SECTION 1 – MATERIAL IDENTIFICATION AND USE

Material Name: BITUMEN EMULSION
Use: Process stream
WHMIS Classification: Class D, Div. 2, Sub-Div. A and B
NFPA: **Fire**: 2 **Reactivity**: 0 **Health**: 3
TDG Shipping Name: Not regulated as Flammable Liquid due to flash point greater than 60 deg.C.
If shipped above 100 deg.C, then
TDG Shipping Name: Elevated Temperature Liquid N.O.S. (Bitumen)
TDG **Class:** 9 **UN**: 3257 **Packing Group:** III
Manufacturer/Supplier: CENOVUS ENERGY INC.
500 Centre Street SE, PO Box 766
Calgary, AB T2G 0M5
Emergency Telephone: 1-877-458-8080; CANUTEC: 1-613-996-6666 (Canada); CHEMTREC 1-800-424-9300
Chemical Family: A naturally occurring mixture of paraffins, naphthalenes, aromatic hydrocarbons and small amounts of sulfur and nitrogen compounds before addition of diluent.

SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL

Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 Specify Species& Route	Exposure Limits
Bitumen	30 - 50	8052-42-4	--	5 mg/m3 (OEL,TLV,PEL oil mist)
Water	50 - 70	7732-18-5	--	--
Benzene	0.01 - 0.1	71-43-2	LD50,rat,oral,930 mg/kg LC50,rat,4 hr,13200 ppm	0.5 ppm (OEL, TLV)
Hydrogen Sulphide§	>20 ppm	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10 ppm (OEL) 1 ppm (TLV), 20 ppm (PEL-C)

OEL = 8 hr. Alberta Occupational Exposure Limit; TLV = Threshold Limit Value (8 hrs) PEL = OSHA Permissible Exposure Limit; C = Ceiling; §Hydrogen sulfide in liquid, vapour phase may contain higher concentrations

SECTION 3 – PHYSICAL DATA FOR MATERIAL

Physical State: Viscous liquid
Specific Gravity: 0.93 - 1.01
Vapour Density (air=1): 2.5 -5.0
Percent Volatiles, by volume: 5 (estimated)
pH: N.Av.
Vapour Pressure (mmHg): N.Av.
Odour Threshold (ppm): N.Av.
Evaporation Rate: N.Av.
Boiling Pt. (deg.C): 182 +
Freezing Pt. **(deg.C**): <0
Coefficient of Water/Oil Distribution: <0.1
Odour & Appearance: Brown/black viscous liquid/semi-solid, rotten eggs / hydrocarbon odour
(N.AV. = not available N.App. = not applicable)

SECTION 4 – FIRE AND EXPLOSION

Flammability: No **Conditions**: Vapour will ignite, at temperatures > 100 deg.C.
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) & Method: 148 (PMCC)
Upper Explosive Limit (% by vol.): 8 **Sensitivity to Impact**: No
Lower Explosive Limit (% by vol.): 0.8 **Sensitivity to Static Discharge**: Yes, at elevated temperatures
Auto-Ignition Temp. (deg.C): N.Av. **TDG Flammability Classification**: N.App.
Hazardous Combustion Products: Carbon monoxide, carbon dioxide

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

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: Hydrogen sulfide may initially cause irritation of eyes, nose and throat, and then 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. Hydrocarbon vapours may cause irritation of eyes, nose and throat, dizziness and drowsiness. Contact with skin may cause irritation and possibly dermatitis. If material is heated, contact may cause skin burns. 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 anaemia 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); 10 ppm (OEL for hydrogen sulphide)
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 (SCBA), 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 or full facepiece SCBA.
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. Note: hydrogen sulphide may build up to high concentrations in headspaces of vessels. 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 Information: Not regulated unless is offered for transport or transported at a temperature greater than or equal to 100°C if it is in a liquid state or at a temperature greater than or equal to 240°C if it is in a solid state.

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: 1-403-766-2000
Preparation Date: March 14, 2014