Material Safety Data Sheet

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

Material Name	:	**Shell MFO 180 (RME 180)**
Recommended Uses	:	Fuel for use in marine diesel engines, boilers, furnaces and other combustion equipment.
Product Code	:	002C0864
Manufacturer/Supplier	:	**The Shell Company of Australia Limited** (ABN 46 004 610 459) 8 Redfern Road Hawthorn East Victoria 3123 Australia
Telephone	:	+61 (0)3 9666 5444
Fax	:	+61 (0)3 8823 4800
Emergency Telephone Number	:	1800 651 818 (within Australia only) +61 3 9663 2130 (International)

2. HAZARDS IDENTIFICATION

HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.
Classified as hazardous according to the criteria of NOHSC, and not classified as Dangerous Goods according to the Australian Dangerous Goods Code.

Symbol(s)	:	T Toxic.
R-phrase(s)	:	R45 May cause cancer. R66 Repeated exposure may cause skin dryness or cracking. R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S-phrase(s)	:	S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S53 Avoid exposure. Obtain special instructions before use. S61 Avoid release to the environment. Refer to special instructions/Safety data sheets.
Health Hazards	:	Hydrogen sulphide is highly toxic and may be fatal if inhaled. Hydrogen sulphide (H2S), an extremely flammable and toxic gas, and other hazardous vapours may evolve and collect in the headspace of storage tanks, transport vessels and other enclosed containers. May dull the sense of smell, so do not rely on odour as an indication of hazard. Repeated exposure may cause skin dryness or cracking. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis. May cause cancer.
Signs and Symptoms	:	H2S has a broad range of effects dependent on the airborne concentration and length of exposure: 0.02 ppm odour threshold, smell of rotten eggs; 10 ppm eye and respiratory tract irritation; 100 ppm coughing, headache, dizziness, nausea, eye irritation, loss of sense of smell in minutes; 200 ppm potential for pulmonary oedema after >20-30 minutes; 500

ppm loss of consciousness after short exposures, potential for respiratory arrest; >1000ppm immediate loss of consciousness, may lead rapidly to death, prompt cardiopulmonary resuscitation may be required. Do not depend on sense of smell for warning. H2S causes rapid olfactory fatigue (deadens sense of smell). There is no evidence that H2S will accumulate in the body tissue after repeated exposure. Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.

Safety Hazards : Not classified as flammable but will burn. Flammable vapours may be present even at temperatures below the flash point. Therefore it should be treated as a potentially flammable liquid. May ignite on surfaces at temperatures above auto-ignition temperature. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.

Environmental Hazards : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Additional Information : This product is intended for use in closed systems only.

SUSDP Schedule : Not scheduled. When packed in containers having capacity of greater than 20 litres.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Preparation description : Streams obtained from distillation and cracking processes and containing a mixture of saturated, aromatic and olefinic hydrocarbons with carbon numbers predominantly in the C9 to C50 range. Contains cracked components in which polycyclic aromatic compounds, mainly 3-ring but some 4 to 6 ring species, are present. Contains sulphur, oxygen, nitrogen compounds, vanadium and other metals at >10 ppm <500ppm w/w.

Hazardous Components

Chemical Identity	CAS	EINECS	Symbol(s)	R-phrase(s)	Conc.
Fuel oil, residual	68476-33-5	270-675-6	T	R45; R66; R52/53	< 100.00 %

Additional Information : Hydrogen sulphide may be present both in the liquid and the vapour. Composition is complex and varies with the source of the crude oil. Heavy Fuel Oils are blends of residual fuels and distillate streams which always require heating before use. Refer to chapter 16 for full text of EC R-phrases.

4. FIRST AID MEASURES

General Information : Vaporisation of H2S that has been trapped in clothing can be dangerous to rescuers. Maintain respiratory protection to avoid contamination from the victim to rescuer. Mechanical ventilation should be used to resuscitate if at all possible.

Inhalation : Remove to fresh air. Do not attempt to rescue the victim unless

		proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting, or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Give nothing by mouth.
Advice to Physician	:	Hydrogen sulphide (H2S) - CNS asphyxiant. May cause rhinitis, bronchitis and occasionally pulmonary oedema after severe exposure. CONSIDER: Oxygen therapy. Consult a Poison Control Center for guidance. 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. Call a doctor or poison control center for guidance.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Specific Hazards	:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Oxides of sulphur. Unidentified organic and inorganic compounds. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Sinks in fresh water, floats on sea water and may reignite on water surface. Flammable vapours may be present even at temperatures below the flash point. Hydrogen sulphide (H2S) and toxic sulphur oxides may be given off when this material is heated. Do not depend on sense of smell for warning.
Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe all relevant local and international regulations. Remove contaminated clothing. Evacuate the area of all non-essential personnel. Avoid contact with skin, eyes and

clothing. Ventilate contaminated area thoroughly.

Protective measures	:	May ignite on surfaces at temperatures above auto-ignition temperature. Do not breathe fumes, vapour. Do not operate electrical equipment. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Clean Up Methods	:	For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Shovel into a suitable clearly marked container for disposal or reclamation in accordance with local regulations.
Additional Advice	:	Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26.

7. HANDLING AND STORAGE

General Precautions	:	Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Prevent spillages. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Maintenance and Fuelling Activities - Avoid inhalation of vapours and contact with skin. Classified as a C1 (COMBUSTIBLE LIQUID) for the purpose of storage and handling, in accordance with the requirements of AS 1940. Refer to State Regulations for storage and transport requirements. AS 1940:2004 The storage and handling of

flammable and combustible liquids.

Handling : The inherent toxic and olfactory (sense of smell) fatiguing properties of hydrogen sulphide require that air monitoring alarms be used if concentrations are expected to reach harmful levels such as in enclosed spaces, heated transport vessels and spill or leak situations. If the air concentration exceeds 50 ppm, the area should be evacuated unless respiratory protection is in use. Avoid prolonged or repeated contact with skin. When using do not eat or drink. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.

Storage : Drum and small container storage: Drums should be stacked to a maximum of 3 high. Use properly labelled and closeable containers. Prevent ingress of water. Tank storage: Tanks must be specifically designed for use with this product. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Tanks should be fitted with heating coils. Ensure heating coils are always covered with product (minimum 15 cm).

Product Transfer : Avoid splash filling. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes.

Recommended Materials : For containers, or container linings use mild steel, stainless steel. Aluminium may also be used for applications where it does not present an unnecessary fire hazard. Examples of suitable materials are: high density polyethylene (HDPE) and Viton (FKM), which have been specifically tested for compatibility with this product. For container linings, use amine-adduct cured epoxy paint. For seals and gaskets use: graphite, PTFE, Viton A, Viton B.

Unsuitable Materials : Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Examples of materials to avoid are: natural rubber (NR), nitrile rubber (NBR), ethylene propylene rubber (EPDM), polymethyl methacrylate (PMMA), polystyrene, polyvinyl chloride (PVC), polyisobutylene.; However, some may be suitable for glove materials.

Additional Information : Ensure that all local regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Hydrogen Sulphide	AU OEL	TWA	10 ppm	14 mg/m3	
	AU OEL	STEL	15 ppm	21 mg/m3	

Additional Information : ISGOTT 5th edition (2006) recommends that the TLV-TWA for H2S is 5 ppm over a period of 8 hours.

Material Safety Data Sheet

Exposure Controls	:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use.
Personal Protective Equipment	:	Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers. AS/NZS 1337: Eye protectors for industrial applications. AS/NZS 2161: Occupational protective gloves - Selection, use and maintenance. AS/NZS 1715: Selection, use and maintenance of respiratory protective devices. AS/NZS 1716: Respiratory protective devices.
Respiratory Protection	:	If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. All respiratory protection equipment and use must be in accordance with local regulations.
Hand Protection	:	Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Select gloves tested to a relevant standard (e.g. Europe EN374, US F739). When prolonged or frequent repeated contact occurs, Nitrile gloves may be suitable. (Breakthrough time of > 240 minutes.) For incidental contact/splash protection Neoprene, PVC gloves may be suitable.
Eye Protection	:	Chemical splash goggles (chemical monogoggles). Approved to EU Standard EN166.
Protective Clothing	:	Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).
Monitoring Methods	:	Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Environmental Exposure Controls	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

Material Safety Data Sheet

Appearance	:	Brown to black. Viscous liquid.
Odour	:	Hydrocarbon
pH	:	
Initial Boiling Point and Boiling Range	:	150 - 600 °C / 302 - 1,112 °F
Freezing/melting point	:	
Flash point	:	> 60 °C / 140 °F
Lower / upper Flammability or Explosion limits	:	0.5 - 5.0 %(V)
Auto-ignition temperature	:	220 - 250 °C / 428 - 482 °F
Vapour pressure	:	< 1 hPa at 40 °C / 104 °F
Specific gravity	:	
Density	:	< 0.991 g/cm3 at 15 °C / 59 °F
Water solubility	:	Negligible.
Solubility in other solvents	:	
n-octanol/water partition coefficient (log Pow)	:	3 - 6
Kinematic viscosity	:	< 180 mm2/s at 50 °C / 122 °F
Vapour density (air=1)	:	

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on product data, a knowledge of the components and the toxicology of similar products.
Acute Oral Toxicity	:	Low toxicity:LD50 >2000 mg/kg, Rat
Acute Dermal Toxicity	:	Low toxicity:LD50 >2000 mg/kg, Rabbit
Acute Inhalation Toxicity	:	Low toxicity: LC50 >5 mg/l / 4 h, Rat
Skin Irritation	:	Slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	:	Slightly irritating.
Respiratory Irritation	:	Slightly irritating.
Sensitisation	:	Not a skin sensitiser.
Repeated Dose Toxicity	:	Expected to have low toxicity on repeated exposure.
Mutagenicity	:	In-vitro mutagenicity studies show that mutagenic activity is related to 4-6 ring polycyclic aromatic content.
Carcinogenicity	:	May cause cancer. The International Agency for Research on Cancer (IARC) has determined that there is sufficient evidence for the carcinogenicity in humans of untreated and mildly treated oils.

Reproductive and Developmental Toxicity	:	Causes foetotoxicity at doses which are maternally toxic.

12. ECOLOGICAL INFORMATION

Fuels are typically made from blending several refinery streams. Ecotoxicological studies have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity	:	Harmful:LL/EL/IL50 10-100 mg/l(to aquatic organisms)(LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract).
Mobility	:	Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. Large volumes may penetrate soil and could contaminate groundwater. Sinks in fresh water, but will float on sea water and form a slick. Contains volatile constituents.
Persistence/degradability	:	The volatile constituents will oxidize rapidly by photochemical reactions in air. Major constituents are inherently biodegradable.
Bioaccumulation	:	Contains constituents with the potential to bioaccumulate.
Other Adverse Effects	:	Films formed on water may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. Waste arising from a spillage or tank cleaning should be 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.
Container Disposal	:	Send to drum recoverer or metal reclaimer. Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard if heated above the flash point. Do not puncture, cut or weld uncleaned drums. Do not pollute the soil, water or environment with the waste container. Comply with any local recovery or waste disposal regulations.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

Material Safety Data Sheet

14. TRANSPORT INFORMATION

ADG

This material is not classified as dangerous according to the Australian Dangerous Goods Code.

IMDG
This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

SUSDP Schedule	:	Not scheduled. When packed in containers having capacity of greater than 20 litres.
AICS	:	All components are listed or exempt
Classification triggering components	:	Contains fuel oil, residual.
Other Information	:	National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011] List of Designated Hazardous Substances [NOHSC:10005]. Approved Criteria for Classifying Hazardous Substances [NOHSC:1008]. Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003]. Australian Dangerous Goods Code. Standard Uniform Scheduling of Drugs and Poisons.

16. OTHER INFORMATION

Additional Information	:	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.

R-phrase(s)

R45	May cause cancer.
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R66	Repeated exposure may cause skin dryness or cracking.

Material Safety Data Sheet

MSDS Version Number	:	1.0
MSDS Effective Date	:	20.04.2010
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	
Uses and Restrictions	:	This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product.
Disclaimer	:	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 therefore be construed as guaranteeing any specific property of the product.