MISC0019 Revised 5-DEC-1997 Printed 12-MAY-1998

Crude Oil

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification
CAS Number 8002-05-9

Company Identification
MANUFACTURER/DISTRIBUTOR
Conoco, Inc.
P.O. Box 2197
Houston, TX 77252

PHONE NUMBERS
Product Information 1-281-293-5550
Transport Emergency CHEMTREC 1-800-424-9300
Medical Emergency 1-800-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
Hydrocarbons (Aromatic, Naphthenic, & Paraffinic)		>95
including:		
*Hexane	110-54-3	1-10
*Benzene	71-43-2	0.01-2
*Hydrogen Sulfide	7783-06-4	0-3

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

Components (Remarks)
Hydrogen sulfide may accumulate in container head space.

(Continued)

HAZARDS IDENTIFICATION

Potential Health Effects

Primary Routes of Entry: Skin, inhalation

The product may cause irritation to the eyes, nose, throat, lungs, and skin after prolonged or repeated exposure. Overexposure may cause weakness, headache, nausea, confusion, blurred vision, drowsiness, and other nervous system effects; greater overexposure may cause dizziness, slurred speech, flushed face, unconsciousness, and convulsions.

Chronic overexposure to n-hexane may cause nerve damage characterized by progressive weakness and numbness in the arms and legs. Recovery ranged from no recovery to complete recovery depending upon severity of the nerve damage.

Hydrogen sulfide can be irritating at low concentrations to the eyes, skin, and respiratory tract. At higher concentrations, loss of ability to smell hydrogen sulfide, respiratory paralysis, and death may occur.

Studies of industry employees have indicated that workers exposed many years to high concentrations of benzene have a higher incidence of acute myelogenous leukemia. Benzene can also be toxic to the blood and blood-forming tissues.

Carcinogenicity Information

The following components are listed by IARC, NTP, OSHA or ACGIH as carcinogens.

Material	IARC	NTP	OSHA	ACGIH
Benzene	X	X	X	X

DuPont controls the following materials as carcinogens: ^^
Benzene.

FIRST AID MEASURES

First Aid

INHALATION

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

Hydrogen sulfide can cause death; therefore, if it could be present, rescuers must wear positive-pressure full facepiece, self-contained or supplied-air NIOSH approved respirators before attempting rescue.

(Continued)

FIRST AID MEASURES (Continued)

SKIN CONTACT

In case of contact, immediately wash skin with soap and water. Wash contaminated clothing before reuse.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

If swallowed, do not induce vomiting. Immediately give 2 glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

Notes to Physicians

Activated charcoal mixture may be administered. To prepare activated charcoal mixture, suspend 50 grams activated charcoal in 400 mL water and mix thoroughly. Administer 5 mL/kg, or 350 mL for an average adult.

FIRE FIGHTING MEASURES

Flammable Properties

Flammable limits in Air, % by Volume

LEL	<1
UEL	10

Flash Point: Less than Ambient (Variable)

Flash point is variable; handle and store in accordance with NFPA procedures. Could be as hazardous as Class IA Flammable Liquid - NFPA 30-1987.

Extinguishing Media

Foam, Dry Chemical, CO2.

Fire Fighting Instructions

Water may be ineffective to extinguish but water should be used to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Water spray may be used to flush spills away from sources of potential ignition.

Highly flammable. Products of combustion may contain carbon monoxide, carbon dioxide, and other toxic materials. Do not enter enclosed or confined space without proper protective equipment including respiratory protection.

(Continued)

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Evacuate personnel, thoroughly ventilate area, use self-contained breathing apparatus. Remove source of heat, sparks, flame, impact, friction and electricity including internal combustion engines and power tools. If equipment is used for spill cleanup, it must be explosion proof and suitable for flammable liquid and vapor.

NOTE: Vapors released from the spill may create an explosive atmosphere.

Initial Containment

Dike spill. Prevent material from entering sewers, waterways, or low areas.

Spill Clean Up

Soak up with sawdust, sand, oil dry or other absorbent material. Shovel or sweep up.

HANDLING AND STORAGE

Handling (Personnel)

Do not breathe vapor or mist. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling. Wash clothing after use.

Handling (Physical Aspects)

Use of non-sparking and explosion-proof equipment may be necessary depending on type of operation. Keep away from heat, sparks and flames. Do not pressurize, cut, weld, braze, solder, grind, or drill on or near full or empty container. Empty container retains residue (liquid and/or vapor) and may explode in heat of fire.

Storage

Store in accordance with National Fire Protection Association recommendations. Keep away from heat, sparks and flames.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

VENTILATION
Wherever necessary, engineering controls should be utilized to minimize possible exposure to hydrogen sulfide. Properly designed local exhaust ventilation may be useful to remove hydrogen sulfide from a specific work area.

(Continued)

EXPOSURE CONTROLS/PERSONAL PROTECTION (Continued)

Personal Protective Equipment

RESPIRATORY PROTECTION
In atmospheres where the concentrations of hydrogen sulfide may exceed any of the exposure levels shown in the Health Hazard Section:

Type C respiratory protection such as an airline respirator with full facepiece and an escape bottle, or a SCBA with full facepiece should be used. Such respiratory protection must be operated in pressure-demand, positive-pressure, or continuous-flow mode. Use of negative pressure respirators should be avoided because of the possibility of olfactory fatigue which can be caused by hydrogen sulfide.

In all other situations:

Select appropriate NIOSH-approved organic vapor respiratory protection where necessary to maintain exposures to petroleum distillates and benzene below the acceptable levels shown in the Health Hazard Section.

Proper respirator selection should be determined by adequately trained personnel and based on the contaminant(s), the degree of potential exposure, and published respirator protection factors.

PROTECTIVE GLOVES
Neoprene or NBR gloves should be worn to protect against chronic skin contact.

EYE PROTECTION
Safety glasses with side shields and/or face shield where splashing is present. Full facepiece if respiratory protection is required for hydrogen sulfide.

OTHER PROTECTIVE EQUIPMENT
Coveralls if splashing is present. Launder contaminated clothing before reuse.

Exposure Guidelines

Exposure Limits

Crude Oil

PEL	(OSHA)	500 ppm, 2000 mg/m3, 8 Hr. TWA
TLV	(ACGIH)	None Established
AEL *	(DuPont)	None Established

Other Applicable Exposure Limits

Hexane

PEL	(OSHA)	500 ppm, 1800 mg/m3, 8 Hr. TWA Hexane isomers - varies with compound
TLV	(ACGIH)	50 ppm, 176 mg/m3, 8 Hr. TWA Other Isomers: 500 ppm, 1,760 mg/m3 STEL 1,000 ppm, 3,500 mg/m3

(Continued)

EXPOSURE CONTROLS/PERSONAL PROTECTION (Continued)

	Notice of Intended Changes (1997) Skin
AEL * (DuPont)	50 ppm, 8 & 12 Hr. TWA
Benzene	
PEL (OSHA)	1 ppm, 8 Hr. TWA 5 ppm, STEL 0.5 ppm, Action Level
TLV (ACGIH)	0.5 ppm, 1.6 mg/m3, 8 Hr. TWA, Skin, A1 STEL 2.5 ppm, 8 mg/m3, A1
AEL * (DuPont)	1 ppm, 8 & 12 Hr. TWA 5 ppm, 15 minute TWA
Hydrogen Sulfide	
PEL (OSHA)	20 ppm, Ceiling 50 ppm - 10 Min. Max.
TLV (ACGIH)	10 ppm, 14 mg/m3, 8 Hr. TWA STEL 15 ppm, 21 mg/m3
AEL * (DuPont)	10 ppm, 8 & 12 Hr. TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point	>50-1100 F (10-593 C)
Vapor Pressure	100-800 mm Hg @ 68 F (20 C) (Variable)
Evaporation Rate	(Ether = 1) Variable
Odor	Aromatic or sulfide
Form	Liquid
Color	Usually greenish-black
Specific Gravity	0.7-1.1 (Water = 1)

STABILITY AND REACTIVITY

Chemical Stability
Stable.

Conditions to Avoid
Heat, sparks, and flames.

Incompatibility with Other Materials
Incompatible or can react with oxidizers.

Decomposition
Normal combustion forms carbon dioxide; incomplete combustion may produce carbon monoxide.

Polymerization
Polymerization will not occur.

(Continued)

TOXICOLOGICAL INFORMATION

Animal Data

Mouse skin painting studies have shown that some crude oils caused a low incidence of skin tumors. This animal data should be interpreted cautiously since these studies involved repeated exposure of shaved skin which was never washed free of test material; the resulting skin effects (irritation, cell damage, etc.) may play a role in the tumorigenic response. Also, limited studies of carcinogenic oils have shown that washing the animals' skin with soap and water between applications greatly reduces tumor formation. These studies demonstrate the effectiveness of cleansing the skin after contact.

Animal studies have shown that prolonged or repeated inhalation exposures to high concentrations of some petroleum distillates have caused liver tumors in mice and kidney damage and tumors in male rats. However, kidney effects were not seen in similar studies involving female rats, guinea pigs, dogs, or monkeys. Present studies indicate the kidney effects will only occur in male rats. Also, human studies do not indicate this peculiar sensitivity for kidney damage and studies reported in 1992 showed that this particular type of rat kidney damage is not useful in predicting a human health hazard. The significance of liver tumors in mice exposed to high doses of chemicals is highly speculative and probably not a good indicator for predicting a potential human carcinogenic hazard.

Animal data from chronic inhalation studies using commercial hexane (51.5% n-hexane) show an increased incidence of liver tumors in female mice at an exposure level of 9018 ppm. No such tumor increases occurred in male mice, nor in male or female rats. The No-Observed-Adverse-Effect-Level (NOAEL) for tumors was 3000 ppm. The significance of liver tumors in mice exposed to high doses of chemicals is highly speculative and probably not a good indicator for predicting a potential human carcinogenic hazard.

ECOLOGICAL INFORMATION

Ecotoxicological Information

AQUATIC TOXICITY:

Benzene
Moderately toxic.
96 hour LC50 - Fathead minnows: 12.6 mg/L

n-Hexane
Slightly toxic.
48 hour LC 50 - Golden orfe: 150-210 mg/L

(Continued)

DISPOSAL CONSIDERATIONS

Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Do not flush to surface water or sanitary sewer system.

By itself, the liquid is expected to be a RCRA ignitable hazardous waste.

Container Disposal

Empty drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All other containers should be disposed of in an environmentally safe manner.

TRANSPORTATION INFORMATION

Shipping Information

DOT

Proper Shipping Name — Not regulated if flash point is >200 F; if <200 F see below.

ICAO/IMO

Proper Shipping Name — Not restricted if flash point is >141 F; if <141 F see below.

DOT:

Flashpoint -	<100 F	>100 F - <200 F
Proper Shipping Name	Crude Oil, Petroleum	Crude Oil, Petroleum
Hazard Class	Flammable Liquid	Combustible Liquid
UN/NA No.	UN 1267	UN 1267
DOT Label	Flammable Liquid	None
DOT Placard	Flammable	Combustible
Note	See below	

IATA/IMO:

Flashpoint -	<73 F	>73 F - <141 F
Proper Shipping Name	Petroleum crude oil	Petroleum crude oil
Hazard Class	3 (3.2 IMO)	3 (3.3 IMO)
UN No.	UN 1267	UN 1267
IMO/ICAO Label	Flammable liquid	Flammable liquid
Packaging Group	II	III
Note	See below	

NOTE : May contain potentially harmful concentrations of hydrogen sulfide, which can accumulate in the head space of storage vessel.

(Continued)

TRANSPORTATION INFORMATION (Continued)

Shipping Information -- Canada

TDG

Proper Shipping Name — Not regulated if flash point is >141 F; if <141 F see below.

Proper Shipping Name: Petroleum Crude Oil
TDG Classes: 3.1 (Flash <0 F)
: 3.2 (Flash 0 to <73 F)
: 3.3 (Flsah 73 to <141 F)
PIN Number: UN1267
TDG Label: Flammable liquid
TDG Placard: Flammable

NOTE : May contain potentially harmful concentrations of hydrogen sulfide, which can accumulate in the head space of storage vessels.

REGULATORY INFORMATION

U.S. Federal Regulations

OSHA HAZARD DETERMINATION
This material is hazardous as defined by OSHA's Hazard Communication Standard, 29 CFR 1910.1200.

CERCLA/SUPERFUND
Not applicable; this material is covered by the CERCLA petroleum exclusion. Releases are not reportable.

SARA, TITLE III, 302/304
This material contains extremely hazardous substances at greater than 1.0% concentration; it is possible that this material may contain other extremely hazardous substances at a lower concentration.

Hazardous Substance	Hydrogen Sulfide
Threshold Planning Quantity	500 lbs of H2S
Reportable Quantity	100 lbs of H2S

TSCA
This material is in the TSCA Inventory of Chemical Substances (40 CFR 710) and/or is otherwise in compliance with TSCA.

RCRA
The material, when discarded or disposed of, is not specifically listed as a hazardous waste in Federal regulations; however, it meets criteria for being toxic, corrosive, ignitable, and/or reactive according to U.S. EPA definitions (40 CFR 261). This material could also become a hazardous waste if it is mixed with, or comes in contact with, a listed hazardous waste. If it is a hazardous waste, regulations at 40 CFR 262-266 and 268 may apply.

CLEAN WATER ACT
The material contains the following ingredient(s) which is

(Continued)

REGULATORY INFORMATION (Continued)

considered hazardous if spilled into navigable waters and therefore reportable to the National Response Center (1-800-424-8802).

Ingredient	Petroleum Hydrocarbons.
Reportable Quantity	Film or sheen upon or discoloration of any water surface.

State Regulations (U.S.)

CALIFORNIA "PROP 65"
The material contains ingredient(s) known to the State of California to cause cancer, birth defects, or other reproductive harm. Read and follow all label directions.

Ingredient	Benzene

PENNSYLVANIA WORKER & COMMUNITY RIGHT TO KNOW ACT
This material may contain the following ingredient(s) subject to the Pennsylvania Worker and Community Right to Know Hazardous Substances List.

Ingredient	Benzene
Category	Special Hazardous Substance, Environmental Hazardous Substance.
Ingredient	Hydrogen Sulfide
Category	Environmental Hazardous Substance.
Ingredient	Petroleum Distillates
Category	Hazardous Substance.

Canadian Regulations

CLASS B Division 2 - Flammable Liquid.

CLASS D Division 1 Subdivision A - Very Toxic Material/Acute Lethality.

CLASS D Division 2 Subdivision A - Very Toxic Material. Chronic Toxic Effects, Carcinogen.

CLASS D Division 2 Subdivision B - Toxic Material. Skin or Eye Irritant.

OTHER INFORMATION

NFPA, NPCA-HMIS

NFPA Rating	
Health	1
Flammability	3
Reactivity	0
NPCA-HMIS Rating	
Health	2

(Continued)

OTHER INFORMATION (Continued)

Flammability	3
Reactivity	0

Personal Protection rating to be supplied by user depending on use conditions.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS	MSDS Administrator, SHEA
Address	Conoco Inc. PO Box 2197 Houston, TX 77252
Telephone	713-293-5550

# Indicates updated section.

End of MSDS