RTECS # EU9800000 ICSC # 0020 UN # 2570 (cadmium compounds)			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable in powder form. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with heat or acids.	Dry sand. Special powder. No other agents.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	IN ALL CASES CONSULT A DOCTOR!
• INHALATION	Cough. Headache. Symptoms may be delayed (see Notes).	Local exhaust or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration if indicated. Refer for medical attention.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness. Pain.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Diarrhoea. Headache. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Evacuate danger area! Extinguish ignition sources. Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place (extra personal protection: P3 filter respirator for toxic particles).		Fireproof. Separated from strong oxidants, strong acids, food and feedstuffs.	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. UN Hazard Class: 6.1
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0020		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

International Chemical Safety Cards

CADMIUM

ICSC: 0020

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: SOFT BLUE-WHITE METAL LUMPS OR GREY POWDER. MALLEABLE. TURNS BRITTLE ON EXPOSURE TO 80°C AND TARNISHES ON EXPOSURE TO MOIST AIR.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: Reacts with acids giving off flammable hydrogen gas. Dust reacts with oxidants, hydrogen azide, zinc, selenium or tellurium, causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV (as dust): ppm; 0.05 mg/m³ as TWA (ACGIH 1991-1992).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the eyes and the respiratory tract. Inhalation of fume may cause lung oedema (see Notes). Inhalation of fume may cause metal fever. The effects may be delayed. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may have effects on the kidneys, resulting in proteinuria and kidney dysfunction. This substance is probably carcinogenic to humans.</p>
PHYSICAL PROPERTIES	Boiling point: 765°C Melting point: 321°C Relative density (water = 1): 8.6	Solubility in water: none Auto-ignition temperature: 250°C (cadmium metal dust)°C
ENVIRONMENTAL DATA		
NOTES		
Reacts violently with fire extinguishing agents such as water, foam, carbon dioxide and halons. Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Do NOT take working clothes home.		
ADDITIONAL INFORMATION		
ICSC: 0020		CADMIUM
© IPCS, CEC, 1993		
IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

CHROMIUM Chrome (powder) Cr (metal) Atomic mass: 52.0			
CAS # 7440-47-3 RTECS # GB4200000 ICSC # 0029			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible if in very fine powder. Gives off irritating or toxic fumes (or gases) in a fire.	No open flames if in powder form.	In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
• INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
• SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
• EYES	Redness.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).		Fireproof. Separated from strong oxidants.	
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0029		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

I	PHYSICAL STATE; APPEARANCE: STEEL GREY LUTROUS METAL.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.
M	PHYSICAL DANGERS:	

P O R T A N T D A T A	Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.
	CHEMICAL DANGERS: Reacts violently with strong oxidants such as hydrogen peroxide, causing fire and explosion hazard. Reacts with diluted hydrochloric and sulfuric acids. Incompatible with alkalis and alkali carbonates.	EFFECTS OF SHORT-TERM EXPOSURE: EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact may cause skin sensitization.
OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV: ppm; 0.5 mg/m ³ (as TWA) (ACGIH 1994-1995).		
PHYSICAL PROPERTIES	Boiling point: 2642°C Melting point: 1900°C	Relative density (water = 1): 7.14 Solubility in water: none
ENVIRONMENTAL DATA		
NOTES		
Explosive limits are unknown in literature. Depending on the degree of exposure, periodic medical examination is indicated.		
ADDITIONAL INFORMATION		
ICSC: 0029	CHROMIUM	
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AMOCO OIL -- LS NO. 2 DIESEL FUEL - DIESEL FUEL
MATERIAL SAFETY DATA SHEET
NSN: 9140002865294
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: LS NO. 2 DIESEL FUEL

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General Information
=====

Item Name: DIESEL FUEL
Company's Name: AMOCO OIL COMPANY
Company's Street: 200 EAST RANDOLPH DRIVE
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601
Company's Emerg Ph #: 800-447-8735/800-424-9300
Company's Info Ph #: 312-856-3907
Distributor/Vendor # 1: AMOCO INTERNATIONAL OILCO
Distributor/Vendor # 1 Cage: 6G027
Distributor/Vendor # 2: SPENCER OIL CORP (810-775-5022)
Distributor/Vendor # 2 Cage: 5W753
Record No. For Safety Entry: 039
Tot Safety Entries This Stk#: 112
Status: SE
Date MSDS Prepared: 24SEP93
Safety Data Review Date: 07SEP94
Supply Item Manager: KY
MSDS Preparer's Name: DONALD M. BARKER, DIR
Preparer's Company: PRODUCT STWEARDSHIP & TOXICOLOGY, AMOCO
MSDS Serial Number: BJPSG
Specification Number: VV-F-800
Spec Type, Grade, Class: DF-2
Hazard Characteristic Code: F4
Unit Of Issue: GL
Unit Of Issue Container Qty: BULK
Type Of Container: BULK
Net Unit Weight: BULK

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: PETROLEUM DISTILLATE, NO. 2 FUEL OIL
Ingredient Sequence Number: 01
Percent: N/GIVEN
NIOSH (RTECS) Number: LS8930000
CAS Number: 68476-30-2
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: NAPHTHALENE (SARA III)
Ingredient Sequence Number: 02
Percent: 1
NIOSH (RTECS) Number: QJ0525000
CAS Number: 91-20-3
OSHA PEL: 10 PPM
ACGIH TLV: 10 PPM/15 STEL; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)

Ingredient Sequence Number: 03
Percent: 1
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM
ACGIH TLV: 100 PPM/150STEL;9394
Other Recommended Limit: NONE RECOMMENDED

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Physical/Chemical Characteristics
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Appearance And Odor: CLEAR, WATER SHITE TO BLUE-GREEN LIQUID.
Boiling Point: 340F,171C
Specific Gravity: 0.85-0.88
Solubility In Water: NEGLIGIBLE (<0.1%)
Viscosity: >1.8 CST

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Fire and Explosion Hazard Data
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Flash Point: 120F,49C
Flash Point Method: TCC
Lower Explosive Limit: 0.6
Upper Explosive Limit: 7.5
Extinguishing Media: AGENTS APPROVED FOR CLASS B HAZ (E.G. DRY CHEMICAL,
CARBON DIOXIDE, HALOGENATED AGENTS, FOAM, STEAM) OR WATER FOG.
Special Fire Fighting Proc: NONE SPECIFIED BY MFG; HOWEVER WEAR
APPROPRIATE PROTECTIVE EQUIPMENT.
Unusual Fire And Expl Hazrds: COMBUSTIBLE LIQUID.

=====
Reactivity Data
=====

Stability: YES
Cond To Avoid (Stability): KEEP AWAY FROM IGNITIN SOURCES (E.G. HEAT AND
OPEN FLAMES).
Materials To Avoid: AVOID CHLORINE, FLUORINE, AND OTHER STRONG OXIDIZERS.
Hazardous Decomp Products: INCOMPLETE BURNING CAN PRODUCE CARBON MONOXIDE
&/OR CARBON DIOXIDE AND OTHER HARMFUL PRODUCTS.
Conditions To Avoid (Poly): NONE SPECIFIED BY MFG.

=====
Health Hazard Data
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LD50-LC50 Mixture: LD50,ORAL FOR SIMILAR PRODUCT >5G/KG.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: NO SIGNIFICANT EYE HEALTH HAZ IDENTIFIED.
CAN CAUSE SKIN IRRIT ON PROLONG/REPEAT CONTACT. NO SIGNIFICANT INHAL HEALTH
HAZ IDENTIFIED FOR THE LIQUID FUEL.LOW VISCOSITY PRODUCT. HARMFUL OR FATAL
IF SWALLOWED & THEN ASPIRATED INTO LUNGS CAUSING CHEM PNEUMONIA & DEATH.
KIDNEY DAMAGE IN MALE RATS W/MATLS OF THIS TYPE.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: PER MSDS NO INGRED PRESENT @ LEVELS FOR
CARCINO.NIOSH RECOMMENDS WHOLE DIESEL EXHAUST REGARDED AS POTENTIAL OCCUP
CARCIN
Signs/Symptoms Of Overexp: INHAL OF VAPORS FROM HEATED MATL IN CONFINED
AREA CAUSES DIZZINESS, HEADACHE, NAUSEA, POSSIBLE IRRIT OF EYE/NOSE/THROAT.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MFG.
Emergency/First Aid Proc: EYE:FLUSH W/PLENTY OF WATER. SKIN:WASH W/ SOAP &
WATER. REMOVE CONTAMIN CLOTHING/SHOE. INHAL:IF ADVERSE EFFECTS OCCUR REMOVE
TO UNCONTAMINATED AREA. INGEST:DO NOT INDUCE VOMIT. GET IMMED MED ATTN.

=====
Precautions for Safe Handling and Use
=====

Steps If Matl Released/Spill: REMOVE OR SHUT OFF ALL SOURCES OF IGNITION. PREVENT SPREADING BY DIKING, DITCHING, OR ABSORBING ON INERT MATERIALS. IF SPILLED INTO WATERS FO USA IT MAY BE REPORTABLE UNDER 33 CFR PART 153 IF IT PRODUCES A SHEEN.

Neutralizing Agent: NONE SPECIFIED BY MFG.

Waste Disposal Method: DISPOSAL MUST BE IN ACCORDANCE W/APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. ENCLOSED-CONTROLLED INCINERATION IS RECOMMENDED UNLESS DIRECTED OTHERWISE BY APPLICABLE ORDINANCES. PRODUCT EXEMPT FROM CERCLA REPORTING REQMTS UNDER 40CFRPART302.4.

Precautions-Handling/Storing: STORE IN COMBUSTIBLE LIQUIDS STORAGE AREA. STORE AWAY FROM HEAT, IGNITION SOURCES, AND OPEN FLAME IN ACCORDANCE W/APPLICABLE FED/STATE/LOC REGS.

Other Precautions: THE CONTAINER FOR THIS PRODUCT CAN PRESENT EXPLOSION OR FIRE HAZARDS, EVEN WHEN EMPTIED. TO AVOID RISK OF INJURY, DO NOT CUT, PUNCTURE OR WELD ON OR NEAR THIS CONTAINER.

=====
Control Measures
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Respiratory Protection: NONE SPECIFIED BY MFG. HOWEVER, USE WITH ADEQUATE VENTILATION. IF AIR CONTAMINANTS LEVEL ABOVE ESTABLISHED EXPOSURE LIMITS USE APPROPRIATE NIOSH APPROVED RESP.

Ventilation: USE WITH ADEQUATE VENTILATION.

Protective Gloves: WEAR PROTECTIVE GLOVES.

Eye Protection: NONE REQUIRED; HOWEVER USE EYE PROTECTION

Other Protective Equipment: WEAR PROTECTIVE CLOTHING IF PROLONG/REPEAT CONTACT. EYE PROTECTION IS GOOD INDUSTRIAL PRACTICE.

Work Hygienic Practices: WASH HANDS AFTER HANDLING. PRACTICE GOOD PERSONAL HYGIENIC PRACTICES. THOROUGHLY CLEAN & DRY CONTAMINATED CLOTHING BEFORE REUSE

Suppl. Safety & Health Data: BOILING PT RANGE: 340F-675F APPROX. FROM SKIN-PAINTING STUDIES OF PETRO DISTILLATES OF SIMILAR COMPOSITION & DISTILLATE RANGE HAS BEEN SHOWN THESE MATLS OFTEN POSSESS WEAK CARCINOGENIC ACTIVITY IN LAB ANIMALS. MFG HAVE CHOSEN TO BE CAUTIOUS IN LIGHT OF FINDINGS W/OTHER DISTILLATED STREAMS.

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Transportation Data
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Trans Data Review Date: 94250
DOT PSN Code: EXF
DOT Symbol: D
DOT Proper Shipping Name: DIESEL FUEL
DOT Class: 3
DOT ID Number: NA1993
DOT Pack Group: III
DOT Label: NONE
IMO PSN Code: HIA
IMO Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. o
IMO Regulations Page Number: 3345
IMO UN Number: 1993
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: MCA
IATA UN ID Number: 1993
IATA Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. *
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: JEV
AFI Symbols: D
AFI Prop. Shipping Name: DIESEL FUEL
AFI Class: 3
AFI ID Number: UN1202
AFI Pack Group: III
AFI Basic Pac Ref: 7-7
N.O.S. Shipping Name: FUEL OIL, NO.2
Additional Trans Data: PER MSDS: DOT SHIPPING DESCRIPTION DIESEL FUEL

COMBUSTIBLE LIQUID NA1993, III. IMO & IATA DO NOT HAVE CODES FOR THIS
THEREFORE USED FLAMM LIQ NOS, III.

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Disposal Data
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Label Data
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Label Required: YES
Technical Review Date: 07SEP94
Label Status: F
Common Name: LS NO. 2 DIESEL FUEL
Chronic Hazard: NO
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-Moderate: X
Reactivity Hazard-None: X
Special Hazard Precautions: WARANING! COMBUSTIBLE. NO SIGNIFICANT EYE
HEALTH HAZ IDENTIFIED. CAN CAUSE SKIN IRRIT ON PROLONG/REPEAT CONTACT. NO
SIGNIFICANT INHAL HEALTH HAZ IDENTIFIED FOR THE LIQUID FUEL. LOW VISCOSITY
PRODUCT. HARMFUL OR FATAL IF SWALLOWED & THEN ASPIRATED INTO LUNGS CAUSING
FLUSH W/PLENTY OF WATER. SKIN:WASH W/SOAP & WATER. REMOVE CONTAMIN
CLOTHING/SHOE. INHAL:IF ADVERSE EFFECTS OCCUR REMOVE TO UNCONTAMINATED
AREA. INGEST:DO NOT INDUCE VOMIT. GET IMMED MED ATTN.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: AMOCO OIL COMPANY
Label Street: 200 EAST RANDOLPH DRIVE
Label City: CHICAGO
Label State: IL
Label Zip Code: 60601
Label Country: US
Label Emergency Number: 800-447-8735/800-424-9300

MSDS Material Safety Data Sheet

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



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

National Response in Canada
CANUTEC: 613-996-6666

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

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

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

TOLUENE

MSDS Number: T3913 --- Effective Date: 11/17/99

1. Product Identification

Synonyms: Methylbenzene; Toluol; Phenylmethane

CAS No.: 108-88-3

Molecular Weight: 92.14

Chemical Formula: C₆H₅-CH₃

Product Codes:

J.T. Baker: 5375, 5584, 5809, 5812, 9336, 9351, 9364, 9456, 9457, 9459, 9460, 9462, 9466, 9472, 9476

Mallinckrodt: 4483, 8091, 8092, 8604, 8608, 8610, 8611, V560

2. Composition/Information on Ingredients

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

3. Hazards Identification

Emergency Overview

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

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

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

Potential Health Effects

Inhalation:

Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.

Ingestion:

Swallowing may cause abdominal spasms and other symptoms that parallel overexposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.

Skin Contact:

Causes irritation. May be absorbed through skin.

Eye Contact:

Causes severe eye irritation with redness and pain.

Chronic Exposure:

Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or impaired liver or kidney function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

4. First Aid Measures

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.

Ingestion:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

Skin Contact:

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

Eye Contact:

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

5. Fire Fighting Measures

Fire:

Flash point: 7C (45F) CC

Autoignition temperature: 422C (792F)

Flammable limits in air % by volume:

lcl: 3.3; ucl: 19

Flammable liquid and vapor!

Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.

Explosion:

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

Fire Extinguishing Media:

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

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool.

6. Accidental Release Measures

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

J. T. Baker SOLUSORB(R) solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Toluene:

- OSHA Permissible Exposure Limit (PEL):

200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).

- ACGIH Threshold Limit Value (TLV):

50 ppm (TWA) skin, A4 - Not Classifiable as a Human Carcinogen.

Ventilation System:

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

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face organic vapor respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.

WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

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

Eye Protection:

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

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Aromatic benzene-like.

Solubility:

0.05 gm/100gm water @ 20C (68F).

Specific Gravity:

0.86 @ 20C / 4 C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

111C (232F)

Melting Point:

-95C (-139F)

Vapor Density (Air=1):

3.14

Vapor Pressure (mm Hg):
22 @ 20C (68F)
Evaporation Rate (BuAc=1):
2.24

10. Stability and Reactivity

Stability:

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

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetroxide; will attack some forms of plastics, rubber, coatings.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:

Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m³/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

Has shown some evidence of reproductive effects in laboratory animals.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Toluene (108-88-3)	No	No	3

12. Ecological Information

Environmental Fate:

When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. Bioconcentration factor = 13.2 (eels).

Environmental Toxicity:

This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

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

14. Transport Information

Domestic (Land, D.O.T.)

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

International (Water, I.M.O.)

Proper Shipping Name: TOLUENE
Hazard Class: 3.2
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

15. Regulatory Information

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-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Toluene (108-88-3)                             Yes  Yes  Yes    Yes
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-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL  NDSL  Phil.
-----
Toluene (108-88-3)                             Yes   Yes  No    Yes
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-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ  TPQ  List  Chemical Catg.
-----
Toluene (108-88-3)                             No   No   Yes   No
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-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     CERCLA  -RCRA-  -TSCA-
                                     1000    261.33  8(d)
-----
Toluene (108-88-3)                             1000    U220    No
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Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:

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

Australian Hazchem Code: 3[Y]E

Poison Schedule: S6

WHMIS:

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

16. Other Information

NFPA Ratings: Health: 2 Flammability: 3 Reactivity: 0

Label Hazard Warning:

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Label Precautions:

Keep away from heat, sparks and flame.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Avoid breathing vapor.

Avoid contact with eyes, skin and clothing.

Label First Aid:

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

Product Use:

Laboratory Reagent.

Revision Information:

No changes.

Disclaimer:

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

ASHLAND OIL -- UNLEADED 87 - GASOLINE,AUTOMOTIVE
MATERIAL SAFETY DATA SHEET
NSN: 913000DOO3077
Manufacturer's CAGE: 81355
Part No. Indicator: A
Part Number/Trade Name: UNLEADED 87

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General Information
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Item Name: GASOLINE,AUTOMOTIVE
Company's Name: ASHLAND OIL INC
Company's Street: 1409 WINCHESTER AVE
Company's P. O. Box: 391
Company's City: ASHLAND
Company's State: KY
Company's Country: US
Company's Zip Code: 41114
Company's Emerg Ph #: 606-329-3333
Company's Info Ph #: 606-329-3333
Distributor/Vendor # 1: BASEVIEW PETROLEUM INC
Distributor/Vendor # 1 Cage: 5W146
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 29JAN93
Safety Data Review Date: 29JUL93
Supply Item Manager: CD
MSDS Serial Number: BRFXP
Hazard Characteristic Code: F2
Unit Of Issue Container Qty: NOT KNOWN
Type Of Container: NOT KNOWN
Net Unit Weight: NOT KNOWN

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Ingredients/Identity Information
=====

Proprietary: NO
Ingredient: BENZINE (MOTOR FUEL)/GASOLINE - INCLUDES COMPOUNDS LISTED
BELOW
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: DE3550000
CAS Number: 86290-81-5
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III), 4-10%
Ingredient Sequence Number: 02
Percent: SEE # 1
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150STEL;9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TOLUENE (SARA III), 3-10%
Ingredient Sequence Number: 03
Percent: SEE # 1
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL

ACGIH TLV: 50 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BENZENE (SARA III), 1-5%
Ingredient Sequence Number: 04
Percent: SEE # 1
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: PENTANE, 1-4%
Ingredient Sequence Number: 05
Percent: SEE # 1
NIOSH (RTECS) Number: RZ9450000
CAS Number: 109-66-0
OSHA PEL: 1000 PPM/750 STEL
ACGIH TLV: 600 PPM/750STEL;9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: 1,2,4-TRIMETHYLBENZENE (SARA III), 0-4%
Ingredient Sequence Number: 06
Percent: SEE # 1
NIOSH (RTECS) Number: DC3325000
CAS Number: 95-63-6
OSHA PEL: 25 PPM
ACGIH TLV: 25 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: HEXANE (N-HEXANE), 1-3%
Ingredient Sequence Number: 07
Percent: SEE # 1
NIOSH (RTECS) Number: MN9275000
CAS Number: 110-54-3
OSHA PEL: 500 PPM
ACGIH TLV: 50 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BUTANE/N-BUTANE, 1-3%
Ingredient Sequence Number: 08
Percent: SEE # 1
NIOSH (RTECS) Number: EJ4200000
CAS Number: 106-97-8
OSHA PEL: 800 PPM
ACGIH TLV: 800 PPM; 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III), 1-2%
Ingredient Sequence Number: 09
Percent: SEE # 1
NIOSH (RTECS) Number: DA0700000
CAS Number: 100-41-4
OSHA PEL: 100 PPM/125 STEL
ACGIH TLV: 100 PPM/125STEL 9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO

Ingredient: N-HEPTANE, 1-2%
Ingredient Sequence Number: 10
Percent: SEE # 1
NIOSH (RTECS) Number: MI7700000
CAS Number: 142-82-5
OSHA PEL: 500 PPM/500 STEL
ACGIH TLV: 400 PPM/500STEL;9293
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III), 0-2%
Ingredient Sequence Number: 11
Percent: SEE # 1
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

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Physical/Chemical Characteristics

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Appearance And Odor: CLEAR LIQUID - GASOLINE ODOR
Boiling Point: <100F,<38C
Melting Point: NOT KNOWN
Vapor Pressure (MM Hg/70 F): >259 @ 68F
Vapor Density (Air=1): >3
Specific Gravity: >0.70
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: <1 (ETHER=1)
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: 100
Corrosion Rate (IPY): UNKNOWN

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Fire and Explosion Hazard Data

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Flash Point: -40F,-40C
Flash Point Method: TCC
Lower Explosive Limit: 1.5
Upper Explosive Limit: 7.6
Extinguishing Media: USE CARBON DIOXIDE, FOAM, DRY CHEMICAL AND VAPORIZING LIQUID TYPE EXTINGUISHERS. WATER MAY BE INEFFECTIVE.
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT & A FULL FACED SELF CONTAINED BREATHING APPARATUS/SUPPLIED-AIR RESPIRATOR.COOL FIRE EXPOSED CONTAINERS WITH WATER SPRAY.
Unusual Fire And Expl Hazrds: THE INVISIBLE VAPORS ARE HEAVIER THAN AIR AND TRAVEL SOME DISTANCE TO IGNITION SOURCES & FLASH BACK. CAN FORM FLAMMABLE MIXTURE WITH AIR & FLASH AT ROOM TEMP.

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Reactivity Data

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Stability: YES
Cond To Avoid (Stability): HIGH HEAT, SPARKS, OPEN FLAMES AND OTHER SOURCES OF IGNITION
Materials To Avoid: STRONG OXIDIZING AGENTS
Hazardous Decomp Products: FUMES, CARBON MONOXIDE, CARBON DIOXIDE AND OTHER DECOMPOSITION PRODUCTS
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

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Health Hazard Data

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LD50-LC50 Mixture: TLV FOR BENZENE IS 10 PPM.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES

Route Of Entry - Ingestion: NO

Health Haz Acute And Chronic: ACUTE- INHALATION OF VAPORS MAY CAUSE CNS DEPRESSION, CONVULSION, LOSS OF CONSCIOUSNESS. INGESTION HAS SYMPTOMS SIMILAR TO INHALATION & ASPIRATION HAZARD. EYE/SKIN CONTACT CAUSES IRRITATION. CHRONIC- DERMATITIS, NERVOUS SYSTEM, KIDNEY, LIVER & BLOOD DISORDERS INCLUDING ANEMIA & LEUKEMIA. KIDNEY CANCER IN LAB ANIMALS.

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: YES

Explanation Carcinogenicity: CONTAINS BENZENE. MAY CAUSE BLOOD DISEASES INCLUDING LEUKEMIA. VAPORS MAY CAUSE KIDNEY CANCER IN MALE RATS.

Signs/Symptoms Of Overexp: HEADACHE, NASAL & RESPIRATORY IRRITATION, NAUSEA, DROWSINESS, FATIGUE, EYE & SKIN IRRITATION, PULMONARY EDEMA, CONVULSION & LOSS OF CONSCIOUSNESS

Med Cond Aggravated By Exp: BENZENE- INDIVIDUALS WITH LIVER, KIDNEY AND BLOOD DISEASES. HEXANE- INDIVIDUALS WITH NEUROLOGICAL DISEASES. PETROLEUM SOLVENT- THOSE WITH EXISTING DERMATITIS.

Emergency/First Aid Proc: CALL A PHYSICIAN IN ALL CASES. EYES: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES, HOLDING EYELIDS OPEN. SKIN: WASH WITH SOAP & WATER. INHALED:REMOVE TO FRESH AIR & PROVIDE CPR/OXYGEN IF NECESSARY.

ORAL:DO NOT INDUCE VOMITING UNLESS INSTRUCTED BY A PHYSICIAN. CALL A PHYSICIAN IMMEDIATELY. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS.

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Precautions for Safe Handling and Use

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Steps If Matl Released/Spill: WEAR PROTECTIVE EQUIPMENTS.ELIMINATE ALL SOURCES OF IGNITION.USE EXPLOSION-PROOF TOOLS.SHUT OFF FUEL SOURCE.DIKE SPILL.PREVENT LIQUID FROM ENTERING SEWERS/WATERWAYS.RECOVER FREE LIQUID.ADD SAND,EARTH OR OTHER ABSORBENT MATERIAL.TRANSFER TO CONTAINER.

Neutralizing Agent: NOT APPLICABLE

Waste Disposal Method: RECYCLE AS MUCH AS POSSIBLE. TREATMENT, STORAGE, TRANSPORTATION AND DISPOSAL MUST BE IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS.

Precautions-Handling/Storing: STORE IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION REGULATIONS. KEEP CONTAINERS CLOSED.

Other Precautions: "EMPTY" CONTAINERS RETAIN RESIDUE AND CAN BE DANGEROUS. DO NOT PRESSURIZE, CUT, WELD, SOLDER, DRILL OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS. THEY MAY EXPLODE AND CAUSE INJURY/DEATH. AVOID REPEATED OR PROLONGED CONTACT WITH SKIN.

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Control Measures

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Respiratory Protection: NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS OR ORGANIC VAPOR RESPIRATOR OR SUPPLIED-AIR RESPIRATOR, IF NEEDED.

Ventilation: LOCAL/MECHANICAL (GENERAL) VENTILATION - EXPLOSION PROOF, WELL GROUNDED EQUIPMENTS

Protective Gloves: RUBBER RECOMMENDED

Eye Protection: CHEMICAL SPLASH GOGGLES & FACE SHIELD

Other Protective Equipment: IMPERVIOUS CLOTHING TO AVOID SKIN AND EYE CONTACT. EYE WASH STATION & SAFETY SHOWER.

Work Hygienic Practices: AVOID CONTACT WITH EYES, SKIN OR CLOTHING. WASH HANDS AFTER USING PRODUCT. AVOID BREATHING VAPORS OR MISTS.

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Transportation Data

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Trans Data Review Date: 93210

DOT PSN Code: GTN

DOT Proper Shipping Name: GASOLINE

DOT Class: 3

DOT ID Number: UN1203

DOT Pack Group: II

DOT Label: FLAMMABLE LIQUID

IMO PSN Code: HRV

IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: RNE
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Basic Pac Ref: 7-7

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Disposal Data
==========
Label Data
=====

Label Required: YES
Technical Review Date: 29JUL93
MFR Label Number: NOT APPLICABLE
Label Status: G
Common Name: UNLEADED 87
Signal Word: DANGER!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE- INHALATION OF VAPORS MAY CAUSE CNS DEPRESSION, CONVULSION, LOSS OF CONSCIOUSNESS. INGESTION HAS SYMPTOMS SIMILAR TO INHALATION & ASPIRATION HAZARD. EYE/SKIN CONTACT CAUSES IRRITATION. CHRONIC- DERMATITIS, NERVOUS SYSTEM, KIDNEY, LIVER & BLOOD DISORDERS. STORE IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION REGULATIONS. REMOVE SPILL WITH NON-FLAMMABLE ABSORBENT MATERIAL. FIRST AID- CALL A PHYSICIAN IN ALL CASES. EYES: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES, HOLDING EYELIDS OPEN. SKIN: WASH WITH SOAP & WATER. INHALED: REMOVE TO FRESH AIR & PROVIDE CPR/OXYGEN IF NEEDED. ORAL: DO NOT INDUCE VOMITING UNLESS INSTRUCTED BY A DOCTOR.
Protect Eye: Y
Label Name: ASHLAND OIL INC
Label Street: 1409 WINCHESTER AVE
Label P.O. Box: 391
Label City: ASHLAND
Label State: KY
Label Zip Code: 41114
Label Country: US
Label Emergency Number: 606-329-3333

International Chemical Safety Cards

2-METHOXY-2-METHYL PROPANE

ICSC: 1164

2-METHOXY-2-METHYL PROPANE tert-Butyl methyl ether Methyl tert-butyl ether MTBE $(\text{CH}_3)_3\text{COCH}_3$ Molecular mass: 88.2			
CAS # 1634-04-4 RTECS # KN5250000 ICSC # 1164 UN # 2398			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking. NO contact with oxidants.	Water spray. Alcohol-resistant foam. Carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive. Risk of fire and explosion.	Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
• INHALATION	Cough. Dizziness. Unconsciousness. Weakness.	Ventilation.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• SKIN	Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness. Pain.	Safety goggles or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Dizziness. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Use self-contained breathing apparatus in the case of large spills.	Fireproof. Separated from strong oxidants, strong acids. Keep in a well-ventilated room.	UN Haz Class: 3 UN Pack Group: II	
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 1164		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

International Chemical Safety Cards

2-METHOXY-2-METHYL PROPANE

ICSC: 1164

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.
	PHYSICAL DANGERS: The vapour is heavier than air and may travel along the ground; distant ignition possible. The vapour mixes well with air, explosive mixtures are easily formed. As a result of flow, agitation, etc., electrostatic charges can be generated.	INHALATION RISK: EFFECTS OF SHORT-TERM EXPOSURE: Inhalation of high concentrations of vapour may cause irritation of respiratory tract. Exposure to high concentrations could cause lowering of consciousness.
	CHEMICAL DANGERS: Reacts violently with strong oxidants causing fire hazard.	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV not established.	
PHYSICAL PROPERTIES	Boiling point: 55°C Melting point: -109°C Relative density (water = 1): 0.7 Solubility in water, g/100 ml: 4.8 Solubility in water: 6.9% by volume Vapour pressure, kPa at 25°C: 32.7	Relative vapour density (air = 1): 3.0 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.7 Flash point: -28°C Auto-ignition temperature: 224°C Explosive limits, vol% in air: 1.6-15.1 Octanol/water partition coefficient as log Pow: 1.3
ENVIRONMENTAL DATA		
NOTES		
Other explosive limits: 1.6-8.4 volume %. Much less likely to form peroxides than other ethers. Transport Emergency Card: TEC (R)-30G30		
ADDITIONAL INFORMATION		
ICSC: 1164		2-METHOXY-2-METHYL PROPANE
© IPCS, CEC, 1993		
IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.	

MSDS **Material Safety Data Sheet**

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



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

National Response in Canada
CANUTEC: 613-996-6666

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

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

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

TRICHLOROETHYLENE

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

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride

CAS No.: 79-01-6

Molecular Weight: 131.39

Chemical Formula: C₂HCl₃

Product Codes:

J.T. Baker: 5376, 9454, 9458, 9464, 9473, 9474

Mallinckrodt: 8598, 8600, 8633

2. Composition/Information on Ingredients

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

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

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

Health Rating: 3 - Severe (Cancer Causing)

Flammability Rating: 1 - Slight

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD;
PROPER GLOVES

Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

Ingestion:

Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

Skin Contact:

Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

Eye Contact:

Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

Chronic Exposure:

Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

Skin Contact:

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

Eye Contact:

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

Note to Physician:

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

5. Fire Fighting Measures

Fire:

Autoignition temperature: 420C (788F)

Flammable limits in air % by volume:

l_{el}: 8; u_{el}: 12.5

Explosion:

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

Fire Extinguishing Media:

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

Special Information:

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

6. Accidental Release Measures

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

7. Handling and Storage

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

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Trichloroethylene:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (Ceiling),
300 ppm/5min/2hr (Max)

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

Ventilation System:

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

Personal Respirators (NIOSH Approved):

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

Skin Protection:

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

Eye Protection:

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

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Chloroform-like odor.

Solubility:

Practically insoluble in water. Readily miscible in organic solvents.

Specific Gravity:

1.47 @ 20C/4C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

87C (189F)

Melting Point:

-73C (-99F)

Vapor Density (Air=1):

4.5

Vapor Pressure (mm Hg):

57.8 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.

Hazardous Decomposition Products:

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.

Conditions to Avoid:

Heat, flame, ignition sources, light, moisture, incompatibles

11. Toxicological Information

Toxicological Data:

Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

This material has been linked to mutagenic effects in humans.

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

12. Ecological Information

Environmental Fate:

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

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

14. Transport Information

Domestic (Land, D.O.T.)

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

International (Water, I.M.O.)

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

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

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

15. Regulatory Information

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-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Trichloroethylene (79-01-6)                   Yes   Yes   Yes    Yes
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-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  --Canada--  Phil.
                                     Korea  DSL   NDSL
-----
Trichloroethylene (79-01-6)                   Yes   Yes   No     Yes
```

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-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
                                     RQ   TPQ   List  Chemical Catg.
-----
Trichloroethylene (79-01-6)                   No    No    Yes   No
```

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-----\Federal, State & International Regulations - Part 2\-----
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Ingredient	CERCLA	-RCRA-	-TSCA-
-----	-----	261.33	8 (d)
Trichloroethylene (79-01-6)	100	U228	No

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

WARNING:

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

Australian Hazchem Code: No information found.

Poison Schedule: S6

WHMIS:

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

16. Other Information

NFPA Ratings: Health: **2** Flammability: **1** Reactivity: **0**

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Keep away from heat and flame.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 8, 11.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving

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

MSDS Material Safety Data Sheet

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



Mallinckrodt
CHEMICALS



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

National Response in Canada
CANUTEC: 613-996-6666

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

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

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

XYLENES

MSDS Number: X2000 --- Effective Date: 09/14/00

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene

CAS No.: 1330-20-7

Molecular Weight: 106.17

Chemical Formula: C₆H₄(CH₃)₂

Product Codes:

J.T. Baker: 5377, 5810, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516

Mallinckrodt: 8664, 8668, 8671, 8672, 8685, 8802, V052

2. Composition/Information on Ingredients

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

3. Hazards Identification**Emergency Overview**

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

FLAMMABLE LIQUID AND VAPOR.

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

Health Rating: 2 - Moderate

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES;
CLASS B EXTINGUISHER.

Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

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

Ingestion:

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

Skin Contact:

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

Eye Contact:

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

Chronic Exposure:

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

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.

Ingestion:

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.

Skin Contact:

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

reuse. Thoroughly clean shoes before reuse.

Eye Contact:

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

5. Fire Fighting Measures

Fire:

Flash point: 29C (84F) CC

Autoignition temperature: 464C (867F)

Flammable limits in air % by volume:

lel: 1.0; uel: 7.0

Explosion:

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

Fire Extinguishing Media:

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

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

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

J. T. Baker SOLUSORB(R) solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

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

liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA) xylene

100 ppm (TWA) ethylbenzene

-ACGIH Threshold Limit Value (TLV):

100 ppm (TWA) 150 ppm (STEL) xylene

Carcinogen Category (xylene): A4

100 ppm (TWA) 125 ppm (STEL) ethyl benzene

Ventilation System:

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

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

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

Eye Protection:

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

9. Physical and Chemical Properties

The following physical data is for xylene.

Appearance:

Clear, colorless liquid.

Odor:

Characteristic odor.

Solubility:

Insoluble in water.

Specific Gravity:

0.86 @ 20C/4C

pH:

Not applicable.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

137 - 140C (279 - 284F)

Melting Point:

-25C (-13F)

Vapor Density (Air=1):

3.7

Vapor Pressure (mm Hg):

8 @ 20C (68F)

Evaporation Rate (BuAc=1):

0.7

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Involvement in a fire causes formation of carbon monoxide and unidentified organic components.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidizing agents and strong acids.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:

Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector.

Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

May cause teratogenic effects.

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

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

12. Ecological Information

Environmental Fate:

Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)

Environmental Toxicity:

For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

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

14. Transport Information

Domestic (Land, D.O.T.)

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

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3.3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----
 Ingredient TSCA EC Japan Australia

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

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

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

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

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

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

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8 (d)
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No
p-Xylene (106-42-3)	100	No	Yes
Ethyl Benzene (100-41-4)	1000	No	No

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

Australian Hazchem Code: 3[Y]

Poison Schedule: No information found.

WHMIS:

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

16. Other Information

NFPA Ratings: Health: 2 Flammability: 3 Reactivity: 0

Label Hazard Warning:

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

Label Precautions:

Keep away from heat, sparks and flame.

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

Label First Aid:

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

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 8, 11.

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

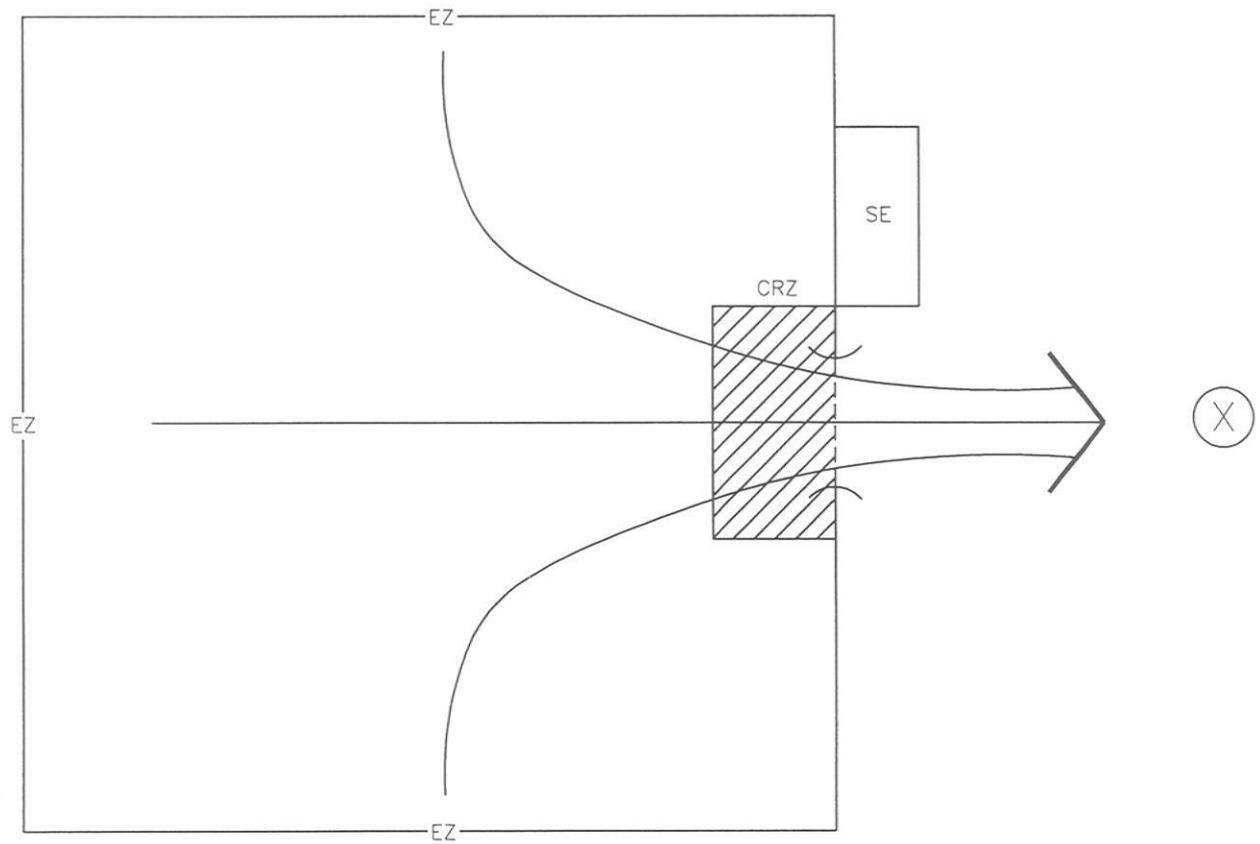
**APPENDIX E
HEALTH AND SAFETY CHECKLIST**

Health and Safety Checklist

- First aid kits (one per vehicle and facility)
- Fire extinguishers (one per vehicle and facility)
- Safety glasses or goggles, ANSI approved
- Hard hats, ANSI approved
- Ear plugs, 25 dBA or greater
- Under gloves (latex, Nitrile)
- Impermeable gloves
- Work gloves
- Steel-toed work boots, ANSI approved
- Tyvek suits (sizes XXL – XXXXL)
- Duct tape
- Trash bags
- Eyewash
- Emergency shower
- Portable toilet
- Drinking water and disposable cups
- Gatoraid/electrolyte replacement
- Air-purifying respirators (full-face/half-face)
- Organic vapor P100 cartridges, NIOSH approved
- Thermometer
- Barricade tape (yellow and red)
- O₂ LEL meter with CO/SO₂/H₂S sensor options
- Photoionization detector (PID)
- Miniram aerosol monitor
- Decon tubs
- Personal sampling pump
- Charcoal tubes
- Filter cassettes
- Detector tubes
- Methane calibration gas
- Isobutylene calibration gas
- Tedlar bags
- Brushes
- Hand/face wash station
- Paper towels
- Complete Health and Safety Plan
- MSDSs
- Rubber boots/boot covers
- Sun block
- Shade
- Air horn
- Noise dosimeter/sound level meter with calibrator
- Traffic control signs
- Traffic control vests
- Wet Bulb Globe Thermometer (WBGT)
- Barricades with lights
- Traffic cones
- Scrub suits
- Towels
- Laundry service and letter to service
- Pulse rate meter
- Air flow calibrator
- PVC raingear
- Wire mesh face shield
- Ear muffs/ear plugs
- EZ evaluation route maps

**APPENDIX F
EXCLUSION ZONE EVACUATION MAP**

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
---	---	Concord	RB	8-1-01	NH	8-1-01	DLS	8-1-01	807181-A29



LEGEND

- EZ EXCLUSION ZONE
- CRZ CONTAMINANT REDUCTION ZONE
- SZ SUPPORT ZONE
-) (ENTRY/EXIT
- ⇒ EVACUATION ROUTE
- X MUSTER POINT
- SE SAFETY EQUIPMENT (AIR HORN, FIRE EXTINGUISHER, FIRST AID KIT, EYEWASH, SHOWER)
- < WIND DIRECTION

NOT TO SCALE

 <p>ITT CORPORATION</p>	<p>DEPARTMENT OF THE NAVY ENGINEERING FIELD DIVISION SOUTHWEST DIVISION SAN DIEGO, CALIFORNIA</p>
	<p>EXCLUSION ZONE EVACUATION ROUTE MAP</p> <p>ALAMEDA POINT ALAMEDA, CALIFORNIA</p>

**FINAL
ENVIRONMENTAL PROTECTION PLAN
FUEL REMEDIATION MEASURES
IR SITE 7 AND PARCEL 37
ALAMEDA POINT
ALAMEDA, CALIFORNIA**

**Environmental Remedial Action
Contract Number N62474-98-D-2076
Contract Task Order 0013**

**Document Control Number 1538
Revision 1**

August 1, 2001

Submitted to:

U.S. Department of the Navy
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92132-5190

Submitted by:

IT Corporation
4005 Port Chicago Highway
Concord, California 94520-1120

Issued to: _____

Date: _____

Controlled

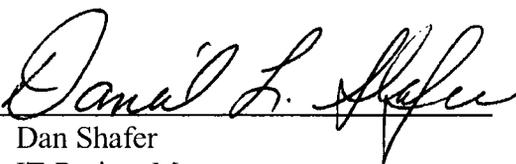
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**FINAL
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Approved by: 
Dan Shafer
IT Project Manager

Date: August 1, 2001

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Acronyms and Abbreviations

BAAQMD	Bay Area Air Quality Management District
CSO	Caretaker Site Office
DVE	dual vacuum extraction
EPP	Environmental Protection Plan
GAC	granular activated carbon
HAZMAT	hazardous materials
IT	IT Corporation
OSHA	Occupational Safety and Health Administration
ROICC	Resident Officer in Charge of Construction
SHSP	Site Health and Safety Plan

1.0 Introduction

This Environmental Protection Plan (EPP) was developed to meet requirements for performing the work described in this Site 7 and Parcel 37 Fuel Remediation Measures Work Plan in a manner that protects the environment during the contract period. For the purpose of this project, environmental protection is defined as maintaining the environment in its natural state and enhancing and/or restoring the appearance of disturbed sites after construction and remediation completion.

To accomplish environmental protection, consideration will be given to air, water, and land resources, including management of visual aesthetics; natural, historical, and archeological resources; noise; and liquid and solid wastes. The IT Corporation (IT) Project Manager will implement the EPP so that all work is performed in a manner that minimizes the pollution of air, water, and land resources and complies with federal, state, and local regulations.

1.1 Conformance with Laws, Regulations, and Permits

The IT Project Manager will verify that all work is performed in accordance with applicable and relevant federal, state, or local regulations and permits for protection of the environment.

1.2 Environmental Conditions

Photographs of existing conditions at Site 7 and Parcel 37 will be submitted to the Navy prior to the start of any field activities. The photographs will document pre-remediation conditions at both areas.

1.3 Protection of Air Resources

Construction activities associated with this project will be conducted in a manner that minimizes the release of airborne particulates and volatile chemical compounds within and outside the project boundary. Air emissions and dust control will be practiced according to the requirements described below.

1.3.1 Process Air Emissions Control

In accordance with Bay Area Air Quality Management District (BAAQMD), Regulation 8, Rule 47, an air permit will be obtained for the operation of the remediation systems. At Parcel 37, vapor emissions from the dual vacuum extraction (DVE) system will be abated with two granular activated carbon (GAC) vessels in series configuration. The vessels will be operated under negative pressure. At Site 7, vapor emissions from the DVE system will be

abated with a thermal/catalytic oxidizer. The start-up phase and operations will be conducted according to permit requirements for the protection of air resources.

1.3.2 Dust Control and Air Monitoring

Remediation system construction activities include installing piezometers, excavating shallow collection trenches, and setting up process equipment above grade on existing surfaces. Dust emissions will be monitored by visual observation; temporary dust control will be addressed as needed, using any of the approved methods including sprinkling with water or stopping work.

1.3.3 Burning

No hot-work permits are anticipated for this work; however, any work requiring an open flame or posing a potential fire hazard will be coordinated with the Caretaker Site Office (CSO), the Project Health and Safety Officer, the Resident Officer in Charge of Construction (ROICC), and the applicable fire department(s) for Alameda Point and/or the City of Alameda.

1.3.4 Noise

IT will comply with Occupational Safety and Health Administration (OSHA) and applicable local noise standards. Equipment operators, contractors, and other personnel will be required to wear appropriate hearing protection when necessary as detailed in the Site Health and Safety Plan (SHSP). Efforts will be made to locate operating equipment, such as the DVE blower skid, away from any personnel regularly working in the vicinity.

1.4 Protection of Land Resources

Construction activities associated with this project will be conducted in a manner that minimizes the impact to land resources within and outside the project boundaries. Project activities will be coordinated with the CSO and the ROICC to minimize impact to land resources.

1.4.1 Landscape Protection

IT will coordinate with the CSO and the ROICC before construction activities at the sites to identify any land resources to be preserved within the work areas. IT personnel will mark the areas to be preserved and provide fencing, barriers, or other physical protection. IT will make a reasonable effort to minimize damage of land resources within and outside the project work area.

1.4.2 Historical and Archeological Finds

IT is not aware of any structure(s) and/or artifact(s) of historical importance within the work area. Items discovered during construction activities that could be of historical or archeological interest will be carefully preserved in an undisturbed state. The Site Superintendent will

immediately report any findings to the CSO and the ROICC so that proper authorities may be notified.

1.5 *Runoff, Soil Erosion, and Sediment Control*

In accordance with the Work Plan, soil from the trench excavations will be returned to the trenches following the construction activities. The soil from the trenching activities will be temporarily stockpiled until being returned to the trenches. Soil cuttings from well borings will be placed in drums. As a precaution against runoff and sedimentation of the storm drains, IT will place temporary seals (plastic and geotextile) over the storm drain inlets that could be affected by drainage or sedimentation resulting from the temporary placement of the stockpiles.

2.0 Protection of Surface and Groundwater Resources

Construction activities associated with this project will be conducted to prevent the discharge of pollutants and to minimize the impact to water resources within and outside the project boundaries. Project activities will be conducted in compliance with all appropriate federal, state, and local laws regarding potential and actual contamination of surface and groundwater. In addition, activities will be performed to prevent the discharge of pollutants into existing waterways.

2.1 Spill Prevention Measures

The types of liquids handled during this project that could potentially result in spills and discharges include well development water, water purged from piezometers during sampling, water collected during dual vacuum extraction, recovered product, and decontamination water.

When handling and transferring the above liquids during the various activities described in the Work Plan, the following spill prevention measures will be undertaken:

- Process equipment containing liquids, including the liquid/vapor separators, transfer pumps, liquid holding tanks, oil/water separators, GAC vessels, filter housings, and interconnecting hoses and piping will be placed within a bermed area lined with polyethylene membrane material.
- The holding tank levels will be visually monitored regularly, and liquids will be transferred for disposal as needed. If more liquid holding capacity is required, additional portable tanks will be used.
- Quick-disconnect hose fittings will be checked for proper fit and secured with wire to prevent accidental opening. Outside of the equipment containment area, a portable pan will be inserted underneath each connection before disconnecting to prevent dripping on the ground surface.
- During operations, all equipment, hoses, and piping will be periodically monitored visually for leaks and drips.
- Process valves will be closed when operations are shut down.
- Equipment decontamination will occur in a lined and bermed area that is designated specifically for decontamination.
- Contaminated water from well development will be stored in drums or other regulation containers within lined, bermed areas.

2.2 Stormwater Management

During heavy storms, it is possible that stormwater may fill, and possibly overflow, the bermed secondary containment area surrounding the skid unit. The overflow of stormwater would present an environmental hazard only if the bermed area already contained a spill of contaminated material. To prevent an overflow of contaminated material, a sump pump with automatic level sensors will be placed in the bermed area. When the high liquid level is reached in the bermed area, the sump will automatically begin pumping accumulated liquid into a polytank with a minimum 1,000-gallon capacity. The sump will automatically stop running when the liquid in the bermed area reaches the low level.

2.3 Spill Response

IT will maintain the following equipment and materials for use during spill response activities:

- Absorbent pads
- Granular absorbent material (noncombustible)
- Polyethylene sheeting
- 55-gallon drums
- Shovels and assorted hand tools

If a hazardous waste spill or material release to the air, soil, or water at the site is observed, IT will immediately notify the CSO representative and the facility Fire Department or Hazardous Materials (HAZMAT) unit. An assessment will be made of the magnitude and potential impact of the release. If it is safe to do so, site personnel will attempt to locate the source of the release, prevent further release, and contain the spilled materials as follows:

- The spill area will be approached cautiously. Hazards will be identified based on available information from witnesses to determine the proper personal protection levels, methods, and equipment necessary for the response.
- The source of the spill will be controlled by shutting off pumps, plugging or closing valves, righting containers or drums, or transferring contents of leaking tanks or drums will be implemented immediately.
- If fuel is spilled, IT will impose a 50-foot-radius rule, and all sources of ignition will be eliminated.
- If possible, spill containment will initially be made without entering the immediate release area.
- Spill containment and collection will be performed by using absorbent materials and constructing temporary dikes.

Given the types and quantities of liquids handled during this product removal activity, it is not anticipated that site personnel will require outside help to manage any spill that may potentially occur. However, if IT personnel cannot safely and sufficiently respond to an environmental release, assistance from the facility or HAZMAT unit will be employed.

3.0 Postconstruction Cleanup

IT will remove all equipment that will not continue running as part of the interim system. Final equipment removal and site cleanup will be performed upon completion of the remediation. IT will leave the project site in a suitably restored condition.

IT will remove all equipment used for the corrective action unless the same equipment is to be used for monitoring or additional site remediation. Final site restoration and cleanup will be performed at the end of the full-scale system operation for this remedial activity.