Safety Data Sheet

1. Product and Company Identification

Product Identifier:	**Heavy Fuel Oil**
Synonyms:	# 6 Fuel Oil, Fuel Oil, Bunker C
Chemical Family:	Hydrocarbon
Prodcut Use:	Refinery feedstock
Supplier:	Altex Energy Ltd. 1100, 700 9th Avenue S.W Calgary, Alberta T2P 3V4 403-508-7525
EMERGENCY TELEPHONE:	24 Hour Emergency Number - 403-540-4046 Back-up Number - 1-877-378-7745 Chemtrec: 1-800-424-9300 Canutec: 613-996-6666 or *666 Cellular

2. Hazard Identification

Classification:
Flammable Liquids - Category 4 (Flash point ≥ 60°C (140°F) and ≤ 93°C (200°F))
Germ Cell Mutagenicity – Category 1B
Carcinogenicity - Category 1B
Eye damage/irritation – Category 2
Specific Target Organ Toxicity Single Exposure - Category 3
Specific Target Organ Toxicity Repeat Exposure - Category 2(bone marrow, liver, thymus)
Hazardous to the aquatic environment, chronic toxicity – Category 2

Label Elements:
Symbol(s)

Signal Word
Danger

Hazard Statements
Combustible liquid.
May cause genetic defects.
May cause cancer.
May cause respiratory irritation.
May cause an allergic skin reaction.
May cause drowsiness or dizziness.
May cause damage to organs (liver, kidneys, blood, nervous system, and skin) through prolonged or repeated exposure.
Toxic to aquatic life.

Precautionary Statements
Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not handle until all safety precautions have been read and understood
Obtain special instructions before use.
Avoid breathing dust/fume/gas/mist/vapours/spray
Wash thoroughly after handling
Use only outdoors or in a well-ventilated area
Avoid release to the environment
Wear protective gloves / protective clothing / eye protection / face protection

Response
IF ON SKIN OR HAIR: Remove/take off immediately all contaminated clothing. Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists, get medical advice/attention
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction
Collect spillage

Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed, Keep cool

Disposal
Dispose of contents/container to approved facility

3. Composition / Information on Ingredients

CAS #	Component	Concentration%
68476-33-5	Fuel Oil	100
Ethane	74-84-0	0.00 - 0.03
Propane	74-98-6	0.00 - 0.03

Isobutane	75-28-5	0.01 - 0.05
n-Butane	106-97-8	0.01 - 0.05
Isopentane	78-78-4	0.01 - 0.05
n-Pentane	109-66-0	0.01 - 0.05
Hexanes	110-54-3	0.05 - 0.10
Heptanes	142-82-5	0.15 - 0.25
Octanes	111-65-9	0.25 - 0.50
Nonanes	111-84-2	0.25 - 0.50
Decanes	124-18-5	0.50 - 1.00
Methylcyclopentane	96-37-7	0.05 - 0.10
Benzene	71-43-2	0.00 - 0.03
Cyclohexane	110-82-7	0.01 - 0.10
Methylcyclohexane	108-87-2	0.15 - 0.25
Toluene	108-88-3	0.00 - 0.03
Ethylbenzene	100-41-4	0.01 - 0.05
Xylene (mixed isomers)	1330-20-7	0.05 - 0.10

Note
Small amount of hydrogen sulfide, a highly toxic gas, may be present, especially in the headspace of containers.

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 and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.

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.

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.

Most Important Symptoms and Effects
Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue
Delayed: Dry skin and possible irritation with repeated or prolonged exposure

5. Fire Fighting Measures

NFPA Flammability Classification
NFPA Class-IIIA combustible material.

General Fire Hazards
Flash Point: > 60°c (140°f)
Flash Point Method: ASTM D 7094

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.

Hazardous Combustion Products
Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons and oxides of sulfur and/or nitrogen.

Extinguishing Media
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or gaseous extinguishing agent.
LARGE FIRES: Use foam, water fog, or water spray. Water fog and spray are effective in cooling containers and adjacent structures. However, water can cause frothing and/or may not extinguish the fire. Water can be used to cool the external walls of vessels to prevent excessive pressure, auto ignition or explosion. DO NOT use a solid stream of water directly on the fire as the water may spread the fire to a larger area

Unsuitable Extinguishing Media
None

Fire Fighting Equipment/Instructions
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other firefighting 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 face piece 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 firefighting foam.

6. Accidental Release Measures

Recovery and Neutralization
Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up
Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal.

Emergency Measures
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.

Personal Precautions and Protective Equipment
Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions
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. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection - do not discharge solid water stream patterns into the liquid resulting in splashing.

Notification Procedures
In the event of a spill or accidental release, notify relevant authorities in accordance with applicable regulations.

Prevention of Secondary Hazards
None

7. HANDLING AND STORAGE

Precautions for Safe Handling

Handle as a combustible liquid. Product is generally transported and stored hot (typical 110 - 140 °F). 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. Do not enter storage areas or confined spaces unless adequately ventilated.

Storage Procedures

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."

Caution: Hydrogen sulfide may accumulate in headspaces of tanks and other equipment, even when concentrations in the liquid product are low. Factors increasing this hazard potential include heating, agitation and contact of the liquid with acid or acid salts. Assess the exposure risk by gas monitoring. Wear air supplying breathing apparatus if necessary. Overexposure to hydrogen sulfide may cause dizziness, headache, nausea and possibly unconsciousness and death.

Incompatibilities

Keep away from strong oxidizers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits

Derived No Effect Levels (DNEL/DMEL) Table

COMPONENTS	TYPE	VALUES	FORM
Fuel oil, residual	acute, systemic effects	4700 mg/m3/15 mins (aerosol)	Inhalable fraction
	long term, systemic effects	0,065 mg/kg 8h	Dermal
	long term, systemic effects	0,12 mg/m3/8h (aerosol)	Inhalable fraction
	long term, systemic effects	0,015 mg/kg 24h	Oral

Respiratory Protection
Normally not needed for normal exposure. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA 29 CFR 1910.134. Use a NIOSH/MSHA approved air purifying respirator as needed to control exposure. Consult with respirator manufacturer to determine respirator selection, use, and limitations. Use positive pressure, air-supplied respirator for uncontrolled releases or when air purifying respirator limitations may be exceeded. Follow respirator protection program requirements (OSHA 1910.134 and ANSI Z88.2) for all respirator use.

Ventilation
Normally ventilation is not required for usual conditions of use. If ventilation is needed, explosion proof motors and fans are required to provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(S). Inhalation of oil vapor and mists should be avoided. This product contains high boiling point aromatic components that may cause skin irritation or more serious skin disorders

Engineering controls
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of mists and/or vapors below the recommended exposure limits (see below). An eye wash station and safety shower should be located near the work-station.

Personal protective equipment
Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.

Eye protection
Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing, or spraying of this material

Hand protection
Use gloves constructed of chemical resistant materials such as heavy nitrile rubber. Use heat-protective gloves when handling product at elevated temperatures.

Body protection
Use clean, chemical-resistant, full-body protective clothing. If significant contact occurs, remove oil-contaminated clothing immediately and promptly shower. Wash skin thoroughly with soap and water to remove hydrocarbon residues. Launder contaminated clothing before reuse or discard. Discard contaminated leather goods and boots. Wear heat protective boots and protective clothing when handling material at elevated temperatures.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Thick, black, oily liquid.
Odor	Petroleum.
Odor threshold	Not available.
Physical state	Liquid.
Heavy fuel oil msds pH	Not applicable.
Melting point	Not available.
Freezing point	Not available.
Initial Boiling Point and Boiling Range	150 - 750 °C / 302 - 1.382 °F
Flash point	> 140°F (> 60 °C) ASTM D7094 PMCC
Evaporation rate (n-Butyl acetate = 1)	< 1
Flammability	NFPA Class-IIIA combustible material.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Viscosity-Kinematic	1123 centistokes at 40°C (104°F)
Vapor pressure (RVP)	1.0 – 7.5 kPa at 37.8°C (100°F)
Vapor density	> 1 (Air = 1)
Specific gravity	0.88 - 1.02 (water=1)
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature Decomposition temperature	>300°C (572°F) (estimated)

10. STABILITY AND REACTIVITY

Reactivity
Oxidizes on contact with air.

Chemical Stability
Stable under normal temperature conditions and recommended use.

Possibility Of Hazardous Reactions
Hazardous polymerization does not occur. Not sensitive to mechanical impact.

Conditions to Avoid
Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.

Incompatible Materials
Strong oxidizing agents. Acids. Alkalis.

Hazardous Decomposition Products
Very toxic carbon monoxide, carbon dioxide; corrosive sulfur oxides; corrosive, oxidizing nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Chemical Name	LC50	LD50 (oral)	LD50 (dermal
Ethane	Not available	Not available	Not available
Propane	> 800000 ppm (rat) (30-minute exposure)	Not available	Not available
Isobutane	368000 mg/kg (male mouse) (4-hour exposure) (vapour)	Not available	Not available
n-Butane	658 mg/L (rat) (4-hour exposure)	Not available	Not available
Isopentane	140000 ppm (mouse) (2-hour exposure) (vapour)	Not available	Not available
n-Pentane	6106 ppm (rat) (4-hour exposure)	> 2000 mg/kg (rat)	Not available
Hexanes	73680 ppm (rat) (4-hour exposure) (vapour)	32290 mg/kg (male rat)	> 3295 mg/kg (rabbit)
Heptanes	~ 25000 ppm (rat) (4-hour exposure)	> 15000 mg/kg (rat)	Not available
Octanes	25250 ppm (rat) (4-hour exposure)	Not available	Not available
Nonanes	3200 ppm (rat) (4-hour exposure)	> 15000 mg/kg	Not available
Decanes	72300 mg/m3 (mouse) (2-hour exposure) (aerosol)	Not available	Not available
Methylcyclopentane	95000-120000 mg/m3 (mouse)	5000-15000 mg/kg (rat)	Not available
Benzene	13700 ppm (rat) (4-hour exposure)	930 mg/kg (rat)	> 8240 mg/kg (rabbit)
Cyclohexane	> 9500 ppm (rat) (4-hour exposure)	30400 mg/kg (rat)	> 2000 mg/kg (rabbit)
Methylcyclohexane	7350 ppm (mouse) (4-hour exposure)	2250 mg/kg (mouse)	> 86700 mg/kg (rabbit)
Toluene	7585 ppm (rat) (4-hour exposure)	5580 mg/kg (male rat)	12125 mg/kg (rabbit)
Ethylbenzene	~ 4000 ppm (rat) (4-hour exposure)	3500 mg/kg (rat)	15380 mg/kg (rabbit)
Xylene (mixed isomers)	6350 ppm (male rat) (4-hour exposure)	3523 mg/kg (rat)	Not available

Skin Irritation/Corrosion
May cause mild irritation based on information for closely related chemicals.

Eye Irritation/Corrosion
May cause moderate or severe irritation based on information for closely related materials.

Effects of Short-Term (Acute) Exposure
Inhalation
Depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion.

Skin Absorption
Liquid may be absorbed through the skin if large areas of skin are exposed.

Ingestion
May be harmful. May cause gastrointestinal irritation. Symptoms may include abdominal pain, stomach upset, nausea, vomiting, and diarrhea.

Effects of Long-Term (Chronic) Exposure
Material in general is not expected to cause harm.

Respiratory and/or Skin Sensitization
Not a respiratory sensitizer. Not a skin sensitizer.

Carcinogenicity
Material may contain benzene, a known carcinogen. Material in general is not expected to cause harm.

Teratogenicity / Embryotoxicity
Material in general is not expected to cause harm.

Reproductive Toxicity
Material in general is not expected to cause harm.

Mutagenicity
Material in general is not expected to cause harm.

Toxicologically Synergistic Materials
No information was located.

12. ECOLOGICAL INFORMATION

General Product Information
Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal, Provincial and State regulations**.**

Component Analysis - Ecotoxicity - Aquatic Toxicity

Benzene (71-43-2) Test & Species	Conditions
96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22330-41160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70000-142000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76 - 15.6 mg/L [Static]
48 Hr EC50 Daphnia magna	10 mg/L

Persistence and Degradability
No ingredient of this product or its degradation products is known to be highly persistent.

Mobility
If released into soil, this material will absorb and may biodegrade in anaerobic conditions. In water it may become volatile. Photo-oxidation products may include phenol, nitrophenols, nitrobenzene, formic acid.

Bioaccumulation / Accumulation
This product and its byproducts are not expected to bioaccumulate.

13. DISPOSAL CONSIDERATIONS

Dispose of waste in accordance with all applicable federal, provincial and/ or local regulations. Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container.

14. TRANSPORT INFORMATION

U.S. Department Of Transportation (Dot)

Proper Shipping Name: Combustible Liquids,NOS
Class / Division Combustible liquid
Transport Hazard Class: 3 (Combustible)
Identification Number: NA1993
Packing Group: lll

Additional Information:
Environmental Hazards
Special Provisions: 144, B1, Ib3, T4, Tp1, Tp29
Packaging Exceptions: 150
ERG Number: 128

15. REGULATORY INFORMATION

Canadian Federal Regulations
This product has been classified in accordance with the *Controlled Products Regulations* and the SDS contains all the information required by the *Controlled Products Regulations* and is in line with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

CANADA - CEPA - SCHEDULE I - LIST OF TOXIC SUBSTANCES

CANADA - WHMIS - INGREDIENT DISCLOSURE LIST	CAS	PRESENT
Benzene	71-43-2	0.00 – 0.03 %

WHMIS Classification
Class A - Division 3 - Combustible Liquid

16. OTHER INFORMATION

Note
This Safety Data Sheet (SDS) applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical Specifications vary greatly depending on the products and are not reflected in this document. Consult specification sheets for technical information.

References
CHEMINFO database. Canadian Centre for Occupational Health and Safety (CCOHS).
Registry of Toxic Effects of Chemical Substances (RTECS®) database. Accelrys, Inc. Available from Canadian Centre for Occupational Health and Safety (CCOHS).

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