



MATERIAL SAFETY DATA SHEET

No. 6 Fuel Oil

MSDS No. 4304

**EMERGENCY OVERVIEW**

**CAUTION!**

**COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT  
EFFECTS CENTRAL NERVOUS SYSTEM  
HARMFUL OR FATAL IF SWALLOWED**



NFPA 704 (Section 16)

Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation. Long-term, repeated exposure may cause skin cancer. Hot liquid may cause thermal burns. If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

HYDROGEN SULFIDE (toxic gas) may accumulate in tank vapor space. High concentration may cause immediate unconsciousness - death may result unless victim is promptly and successfully resuscitated. Hydrogen sulfide causes eye irritation.

**1. CHEMICAL PRODUCT and COMPANY INFORMATION**

**HOVENSA LLC**  
1 Estate Hope  
Christiansted, VI 00820-5652

**EMERGENCY TELEPHONE NUMBER (24 hrs):**  
**COMPANY CONTACT (business hours):**

**CHEMTREC (800)424-9300**  
**(340) 692-3000**

**SYNONYMS:** #6 Fuel Oil; 6 Oil; Bunker C; Bunkers; High Sulfur Residual Fuel Oil; Low Sulfur Residual Fuel Oil; Residual Fuel Oil  
See Section 16 for abbreviations and acronyms.

**2. COMPOSITION and INFORMATION ON INGREDIENTS**

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Fuel Oil, Residual (68476-33-5) (See also Section 15)	100
Hydrogen Sulfide - H <sub>2</sub> S (7783-06-4)	< trace - see below >

A complex combination of heavy (high boiling point) petroleum hydrocarbons. The amount of sulfur varies with product specification and does not affect the health and safety properties as outlined in this Material Safety Data Sheet.

Hydrogen Sulfide (H<sub>2</sub>S) may be present in trace quantities (by weight), but may accumulate to toxic concentrations such as in tank headspace. The presence of H<sub>2</sub>S is highly variable, unpredictable and does not correlate with sulfur content. Studies with similar products have shown that 1 ppm H<sub>2</sub>S by weight in liquid may produce 100 ppm or more H<sub>2</sub>S in the vapor headspace of the storage tank .

**3. HAZARDS IDENTIFICATION**

**EYES**

Contact with eyes may cause mild to moderate irritation.

**SKIN**

May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. May cause dermal sensitization. Liquid may be hot (typically 110 - 120 °F) which could cause 1st, 2nd, or 3rd degree thermal burns.



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### **INGESTION**

This material has a low order of acute toxicity. If large quantities are ingested, nausea, vomiting and diarrhea may result. Ingestion may also cause effects similar to inhalation of the product. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

### **INHALATION**

Because of its low vapor pressure, this product presents a minimal inhalation hazard at ambient temperature. Upon heating, fumes may be evolved. Inhalation of fumes or mist may result in respiratory tract irritation and central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

**WARNING:** the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

**WARNING:** Irritating and toxic hydrogen sulfide gas may be found in confined vapor spaces. Greater than 15 - 20 ppm continuous exposure can cause mucous membrane and respiratory tract irritation. 50 - 500 ppm can cause headache, nausea, and dizziness, loss of reasoning and balance, difficulty in breathing, fluid in the lungs, and possible loss of consciousness. Greater than 500 ppm can cause rapid or immediate unconsciousness due to respiratory paralysis and death by suffocation unless the victim is removed from exposure and successfully resuscitated.

The "rotten egg" odor of hydrogen sulfide is not a reliable indicator for warning of exposure, since olfactory fatigue (loss of smell) readily occurs, especially at concentrations above 50 ppm. At high concentrations, the victim may not even recognize the odor before becoming unconscious.

### **CHRONIC and CARCINOGENICITY**

Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11, Toxicological Information.

### **MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE**

Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

### **FUEL OIL COMBUSTION ASH**

Trace amounts of nickel, vanadium, and other metals in slurry oil can become concentrated in the oxide form in combustion ash deposits. Vanadium is a toxic metal affecting a number of organ systems. Nickel is a suspect human carcinogen (lung, nasal, sinus), an eye, nose, and throat irritant, and can cause allergic skin reaction in some individuals. See Section 7 for appropriate work practices.

## **4. FIRST AID MEASURES**

### **EYES**

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

### **SKIN**

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and the area of the body burned.

### **INGESTION**

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.



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### **INHALATION**

Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

### **5. FIRE FIGHTING MEASURES**

#### **FLAMMABLE PROPERTIES:**

FLASH POINT: > 150 °F (>65.5 °C) (minimum) ASTM D-93  
AUTOIGNITION TEMPERATURE: > 765 °F (>407 °C)  
OSHA/NFPA FLAMMABILITY CLASS: 3A (COMBUSTIBLE)  
LOWER EXPLOSIVE LIMIT (%): N/D  
UPPER EXPLOSIVE LIMIT (%): N/D

#### **FIRE AND EXPLOSION HAZARDS**

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

**CAUTION:** flammable vapor production at ambient temperature in the open is expected to be minimal unless the oil is heated above its flash point. However, industry experience indicates that light hydrocarbon vapors can build up in the headspace of storage tanks at temperatures below the flash point of the oil, presenting a flammability and explosion hazard. Tank headspaces should be regarded a potentially flammable, since the oil's flash point can not be regarded as a reliable indicator of the potential flammability in tank headspaces.

#### **EXTINGUISHING MEDIA**

**SMALL FIRES:** Any extinguisher suitable for Class B fires, dry chemical, CO<sub>2</sub>, water spray, fire fighting foam, or Halon.

**LARGE FIRES:** Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

#### **FIRE FIGHTING INSTRUCTIONS**

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

### **6. ACCIDENTAL RELEASE MEASURES**

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas.



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Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment.

### **7. HANDLING and STORAGE**

#### **HANDLING PRECAUTIONS**

Product is generally transported and stored hot (typical 110 - 120 °F). Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

#### **STORAGE PRECAUTIONS**

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Hydrogen sulfide may accumulate in tanks and bulk transport compartments. Consider appropriate respiratory protection (see Section 8). Stand upwind. Avoid vapors when opening hatches and dome covers. Confined spaces should be ventilated prior to entry.

#### **WORK/HYGIENIC PRACTICES**

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use gasoline or solvents (naphtha, kerosene, etc.) for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

#### **OTHER/GENERAL PROTECTION**

Petroleum industry experience indicates that a program providing for good personal hygiene, proper use of personal protective equipment, and minimizing the repeated and prolonged exposure to liquids and fumes, as outlined in this MSDS, is effective in reducing or eliminating the carcinogenic risk of high boiling aromatic oils (polynuclear aromatic hydrocarbons) to humans.

#### **FUEL OIL ASH PRODUCTS**

Personnel exposed to ash should wear appropriate protective clothing (example, DuPont Tyvek ®), wash skin thoroughly, launder contaminated clothing separately, and wear respiratory protection approved for use against toxic metal dusts (such as HEPA filter cartridges). Wetted-down combustion ash may evolve toxic hydrogen sulfide (H<sub>2</sub>S) - confined spaces should be tested for H<sub>2</sub>S prior to entry if ash is wetted.



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8. EXPOSURE CONTROLS and PERSONAL PROTECTION

**EXPOSURE LIMITS**

Components (CAS No.)	Source	Exposure Limits	
		TWA/STEL	Note
Fuel Oil, Residual (68476-33-5)	OSHA	5 mg/m <sup>3</sup> (as oil mist) TWA	
	ACGIH	0.2 mg/m <sup>3</sup> (as mineral oil), TWA	A2
Hydrogen Sulfide -H <sub>2</sub> S (7783-06-4)	OSHA	20 ppm Ceiling / 50 ppm Peak	
	ACGIH	10 ppm TWA/ 15 ppm STEL	2006 NOIC – 1/5 ppm

**ENGINEERING CONTROLS**

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

**EYE/FACE PROTECTION**

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying

**SKIN PROTECTION**

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont Tyvek QC®, Saranex®, TyChem® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information

**RESPIRATORY PROTECTION**

If a hydrogen sulfide hazard is present (that is, exposure potential above H<sub>2</sub>S permissible exposure limit), use a positive-pressure SCBA or Type C supplied air respirator with escape bottle.

Where it has been determined that there is no hydrogen sulfide exposure hazard (that is, exposure potential below H<sub>2</sub>S permissible exposure limit), a NIOSH/ MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

**APPEARANCE**

Black, viscous liquid

**ODOR**

Heavy, petroleum/asphalt-type odor

Hydrogen sulfide (H<sub>2</sub>S) has a rotten egg “sulfurous” odor. This odor should not be used as a warning property of toxic levels because H<sub>2</sub>S can overwhelm and deaden the sense of smell. Also, the odor of H<sub>2</sub>S in heavy oils can easily be masked by the petroleum-like odor of the oil. Therefore, the smell of H<sub>2</sub>S should not be used as an indicator of a hazardous condition - a H<sub>2</sub>S meter or colorimetric indicating tubes are typically used to determine the concentration of H<sub>2</sub>S.

**BASIC PHYSICAL PROPERTIES**

BOILING RANGE: > 500 °F (> 260 °C)  
 VAPOR PRESSURE: <0.1 psia @ 70 °F (21 °C)  
 VAPOR DENSITY (air = 1): NA  
 SPECIFIC GRAVITY (H<sub>2</sub>O = 1): 0.876 – 1.000 (API 30.0 – 10.0)  
 PERCENT VOLATILES: Negligible  
 EVAPORATION RATE: negligible  
 SOLUBILITY (H<sub>2</sub>O): negligible

**10. STABILITY and REACTIVITY**

**STABILITY:** Stable. Hazardous polymerization will not occur.

**CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS**

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

**11. TOXICOLOGICAL PROPERTIES**

**ACUTE TOXICITY**

Acute dermal LD50 (rabbits): > 5 ml/kg	Acute oral LD50 (rats): 5.1 ml/kg
Primary dermal irritation: slightly irritating (rabbits)	Draize eye irritation: mildly irritating (rabbits)
Guinea pig sensitization: mildly sensitizing	

**CHRONIC EFFECTS AND CARCINOGENICITY**

Carcinogenicity: **OSHA:** NO **IARC:** 2B (animal) **NTP:** YES **ACGIH:** A2

This material contains polynuclear aromatic hydrocarbons (PNAs), some of which are animal carcinogens. Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

The presence of carcinogenic PNAs indicates that precautions should be taken to minimize repeated and prolonged inhalation of fumes or mists.

**MUTAGENICITY (genetic effects)**

Materials of similar composition have been positive in mutagenicity studies.

**12. ECOLOGICAL INFORMATION**

Keep out of sewers, drainage and waterways. Report spills and releases, as applicable, under Federal and State regulations.

**13. DISPOSAL CONSIDERATIONS**

Consult federal, state and local waste regulations to determine appropriate disposal options. Combustion ash may be a characteristic hazardous waste.

**14. TRANSPORTATION INFORMATION**

	<u>BULK Shipment</u>	<u>Non- BULK Shipment</u>
PROPER SHIPPING NAME:	Combustible liquid, n.o.s. (No. 6 Fuel Oil)	Not Regulated
HAZARD CLASS and PACKING GROUP:	Combustible Liquid, PG III	N/A
DOT IDENTIFICATION NUMBER:	NA 1993	N/A
DOT SHIPPING LABEL:	Combustible Liquid	N/A





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15. REGULATORY INFORMATION

U.S. FEDERAL, STATE and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

<u>ACUTE HEALTH</u>	<u>CHRONIC HEALTH</u>	<u>FIRE</u>	<u>SUDDEN RELEASE OF PRESSURE</u>	<u>REACTIVE</u>
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

According to the US EPA guidance documents for reporting Persistent Bioaccumulating Toxics (PBTs), this product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

<u>INGREDIENT NAME (CAS NUMBER)</u>	<u>CONCENTRATION (PARTS PER MILLION (PPM) BY WEIGHT)</u>
Polycyclic aromatic compounds (PACs)	2461
Benzo (g,h,i) perylene (191-24-2)	26.5
Lead (7439-92-1)	1
Mercury (7439-97-6)	0.00067
Vanadium (7440-62-2)	3.325
Polychlorinated biphenyls (PCBs)	Though EPA estimates 10% of the residual fuel oil "pool" may have < 50 ppm PCBs (Ref 2), AHC has no reason to believe there are any PCBs in its residual fuel oil products.

CALIFORNIA PROPOSITON 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

<u>INGREDIENT NAME (CAS NUMBER)</u>	<u>Date Listed</u>
Residual Fuel Oil (no CAS Number listed)	10/01/1990

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid)



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16. OTHER INFORMATION

NFPA® HAZARD RATING HEALTH: 0
FIRE: 2
REACTIVITY: 0

Refer to NFPA 704 "Identification of the Fire Hazards of Materials" for further information

HMIS® HAZARD RATING HEALTH: 1\* Slight
FIRE: 2 Moderate
PHYSICAL: 0 Negligible
\*Chronic

SPECIAL HAZARDS: Container vapor space may contain hydrogen sulfide (poison gas).

SUPERSEDES MSDS DATED: 05/24/02

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

Table with 2 columns: Acronym and Full Name. Includes ACGIH, AIHA, ANSI, API, CERCLA, DOT, EPA, HMIS, IARC, MSHA, NFPA, NIOSH, NOIC, NTP, OPA, OSHA, PEL, RCRA, REL, SARA, SCBA, SPCC, STEL, TLV, TSCA, TWA, WEEL, WHMIS.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet.