SAFETY DATA SHEET

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

1.1 Product identifier
Product Name: Fuel oil, residual
Product Description: V2010a-LOW SULFUR STRAIGHT RUN FO-Fuel oil, residual
Trade name: LOW SULFUR STRAIGHT RUN FO
Product Code: LSSR
CAS No.: 68476-33-5
EC No.: 270-675-6

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified use(s): Fuel for engines
Use advised against: Blend component

1.3 Details of the supplier of the safety data sheet
Company Identification: Vitol SA
Boulevard du Pont d’Arve 28
P.O. Box 384
1211 Geneva 4
Switzerland
Telephone: +31 10 498 7200
Fax: +31 10 452 9545
E-Mail (competent person): xreach@vitol.com

1.4 Emergency telephone number
Emergency Phone No. (24 h): +44 (0) 1235 239 670 (24 hours, 7 days)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
According to Regulation (EC) No. 1272/2008 (CLP)
Asp. Tox. 1; H304
Acute Tox. 4; H332
Carc. 1B; H350
Repr. 2; H361d
STOT RE 2; H373
Aquatic Acute 1; H400
Aquatic Chronic 1; H410
EUH066

Carc. Cat. 2; R45
Repr. Cat. 3; R63
Xn; R20; R48/21
N; R50/53
R66

2.2.1 Label elements
According to Regulation (EC) No. 1272/2008 (CLP)
Hazard pictogram(s):

Signal word(s): Danger
Hazard statement(s):
- H304: May be fatal if swallowed and enters airways.
- H332: Harmful if inhaled.
- H350: May cause cancer.
- H361d: Suspected of damaging the unborn child.
- H373: May cause damage to organs through prolonged or repeated exposure: Skin Contact
- H410: Very toxic to aquatic life with long lasting effects.

Supplemental Hazard Information:
- EUH066: Repeated exposure may cause skin dryness or cracking.

Precautionary statement(s):
- P210: Keep away from heat, sparks, open flame, hot surfaces - No smoking.
- P260: Do not breathe mist/vapours/spray.
- P281: Use personal protective equipment as required.
- P301 + P310: IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.
- P331: Do NOT induce vomiting.
- P501: Dispose of contents/container to: Disposal should be in accordance with local, state or national legislation.

2.2.2 Label elements

Hazard pictogram(s):
- Toxic. Dangerous for the environment.

Risk Phrases:
- R20: Harmful by inhalation.
- R45: May cause cancer.
- R48/21: Harmful: danger of serious damage to health by prolonged exposure in contact with skin.
- R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- R63: Possible risk of harm to the unborn child.
- R66: Repeated exposure may cause skin dryness or cracking.

Safety Phrases:
- S23: Do not breathe vapour/spray.
- S24: Avoid contact with skin.
- S36/37: Wear suitable protective clothing and gloves.
- S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S51: Use only in well-ventilated areas.
- S53: Avoid exposure - obtain special instructions before use.
- S61: Avoid release to the environment. Refer to special instructions/Safety Data Sheets.

2.3 Other hazards
Vapour may create explosive atmosphere. The vapour is heavier than air; beware of pits and confined spaces. May cause irritation to eyes and air passages.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
EC Classification No. 1272/2008

<table>
<thead>
<tr>
<th>Hazardous ingredient(s)</th>
<th>%W/W</th>
<th>CAS No.</th>
<th>EC No.</th>
<th>Hazard symbol(s) and hazard statement(s)</th>
</tr>
</thead>
</table>

Fuel oil, residual

Date: 31 August 2012
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SAFETY DATA SHEET

Fuel oil, residual

<table>
<thead>
<tr>
<th>Hazardous ingredient(s)</th>
<th>%W/W</th>
<th>CAS No.</th>
<th>EC No.</th>
<th>Risk Phrases and Safety Phrases</th>
</tr>
</thead>
</table>
| Fuel oil, residual      | 100  | 68476-33-5 | 270-675-6 | Carc. Cat. 2; R45
|                         |      |          |        | Repr. Cat. 3; R63
|                         |      |          |        | Xn; R20; R48/21
|                         |      |          |        | N; R50/53
|                         |      |          |        | R66 |

EC Classification No. 67/548/EC

4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation: Obtain immediate medical attention. Remove patient from exposure, keep warm and at rest.

Skin Contact: Remove contaminated clothing immediately and drench affected skin with plenty of water, then wash with soap and water. Obtain medical attention. Contaminated clothing should be thoroughly cleaned.

Eye Contact: If substance has got into the eyes, immediately wash out with plenty of water for at least 15 minutes. Obtain medical attention.

Ingestion: Obtain immediate medical attention. Do not induce vomiting. Provided the patient is conscious, wash out mouth with water and give 200-300 ml (half a pint) of water to drink.

4.2 Most important symptoms and effects, both acute and delayed

Aspiration hazard. Repeated and/or prolonged skin contact may cause irritation. May cause irritation to eyes and air passages.

4.3 Indication of the immediate medical attention and special treatment needed

If breathing is laboured, oxygen should be administered by qualified personnel. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing Media: Foam, CO2 or dry powder.

Unsuitable Extinguishing Media: For large fire use: Water.

Do not use water jet.

5.2 Special hazards arising from the substance or mixture

Vapour may create explosive atmosphere. The vapour is heavier than air; beware of pits and confined spaces.
SAFETY DATA SHEET

May give off toxic fumes in a fire. Carbon monoxide, Carbon dioxide and various hydrocarbons.

5.3 Advice for fire-fighters

A self contained breathing apparatus and suitable protective clothing should be worn in fire conditions. Keep fire exposed containers cool by spraying with water.

Flash Point (°C): > 75
Auto Ignition Temperature (°C): 337

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Eliminate sources of ignition. Vapour may create explosive atmosphere. The vapour is heavier than air; beware of pits and confined spaces. Ensure adequate ventilation. Use non-sparking hand tools and explosion proof electrical equipment. Take precautionary measures against static discharges.

Avoid inhalation of vapours. Avoid contact with skin and eyes. Wear suitable protective clothing and gloves. (See Section: 8). Contaminated clothing should be thoroughly cleaned.

6.2 Environmental precautions

Do not allow to enter drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body.

6.3 Methods and material for containment and cleaning up

Adsorb spillages onto sand, earth or any suitable adsorbent material. Sweep up carefully with non-sparking tools. Transfer to a container for disposal. Wash spill area with soapy water. Contaminated adsorbent must be removed in sealed, plastic lined drums and disposed of via an authorised waste disposal contractor.

6.4 Reference to other sections

Personal Protection: See Section: 8.

Other advice

Caution - spillages may be slippery.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Eliminate sources of ignition. Vapour may create explosive atmosphere. The vapour is heavier than air; beware of pits and confined spaces. Provide adequate ventilation, including appropriate local extraction, to ensure that the occupational exposure limit is not exceeded. Use non-sparking hand tools and explosion proof electrical equipment. Take precautionary measures against static discharges.

Avoid inhalation of vapours. Avoid contact with skin and eyes. Wear suitable protective clothing and gloves. (See Section: 8).

Do not eat, drink or smoke at the work place. Wash hands and exposed skin after use. Contaminated clothing should be thoroughly cleaned.

7.2 Conditions for safe storage, including any incompatibilities

Keep away from heat and sources of ignition. Keep from direct sunlight. Keep only in the original container in a cool, well-ventilated place. Keep/store away from: Oxidising agents.
7.3 Specific end use(s)  
Industrial use only.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters  
No Occupational Exposure Limit assigned.

8.2 Exposure controls

8.2.1 Appropriate engineering controls  
Provide adequate ventilation, including appropriate local extraction, to ensure that the occupational exposure limit is not exceeded.

8.2.2 Personal Protection

Eye/face protection  
Goggles giving complete protection to eyes. (EN 166)

Skin protection  
Protective gloves. (EN 374)

Respiratory protection  
In case of insufficient ventilation, wear suitable respiratory equipment. (BS EN 14387:2004+A1)

Other:  
Apron or other light protective clothing, boots and plastic or rubber gloves.

8.2.3 Environmental Exposure Controls  
Avoid release to the environment.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance: Liquid.
Colour: May be coloured.
Odour: Characteristic.
Boiling Point (°C): 350-600
Flash Point (°C): > 75
Vapour Pressure (Pascal): > 500 (@ 20°C)
Specific Gravity: 0.94-0.97 (@ 15°C)
Solubility (Water): Negligible.
Partition Coefficient: (n-Octanol/water) 2.7-6
Auto Ignition Temperature (°C): 337
Viscosity: 7-20.5 mm²/s (@ 40°C)
Explosive Properties: Vapour may create explosive atmosphere.
Oxidising Properties: Not oxidising.
Vapour Density (Air=1): >1

9.2 Other information  
None.

10. STABILITY AND REACTIVITY

10.1 Reactivity  
Reacts with - Strong oxidising agents.

10.2 Chemical stability  
Stable under normal conditions.

10.3 Possibility of hazardous reactions  
No information available.
10.4 Conditions to avoid
Keep away from heat, sources of ignition and direct sunlight.

10.5 Incompatible materials
Oxidising agents.

10.6 Hazardous Decomposition Product(s)
May give off toxic fumes in a fire. Carbon monoxide, Carbon dioxide and various hydrocarbons.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>Mode of Exposure</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingestion:</td>
<td>LD_{50} (oral/rat): &gt;5000 mg/kg (ARCO, 1987b)</td>
</tr>
<tr>
<td>Inhalation:</td>
<td>LC_{50}(inhalation/rat): 4 mg/l/4h (API, 1982)</td>
</tr>
<tr>
<td>Skin Contact:</td>
<td>LD_{50} (dermal/rabbit): &gt;2000 mg/kg (API 1982, ARCO 1987a)</td>
</tr>
<tr>
<td>Eye Contact:</td>
<td>No information available.</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation
Repeated and/or prolonged skin contact may cause irritation. Repeated exposure may cause skin dryness or cracking.

Serious eye damage/irritation: May cause eye irritation.

Respiratory or skin sensitization: Negative.

Mutagenicity: There is no evidence of mutagenic potential.

Carcinogenicity: May cause cancer. Carc. 1B (Category 2).

Reproductive toxicity: Suspected of damaging the unborn child. (Category 2).

STOT-single exposure: May cause drowsiness or dizziness.

STOT-repeated exposure: May cause damage to organs through prolonged or repeated exposure: Skin Contact.

Aspiration hazard: Risk of aspiration. Aspiration of liquid may cause pulmonary oedema.

Other information: No information available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

<table>
<thead>
<tr>
<th>Effect</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC_{50} (Rainbow trout)</td>
<td>&lt;1 mg/l/96h</td>
</tr>
<tr>
<td>NOEL</td>
<td>&lt;1 mg/l</td>
</tr>
<tr>
<td>WGK</td>
<td>Not established.</td>
</tr>
</tbody>
</table>

12.2 Persistence and degradability
Inherently biodegradable.

12.3 Bioaccumulative potential
The product has high potential for bioaccumulation. logK{sub}ow: 3-6.

12.4 Mobility in soil
The product has high mobility in soil.

12.5 Results of PBT and vPvB assessment
vPvB: very Persistent and very Bioaccumulative.

12.6 Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Do not empty into drains; dispose of this material and its container in a safe way. To be disposed of as hazardous waste. Disposal should be in accordance with local, state or national legislation.

14. TRANSPORT INFORMATION

14.1 UN number
3082

14.2 Proper Shipping Name
Environmentally hazardous substance, liquid, n.o.s.

14.3 Transport hazard class(es)
9

14.4 Packing Group
III

14.5 Environmental hazards
Very toxic to aquatic life with long lasting effects.

14.6 Special precautions for user
Vapour may create explosive atmosphere. The vapour is heavier than air, beware of pits and confined spaces.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.
15. REGULATORY INFORMATION

According to Regulation (EC) No. 1272/2008 (CLP)

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- S61: Avoid release to the environment. Refer to special instructions/Safety Data Sheets.
16. OTHER INFORMATION

Full text of Hazard statements and Risk phrases for pure substances listed in section 3.

**Hazard Symbol:**
- H304: May be fatal if swallowed and enters airways.
- H322: Harmful if inhaled.
- H350: May cause cancer.
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The following sections contain revisions or new statements: 1-16.

**Abbreviations:**
- CAS = Chemical Abstracts Service;
- CNS = Central Nervous System;
- EINECS = European Inventory of Existing Commercial Chemical Substances;
- EC50 = Effective Concentration 50%;
- IARC = International Agency for Research on Cancer;
- IC50 = Inhibitory Concentration 50%;
- LC50 = Lethal Concentration 50%;
- LD50 = Lethal Dose 50%;
- LTEL = Long Term Exposure Limit;
- STEL = Short Term Exposure Limit;
- TWA = Time Weighted Average;

**References:**
- Concawe product dossier "Hazard classification and labelling of petroleum substances in the European Economic Area 2010". Brussels; December 2010
- ARCO (1987a) Acute dermal toxicity study in rabbits administered F-74-01 heavy fuel oil. UBTL Study No. 60563.
Los Angeles CA: ARCO

ARCO (1987b) Acute inhalation toxicity study in rats administered F-74-01 heavy fuel oil. Study conducted by Bio/dynamics Inc. Study No. 85-7869. Los Angeles CA: ARCO

ARCO (1989) Dermal sensitization study in albino guinea pigs administered test article F-98-01 vacuum tower bottoms. UBTL Study No. 65066. Los Angeles CA: ARCO

ARCO (1990) Primary dermal irritation study in rabbits administered test article F-113-01 heavy vacuum gas oil stock. UBTL Study No. 65288. Los Angeles CA: ARCO

ARCO (1991) Primary eye irritation study in rabbits administered test article F-132 atmospheric tower bottoms ->C20 HC. UBTL Study No. 65833. Los Angeles CA: ARCO

ARCO (1992a) Acute dermal toxicity study in rabbits administered test article F-136 heavy thermocracked distillate. UBTL Study No. 65989. Los Angeles CA: ARCO

ARCO (1992b) Primary dermal irritation study in rabbits administered test article F-132 atmospheric tower bottoms. UBTL Study No. 65841. Los Angeles CA: ARCO

ARCO (1992c) Primary eye irritation study in rabbits administered test article F-136 heavy thermocracked distillate. UBTL Study No. 65997. Los Angeles CA: ARCO

ARCO (1993a) 28-day dermal toxicity study in rats administered test article F-115-01 FCCU clarified oil. UBTL Study No. 65508. Los Angeles CA: ARCO

ARCO (1993b) Ninety (90) day dermal toxicity study in rats administered test article F-179. UBTL Study No. 66152. Los Angeles CA: ARCO

ARCO (1994) A developmental toxicity screen in female rats administered F-228 dermally during gestation days 0 to 20. UBTL Study No. 66479. Los Angeles CA: ARCO


EMBSI (2008c) Fish acute toxicity test. MRD-07-911 heavy fuel oil #5. Study performed for CONCAWE. EMBSI Study No. 0791158. Annandale NJ: ExxonMobil Biomedical Sciences Inc.


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