1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: MIDALE CRUDE OIL
Synonyms: Midale, Weyburn Sales Oil
Chemical Description: A mixture of paraffins, naphthalenes, 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: Cenovus 1-877-458-8080, CANUTEC 1-613-996-6666 (Canada), CHEMTREC 1-800-424-9300

2. HAZARDS IDENTIFICATION

Hazard Classifications

- 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
- 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

Emergency Overview: Danger. Extremely flammable liquid and vapour. May be harmful if inhaled or swallowed and enters airways. May cause respiratory and mild skin irritation. May cause serious eye irritation. May cause drowsiness or dizziness. May cause damage to organs (liver, kidneys, blood, nervous system and skin) through prolonged or repeated exposure. The benzene component of this material may cause cancer and is suspected of causing genetic effects.Harmful to aquatic life.
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. Keep container tightly closed. Keep cool.
Keep away from heat, sparks, open flames and hot surfaces. No smoking.
Take precautionary measures against static discharge. Ground and bond container and receiving equipment. Use explosion-proof equipment and non-sparking tools where conditions may generate an explosive atmosphere.
Wash exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe vapours. Use only outdoors or in a well-ventilated area.
Wear personal protective equipment appropriate for the task: gloves, eyewear, and clothing. In case of inadequate ventilation wear respiratory protection.
Avoid release to the environment.

Response: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center or a doctor if you feel unwell.

IF IN EYES: Rinse caustiously 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 ON SKIN (or hair): Take off contaminated clothing immediately. Rinse skin with water/shower. Wash with plenty of soap and water. IF skin irritation occurs: Get medical advice/attention.
In case of fire: Use water spray, fog or fire-fighting foam to extinguish.

Storage: Store locked up, in a cool, well-ventilated place. Keep container tightly closed.

Disposal: Dispose of container in accordance with local, regional, national, and 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	≤1.0 v/v
Hydrogen Sulfide*	7783-06-04	<0.01 w/w

*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: 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.

5. FIRE FIGHTING MEASURES

General Fire Hazards:
See Section 9 for Physical and Chemical Properties related to flammability.
Vapors 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 vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.
Hazardous Combustion Products:
Carbon monoxide, carbon dioxide, sulfur oxides, nitrogen oxides, smoke particles.
Extinguishing Media:
Foam, water fog or spray, carbon dioxide (CO_2), 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 face piece 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. ACIDENTAL 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 in a well-ventilated place. Keep cool. 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 CONTROL/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. Use explosion-proof equipment and non-sparking tools where conditions may generate an explosive atmosphere.
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.
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: air-purifying respirator is not suitable for hydrogen sulfide, oxygen-deficient or IDLH situations).
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:**	Brown/black
Odour:	Hydrocarbon-like	**Odour Threshold (ppm):**	Not Available
Specific Gravity:	0.87-0.88	**pH:**	Not Available
Vapour Pressure (mmHg, 38ºC):	293	**RVP (kPa):**	39
Vapour Density (air=1):	Not Available	**Evaporation Rate:**	Not Available
Boiling Range (°C, D-7169):	-2-400+	**Initial Boiling Pt. (°C, D7169):**	-1.4
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):	400 (estimated)		
Sensitivity to Impact:	No	**Sensitivity to Static Discharge:**	Yes, at normal temperatures.
Octanol/Water Coefficient:	Not Available	**Solubility in Water**	Negligible

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.

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 moderate 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	1620 mg/kg	-
	LD50 Dermal	Rabbit	>8260 mg/kg	
	LC50 Inhalation	Rat	14000 ppm	4 hours
Hydrogen Sulfide	LC50 Inhalation	Rat	444 ppm/ 0.701 mg/L	4 hours
	LC50 Inhalation	Mouse	335 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.

Irritant: Yes **Skin Sensitization:** No **Respiratory Sensitization:** No

Carcinogenicity: Yes **Reproductive Toxicity:** Possibly **Teratogenicity:** Possibly

Mutagenicity: Possibly **Synergistic Materials/Products:** 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

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

DISPOSAL CONSIDERATIONS

Disposal: Dispose of contents/container in accordance with local/regional/national/international regulations. 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	Toxic-Inhalation Hazard
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

Emergency Response Assistance Plan Number (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

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.

WHMIS 1988 Classification: B2, D2A, D2B

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 SDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

CERCLA/SARA – Section 302 Extremely Hazardous Substances: Hydrogen sulfide: 500 lbs TPQ.

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: Hydrogen sulfide: 100 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.

NFPA 704 Rating: Flammability:3, Instability/Reactivity:1, Health:2

GHS: This material is considered hazardous according to the Regulation of Labeling and Hazard Communication of Dangerous and Harmful Materials.

16. OTHER INFORMATION

Guide to Abbreviations: 15min = 15 minutes; 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; TWA = Time-Weighted Average; 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