SAFETY DATA SHEET

SECTION 1  PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: SAN ARDO CRUDE OIL
Product Description: Petroleum Crude Oil
Product Code: 940007-02
Intended Use: Crude oil

COMPANY IDENTIFICATION

Supplier: EXXONMOBIL UPSTREAM PRODUCTION
EXXONMOBIL BUILDING
800 BELL STREET
HOUSTON, TX. 77002     USA
24 Hour Health Emergency 609-737-4411
ExxonMobil Transportation No. 800-424-9300 or 703-527-3887 CHEMTREC

SECTION 2  HAZARDS IDENTIFICATION

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION:

Flammable liquid: Category 4.

LABEL:

Pictogram:

Signal Word: Danger

Hazard Statements:

Precautionary Statements:
P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from flames and hot surfaces. -- No smoking. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves and eye / face protection.P301 + P310: IF SWALLOWED:

Contains: PETROLEUM CRUDE OIL

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1910.1200.

PHYSICAL / CHEMICAL HAZARDS
Material can accumulate static charges which may cause an ignition. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Combustible.

HEALTH HAZARDS
High-pressure injection under skin may cause serious damage. Hydrogen sulfide, a highly toxic gas, is expected to be present. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. Repeated exposure may cause skin dryness or cracking. May be irritating to nose, throat, and lungs. May cause central nervous system depression. Exposure to benzene is associated with cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders (see Section 11).

ENVIRONMENTAL HAZARDS
Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID: Health: 2 Flammability: 2 Reactivity: 0
HMIS Hazard ID: Health: 2* Flammability: 2 Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS
This material is defined as a complex substance.

<table>
<thead>
<tr>
<th>Hazardous Substance(s) or Complex Substance(s) required for disclosure</th>
<th>CAS#</th>
<th>Concentration*</th>
<th>GHS Hazard Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PETROLEUM CRUDE OIL</td>
<td>8002-05-9</td>
<td>100 %</td>
<td>H304, H336, H350(1B), H319(2A), H373, H401, H411</td>
</tr>
</tbody>
</table>
### Hazardous Constituent(s) Contained in Complex Substance(s) required for disclosure

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS#</th>
<th>Concentration*</th>
<th>GHS Hazard Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BENZENE</td>
<td>71-43-2</td>
<td>1 - &lt; 5%</td>
<td>H225, H303, H304, H340(1B), H350(1A), H315, H319(2A), H372, H401</td>
</tr>
<tr>
<td>CYCLOHEXANE</td>
<td>110-82-7</td>
<td>1 - &lt; 5%</td>
<td>H225, H304, H336, H315, H400(M factor 1), H410(M factor 1)</td>
</tr>
<tr>
<td>ETHYL BENZENE</td>
<td>100-41-4</td>
<td>0.1 - &lt; 1%</td>
<td>H225, H332, H351</td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>7783-06-4</td>
<td>&gt; 0.005 %</td>
<td>H220, H280, H330(2), H400(M factor 1)</td>
</tr>
<tr>
<td>N-HEXANE</td>
<td>110-54-3</td>
<td>1 - &lt; 5%</td>
<td>H225, H304, H336, H361(F), H315, H373, H401, H411</td>
</tr>
<tr>
<td>NAPHTHALENE</td>
<td>91-20-3</td>
<td>1 - &lt; 5%</td>
<td>H302, H351, H400(M factor 1), H410(M factor 1)</td>
</tr>
<tr>
<td>TOLUENE</td>
<td>108-88-3</td>
<td>1 - &lt; 5%</td>
<td>H225, H304, H336, H361(D), H315, H373, H401, H412</td>
</tr>
<tr>
<td>XYLENES</td>
<td>1330-20-7</td>
<td>1 - &lt; 5%</td>
<td>H226, H304, H312, H332, H335, H315, H320(2B), H373, H401</td>
</tr>
</tbody>
</table>

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

### SECTION 4  FIRST AID MEASURES

**INHALATION**
Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

**SKIN CONTACT**
Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury. For hot product: Immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.

**EYE CONTACT**
Flush thoroughly with water for at least 15 minutes. Get medical assistance.
INGESTION
Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN
If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This light hydrocarbon material, or a component, may be associated with cardiac sensitization following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5  FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING
Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Combustible. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger. Exposure to fire can generate toxic fumes. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulfur oxides, Hydrogen sulfide

FLAMMABILITY PROPERTIES
Flash Point [Method]: 93°C (199°F) - 111°C (232°F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: N/D  UEL: N/D
Autoignition Temperature: N/D

SECTION 6  ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES
In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES
Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.
For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H2S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Chemical goggles are recommended if splashes or contact with eyes is possible. Work gloves that are resistant to aromatic hydrocarbons are recommended. If contact with hot product is possible or anticipated, gloves should be heat-resistant and thermally insulated. Note: gloves made of PVA are not water-resistant, and are not suitable for emergency use. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic and, if necessary, heat resistant and thermal insulated material is recommended.

**SPILL MANAGEMENT**

**Land Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. If permitted by regulatory authorities the use of suitable dispersants should be considered where indicated in local oil spill contingency plans. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

**ENVIRONMENTAL PRECAUTIONS**

Use booms as a barrier to protect shorelines. Use containment booms when the ambient temperature is below the flash point of the material. Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

**SECTION 7**

**HANDLING AND STORAGE**

**HANDLING**

H2S is present. Avoid all personal contact. Crude oils can contain trace levels of natural impurities including heavy metals, such as mercury, nickel or lead, as well as naturally occurring radioactive material. As the impurity content may concentrate during refining/processing, process operations, including equipment, materials and products should be evaluated to identify and manage any potential risks to health, safety or the environment or regulatory concerns. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Use only with adequate ventilation. Do not enter storage areas or confined spaces unless adequately ventilated. The toxic and olfactory (sense of smell) fatigue properties of hydrogen sulfide require that air monitoring alarms and respiratory protection be used where the concentration might be expected to reach a harmful level, such as in an enclosed space, heated transport vessel, or in a spill or leak situation. Material may contain trace amounts of naturally occurring radioactive material (NORM), which will accumulate in process equipment and storage vessels. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and
grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10^-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

**STORAGE**

The container choice, for example storage vessel, may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

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**SECTION 8  EXPOSURE CONTROLS / PERSONAL PROTECTION**

**EXPOSURE LIMIT VALUES**

Exposure limits/standards (Note: Exposure limits are not additive)

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>Form</th>
<th>Limit / Standard</th>
<th>NOTE</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>BENZENE</td>
<td>OSHA</td>
<td>Action level 0.5 ppm</td>
<td>N/A</td>
<td>OSHA Sp.Reg.</td>
</tr>
<tr>
<td>BENZENE</td>
<td>STEL</td>
<td>5 ppm</td>
<td>N/A</td>
<td>OSHA Sp.Reg.</td>
</tr>
<tr>
<td>BENZENE</td>
<td>TWA</td>
<td>1 ppm</td>
<td>N/A</td>
<td>OSHA Sp.Reg.</td>
</tr>
<tr>
<td>BENZENE</td>
<td>STEL</td>
<td>1 ppm</td>
<td>N/A</td>
<td>ExxonMobil</td>
</tr>
<tr>
<td>BENZENE</td>
<td>TWA</td>
<td>0.5 ppm</td>
<td>N/A</td>
<td>ExxonMobil</td>
</tr>
<tr>
<td>BENZENE</td>
<td>STEL</td>
<td>2.5 ppm</td>
<td>Skin</td>
<td>ACGIH</td>
</tr>
<tr>
<td>BENZENE</td>
<td>TWA</td>
<td>0.5 ppm</td>
<td>Skin</td>
<td>ACGIH</td>
</tr>
<tr>
<td>CYCLOHEXANE</td>
<td>TWA</td>
<td>1050 mg/m3 300 ppm</td>
<td>N/A</td>
<td>OSHA Z1</td>
</tr>
<tr>
<td>CYCLOHEXANE</td>
<td>TWA</td>
<td>100 ppm</td>
<td>N/A</td>
<td>ACGIH</td>
</tr>
<tr>
<td>ETHYL BENZENE</td>
<td>TWA</td>
<td>435 mg/m3 100 ppm</td>
<td>N/A</td>
<td>OSHA Z1</td>
</tr>
<tr>
<td>ETHYL BENZENE</td>
<td>TWA</td>
<td>20 ppm</td>
<td>N/A</td>
<td>ACGIH</td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>Ceiling</td>
<td>20 ppm</td>
<td>N/A</td>
<td>OSHA Z2</td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>Maximum concentration 50 ppm</td>
<td>N/A</td>
<td>OSHA Z2</td>
<td></td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>STEL 14 mg/m3 10 ppm</td>
<td>N/A</td>
<td>ExxonMobil</td>
<td></td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>TWA 7 mg/m3 5 ppm</td>
<td>N/A</td>
<td>ExxonMobil</td>
<td></td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>STEL 5 ppm</td>
<td>N/A</td>
<td>ACGIH</td>
<td></td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>TWA 1 ppm</td>
<td>N/A</td>
<td>ACGIH</td>
<td></td>
</tr>
<tr>
<td>N-HEXANE</td>
<td>TWA 1800 mg/m3 500 ppm</td>
<td>N/A</td>
<td>OSHA Z1</td>
<td></td>
</tr>
<tr>
<td>N-HEXANE</td>
<td>TWA 50 ppm</td>
<td>Skin</td>
<td>ACGIH</td>
<td></td>
</tr>
<tr>
<td>NAPHTHALENE</td>
<td>TWA 50 mg/m3 10 ppm</td>
<td>N/A</td>
<td>OSHA Z1</td>
<td></td>
</tr>
</tbody>
</table>
NAPHTHALENE

PETROLEUM CRUDE OIL

TOLUENE

TOLUENE

TOLUENE

XYLENES

XYLENES

<table>
<thead>
<tr>
<th>Substance</th>
<th>Specimen</th>
<th>Sampling Time</th>
<th>Limit</th>
<th>Determinant</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAPHTHALENE</td>
<td></td>
<td>TWA</td>
<td>10 ppm</td>
<td>Skin</td>
<td>ACGIH</td>
</tr>
<tr>
<td>PETROLEUM CRUDE OIL</td>
<td>TWA</td>
<td>2000 mg/m3</td>
<td>500 ppm</td>
<td>N/A</td>
<td>OSHA Z1</td>
</tr>
<tr>
<td>TOLUENE</td>
<td></td>
<td>Ceiling</td>
<td>300 ppm</td>
<td>N/A</td>
<td>OSHA Z2</td>
</tr>
<tr>
<td>TOLUENE</td>
<td></td>
<td>Maximum concentration</td>
<td>500 ppm</td>
<td>N/A</td>
<td>OSHA Z2</td>
</tr>
<tr>
<td>TOLUENE</td>
<td></td>
<td>TWA</td>
<td>200 ppm</td>
<td>N/A</td>
<td>OSHA Z2</td>
</tr>
<tr>
<td>TOLUENE</td>
<td></td>
<td>TWA</td>
<td>20 ppm</td>
<td>N/A</td>
<td>ACGIH</td>
</tr>
<tr>
<td>XYLENES</td>
<td></td>
<td>TWA</td>
<td>435 mg/m3</td>
<td>100 ppm</td>
<td>N/A</td>
</tr>
<tr>
<td>XYLENES</td>
<td></td>
<td>STEL</td>
<td>150 ppm</td>
<td>N/A</td>
<td>ACGIH</td>
</tr>
<tr>
<td>XYLENES</td>
<td></td>
<td>TWA</td>
<td>100 ppm</td>
<td>N/A</td>
<td>ACGIH</td>
</tr>
</tbody>
</table>

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

**Biological limits**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Specimen</th>
<th>Sampling Time</th>
<th>Limit</th>
<th>Determinant</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>BENZENE</td>
<td>Creatinine in urine</td>
<td>End of shift</td>
<td>500 ug/g</td>
<td>t,t-Muconic acid</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>BENZENE</td>
<td>Creatinine in urine</td>
<td>End of shift</td>
<td>25 ug/g</td>
<td>S-Phenylmercapturic acid</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>ETHYL BENZENE</td>
<td>Creatinine in urine</td>
<td>End of shift</td>
<td>0.15 g/g</td>
<td>Sum of mandelic acid and phenylglyoxylic acid</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>N-HEXANE</td>
<td>Urine</td>
<td>End of shift at end of work wk</td>
<td>0.4 mg/l</td>
<td>2,5-Hexanedion, without hydrolysis</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>NAPHTHALENE</td>
<td>No Biological Specimen provided</td>
<td>End of shift</td>
<td>Not Assigned</td>
<td>1-Naphthol, with hydrolysis + 2-Naphthol, with hydrolysis</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>PETROLEUM CRUDE OIL</td>
<td>Urine</td>
<td>End of shift at end of work wk</td>
<td>Not Assigned</td>
<td>1-Hydroxypyrene, with hydrolysis (1-HP)</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>TOLUENE</td>
<td>Blood</td>
<td>Prior to last shift of work wk</td>
<td>0.02 mg/l</td>
<td>Toluene</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>TOLUENE</td>
<td>Creatinine in urine</td>
<td>End of shift</td>
<td>0.3 mg/g</td>
<td>o-Cresol, with hydrolysis</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>TOLUENE</td>
<td>Urine</td>
<td>End of shift</td>
<td>0.03 mg/l</td>
<td>Toluene</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
<tr>
<td>XYLENES</td>
<td>Creatinine in urine</td>
<td>End of shift</td>
<td>1.5 g/g</td>
<td>Methylhippuric acids</td>
<td>ACGIH BELs (BEIs)</td>
</tr>
</tbody>
</table>

**ENGINEERING CONTROLS**

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
- Use explosion-proof ventilation equipment to stay below exposure limits.

**PERSONAL PROTECTION**

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a
level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Positive-pressure, air-supplied respirator in areas where H2S vapors may accumulate is recommended.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If product is hot, thermally protective, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

**Eye Protection:** Chemical goggles are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended. If product is hot, thermally protective, chemical resistant apron and long sleeves are recommended.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

**ENVIRONMENTAL CONTROLS**
Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

**SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES**

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

**GENERAL INFORMATION**

- **Physical State:** Liquid
- **Color:** Black
- **Odor:** Rotten Egg
- **Odor Threshold:** N/D

**IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION**

- **Relative Density (at 15 °C):** 0.661 - 1.013
- **Flammability (Solid, Gas):** N/A
- **Flash Point [Method]:** 93°C (199°F) - 111°C (232°F) [ASTM D-93]
- **Flammable Limits (Approximate volume % in air):** LEL: N/D  UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: 74°C (165°F) - 111°C (232°F)
Decomposition Temperature: N/D
Vapor Density (Air = 1): N/D
Vapor Pressure: 0 kPa (0 mm Hg) at 20 C - 106.4 kPa (800 mm Hg) at 20 °C
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Vapor Density (Air = 1): N/D
Viscosity: >0.42 cSt (0.42 mm2/sec) at 40 °C
OXIDIZING PROPERTIES: See Hazards Identification Section.
OTHER INFORMATION
Freezing Point: N/D
Melting Point: N/A
Pour Point: -73°C (-100°F) - 48°C (118°F)

SECTION 10  STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Open flames and high energy ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11  TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Conclusion / Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td></td>
</tr>
<tr>
<td>Acute Toxicity</td>
<td>No end point data for material.</td>
</tr>
<tr>
<td>Irritation</td>
<td>No end point data for material.</td>
</tr>
<tr>
<td></td>
<td>Elevated temperatures or mechanical action may form vapors, mist, or fumes which</td>
</tr>
<tr>
<td></td>
<td>may be irritating to the eyes, nose, throat, or lungs.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Ingestion</td>
<td></td>
</tr>
<tr>
<td>Acute Toxicity</td>
<td>LD50 &gt; 5000 mg/kg Minimally Toxic. Based on test data for structurally similar</td>
</tr>
<tr>
<td></td>
<td>materials. Test(s) equivalent or similar to OECD Guideline 401</td>
</tr>
<tr>
<td>Skin</td>
<td></td>
</tr>
<tr>
<td>Acute Toxicity</td>
<td>LD50 &gt; 2000 mg/kg Minimally Toxic. Based on test data for structurally similar</td>
</tr>
<tr>
<td></td>
<td>materials. Test(s) equivalent or similar to OECD Guideline 402</td>
</tr>
<tr>
<td>Skin Corrosion/Irritation</td>
<td>Data available. May dry the skin leading to discomfort and dermatitis. Based on</td>
</tr>
<tr>
<td></td>
<td>test data for structurally similar materials. Test(s) equivalent or similar to OECD</td>
</tr>
<tr>
<td></td>
<td>Guideline 404</td>
</tr>
</tbody>
</table>

Eye
Serious Eye Damage/Irritation (Rabbit): Data available. Irritating and will injure eye tissue. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405

Sensitization
Respiratory Sensitization: No end point data for material. Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available. Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406

Aspiration: Data available. May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.

Germ Cell Mutagenicity: Data available. Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test method unavailable.

Carcinogenicity: Data available. Caused cancer in laboratory animals. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451

Reproductive Toxicity: Data available. Not expected to be a reproductive toxicant. Based on test data for structurally similar materials. Test method unavailable.

Lactation: No end point data for material. Not expected to cause harm to breast-fed children.

Specific Target Organ Toxicity (STOT)
Single Exposure: Data available. May cause drowsiness or dizziness. Based on test data for structurally similar materials. Test method unavailable.
Repeated Exposure: Data available. Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test method unavailable.

TOXICITY FOR SUBSTANCES

<table>
<thead>
<tr>
<th>NAME</th>
<th>ACUTE TOXICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETHYL BENZENE</td>
<td>Inhalation Lethality: 4 hour(s) LC50 17.8 mg/l (Vapor) (Rat); Oral Lethality: LD50 3.5 g/kg (Rat)</td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>Inhalation Lethality: 4 hour(s) LC50 444 ppm (Gas) (Rat)</td>
</tr>
<tr>
<td>NAPHTHALENE</td>
<td>Inhalation Lethality: 4 hour(s) LC50 &gt; 0.4 mg/l (Max attainable vapor conc.) (Rat); Oral Lethality: LD50 533 mg/kg (Mouse)</td>
</tr>
</tbody>
</table>

OTHER INFORMATION
For the product itself:
Target Organs Repeated Exposure: Blood, Liver, Spleen, Thymus

Vapor/aerosol concentrations above recommended exposure levels are irritating to the eyes and respiratory tract, may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness and other central nervous system effects including death.
May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage.
Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Very high exposure (confined spaces / abuse) to light hydrocarbons may result in abnormal heart rhythm (arrhythmias). Concurrent high stress levels and/or co-exposure to high levels of hydrocarbons (above occupational exposure limits), and to heart-stimulating substances like epinephrine, nasal decongestants, asthma drugs, or cardiovascular drugs may initiate arrhythmias.
Crude oil: Contains polycyclic aromatic compounds (PACs). Prolonged and / or repeated exposure by skin or inhalation of certain PACs may cause cancer of the skin, lung, and of other sites of the body. In animal studies, some crudes produced skin tumors in mice, while other crudes produced no tumors. Developmental studies of crude oil in lab animals showed reduced fetal weight and increased fetal resorptions at maternally toxic levels. Repeated dermal exposure to crude oils in rats resulted in toxicity to the blood, liver, thymus, and bone marrow.
Contains:
BENZENE: Caused cancer (acute myeloid leukemia and myelodysplastic syndrome), damage to the blood-producing system, and serious blood disorders in human studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus and cancer in laboratory animal studies.
HYDROGEN SULFIDE: Chronic health effects due to repeated exposures to low levels of H2S have not been established. High level (700 ppm) acute exposure can result in sudden death. High concentrations will lead to cardiopulmonary arrest due to nervous system toxicity and pulmonary edema. Lower levels (150 ppm) may overwhelm sense of smell, eliminating warning of exposure. Symptoms of overexposure to H2S include headache, fatigue, insomnia, irritability, and gastrointestinal problems. Repeated exposures to approximately 25 ppm will irritate mucous membranes and the respiratory system and have been implicated in some eye damage.
NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.
N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown.
TOLUENE: Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects.
ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

The following ingredients are cited on the lists below:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>List Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAPHTHALENE</td>
<td>91-20-3</td>
<td>2, 5</td>
</tr>
<tr>
<td>ETHYL BENZENE</td>
<td>100-41-4</td>
<td>5</td>
</tr>
<tr>
<td>BENZENE</td>
<td>71-43-2</td>
<td>1, 3, 6</td>
</tr>
</tbody>
</table>

---REGULATORY LISTS SEARCHED---

1 = NTP CARC
2 = NTP SUS
3 = IARC 1
4 = IARC 2A
5 = IARC 2B
6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY
Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY
More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.
Less volatile component -- Low solubility and floats and is expected to migrate from water to the land.
Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:
- Low molecular wt. component -- Expected to be inherently biodegradable
- High molecular wt. component -- Expected to biodegrade slowly.

Photolysis:
- More water soluble component -- Expected to degrade at a moderate rate in water when exposed to sunlight.

Atmospheric Oxidation:
- More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL
- Components -- Has the potential to bioaccumulate.

ECOLOGICAL DATA

<table>
<thead>
<tr>
<th>Ecotoxicity</th>
<th>Test</th>
<th>Duration</th>
<th>Organism Type</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic - Acute Toxicity</td>
<td>48 hour(s)</td>
<td>Invertebrate</td>
<td></td>
<td>EC50 10 - 100 mg/l: data for similar materials</td>
</tr>
</tbody>
</table>

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS
- Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION
- RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics: TCLP (BENZENE)

Empty Container Warning
- Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION
LAND (DOT)
Proper Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Hazard Class & Division: 3
ID Number: 3494
Packing Group: III
ERG Number: 131
Label(s): 3 (6.1)
Transport Document Name: UN3494, PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC, 3 (6.1), PG III

LAND (TDG)
Proper Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Hazard Class & Division: 3 (6.1)
UN Number: 3494
Packing Group: III

Footnote: If shipped over water, product TDG classification as shown below for SEA (IMDG).

SEA (IMDG)
Proper Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 3494
Packing Group: III
Marine Pollutant: Yes
Label(s): 3 (6.1)
Transport Document Name: UN3494, PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC, 3 (6.1), PG III, MARINE POLLUTANT

AIR (IATA)
Proper Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Hazard Class & Division: 3
UN Number: 3494
Packing Group: III
Label(s) / Mark(s): 3 (6.1)
Transport Document Name: UN3494, PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC, 3, PG III, (6.1)

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

EPCRA SECTION 302: This material contains no extremely hazardous substances.
CERCLA: This material is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Contact local authorities to determine if other reporting requirements apply.


SARA (313) TOXIC RELEASE INVENTORY:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Typical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLYNUCLEAR AROMATIC HYDROCARBONS</td>
<td></td>
<td>&gt; 0.1%</td>
</tr>
<tr>
<td>ETHYL BENZENE</td>
<td>100-41-4</td>
<td>0.1 - &lt; 1%</td>
</tr>
<tr>
<td>BENZENE</td>
<td>71-43-2</td>
<td>1 - &lt; 5%</td>
</tr>
<tr>
<td>TOLUENE</td>
<td>108-88-3</td>
<td>1 - &lt; 5%</td>
</tr>
<tr>
<td>NAPHTHALENE</td>
<td>91-20-3</td>
<td>1 - &lt; 5%</td>
</tr>
<tr>
<td>N-HEXANE</td>
<td>110-54-3</td>
<td>1 - &lt; 5%</td>
</tr>
<tr>
<td>CYCLOHEXANE</td>
<td>110-82-7</td>
<td>1 - &lt; 5%</td>
</tr>
<tr>
<td>XYLENES</td>
<td>1330-20-7</td>
<td>1 - &lt; 5%</td>
</tr>
<tr>
<td>PETROLEUM CRUDE OIL</td>
<td>8002-05-9</td>
<td>100 %</td>
</tr>
</tbody>
</table>

The following ingredients are cited on the lists below:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>List Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>BENZENE</td>
<td>71-43-2</td>
<td>1, 2, 4, 10, 11, 13, 15, 16, 17, 18, 19</td>
</tr>
<tr>
<td>CYCLOHEXANE</td>
<td>110-82-7</td>
<td>1, 4, 13, 16, 17, 18, 19</td>
</tr>
<tr>
<td>ETHYL BENZENE</td>
<td>100-41-4</td>
<td>1, 4, 10, 17, 19</td>
</tr>
<tr>
<td>HYDROGEN SULFIDE</td>
<td>7783-06-4</td>
<td>1, 4</td>
</tr>
<tr>
<td>N-HEXANE</td>
<td>110-54-3</td>
<td>1, 4, 13, 16, 17, 18, 19</td>
</tr>
<tr>
<td>NAPHTHALENE</td>
<td>91-20-3</td>
<td>1, 4, 10, 13, 16, 17, 18, 19</td>
</tr>
<tr>
<td>PETROLEUM CRUDE OIL</td>
<td>8002-05-9</td>
<td>4, 13, 16, 17, 18, 19</td>
</tr>
<tr>
<td>POLYNUCLEAR AROMATIC HYDROCARBONS</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>TOLUENE</td>
<td>108-88-3</td>
<td>1, 4, 11, 13, 15, 16, 17, 18, 19</td>
</tr>
<tr>
<td>XYLENES</td>
<td>1330-20-7</td>
<td>1, 4, 13, 15, 16, 17, 18, 19</td>
</tr>
</tbody>
</table>

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL  
2 = ACGIH A1  
3 = ACGIH A2  
4 = OSHA Z  
5 = TSCA 4  
6 = TSCA 5a2  
7 = TSCA 5e  
8 = TSCA 6  
9 = TSCA 12b  
10 = CA P65 CARC  
11 = CA P65 REPRO  
12 = CA RTK  
13 = IL RTK  
14 = LA RTK  
15 = MI 293  
16 = MN RTK  
17 = NJ RTK  
18 = PA RTK  
19 = RI RTK  

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission
or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

- H220: Extremely flammable gas; Flammable Gas, Cat 1
- H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2
- H226: Flammable liquid and vapor; Flammable Liquid, Cat 3
- H280: Contains gas under pressure; may explode if heated; Pressurized Gas
- H302: Harmful if swallowed; Acute Tox Oral, Cat 4
- H303: May be harmful if swallowed; Acute Tox Oral, Cat 5
- H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
- H312: Harmful in contact with skin; Acute Tox Dermal, Cat 4
- H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
- H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
- H320(2B): Causes eye irritation; Serious Eye Damage/Irr, Cat 2B
- H330(2): Fatal if inhaled; Acute Tox Inh, Cat 2
- H332: Harmful if inhaled; Acute Tox Inh, Cat 4
- H335: May cause respiratory irritation; Target Organ Single, Resp Irr
- H336: May cause drowsiness or dizziness; Target Organ Single, Narcotic
- H340(1B): May cause genetic defects; Germ Cell Mutagenicity, Cat 1B
- H350(1A): May cause cancer; Carcinogenicity, Cat 1A
- H350(1B): May cause cancer; Carcinogenicity, Cat 1B
- H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
- H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
- H361(F): Suspected of damaging fertility; Repro Tox, Cat 2 (Fertility)
- H372: Causes damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 1
- H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
- H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
- H401: Toxic to aquatic life; Acute Env Tox, Cat 2
- H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
- H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Updates made in accordance with implementation of GHS requirements.

**THIS MSDS COVERS THE FOLLOWING MATERIALS:** CRUDE OIL SOUR ("Sour" applied by definition of Society of Petroleum Engineers for oils containing sulfur compounds >1%)

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PPEC: DVF
DGN: 2018204VUS (1022045)

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