

1. IDENTIFICATION

Product Identifier	CENTRAL ALBERTA CRUDE OIL (CAL)
Synonyms	Grassland crude
Chemical Description	A naturally occurring mixture of paraffins, naphthalenes, aromatic hydrocarbons and small amounts of sulphur and nitrogen compounds mixed with condensate
Product Use	Process stream, fuel 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	Cenovus 1-877-458-8080 CANUTEC 1-613-996-6666 (Canada) CHEMTREC 1-800-424-9300

2. HAZARDS IDENTIFICATION

Hazard Classifications	<p>Flammable Liquids – Cat 1 Acute Toxicity, Oral – Cat 4 Acute Toxicity, Inhalation – Cat 2 Skin Corrosion/Irritation – Cat 2 Series Eye Damage/Eye irritation – Cat 2A Germ Cell Mutagenicity – Cat 2</p>	<p>Carcinogenicity – Cat 1 Reproductive Toxicity – Cat 2 STOT, Single Exposure – Cat 3 STOT, Repeated Exposure – Cat 2 Aspiration Hazard – Cat 1 Aquatic Hazard, Acute – Cat 3 Aquatic Hazard, Chronic – Cat 3</p>
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Label Elements



Emergency Overview

Danger. Extremely flammable liquid and vapour. Harmful if swallowed. Fatal if inhaled. Causes skin irritation. Causes serious eye irritation. Suspected of causing genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. May cause respiratory irritation. May cause damage to organs (liver, kidneys, blood, nervous system, and skin) through prolonged or repeated exposure. May be fatal if swallowed and enters airways. Harmful to aquatic life. Harmful to aquatic life with long lasting effects.
Sulfur compounds in this material may decompose to release hydrogen sulfide gas which may accumulate to potentially lethal concentrations in enclosed air spaces.

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
Use only outdoors or in a well-ventilated area. Keep away from heat. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical equipment. Use only non-sparking tools. Take precautionary measures against static discharge.
Wear respiratory protection. Wear protective gloves, protective clothing, eye protection, and face protection. Do not breathe vapour. Do not eat, drink or smoke when using this product. Wash face, hands and any exposed skin thoroughly after handling.
Avoid release to the environment.

Response

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with

water/shower. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth. Do NOT induce vomiting.
 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
 IF exposed or concerned: Get medical advice/attention.
 In case of fire: Use water spray, fog or fire-fighting foam to extinguish.

Storage Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep cool.
Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	CAS Number	Approximate Concentration (%)
Crude Oil, Petroleum	8002-05-9	100
Which contains:		
Benzene	71-43-2	0.08-0.15
Hydrogen Sulfide*	7783-06-04	<1 ppm

*Hydrogen Sulfide in the vapour phase may contain higher concentrations.

4. FIRST AID MEASURES

Inhalation	Remove person to fresh air. If person is not breathing, give artificial respiration. If necessary, give additional oxygen once breathing is restored if trained to do so. Get prompt medical attention.
Eye Contact	Remove contact lenses if present and easily done. Flush eyes with large amounts of lukewarm water for 15 minutes, lifting upper and lower lids at intervals. Seek medical attention if irritation, redness or swelling occurs.
Skin Contact	Remove contaminated clothing. Wash affected skin thoroughly with soap and water. Seek medical attention if irritation, redness or swelling occurs or large area of contact.
Ingestion	DO NOT INDUCE VOMITING. Do not give liquids. Get prompt medical attention. If spontaneous vomiting occurs, lean person forward to reduce risk of aspiration. Monitor for breathing difficulties. Rinse product out of mouth.
Most Important Symptoms	Effects of overexposure may include irritation of the respiratory tract, digestive tract, skin and eyes. May cause nausea, vomiting and signs of nervous system depression (e.g., headaches, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Overexposure to hydrogen sulfide gas can induce immediate collapse, with loss of breathing and a high probability of death.

5. FIRE FIGHTING MEASURES

General Fire Hazards	See Section 9 for Physical and Chemical Properties related to flammability. Vapours may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapours can burn in the open or explode in confined spaces. Being heavier than air, vapours may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or
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explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide, sulfur oxides, nitrogen oxides, smoke particles.

Extinguishing Media

Foam, water fog or spray, carbon dioxide (CO₂), dry chemical. Use water spray to cool fire-exposed containers, and to disperse vapors if spill has not ignited. Water fog or spray may not extinguish the fire. Cut off fuel and allow flame to burn out.

Firefighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other firefighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied firefighting foam.

6. ACCIDENTAL RELEASE MEASURES

Notification Procedures

In the event of a spill or accidental release, notify relevant authorities in accordance with applicable regulations.

Personal precautions and Protective Equipment

Avoid direct contact with material. Stay upwind of release; isolate the immediate hazard area; and keep unnecessary and unprotected people away. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see [Section 8](#)). 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 vacuum or take up with sand or other oil absorbing materials. Carefully pump, shovel, scoop or sweep up into a waste container 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

Handle as a flammable liquid. Keep away from heat, sparks, and open flame. Wear appropriate personal protective equipment. Avoid contact with liquid. Avoid inhalation. Do not enter storage areas or confined spaces unless adequately ventilated. 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, well-ventilated area away from heat, hot metal surfaces and ignition sources. Use approved containers only. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. 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 CONTROLS/PERSONAL PROTECTION
Occupational Exposure Limits (8-hour TWA unless otherwise noted)

Hazardous Ingredients	Alberta	Saskatchewan	OSHA PEL	ACGIH TLV
Petroleum Crude Oil	300 ppm; [as VM&P naphtha]	300 ppm 500 ppm (15min) [as VM&P naphtha]	500 ppm; [as petroleum distillates/naphtha]	--
Benzene	0.5 ppm; 2.5 ppm (15min), Skin	--	1 ppm; 5 ppm STEL; Petroleum Industry: 10 ppm; 25 ppm (C)	0.5 ppm; 2.5 ppm STEL, Skin
Hydrogen Sulfide	10 ppm; 15 ppm (C)	10 ppm; 15 ppm (15min)	20 ppm (C)	1 ppm, 5 ppm STEL

Engineering Controls

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

Hygiene Measures

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Avoid repeated and/or prolonged skin exposure. Wash hands with soap and water before eating, drinking, smoking, or using toilet facilities. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

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: air-purifying respirator is not suitable for hydrogen sulfide, oxygen-deficient or IDLH situations).

PPE
Gloves

Chemical-resistant gloves: Viton (Nitrile or neoprene 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid	Appearance:	Dark Brown/Black
Odour:	Hydrocarbon-like	Odour Threshold (ppm):	Not Available
Specific Gravity:	0.85-0.89	pH:	Not Available
Vapour Pressure (mmHg, 38°C):	135-285	RVP (kPa):	18-33
Vapour Density (air=1):	2.5-5.0 (estimated)	Evaporation Rate:	Not Available
Boiling Range (°C, D-7169):	-18-400+	Initial Boiling Pt. (°C, D7169):	25
Flash Point (°C) & Method:	<-5 (PMCC, D93)	Freezing Pt. (°C):	Not available
Upper Explosive Limit (% v/v):	8 (estimated)	Lower Explosive Limit (% v/v):	0.8 (estimated)
Auto-Ignition Temp. (°C):	250 (estimated)	Sensitivity to Static Discharge:	Yes, at normal temperatures.
Sensitivity to Impact:	No	Solubility in Water	Negligible
Octanol/Water Coefficient:	<0.1		

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under normal, ambient conditions.
Hazardous Reactions	Not known to occur.
Conditions to Avoid	High temperatures, open flames, sparks, welding, smoking and other ignition sources.
Incompatibility	Incompatible with strong oxidizing agents (e.g. chlorine, peroxide).
Hazardous Decomposition Products	Carbon monoxide, carbon dioxide, sulfur oxides, smoke.
Synergistic Materials/Products	None reported

11. TOXICOLOGICAL INFORMATION

Acute Exposure At concentrations above recommended exposure levels, vapour may cause irritation of eyes, nose and throat, dizziness and drowsiness. May cause damage to organs (liver, kidneys, blood, nervous system and skin) through prolonged or repeated exposure. Contact with skin may cause irritation and possibly dermatitis. Contact of liquid with eyes may cause severe irritation or burns.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Hazardous Ingredients	Result	Species	Dose	Exposure
Petroleum Crude Oil	LD50 Oral	Rat	>4300 mg/kg	-
	LD50 Dermal	Rabbit	>2000 mg/kg	-
Benzene	LD50 Oral	Rat	1800 mg/kg	-
	LD50 Dermal	Rabbit	>8260 mg/kg	-
	LC50 Inhalation	Rat	13050-14380 ppm	4 hours
Hydrogen Sulfide	LC50 Inhalation	Rat	444 ppm/ 0.701 mg/L	4 hours
	LC50 Inhalation	Mouse	335 ppm	4 hours
	LC50 Inhalation			

Chronic Exposure May cause damage to organs (liver, kidneys, blood, nervous system and skin) through prolonged or repeated exposure. Due to presence of benzene, long term exposure may increase the risk of anemia and leukemia.

Health Effects	Irritant: Yes	Reproductive Toxicity: Possibly
	Skin Sensitization: No	Teratogenicity: Possibly
	Respiratory Sensitization: No	Mutagenicity: Possibly
	Carcinogenicity: Yes	

Carcinogenicity **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

Ecotoxicity	Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.
Biodegradation	Low molecular weight component expected to be inherently biodegradable High molecular weight component expected to biodegrade slowly.
Bioaccumulation	Has the potential to bioaccumulate.
Atmospheric Oxidation	More volatile component expected to degrade rapidly in air.
Photolysis	More water soluble component expected to degrade at a moderate rate in water when exposed to sunlight.
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.

Ecological Data

Petroleum distillates (naphtha) (8002-05-9) Test & Species	Conditions
96 Hr LC50 Salmo gairdneri	258 mg/L [static]
24 Hr EC50 Daphnia magna	36 mg/L
48 Hr EC50 Daphnia magna	<0.26 mg/L [Static]
Hydrogen sulfide (7783-06-4) Test & Species	Conditions
96 Hr LC50 Lepomis macrochirus	0.0448 mg/L [flow-through]
96 Hr LC50 Pimephales promelas	0.016 mg/L [flow-through]
96 Hr LC50 Gammarus pseudolimnaeus	0.022 mg/L
Benzene (71-43-2) Test & Species	Conditions
96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22330-41160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70000-142000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76 - 15.6 mg/L [Static]
48 Hr EC50 Daphnia magna	10 mg/L

13. DISPOSAL CONSIDERATIONS

Waste Disposal Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

Empty containers or liners may retain a 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.

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	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

TDG Emergency Response Assistance Plan (For Rail Transport): ERP2-1933-006; 1-800-265-0212

Latest Proof of Classification: refer to <http://www.cenovus.com/contractor/msds.html>

15. REGULATORY INFORMATION

Canadian Classification	<p>WHMIS 1988 Classifications: B2, D2A, D2B</p> <p>WHMIS 2015: This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulation (HPR) and the SDS contains all of the information required by the HPR.</p> <p>WHMIS Ingredient Disclosure List: Meets criteria for disclosure at 0.1% or greater of benzene.</p> <p>CEPA Domestic Substance List: All components are either listed or exempt.</p>
US Federal and State Regulations	<p>The contents of this SDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.</p> <p>CERCLA/SARA – Section 302 Extremely Hazardous Substances: Hydrogen sulfide: 500 lbs TPQ.</p> <p>CERCLA/SARA 311-312 (Title III Hazard Categories): Hydrogen Sulfide – Fire, Immediate (Acute), Produced Hydrocarbons – Fire, Sudden Release of Pressure, Immediate (Acute), Delayed (Chronic).</p> <p>CERCLA/SARA 313, Reportable Quantity: Hydrogen sulfide: 100 lbs ; Benzene: 10 lbs; RCRA Code U019.</p> <p>Clean Air Act Section 112(b) Hazardous Air Pollutants: Exempt.</p> <p>United States National Chemical Inventory: All components are listed or exempted.</p> <p>California 65: This product contains benzene a chemical known to the State of California to cause cancer and developmental harm.</p> <p>NFPA 704 Rating: Flammability:3, Instability/Reactivity:1, Health:2</p>

16. OTHER INFORMATION

Guide to Abbreviations: ACGIH = American Conference of Governmental Hygienists; C = Ceiling; CAS = Chemical Abstracts Service Registry; CEPA = Canadian Environmental Protection Act; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act cSt = centistokes; 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; GHS = Globally Harmonized System of Classification and Labeling of Chemicals; lbs = pounds; MARPOL = The International Convention for the Prevention of Pollution from Ships; mm²/sec = millimeters squared per second; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PG = Packing Group; Skin = Danger of skin absorption; SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TPQ = Threshold Planning Quantity ; US NTP = United States National Toxicology Program; v/v = volume per volume; w/w = weight per weight; WHMIS = Workplace Hazardous Materials Information System.

Date of preparation is noted in the footer of this document.