

SDS No. DMC04015

**Low Sulphur Light Fuel Oil**

**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY**

**Product name:** Light Fuel Oil  
**Product code:** LFO  
**Product type:** Fuel for use in industrial combustion equipment.  
**Supplier:** Topaz Energy Ltd  
**Address:** Beech Hill,  
Clonskeagh, Dublin 4  
**Contact numbers:**  
**Telephone:** +353 1 202 8888  
**Telex:** 93634  
**Fax:** + 353 1 283 8320  
**Emergency telephone number:**  
**Emergency Cover:** +353 1 808 8232

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

**Substance formal name:** Fuel oil, residual - The liquid product from various refinery streams, usually residues. The composition is complex and varies with the source of the crude oil.  
**Synonyms:** LFO, RFO, Residual Fuel Oil, Black Oil, Fuel Oil.  
**CAS number:** 68476-33-5

**Dangerous components/constituents:**

Component name	CAS number	Content range	EC hazard	R phrases
Fuel oil, residual	68476-33-5	100 %(m/m)	Carc Cat 2	R45-52/53
Note: EU Dangerous Substances Directive, 67/548/EEC, Annex I number for the above substance is 649-024-00-9.				
Contains the following substances for which exposure limits apply: hydrogen sulphide.				

**Other information:** Contains cracked components in which polycyclic aromatic compounds, mainly 3-ring but some 4- to 6-ring species, are present. Contains sulphur, oxygen and nitrogen compounds. Contains organo-metallic compounds. Hydrogen sulphide may be present both in the liquid and vapour.

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### 3. HAZARDS IDENTIFICATION

<b>Human health hazards:</b>	May cause cancer. Product classified as a Category 2 carcinogen. Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis. Under conditions of poor personal hygiene, excessive exposure may lead to irritation, oil acne and folliculitis and development of warty growths which may subsequently become malignant. Prolonged exposure to vapour concentrations may affect the central nervous system. Hydrogen sulphide may accumulate in the head space of containers. Hydrogen sulphide is very toxic by inhalation and is an asphyxiant.
<b>Safety hazards:</b>	Not classified as flammable, but will burn. Therefore it should be treated as a potentially flammable liquid. Flammable vapours may be present even at temperatures below the flash point.
<b>Environmental hazards:</b>	Harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment. Not readily biodegradable. Has the potential to bioaccumulate. Persists under anaerobic conditions.

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### 4. FIRST AID MEASURES

<b>Symptoms and effects:</b>	Exposure to hydrogen sulphide at concentrations above the recommended occupational exposure standard may cause headache, dizziness, irritation of the eyes, upper respiratory tract, mouth and digestive tract, convulsions, respiratory paralysis, unconsciousness and even death. Unconsciousness as a result of exposure to hydrogen sulphide may occur extremely rapidly and without other symptoms. Contact with hot product may cause skin burns, including to the underlying skin. Owing to its high viscosity, this product does not normally constitute an ingestion hazard. Ingestion will only occur in grossly abnormal circumstances. If ingested can lead to irritation of the mouth, irritation of the throat, irritation of the digestive tract, vomiting. Aspiration into the lungs may occur directly or following ingestion. This can cause chemical pneumonitis which may be fatal. Prolonged exposure to vapour/mist concentrations above the recommended occupational exposure standard may cause headache, dizziness, nausea, asphyxiation, unconsciousness and even death.
<b>Protection of first aiders:</b>	Wear self-contained breathing apparatus if presence of hydrogen sulphide is suspected.
<b>First Aid - Inhalation:</b>	Remove to fresh air. If breathing but unconscious, place in the recovery position. If breathing has stopped, apply artificial respiration. If heartbeat absent give external cardiac compression. Monitor breathing and pulse. OBTAIN MEDICAL ATTENTION IMMEDIATELY.
<b>First Aid - Skin:</b>	If high pressure injection injuries occur, obtain medical attention immediately. In the case of burns, wash skin thoroughly with water using soap if available. Do not use kerosine, gasoline or solvents. Contaminated clothing must be removed as soon as possible. It must be laundered before reuse. If persistent irritation occurs, obtain medical attention.

<b>First Aid - Eye:</b>	Flush eye with water. If persistent irritation occurs or if there is any suspicion of damage from hot product, obtain medical attention immediately.
<b>First Aid - Ingestion:</b>	DO NOT DELAY. Do not induce vomiting. Protect the airway if vomiting begins. Give nothing by mouth. If breathing but unconscious, place in the recovery position. If breathing has stopped, apply artificial respiration. OBTAIN MEDICAL ATTENTION IMMEDIATELY.
<b>Advice to physicians:</b>	Treat symptomatically. High-pressure injection injuries require early surgical intervention and possible steroid therapy to minimise tissue damage and loss of nerve function. X-ray examination is required to assess the extent of the injury. Local anaesthetics or hot soaks should not be used with such injuries since they can contribute to local swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign bodies should be carried out under general anaesthetic. Because injected material may be deposited at some distance from the point of injection, wide exploration is essential. Prolonged exposure to high concentrations of hydrogen sulphide may lead to a delayed chemical pneumonitis (pulmonary oedema). In cases of excessive inhalation, observe in hospital for 48 hours for signs of pulmonary oedema. Diagnosis of ingestion of this product is by the characteristic odour on the victim's breath and from the history of events. In cases of ingestion, consider gastric lavage. Gastric lavage must only be undertaken after cuffed endotracheal intubation in view of the risk of aspiration. In cases of chemical pneumonitis, antibiotic and corticosteroid therapy should be considered.

## 5. FIRE FIGHTING MEASURES

<b>Specific hazards:</b>	Hazardous combustion products may include: carbon monoxide, oxides of nitrogen, oxides of sulphur, unburnt hydrocarbons. Flammable vapours may be present even at temperatures below the flash point.
<b>Extinguishing media:</b>	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
<b>Unsuitable extinguishing media:</b>	Water in a jet. Use of Halon extinguishers should be avoided for environmental reasons.
<b>Other information:</b>	Keep adjacent drums and tanks cool by spraying with water.

## 6. ACCIDENTAL RELEASE MEASURES

<b>Personal precautions:</b>	Remove all possible sources of ignition in the surrounding area and evacuate all personnel. Ventilate contaminated area thoroughly. Do not breathe: vapour, mists. Avoid contact with: skin, eyes and clothing. Take off immediately all contaminated clothing.
<b>Personal protection</b>	Wear: impervious overalls, PVC or nitrile rubber gloves, safety shoes or boots - chemical resistant, monogoggles.
<b>Environmental precautions:</b>	Prevent from entering into drains, ditches or rivers. environmental contamination.

<b>Clean-up methods - small spillage:</b>	Absorb or contain liquid with sand, earth or spill control material. Shovel up and place in a labelled sealable container for subsequent safe disposal. Do not disperse using water.
<b>Clean-up methods - large spillage:</b>	Transfer to a labelled, sealable container for product recovery or safe disposal. Otherwise treat as for small spillage.
<b>Other information:</b>	Local authorities should be advised if significant spillages cannot be contained. Observe all relevant local regulations. See Section 13 for information on disposal.

## 7. HANDLING AND STORAGE

<b>Handling:</b>	Although not classified as flammable, this product should be handled as a potentially flammable liquid. When using do not eat, drink or smoke. Only use in well-ventilated areas. Take precautionary measures against static discharges. Earth or bond all equipment.
<b>Handling temperature:</b>	10°C minimum.
<b>Storage:</b>	Locate tanks away from heat and other sources of ignition. Ensure heating coils are always covered with product (minimum 15 cm). Do not store in unsuitable, unlabelled or incorrectly labelled containers. Keep container tightly closed in a dry, well-ventilated place away from direct sunlight and other sources of heat or ignition. Prevent ingress of water. Drums should be correctly stacked to a maximum of 3 high. Keep in a bunded area.
<b>Storage temperature:</b>	10°C minimum.
<b>Product transfer:</b>	Electrostatic charges may be generated during pumping. Ensure electrical continuity by bonding all equipment. Wait 10 minutes after tank filling before opening hatches or manholes.
<b>Tank cleaning:</b>	Cleaning, inspection and maintenance of storage tanks is a specialist operation which requires the implementation of strict procedures and precautions. These include issuing of work permits, gas-freeing of tanks, using a manned harness and lifelines and wearing air-supplied breathing apparatus. Prior to entry and whilst cleaning is underway, the atmosphere within the tank must be monitored using an oxygen meter and/or explosimeter. In addition, appropriate electrochemical sensors or colorimetric tubes must be used to check for the presence of hydrogen sulphide.
<b>Recommended materials:</b>	For containers, use: mild steel, stainless steel. For seals and gaskets, use: compressed asbestos fibre, PTFE, Viton A, Viton B
<b>Unsuitable materials:</b>	Examples of materials to avoid are: cadmium, copper, copper alloys (ferrous and non-ferrous), lead, zinc, zinc alloys. Synthetic materials such as plastics and fibreglass may also be unsuitable, depending on the material specification and intended use. Materials for packages, containers (including containers for the retention or despatch of samples) and container linings must not adversely affect the quality of the product. They must be impermeable and must not be weakened or otherwise affected by the product. Examples of materials to avoid are: natural rubber, thermoplastics.
<b>Other information:</b>	Ensure that all local regulations regarding handling and storage facilities are followed.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Occupational exposure standards:** ACGIH threshold limit values are given below. Lower exposure limits may apply locally.

Name	Limit type	Value	Unit	Other information
Hydrogen sulphide	TWA	14	mg/m <sup>3</sup>	
Hydrogen sulphide	STEL	21	mg/m <sup>3</sup>	

Note: ACGIH - 'Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices', American Conference of Governmental Hygienists, Cincinnati, Ohio, 1996 edition.

**Respiratory protection:** Not normally required. In a confined space self-contained breathing apparatus may be required.

**Hand protection:** PVC or nitrile rubber gloves.

**Eye protection:** Monogoggles or full face shield if splashes are likely to occur.

**Body protection:** Wear overalls to minimise contamination of personal clothing. Launder overalls and undergarments regularly. Safety shoes or boots - chemical resistant.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical state:</b>	Liquid at ambient temperature
<b>Colour:</b>	Dark brown, Black
<b>Odour:</b>	Characteristic
<b>Initial boiling point:</b>	circa 160°C
<b>Final boiling point:</b>	> 350°C
<b>Vapour pressure:</b>	<0.1 kPa at 40 C
<b>Density:</b>	<980 kg/m <sup>3</sup> at 15 C
<b>Kinematic viscosity:</b>	< 13.5 mm <sup>2</sup> /s at 80 C
<b>Vapour density (air=1):</b>	> 5 at 15°C
<b>Flash point:</b>	62°C minimum (PMCC)
<b>Flammability limit - lower:</b>	circa 0.5 %(V/V)
<b>Flammability limit - upper:</b>	circa 5 %(V/V)
<b>Auto-ignition temperature:</b>	220-300°C
<b>Explosive properties:</b>	In use, may form flammable/explosive vapour-air mixture
<b>Oxidizing properties:</b>	Not applicable
<b>Solubility in water:</b>	Data not available
<b>n-octanol/water partition coefficient:</b>	log P <sub>OW</sub> = 3-7
<b>Evaporation rate:</b>	Data not available

## 10. STABILITY/REACTIVITY

**Stability:** Stable.

**Conditions to avoid:** Heat, flames and sparks.

<b>Materials to avoid:</b>	Strong oxidizing agents.
<b>Hazardous decomposition products:</b>	None known.

## 11. TOXICOLOGICAL INFORMATION

<b>Basis for assessment:</b>	Toxicological data have not been determined specifically for this product. Information given is based on a knowledge of the toxicology of similar products.
<b>Acute toxicity - oral:</b>	LD <sub>50</sub> expected to be >5000 mg/kg.
<b>Acute toxicity - dermal:</b>	LD <sub>50</sub> expected to be above 2000 mg/kg.
<b>Acute toxicity - inhalation:</b>	LC <sub>50</sub> expected to be >5 mg/l.
<b>Eye irritation:</b>	Expected to be slightly irritant.
<b>Skin irritation:</b>	Expected to be slightly irritant.
<b>Skin sensitization:</b>	Not expected to be a skin sensitizer.
<b>(Sub) chronic toxicity:</b>	Repeated skin exposure may cause moderate to severe irritation. Repeated exposure causes kidney damage in rabbits.
<b>Carcinogenicity:</b>	Dermal application to mice expected to cause tumours.
<b>Mutagenicity:</b>	Not considered to be a mutagenic hazard.
<b>Reproductive toxicity:</b>	May cause slight foetotoxicity in rats at doses which are maternally toxic.
<b>Human effects:</b>	Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis. Under conditions of poor personal hygiene, excessive exposure may lead to irritation, oil acne and folliculitis and development of warty growths which may subsequently become malignant. Excessive and prolonged exposure to mists may cause chronic inflammation of the lungs and a form of pulmonary fibrosis. See Section 4 for information regarding acute effects to humans.

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## 12. ECOLOGICAL INFORMATION

<b>Basis for assessment:</b>	Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the ecotoxicology of similar products.
<b>Mobility:</b>	Floats on water. If it comes into contact with soil, it will strongly absorb to soil particles.
<b>Persistence/degradability:</b>	Not readily biodegradable. Persists under anaerobic conditions.
<b>Bioaccumulation:</b>	Has the potential to bioaccumulate.
<b>Ecotoxicity:</b>	Poorly soluble mixture. Harmful, $10 < LC/EC_{50} \leq 100$ mg/l, to aquatic organisms (estimated). (LC/EC <sub>50</sub> expressed as the nominal amount of product required to prepare aqueous test extract). Low acute toxicity to mammals. May cause physical fouling of aquatic organisms.

**Sewage treatment:** Product is expected to be harmful, EC<sub>50</sub> >10-100 mg/l, to organisms in sewage treatment plants. (EC<sub>50</sub> expressed as the nominal amount of product required to prepare aqueous test extract).

### 13. DISPOSAL CONSIDERATIONS

**Precautions:** See Section 8.

**Waste disposal:** Waste arising from a spillage or tank cleaning should be recycled or disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Do not dispose into the environment, in drains or in water courses.

**Product disposal:**

**Container disposal:** 200 litre drums should be emptied and returned to the supplier or sent to a drum conditioner without removing or defacing markings or labels. Drums should not be reused without first obliterating all markings.

**Local legislation:** Dangerous Substances (Conveyance of Petroleum by Road) Regulations 1979 - SI No 314 of 1979.  
The European Communities (Waste Oils) Regulations 1992 - SI 399 of 1992.  
Local Government (Water Pollution) (Amendment) Act 1990.

### 14. TRANSPORT INFORMATION

Not dangerous for conveyance under UN, IMO, ADR/RID and IATA/ICAO codes.

### 15. REGULATORY INFORMATION

**EC Label name:** Fuel oil, residual

**EC Classification:** Carcinogenic, category 2  
Dangerous for the environment

**EC Symbols:** T

**EC Risk Phrases:** R45 May cause cancer  
R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**EC Safety Phrases:** S53 Avoid exposure - obtain special instructions before use.  
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)  
S61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

**EINECS (EC):** All components listed

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**National legislation:** Dangerous Substances (Retail and Private Petroleum Stores) Regulations 1979 - SI No 311 of 1979.  
 Dangerous Substances (Conveyance of Petroleum by Road) Regulations 1979 - SI No 314 of 1979.  
 Safety, Health and Welfare at Work Act, 1985.  
 Local Government (Water Pollution) (Amendment) Act 1990.  
 The European Communities (Waste Oils) Regulations 1992 - SI 399 of 1992.  
 EC Directive 94/63/EC on VOC.  
 European Communities (Classification, Packaging, Labelling and Notification of Dangerous Substances) Regulations 1994 - SI No 77 of 1994.  
 European Communities (Dangerous Substances & Preparations Marketing and Use) Regulations 1994 - SI No 79 of 1994.

**Other information:**

## 16. OTHER INFORMATION

**Uses and restrictions:** Fuel for use in industrial combustion equipment. This product must not be used in applications other than the above without first seeking the advice of the supplier.

**Technical contact point:** PQE

**Technical contact number:**

**Telephone:** +353 1 202 8827  
**Telex:** 93634  
**Fax:** + 353 1 283 8318

**SDS history:**

Edition number:	3
First issued:	June 25, 1993
Previous revisions:	April 16, 1996
Revised:	October 8, 1996

**Revisions highlighted:** Section 2 and 12: recommended CONCAWE environmental classification for residual fuel oils added.  
 Sections 3, 4, 5, 6, 7, 8 and 11: Editorial changes.  
 Section 8: OELs for oil mist deleted - not applicable.  
 Changes indicated by vertical bar on left of text.

**SDS distribution:** This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.

**Other information:**

**References:** Useful references include the following:  
 The Institute of Petroleum, London, 'Marketing Safety Code', Heyden and Son Limited, February 1978  
 Applied Science, London, 'European Model Code of Safe Practice in the Storage and Handling of Petroleum Products (1973) Part 1: Operations'

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

## Light Fuel Oil