Material Safety Data Sheet (Canada)
Crude Oil (Sour)

Section 1 – Material Identification and Use

Material Name: CRUDE OIL (SOUR)
Use: Process stream, fuels and lubricants production
WHMIS Classification: Class B, Div. 2; Class D, Div. 1, Sub-Div. A; Class D, Div. 2, Sub-Div. A and B
TDG: UN: 1267 **Class:** 3
Packing Group: **I** (Boiling Point ≤35°C)
II (Boiling Point >35°C)
Shipping Name: PETROLEUM CRUDE OIL
Manufacturer/Supplier: ENCANA SERVICES COMPANY LTD.
500 Centre Street SE
CALGARY, ALBERTA, T2P 2S5
Emergency Telephone: CANUTEC: 1-613-996-6666
Chemical Family: Complex mixture of aliphatic and aromatic hydrocarbons with dissolved hydrogen sulphide.

Section 2 – Hazardous Ingredients of Materials

Hazardous Ingredients	Approximate Concentrations %	C.A.S. Nos.	LD50/LC50 Specify Species & Route	Exposure Limits
Crude oil	100	8002-05-9	LD50, rat, skin, >2 g/kg	N.Av.
n-Hexane	<1	110-54-3	LD50, rat, oral, 28.7 g/kg	50 ppm/ 20 ppm (AB & TLV/ BC)
Toluene	<1	108-88-3	LC50, rat, 4 hrs, 49000 mg/m^3	50 ppm/ 20 ppm (AB/ TLV & BC)
Benzene	<0.1-1	71-43-2	LD50, rat, oral, 930 mg/kg LC50, rat, 4 hrs, 13200 ppm	0.5 & 2.5 ppm (STEL) (AB, TLV & BC)
Naphthalene	<0.1	91-20-3	LD50, rat, oral, 490 mg/kg	10 & 15 ppm (STEL) (AB, TLV & BC)
Coal Tar Pitch Volatiles	<0.1	65996-93-2	LD50, rat, oral, 1.8 g/kg	0.2 mg/m^3 (AB, TLV & BC)
Butane	1-10	106-97-8	LC50, rat, 4 hrs, 658 g/m^3	1000/ 600 (750) ppm (AB & TLV/ BC (STEL))
Hydrogen Sulphide	≥1 ppm	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10 (c)/15 (c)/1 (5) ppm (BC/AB/TLV (STEL))

All exposure levels are 8-hour time-weighted exposure limits unless otherwise indicated. STEL is a short-term exposure limit over a 15 minute time-weighted average. Ceiling exposure limit denoted by (c).

Section 3 – Physical Data for Material

Physical State: Liquid
Specific Gravity: 0.7 - 0.95
Vapour Density (air=1): 2.5 -5.0
Percent Volatiles, by volume: N.Av.
pH: N.Av.
Coefficient of Water/Oil Distribution: <0.1
(N.AV. = not available N.App. = not applicable)

Vapour Pressure (mmHg): 0.5-14000 @ 20 deg. C.
Odour Threshold (ppm): N.Av.
Evaporation Rate: N.Av.
Boiling Pt. (deg.C): See Section 1.0
Freezing Pt. (deg.C): <-40
Appearance & Odour: gold/brown/black/green viscous liquid, rotten eggs odour

Section 4 – Fire and Explosion

Flammability: Yes **Conditions**: Product will ignite at normal temperatures.
Means of Extinction: Foam, CO_2, dry chemical. Explosive accumulations can build up in areas of poor ventilation.
Special Procedures: Use water spray to cool fire-exposed containers, and to disperse vapors if spill has not ignited. Cut off fuel and allow flame to burn out.
Flash Point (deg.C): <23 (TCC)
Upper Explosive Limit (% by vol.): 44.0
Lower Explosive Limit (% by vol.): 0.8
Auto-Ignition Temp. (deg.C): 260

Sensitivity to Impact: No
Sensitivity to Static Discharge: Yes, may ignite
TDG Flammability Classification: 3

Hazardous Combustion Products: Carbon monoxide, carbon dioxide and sulphur dioxide.

Section 5 – Reactivity Data

Chemical Stability: Yes **Conditions**: Heat
Incompatibility: Yes **Substances**: Oxidizing agents (eg. chlorine), may react with iron to form iron sulphides.
Reactivity: Yes **Conditions**: Heat, strong sunlight
Hazardous Decomposition Products: Hydrogen sulphide.

Section 6 – Toxicological Properties of Product

Routes of Entry:
Skin Absorption : Yes **Skin Contact**: Yes (liquid) **Eye Contact**: Yes
Inhalation: **Acute**: Yes **Chronic**: Yes **Ingestion**: Yes
Effects of Acute Exposure: Initial odour of H_2S detected as low as about 0.1 ppm. Gas/vapour may cause irritation of eyes, nose and throat, dizziness and drowsiness. Hydrogen sulphide may cause a loss of sense of smell at 100 ppm. At higher concentrations, severe irritation of eyes, nose, throat and lungs, dizziness, headache, nausea, unconsciousness and respiratory failure may occur. Death may result if not revived promptly. Repeated contact with skin may cause irritation and possibly dermatitis. Absorbed through intact skin. Contact of liquid with eyes may cause severe irritation.
Effects of Chronic Exposure: Due to presence of benzene and n-hexane, long term or high dose rate exposures may increase the risk of anemia, leukemia and nervous system damage. Due to the presence of toluene, long term exposure may increase the risk of hearing loss (ototoxic).
Sensitization to Product: No.
Irritancy: Yes
Synergistic Materials: None reported
Carcinogenicity: Yes **Reproductive Effects**: Possibly **Teratogenicity**: Possibly **Mutagenicity**: Possibly

Section 7 – Preventative Measures

Personal Protective Equipment: Use a NIOSH-approved positive pressure self-contained breathing apparatus or supplied air breathing apparatus when working with this product or where concentrations may exceed exposure limits. Use approved gas detectors to assist in the detection and management of both H_2S and combustible gas and vapours.
Gloves: Viton for full hand immersion, nitrile adequate for incidental contact.
Respiratory: SCBA or SABA
Eye: SCBA with full facepiece
Footwear: Covered footwear such as steel-toed boots. **Clothing**: Fire retardant garments that meet NFPA 2112.
Engineering Controls: Use only in well ventilated areas. Mechanical ventilation required in confined areas. Equipment must be explosion proof.
Leaks & Spills: Stop leak if safe to do so. Use appropriate personal protective equipment. Use water spray to cool containers. Remove all ignition sources. Provide explosion-proof clearing ventilation, if possible. Prevent from entering confined spaces. Dyke and pump into containers for recycling or disposal. Notify appropriate regulatory authorities.
Waste Disposal: Contact regulatory authorities for disposal requirements.
Handling Procedures & Equipment: Avoid contact with liquid. Avoid inhalation. Bond and ground all transfers. Avoid sparking conditions. Exposure controls to prevent overexposure and those that are detailed in the Canadian Association of Petroleum Producers publication entitled "Occupational Health and Safety of Hydrogen Sulphide (H2S)" are recommended. Iron sulphides may be present, which are pyrophoric and must be kept wet to prevent ignition.
Storage Requirements: Store in a cool, dry, well-ventilated area away from heat, strong sunlight, and ignition sources.
Special Shipping Information: N.App.

Section 8 – First aid Measures

Skin: Flush skin with water, removing contaminated clothing. Get medical attention if irritation persists or large area of contact. Decontaminate clothing before re-use.
Eye: Immediately flush with large amounts of luke warm water for 15 minutes, lifting upper and lower lids at intervals. Seek medical attention if irritation persists.
Inhalation: Ensure own safety. Remove victim to fresh air. Give oxygen, artificial respiration, or CPR if needed. Seek medical attention immediately.
Ingestion: Give 2-3 glasses of milk or water to drink. DO NOT INDUCE VOMITING. Keep warm and at rest. Get immediate medical attention.

Section 9 – Preparation Date of MSDS

Prepared By: Encana Environment, Health and Safety (EH&S)
Phone Number: (403) 645-2000 Preparation Date: July 1, 2014 Expiry Date: July 1, 2017