

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

**Product Identifier:** LIGHT CRUDE OIL  
**Synonyms:** Bakken Oil, Bakken Crude  
**Chemical Description:** A naturally occurring mixture of aromatic hydrocarbons and small amounts of sulfur and nitrogen compounds  
**Product Use:** Process stream, fuels and lubricants production  
**Manufacturer/Supplier:** CENOVUS ENERGY INC.  
 500 Centre Street SE, PO Box 766  
 Calgary, AB T2P 0M5  
**Prepared By:** Cenovus Energy Inc. Health and Safety  
**Phone Number:** 1-403-766-2000  
**Emergency Telephone:** 1-877-458-8080, CANUTEC 1-613-996-6666 (Canada)

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Hazardous Ingredients	CAS Number	Approximate Concentration (%)
Petroleum Crude Oil	8002-05-9	100 v/v
Benzene	71-43-2	0.1 – 1.0 v/v
Hydrogen Sulfide in liquid is <0.1% v/v, vapour phase may contain higher concentrations.		

**3. HAZARDS IDENTIFICATION**

**Routes of Entry:** Skin contact, skin absorption, eye contact, inhalation, ingestion  
**Emergency Overview:** Warning. Flammable liquid and vapour. Liquid and vapour may cause irritation or burns to eyes, nose and throat. Inhalation of vapour may cause dizziness and drowsiness. Possible cancer hazard (benzene). Possible asphyxiation hazard (hydrogen sulfide). Wear personal protective equipment appropriate for the task.



**WHMIS** B2, D2-A, D2-B  
**NFPA** F4, R0, H3

**Potential Health Effects:** Contains material which may cause cancer after long-term, repeated skin contact.

**4. FIRST AID MEASURES**

**Eye Contact:** Immediately flush eyes with large amounts of lukewarm water for 15 minutes, lifting upper and lower lids at intervals. Seek medical attention if irritation persists.

**Skin Contact:** Remove contaminated clothing. Flush skin with water. Get medical attention if irritation persists or large area of contact. Decontaminate clothing before re-use.

**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 unless patient is unconscious or has a decreased level of alertness. **DO NOT INDUCE VOMITING.** Keep patient warm and at rest. Seek medical attention immediately.

**5. FIRE FIGHTING MEASURES**

**Flammable:** Material will ignite at normal temperatures.  
**Means of Extinction:** Foam, carbon dioxide (CO<sub>2</sub>), 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.  
**TDG Classification:** 3  
**Flash Point (°C) & Method:** <-35 (PMCC)      **Auto-Ignition Temp. (°C):** 250 (estimated)  
**Upper Explosive Limit (% v/v):** 8 (estimated)      **Lower Explosive Limit (% v/v):** 0.8 (estimated)  
**Sensitivity to Impact:** No  
**Sensitivity to Static Discharge:** Yes, at normal temperatures  
**Hazardous Combustion Products:** Carbon monoxide, sulfur oxides, nitrogen oxides, smoke particles  
**NFPA 704 Rating:** Flammability:4, Instability/Reactivity:0, Health:3

**6. ACIDENTAL RELEASE MEASURES**

**Personnel precautions:** Appropriately trained personnel should respond to uncontrolled releases. Avoid direct contact with material; use the personal protective equipment specified in Section 8. Stay upwind of release; isolate the immediate hazard area; and keep unnecessary and unprotected people away. Use water spray to cool containers. Eliminate all sources of ignition. Provide explosion-proof clearing ventilation, if possible.  
**Environmental precautions:** Prevent material from entering soil, waterways, drains, sewers, or confined areas.  
**Cleanup measures:** Stop leak if safe to do so. Dyke and pump material into containers for recycling or disposal. Contact appropriate regulatory authorities for disposal requirements (see Section 13). Notify the appropriate regulatory authorities of reportable releases (see Section 15).

**7. HANDLING AND STORAGE**

**Handling:** Wear appropriate personal protective equipment. Avoid contact with liquid. Avoid inhalation. Bond and ground all transfers. Avoid sparking conditions. Wash hands and face after handling and before eating, drinking or smoking.  
**Storage:** Store material in a cool, dry, well-ventilated area away from heat, strong sunlight, hot metal surfaces and ignition sources. Use approved containers only. Separate from incompatible material (see Section 10).  
**Caution:** Hydrogen sulfide may accumulate in headspaces of tanks and other equipment, even when concentrations in the liquid product are low. Factors increasing this hazard potential include heating, agitation and contact of the liquid with acid or acid salts. Assess the exposure risk by gas monitoring. Wear air supplying breathing apparatus if necessary. Overexposure to hydrogen sulfide may cause dizziness, headache, nausea and possibly unconsciousness and death.

**8. EXPOSURE CONTROL/PERSONAL PROTECTION**

**Occupational Exposure Limits**

Hazardous Ingredients	Alberta OEL	Saskatchewan	OSHA PEL	ACGIH TLV
Petroleum Crude Oil	300 ppm; 500 ppm (15min)	300 ppm	--	--
Benzene	0.5 ppm; 2.5 ppm (15min), Skin	--	1 ppm; 5 STEL; Petroleum Industry: 10 ppm; 25 ppm (C)	0.5 ppm; 2.5 STEL, Skin
Hydrogen Sulfide	10 ppm; 15 ppm (C)	--	20 ppm (C)	1 ppm

**Engineering Controls:** Use only in well-ventilated areas. Local exhaust ventilation required in confined areas. Equipment must be explosion proof.

**Hygiene Measures:** Wash hands and face after handling and before eating, drinking or smoking. Take off contaminated clothing and wash before re-use.

**Personal Protection**

**Respirator:** Where concentrations may exceed exposure limits, use full-face, positive pressure self-contained breathing apparatus; full-face, positive pressure supplied-air breathing apparatus; or cartridge air-purifying respirator approved for organic vapours (note: cartridge respirator not suitable for hydrogen sulfide, oxygen deficient or IDLH situations).

**Gloves:** Chemical-resistant gloves: Viton (Nitrile adequate for short exposure to liquid.)

**Eyewear:** Chemical splash goggles. A face shield may also be necessary, depending on handling conditions.

**Footwear:** As per safety policy.

**Clothing:** As per fire protection policy.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

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<b>Physical State:</b>	Liquid	<b>Odour &amp; Appearance:</b>	Dark Brown, hydrocarbon-like
<b>Odour Threshold (ppm):</b>	Not Available	<b>Specific Gravity:</b>	0.7 – 0.8
<b>Vapour Density (air=1):</b>	2.5 -5.0 (estimated)	<b>Vapour Pressure (mmHg):</b>	280-360 @ 20°C
<b>Evaporation Rate:</b>	Not Available	<b>Boiling Pt. (°C):</b>	-40 to 530
<b>Freezing Pt. (°C):</b>	<-60	<b>pH:</b>	Not Available
<b>Coefficient of Water/Oil Distribution:</b>	<0.1	<b>Percent Volatiles, (v/v):</b>	15 - 30 (estimated)

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**10. STABILITY AND REACTIVITY**

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**Chemical Stability:** Stable under normal, ambient conditions.

**Incompatibility:** Incompatible with strong oxidizing agents (e.g. chlorine, peroxide).

**Reactivity:** Reactive to heat, strong sunlight and ignition sources.

**Hazardous Decomposition Products:** Carbon monoxide, sulfur oxides, nitrogen oxides, smoke particles

**Hazardous Polymerization:** Not known to occur.

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**11. TOXICOLOGICAL INFORMATION**

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**Acute Exposure**

Vapour may cause irritation of eyes, nose and throat, dizziness and drowsiness. Contact with skin may cause irritation and possibly dermatitis. Contact of liquid with eyes may cause severe irritation or burns.

Hazardous Ingredients	Result	Species	Dose	Exposure
Petroleum Crude Oil	LD50 Oral	Rat	>5 g/kg	-
	LD50 Dermal		>2 g/kg	
	LC50 Inhalation		>4300 ppm	
Benzene	LD50 Oral	Rat	0.9 g/kg	-
	LC50 Inhalation		13200 ppm	4 hours
Hydrogen Sulfide	LC50 Inhalation	Rat	444 ppm	4 hours

**Chronic Exposure**

Due to presence of benzene, long term exposure may increase the risk of anemia and leukemia. Repeated skin contact may increase the risk of skin cancer.

<b>Irritant:</b> Yes	<b>Skin Sensitization:</b> Yes	<b>Respiratory Sensitization:</b> No
<b>Carcinogenicity:</b> Yes	<b>Reproductive Toxicity:</b> Possibly	<b>Teratogenicity:</b> Possibly
<b>Mutagenicity:</b> Possibly	<b>Synergistic Materials/Products:</b> None reported	

**Crude Oil**

IARC – Crude oil is not classifiable as to its carcinogenicity to humans (Group 3).  
 ACGIH, OSHA, US NTP – not listed as a carcinogen.

**Benzene**

ACGIH A1-Confirmed Human Carcinogen  
 IARC, OSHA, US NTP – There is sufficient evidence that benzene is carcinogenic to man.

**Hydrogen Sulfide**

Hydrogen sulfide is not considered to be mutagenic or a reproductive or developmental toxicant.  
 ACGIH, IARC, OSHA, US NTP – Hydrogen sulfide is not listed as a carcinogen.

**12. ECOLOGICAL INFORMATION**

**Aquatic Toxicity:** Not available  
**Biodegradability:** Not available

**13. DISPOSAL CONSIDERATIONS**

**Waste Disposal:** Contact appropriate regulatory authorities for disposal requirements. Empty containers or liners may retain a product residue. This material and its container and rinseates must be disposed of safely and in compliance with the requirements of environmental protection and waste disposal legislation and regional local authority requirements. Avoid dispersal of spilled material and runoff contact with soil, waterways, drains and sewers.

Use which results in chemical or physical change of this material could subject it to regulation as a hazardous product. Container residues and rinseates could be considered hazardous waste.

**US EPA Waste Numbers**

D001 – Ignitability characteristic  
 D018 – Toxicity characteristic (Benzene) (Regulatory Level = 0.5 mg/L)

**14. TRANSPORT INFORMATION**

Regulatory Information	UN Number	Proper Shipping Name	Class	PG	Label	Additional Information
TDG	UN1267	Petroleum Crude Oil	3	I	Flammable Liquids	
DOT	UN1267	Petroleum Crude Oil	3	I	Flammable Liquid	49 CFR 173.150; 173.202; 173.242
IMDG	UN1267	Petroleum Crude Oil	3	I	Flammable Liquid	12°C, P001 EmS:F-E, S-E MARPOL Annex I
ICAO/IATA	UN1267	Petroleum Crude Oil	3	I	Flammable Liquid	ERG Code: 3L

**North American Emergency Response Guide Number:** 128

**15. REGULATORY INFORMATION**

**Canadian Classification**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation (CPR) and the MSDS contains all of the information required by the CPR.

**WHMIS Classification:** B2 – Flammable and combustible material – Flammable liquid  
 D2A – Poisonous and infectious material – Other effects – Very toxic  
 D2B – Poisonous and infectious material – Other effects – Toxic

**WHMIS Ingredient Disclosure List:**

Meets criteria for disclosure at 0.1% or greater of benzene.

**CEPA Domestic Substance List:** All components are either listed or exempt.

**US Federal and State Regulations**

The contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

**CERCLA/SARA – Section 302 Extremely Hazardous Substances:** Exempt.

**CERCLA/SARA 311-312 (Title III Hazard Categories):**

Hydrogen Sulfide – Fire, Immediate (Acute),

Produced Hydrocarbons – Fire, Sudden Release of Pressure, Immediate (Acute), Delayed (Chronic).

**CERCLA/SARA 313, Reportable Quantity:** Benzene: 10 lbs; RCRA Code U019.

**Clean Air Act Section 112(b) Hazardous Air Pollutants:** Exempt.

**United States National Chemical Inventory:** All components are listed or exempted.

**California 65:** This product contains benzene a chemical known to the State of California to cause cancer and developmental harm.

**16. OTHER INFORMATION**

**Guide to Abbreviations:** ACGIH = American Conference of Governmental Hygienists; C = Ceiling; CAS = Chemical Abstracts Service Registry; Cenovus = Supplier recommendation based on composition; CEPA = Canadian Environmental Protection Act; DOT = Department of Transport; EmS = Environmental Management System; ERG = Emergency Response Guide  
 IARC = International Agency for Research on Cancer; ICAO/IATA = International Civil Aviation Organization/International Air Transport Association; IMDG = International Marine Dangerous Goods; MARPOL = The International Convention for the Prevention of Pollution from Ships; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PG = Packing Group; Skin = Danger of skin absorption; SARA STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; US NTP = United States National Toxicology Program; v/v = volume per volume; WHMIS = Workplace Hazardous Materials Information System