

SECTION 1 – MATERIAL IDENTIFICATION AND USE**Material Name:** PRODUCED WATER (SOUR)**Use:** Process stream, waste**WHMIS Classification:** Class B, Div. 2; Class D Div. 1, Subdiv. A; Class D, Div. 2, Sub-Div. A and B**Fire:** 4 **Reactivity:** 0 **Health:** 4 **Inventory No.:****TDG:****If transported in a clean tank:** Not a dangerous good as defined by TDG**If transported in a tank that last carried crude oil or condensate:** use TDG classification of residue**Manufacturer/Supplier:** CENOVUS ENERGY INC.
500 Centre Street SE, PO Box 766
Calgary, AB T2P 0M5**Emergency Telephone:** 1-877-458-8080, CANUTEC 1-613-996-6666 (Canada)**Chemical Family:** Water with C5+ aliphatic/aromatic hydrocarbons, and dissolved hydrogen sulfide.**SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL**

Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 Specify Species & Route	Exposure Limits
Sodium chloride	5 - 20	7647-14-05	N.Av.	N.Av.
n-Hexane	0.1-1	110-54-3	LD50, rat, oral, 28.7 g/kg	50 ppm (OEL, TLV)
Benzene	0.1-1	71-43-2	LD50, rat, oral, 930 mg/kg LC50, rat, 4 hr, 13200 ppm	0.5 ppm (OEL, TLV)
Hydrogen Sulfide	<0.1	7783-06-4	LC50, rat, 4 hr, 444 ppm	10 ppm (OEL) 1 ppm (TLV)

OEL = 8 hr. Alberta Occupational Exposure Limit; TLV = Threshold Limit Value (8 hrs)

SECTION 3 – PHYSICAL DATA FOR MATERIAL**Physical State:** Liquid**Specific Gravity:** 1.0 - 1.1 @ 20 degrees C**Vapour Density (air=1):** 1.2 - 3.0**Percent Volatiles, by volume:** 100**pH:** N.Av.**Coefficient of Water/Oil Distribution:** N.Av.**Odour & Appearance:** colorless/straw coloured liquid, rotten eggs and hydrocarbon odour
(N.Av. = not available N.App. = not applicable)**Vapour Pressure (mmHg):** 42-350 @ 38 deg. C.**Odour Threshold (ppm):** N.Av.**Evaporation Rate:** N.Av.**Boiling Pt. (deg.C):** 50 to 100**Freezing Pt. (deg.C):** -10 to 0 (estimate)**SECTION 4 – FIRE AND EXPLOSION****Flammability:** Yes* **Conditions:** Bulk of material is water, and will not ignite. However, hydrogen sulfide gas and hydrocarbon vapour will ignite at normal temperatures. Explosive accumulations can build up in tank headspaces and other poorly ventilated locations.**Means of Extinction:** Foam, CO2, dry chemical **Special Procedures:** Use water spray to cool fire-exposed containers, and to disperse vapours if spill has not ignited. If safe to do so, cut off supply and allow flame to burn out.**Flash Point (deg.C) & Method:** <-35 (PMCC) (hydrocarbons)***Upper Explosive Limit (% by vol.):** 8***Sensitivity to Impact:** No**Lower Explosive Limit (% by vol.):** 1***Sensitivity to Static Discharge:** Yes, may ignite***Auto-Ignition Temp. (deg.C):** 260***TDG Flammability Classification:** Class 3***Hazardous Combustion Products:** Carbon monoxide, carbon dioxide, hydrogen sulfide, sulfur oxides.**Assuming hydrocarbon content is high enough to ignite. Hydrocarbons may derive from the original produced water or contamination through transportation in a tank that had previously contained crude oil.*

SECTION 5 – REACTIVITY DATA

Chemical Stability: Yes **Conditions:** Heat

Incompatibility: Yes **Substances:** Oxidizing agents (e.g. chlorine)

Reactivity: Yes **Conditions:** Heat, strong sunlight

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, hydrogen sulfide, sulphur oxides.

SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT

Routes of Entry:

Skin Absorption: Yes

Skin Contact: Yes (liquid)

Eye Contact: Yes

Inhalation: Acute: Yes

Chronic: Yes

Ingestion: Yes

Effects of Acute Exposure: Hydrogen sulfide gas and hydrocarbon vapours may cause irritation of eyes, nose and throat, dizziness and drowsiness. Hydrogen sulfide can be detected at about 0.1 ppm. It may cause loss of sense of smell at 100 ppm. At higher concentrations, severe irritation of eyes, nose, throat and lungs may occur. Unconsciousness and respiratory failure may happen without warning. Death may result if not promptly revived. Contact with skin may cause irritation and possibly dermatitis. Hydrocarbons are absorbed through intact skin. Contact of liquid with eyes may cause severe irritation.

Effects of Chronic Exposure: Due to presence of benzene and n-hexane, long term exposure may increase the risk of anaemia, leukemia and nervous system damage.

Sensitization to Product: No.

Exposure Limits of Product: 10 ppm (OEL for hydrogen sulfide); 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

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

Respiratory Protection: Use positive pressure self-contained breathing apparatus or supplied air breathing apparatus where concentrations may exceed exposure limits.

Eye: Full facepiece SCBA or SABA required.

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 respiratory and 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 Information: N.Av.

SECTION 8 – FIRST AID MEASURES

Skin: Flush skin with water, removing contaminated clothing. Get medical attention if irritation persists or large areas of contact.

Eye: Immediately flush with large amounts of luke warm 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: 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: January 24, 2017