

SECTION 1 – MATERIAL IDENTIFICATION

Material Name: HEAVY CRUDE OIL/DILUENT MIX
Synonyms: Bow River (BR); Cold Lake Blend (CLB); Christina Lake Dil-bit Blend (CDB), Christina Lake Blend (CSB); Western Canadian Blend (WCB); Western Canadian Select (WCS); Wabasca Heavy (WH)
Use: Process stream, fuels and lubricants production
WHMIS Classification: Class B, Div. 2, Class D, Div. 2, Sub-Div. A and B
NFPA: **Fire:** 2 **Reactivity:** 0 **Health:** 3
TDG Shipping Name: Petroleum Crude Oil
TDG Class: 3 **UN:** 1267
TDG Packing Group: II (boiling point 35 deg. C or above, and flash point less than 23 deg. C)
Manufacturer/Supplier: CENOVUS ENERGY INC.
 421 - 7 Ave SW PO Box 766
 Calgary, AB T2P 0M5
Emergency Telephone: 1-877-458-8080
Chemical Description: A naturally occurring mixture of paraffins, naphthalenes, aromatic hydrocarbons and small amounts of sulphur and nitrogen compounds mixed with condensate

SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL

Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 Specify Species & Route	Exposure Limits
Crude oil	50 – 90	8002-05-9	LD50, rat, skin, >2 g/kg	5 mg/m ³ (OEL, PEL oil mist)
Hydrocarbon Diluent	10 – 50	N.Av.	N.Av.	900 mg/m ³ (OEL)*
Benzene	0.03 - 0.3	71-43-2	LD50, rat, oral, 930 mg/kg LC50, rat, 4 hr, 13200 ppm	0.5 ppm (OEL, TLV) 10 ppm (PEL)
Hydrogen Sulphide [§]	<0.1	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10 ppm (OEL), 1 ppm (TLV), 20 ppm (PEL-C)

OEL = AB Occupational Exposure Limit; TLV = ACGIH Threshold Limit Value; PEL = OSHA Permissible Exposure Limit; C = Ceiling; *OEL for gasoline; [§]Hydrogen Sulfide in liquid, vapour phase may contain higher concentrations

SECTION 3 – PHYSICAL DATA FOR MATERIAL

Physical State: Liquid **Vapour Pressure, Reid (kPa):** 76 @ 38°C
Specific Gravity: 0.91 – 0.94 **Odour Threshold (ppm):** N.Av.
Vapour Density (air=1): 2.5 -5.0 (estimated) **Evaporation Rate:** N.Av.
Percent Volatiles, (v/v): 15 - 30 (estimated) **Boiling Pt. (deg.C):** 35 – 180°C
pH: N.Av. **Freezing Pt. (deg.C):** <20

Coefficient of Water/Oil Distribution: <0.1

Odour & Appearance: Brown/black liquid, hydrocarbon odour
 (N.Av. = not available N.App. = not applicable)

SECTION 4 – FIRE AND EXPLOSION

Flammability: Yes **Conditions:** Material will ignite at normal temperatures.

Means of Extinction: Foam, CO₂, 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) & Method: <-35 (PMCC)

Upper Explosive Limit (% by vol.): 8 (estimated)

Sensitivity to Impact: No

Lower Explosive Limit (% by vol.): 0.8 (estimated)

Sensitivity to Static Discharge: Yes, at normal temperatures

Auto-Ignition Temp. (deg.C): 250 (estimated)

TDG Flammability Classification: 3

Hazardous Combustion Products: Carbon monoxide, carbon dioxide, sulphur oxides

SECTION 5 – REACTIVITY DATA

Chemical Stability: Stable

Conditions: Heat

Incompatibility: Yes

Substances: Oxidizing agents (e.g. chlorine)

Reactivity: Yes

Conditions: Heat, strong sunlight

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, sulphur oxides

SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT

Routes of Entry:

Skin Absorption: Yes

Skin Contact: Yes

Eye Contact: Yes

Inhalation: Acute: Yes

Chronic: Yes

Ingestion: Yes

Effects of 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/burns.

Effects of 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.

Sensitization to Product: No.

Exposure Limits of Product: 0.5 ppm (OEL for benzene)

Irritancy: Yes

Synergistic Materials: None reported

Carcinogenicity: Yes **Reproductive Effects:** Possibly **Teratogenicity:** Possibly **Mutagenicity:** Possibly

SECTION 7 – PREVENTIVE MEASURES

Personal Protective Equipment: Use positive pressure self-contained breathing apparatus, supplied air breathing apparatus or cartridge air purifying respirator approved for organic vapours where concentrations may exceed exposure limits (note: cartridge respirator not suitable for hydrogen sulfide, oxygen deficiency or IDLH situations) – see also Storage below).

Gloves: Viton (nitrile adequate for short exposure to liquid)

Eye: Chemical splash goggles. **Footwear:** As per safety policy **Clothing:** As per fire protection policy

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 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 appropriate regulatory authorities for disposal requirements.

Handling Procedures & Equipment: Avoid contact with liquid. Avoid inhalation. Bond and ground all transfers. Avoid sparking conditions.

Storage Requirements: Store in a cool, dry, well ventilated area away from heat, strong sunlight, and ignition sources.

Special Shipping Provisions: N.App.

Caution: Hydrogen sulfide may accumulate in headspaces of tanks and other equipment, even when concentrations in the liquid product are low. Overexposure to hydrogen sulphide may cause dizziness, headache, nausea and possibly unconsciousness and death. Factors increasing this risk include heating, agitation and contact of the liquid with acids or acid salts. Assess the exposure risk by gas monitoring. Wear air supplying breathing apparatus if necessary.

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 lukewarm 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: Cenovus Energy Inc. Health and Safety

Phone Number: 1-877-458-8080

Preparation Date: September 30, 2011

Expiry Date: September 30, 2014