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MATERIAL SAFETY DATA SHEET

No. 4 Fuel Oil

This document is subject to review and revision as of June, 2006.

Section I. Product and Company Identification

Common Trade Name:	No. 4 Fuel Oil
Synonyms:	#4 Oil, Fuel Oil, Burner Fuel, Fuel Oil Residual
Material Use or Occurrence:	Distillation Product

Section II. Composition/Information on Ingredients

Chemical Family:	Branched chain hydrocarbons, variable. See also Section III, Hazardous Ingredients.
Chemical Ingredients:	No. 4 Fuel Oil is a mixture of varying proportions of No. 2 and No. 6 Fuel Oils and/or Gas Oil. May contain sulfur, nitrogen and oxygen containing compounds. No. 4 Oil is a petroleum distillate fraction consisting of a complex mixture of parafinic, olefinic, napthenic hydrocarbons plus fused polycyclic hydrocarbons (C10 and higher) as benzene solubles. See Section III, Hazardous Ingredients, for details.
Reportable Quantity:	See Section XV, Regulatory Information.
Marine Pollutant:	Yes.

Section III. Hazards Identification

NFPA:		Hazardous Ingredients		
Fire Hazard  Health Reactivity Specific Hazard	**4 = Extreme** **3 = High** **2 = Slight** **1 = Least**	**Name**	**CAS No.**	**% By Weight**
		No. 4 Fuel Oil: (Petroleum distillate fraction consisting of a complex mixture of parafinic, olefinic, napthenic hydrocarbons plus fused polycyclic hydrocarbons (C10 and higher) as benzene solubles).	68476-31-3	100%
		Benzene:	71-43-2	.01-.64%
		Sulfur:	7704-34-9	0-.04%

Summary of Hazards

Danger! Product may contain or release hydrogen sulfide, which is a naturally occurring constituent. H_2S is a highly toxic, highly flammable gas, which can be fatal if inhaled at certain concentrations. Causes severe skin irritation. Toxic and harmful if inhaled or ingested. Acute exposure to mist/vapor may cause respiratory tract irritation, central nervous system depression, aspiration pneumonitis. May be harmful or fatal if swallowed; may cause irritation, central nervous system depression, coma or death. Direct contact with skin may cause extreme irritation with severe erythems and edema with blistering and open sores. Absorption of large amounts may cause narcosis. May cause slight irritation of the eyes. Chronic exposure could result in renal failure and/or degenerative changes of liver or kidneys.

Signs and symptoms of overexposure include giddiness, headache, dizziness, nausea, vomiting, incoordination, narcosis, stupor, coma, unconsciousness, weight loss, anemia, weakness nervousness, renal failure pains in limbs, peripheral numbness, paresthesias, drying and cracking of skin, rashes or spots on skin.

Hydrogen sulfide and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels.

DANGER! Isolate from sources of ignition. See also Section XI, Toxicological Information.

Section IV. First Aid Measures

Eye Contact:	Flush eyes with copious amounts of water while holding eyelids open until no sign of chemical remains. Rest eyes for 30 minutes. If redness, burning, blurred vision or swelling occur, transport to nearest medical facility for additional treatment.
Skin Contact:	Remove contaminated clothing. Flush with large amounts of water for at least 15 minutes and follow by washing with soap if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
Slight Inhalation:	Remove to fresh air. If breathing is difficult, ensure clear airway and administer oxygen. If not breathing, apply artificial respiration or cardiopulmonary resuscitation. Keep person warm, quiet and get medical attention immediately.
Slight Ingestion:	Never give anything by mouth to an unconscious person. DO NOT induce vomiting. Aspiration of material into the lungs due to vomiting can cause chemical pneumonitis, which can be fatal. If vomiting occurs, keep subject's head lower than hips to prevent pulmonary aspiration. If more than 1 mg/kg of petroleum distillates are swallowed, remove by gastric lavage by a qualified person. After vomiting stops, give 30-60 ml of fleet's phospho-soda diluted 1:4 in water. SEEK IMMEDIATE MEDICAL ATTENTION. Keep person warm and quiet.
Notes to Physician:	If more than 2.0ml/kg body weight has been ingested and vomiting has not occurred, emesis should be induced with supervision. Keep victim's head below hips to prevent aspiration. If symptoms such as loss of gag reflex, convulsions, or unconsciousness occur before emesis, gastric lavage using a cuffed endotracheal tube should be considered.

Section V. Fire Fighting Measures

This Product Is:	A moderate fire hazard.	**NFPA:** **4 = Extreme** **3 = High** **2 = Slight** **1 = Least**	**2**	**Flammability**
Flash Points:	131°F (55° C)		**2**	**Health**
Flammable Limits:	LOWER: 1% -- UPPER: 5%		**0**	**Reactivity**
Auto-Ignition Temperature:	Data not available.			**Specific Hazards**
Flammability:	CAUTION! COMBUSTIBLE!			
Basic Firefighting Procedures:	Material will float and can be re-ignited on surface of water. Foam, carbon dioxide (CO_2), dry chemical, “alcohol foam” for flame; for larger fires use water spray, fog or foam. Do not use a direct stream of water.			
Fire Degradation Products:	Thermal decomposition may release various hydrocarbons and hydrocarbon derivatives including CO_2, water, organic acids and aldehydes.			
Unusual Fire and Explosion Hazards:	Do not mix or store with strong oxidants. Do not store or pour near sources of ignition. Do not pressurize, cut, heat, weld or expose empty containers to sources of ignition, heat or flame. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Prevent vapor accumulation. Vapors form flammable or explosive mixtures with air at room temperature. Vapors may accumulate in low areas. Vapors may concentrate in confined areas. Cool exposed containers with water spray. Continue water spray until entire container contents are cool. Withdraw immediately in case of rising sound from venting safety device or and discoloration of storage tank due to fire (subject to fire chief’s directions). Flowing product can be ignited by self-generated static electricity. Use adequate bonding and grounding to prevent static buildup. Runoff to sewer may cause fire or explosion hazard. Containers may explode in heat of fire. Irritating or toxic substances may be emitted upon thermal decomposition. For fires involving this material, do not enter any enclosed or confined space without proper protective equipment, which may include NIOSH approved self-contained breathing apparatus with full facemask. Clothing, rags or similar organic material contaminated with this product and stored in a closed space may undergo spontaneous combustion. Transfer to and from commonly bonded and grounded containers.			

Section VI. Accidental Release Measures

Spill and Leak Procedures:	CAUTION! COMBUSTIBLE. Eliminate potential sources of ignition. Handling equipment must be bonded and grounded to prevent sparking. Stay upwind and away from spill. Wear appropriate personal protective equipment when cleaning up spills. Refer to Section VIII. Shut off source of leak if safe to do so. Isolate hazard area and restrict entry. If properly trained, proceed with the following measures. FOR SMALL SPILLS: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal in accordance with environmental regulations. FOR LARGE SPILLS: Dike and contain spill in smallest possible area. Recover as much product as possible with vacuum truck or pump to storage/salvage vessels. Reporting: Contact fire authorities and appropriate federal, state and local agencies. U.S. regulations require reporting releases of this material to the environment, which exceed the reportable quantity to the National Response Center at 800-424-8802. CWA: This product is an oil as defined under Section 311 of EPA's Clean Water Act (CWA). If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 800-424-8802. For highway or railway spills, contact Chemtrec at 800-424-9300. See also Section XVI.

Section VII. Handling and Storage

Precautionary Measures:	CAUTION! COMBUSTIBLE. ISOLATE FROM SOURCES OF IGNITION. Keep containers closed. Use only with adequate ventilation. Avoid heat, open flames, including pilot lights, and strong oxidizing agents. Use explosion-proof ventilation to prevent vapor accumulation. Material may release hydrogen sulfide (H_2S), a highly toxic and extremely flammable gas, when heated to 180 Degrees F or higher. H_2S may collect in the headspace of the container. Ground all handling equipment to prevent sparking.
Handling:	Surfaces that are sufficiently hot may ignite liquid material. Do not breathe material. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
Storage:	Keep liquid and vapor away from heat, sparks and flame. Extinguish pilot lights, cigarettes and turn off other sources of ignition prior to use and until all vapors have dissipated. Use explosion-proof ventilation indoors and in laboratory settings. Keep containers closed when not in use. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations on or near containers.

Section VIII. Exposure Controls/Personal Protection

Respiratory Protection:	If workplace exposure limits for product or components are exceeded, NIOSH equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors; however, mask with organic vapor cartridge is recommended. Use positive pressured air-supplied or SCBA in the event of a large spill. This equipment should be available for nonroutine and emergency use. Refer to OSHA Respiratory Protection Standard, 29 CFR 1910.134.
Eye Protection:	Keep away from eyes. Eye contact can be avoided by wearing safety glasses with sideshields or chemical splash goggles. A source of clean water should be available in the work area for flushing eyes.
Skin Protection:	Keep away from skin. Skin contact can be minimized by wearing protective gloves such as neoprene, , pvc, nitrile-butadiene rubber, etc. and, where necessary, impervious clothing and boots. Where potential exists for exposure to a product and water mixture (e.g., hydroblasting exchanger tubes or vessel bottoms), a face shield as well as appropriate barrier creams should be used to prevent face and neck contact. Leather goods contaminated with this product should be discarded. A source of clean water should be available in the work area for flushing skin.
Ventilation:	Avoid breathing mists and vapor. Use in well ventilated area. In confined space, mechanical ventilation may be necessary to reduce vapor concentrations to levels below the allowable exposure limits. Indoors, use lab hood. Outdoors, work upwind.
Confined Space Precautions:	Tanks, vessels, or other confined spaces which contain product should be freed of vapors before entering. Because vapors can accumulate in tanks, vessels, and bulk transport compartments, personnel should stand upwind, keep their faces at least two feet from compartment openings, and avoid breathing vapors when opening hatches and dome covers. The container should be meter checked meter to ensure a safe atmosphere before entry. Empty containers may contain toxic, flammable, combustible or explosive residues or vapors. Do not cut, grind, drill, weld, or reuse empty containers that contained this product. Do not transfer this product to another container unless the container receiving the product is labeled with proper DOT shipping name, hazard class and other information that describes the product and its hazards.

See also Section XI, Toxicological Information.

Section IX. Physical and Chemical Properties

Boiling point:	214 to 1092°F	**Odor Threshold:**	.02 ppm (“rotten egg”)
Melting or Solid Point:	Not applicable	**Specific Gravity:**	0.9-1 (typical)
Vapor Density:	>5 (Air=1)	**Vapor Pressure:**	Negligible
Solubility:	Insoluble	**Volatility:**	Greater than 50% by volume.
Evaporation rate:	>10 (n-butyl acetate =1)	**Physical State and Appearance:**	Dark to black oily liquid, characteristic hydrocarbon odor. Floats on water.

See also Section III, Hazardous Ingredients.

Section X. Stability and Reactivity

Stability:	The product is stable under normal pressures and temperatures.
Incompatibility:	May react when exposed to oxidizing materials.
Hazardous Polymerization:	Hazardous polymerization has not been known to occur under normal temperatures and pressures.
Typical Decomposition Products:	Thermal decomposition may release various hydrocarbons and hydrocarbon derivatives including carbon dioxide, water, organic acids, and aldehydes.

Section XI. Toxicological Information

Primary Routes of Entry:	Eye or skin contact, ingestion, inhalation.	
Target Organs:	Prolonged and repeated exposure to high concentrations of benzene (10s to 100s ppm) has been linked to serious injury to blood-forming organs, anemia and acute myelogenous anemia.	
Carcinogenic Effects:	Product is not listed as a carcinogen or potential carcinogen by NTP, IARC, ACGIH, or OSHA. However, all agencies identified benzene as a carcinogen. IARC identified residual oils (light catalytic cracked distillate) as a possible (2B) carcinogen.	
Exposure Limits:	**#4 Oil (Diesel Fuel):**	ACGIH-TLV TWA : 100 mg/m^3
	Benzene:	ACGIH-TLV TWA: .05 ppmv STEL: 2.5 ppmv (Skin) OSHA-PEL TWA: 1 ppmv STEL: 5 ppmv
	Carbon Dioxide:	ACGIH-TLV TWA: 5,000 ppmm STEL: 30,000 ppmm OSHA-PEL STEL: 30,000 ppmm OSHA-PEL_IS TWA: 10,000 ppmm
	Carbon Monoxide:	OSHA-PEL TWA: 35 ppmv Ceil: 200 ppmv
	Polycyclic Hydrocarbons:	OSHA-PEL: .02mg/ m^3 AGIH TWA: 0.2 mg/m^3
Effects and Hazards of Eye Contact:	May cause irritation of the eyes, manifested by temporary burning sensation, tearing, redness, swelling, and/or blurred vision.	
Effects and Hazards of Skin Contact:	Severely irritating to the skin. Direct contact with skin may severe erythems and edema with blistering and open sores. Absorption of large amounts may cause narcosis.	
Effects and Hazards of Inhalation:	Acute exposure to mist/vapor may cause respiratory tract irritation, central nervous system depression, aspiration pneumonitis. Other central nervous system effects including excitation, euphoria, contracted eye pupils, dizziness, drowsiness, blurred vision, fatigue, nausea, headache, loss of reflexes, tremors, convulsions, seizures, loss of consciousness, coma, respiratory arrest and sudden death could occur as a result of long term and/or high concentration exposure to vapors. May also cause anemia and irregular heart rhythm.	
Effects and Hazards of Ingestion:	This product may be harmful or fatal if swallowed. This product may cause nausea, vomiting, diarrhea and restlessness. DO NOT INDUCE VOMITING. Aspiration into the lungs can cause severe chemical pneumonitis or pulmonary edema/hemorrhage, which can be fatal. May cause gastrointestinal disturbances. Symptoms may include irritation, depression, vomiting and diarrhea. May cause harmful central nervous system effects, similar to those listed under "inhalation".	
Medical Conditions Aggravated by Exposure:	Preexisting eye, skin, heart, central nervous system, kidney, liver and respiratory disorders may be aggravated by exposure to this product. Skin contact may aggravate existing dermatitis.	

Toxicological Information Continued on Next Page.

Toxicological Information, Continued.

Toxicological Information:	**No. 4 Fuel Oil** contains polycyclic aromatic hydrocarbons, which are potentially carcinogenic. Skin painting studies in laboratory animals with petroleum residua have produced severe irritation and systemic toxicity, including cancers. The residuum contains polycyclic aromatic compounds which have been shown to cause anemia, disorders of the liver, bone marrow and lymphoid tissues in rats following dermal application. **HYDROGEN SULFIDE** can affect the body if it is inhaled or if it comes into contact with the eyes, skin, nose or throat. It can also affect the body if it is swallowed. It is colorless and has the odor of rotten eggs. However, its odor cannot be used as an indication of its presence since one of the first effects of H_2S exposure is the loss of the sense of smell. Inhalation of high concentrations of hydrogen sulfide, 1000 to 2000 ppm, may cause coma after a single breath and may be rapidly fatal, convulsions can also occur. Hydrogen sulfide gas is a rapidly acting systemic poison which causes respiratory paralysis with consequent asphyxia at high concentrations (500 to 1000 ppm). A case of polyneuritis and encephalopathy from one day's exposure to a concentration insufficient to cause loss of consciousness has been reported. It irritates the eyes and respiratory tract at lower concentrations (50 to 500 ppm). Pulmonary edema and bronchial pneumonia may follow prolonged exposure at concentrations exceeding 250 ppm. Exposure to concentrations of hydrogen sulfide around 50 ppm for one hour may produce rhinitis, pharyngitis, bronchitis, pneumonitis, acute conjunctivitis with pain, lacrimation and photophobia, in severe form this may progress to keratoconjunctivitis and vesiculation of the corneal epithelium. In lower concentrations, hydrogen sulfide may cause headache, fatigue, irritability, insomnia, and gastrointestinal disturbances, as well as central nervous system disturbances, causing excitation and dizziness. Repeated exposure to hydrogen sulfide results in increased susceptibility, so that eye irritation, cough and systemic effects may result from concentrations previously tolerated without any effect. **BENZENE** may cause serious injury to blood-forming organs and is linked to the later development of acute myelogenous leukemia.	
Toxicity to Animals:	Dermal LD50: >5 ml/kg (rabbit). Skin Irritation Draize: Extremely irritating (rabbit). Oral LD50: 9 ml/kg (rat).	OSHA: Non-toxic based on similar materials. OSHA: Irritating based on similar materials. OSHA: Non-toxic based on similar materials.
	Remark: Related materials have caused the development of skin tumors in lifetime mouse skin painting. However, these tumors have a long development period and may be a result of repeated irritation caused by test materials.	

Section XII. Ecological Information

Protection of Stratospheric Ozone:	Pursuant to section 611 of the Clean Air Act Amendments of 1990 and per 40 CFR Part 82, this product does not contain nor was it directly manufactured with any class I or II ozone depleting substances.
Impact on Ecosystems:	This product can be toxic to aquatic life and cause fouling of the shoreline at high concentrations.

Section XIII. Disposal Considerations

Waste Disposal:	Dispose of material in accordance with local, county, state and federal regulations. Under EPA RCRA (40 CFR 261.21), if this product becomes a waste material intended for disposal and has a flash point below 140° F, it would be ignitable hazardous waste (waste code number D001). Contact state and federal regulators for confirmation of hazardous/industrial waste classification, and handle accordingly. Use licensed transporter and disposal facility.

Section XIV. Transport Information

Danger! Product May Contain or Release Hydrogen Sulfide. H_2S is a highly toxic, highly flammable gas which can be fatal if inhaled at certain concentrations. May cause irritation to eyes, skin and respiratory system. Avoid liquid, mist and vapor contact. Harmful or fatal if swallowed. Aspiration hazard, can enter lungs and cause damage. May cause irritation or be harmful if inhaled or absorbed through the skin. Avoid prolonged or repeated skin contact. Contains polycyclic aromatic compounds which have been shown to cause anemia, disorders of the liver, bone marrow and lymphoid tissues in rats following dermal application.		
DOT:  DOT CLASS 3: Flammable Liquid.	Hazardous Substance/Material RQ: Benzene/1546.2005 lbs. Oil: This product is an oil under 49CFR (DOT) Part 130. If shipped by rail or highway in a tank with a capacity of 3500 gallons or more, it is subject to these requirements. Mixtures or solutions containing 10% or more of this product may also be subject to this rule. Emergency Response Guide #128.	
DOT Shipping Name:	Gas oil or diesel fuel, or heating oil, light.	
DOT IdentificationNumber/ Packaging Group:	UN 1202.	PG (packaging group): III.

Section XV. Regulatory Information

SARA Title III (302, 304, 311, 312):	Section 302/304	Extremely Hazardous Substances				
		Hydrogen Sulfide: RQ = 100 lbs.				
	Section 311 Hazard Category	Immediate Health	Delayed Health	Fire	Pressure	Reactivity
		X	X	X		
SARA Title III (313):	Benzene.					
EPA/TSCA:	On the TSCA inventory list.					
Other Chemical Inventories:	Canadian DSL, Australian AICS, European EINECS.					
California Prop. 65:	This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute.					
State Right-to-know Regulations:	**Chemical Name:** Benzene.	**State Right-to-Know:** MA MI NJ PA				
	Other health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.					
CERCLA/SUPERFUND Reportable Quantities:	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center of release of quantities of Hazardous Substances equal or greater than the reportable quantities (RQs) in 40 CFR 302.4. (Benzene RQ => 10 pounds or 4.54 Kg or 1 gallon.)					
OSHA Hazard Determination:	This material is hazardous as defined by OSHA's Hazard Communication Standard, 29 CFR 1910.1200.					

Section XVI. Other Information

Information contained herein was based on data and compiled from reference materials and other sources believed to be reliable and is offered in good faith. However, the MSDS's accuracy or completeness is not guaranteed by Apex, nor is any responsibility assumed or implied for any loss or damage resulting from inaccuracies or omissions. Conditions of use and suitability of the product for particular uses are beyond our control; all risks of use of the product are therefore assumed by the user and WE EXPRESSLY DISCLAIM ALL WARRANTIES OF EVERY KIND AND NATURE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. Nothing is intended as a recommendation for uses which infringe valid patents or as extending license under valid patents. Appropriate warnings and safe handling procedures should be provided to handlers and users.