



Material Safety Data Sheet (Canada) Produced Water (Sour)

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, Sub-Div. A; Class D, Div. 2, Sub-Div. A and B
TDG: UN: 3494 **Class:** 3 **Subsidiary class/Division:** (6.1)
Packing Group: I (Boiling Point ≤35°C)
Shipping Name: PETROLEUM SOUR CRUDE OIL, FLAMMABLE, TOXIC
Technical Name: (produced water, sour) Toxic by inhalation
Manufacturer/Supplier: ENCANNA CORPORATION
 500 Centre Street SE
 CALGARY, ALBERTA, T2P 2S5
Emergency Telephone: CANUTEC: 1-613-996-6666
Chemical Family: Water with C5+ aliphatic and aromatic hydrocarbons, methanol and dissolved hydrogen sulphide

Section 2 – Hazardous Ingredients of Materials

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.
Methanol	<1-20 (seasonal)	67-56-1	LC50, rat, 6 hrs, 87.5 mg/l LD50, rat, 5628 mg/kg	200 & 250 ppm (STEL) (AB, TLV, & BC)
Natural Gas Condensates	<1	68919-39-1	LC50, rat, >5610 mg/m ³	300 & 500 ppm (STEL) (AB, TLV & BC)
Crude oil	<1	8002-05-9	LD50, rat, skin, >2 g/kg	N.Av.
n-Hexane	<1	110-54-3	LD50, rat, oral, 28.7 g/kg	50 ppm/ 20 ppm (AB & TLV/ BC)
Toluene	<1	108-88-3	LC50, rat, 4 hrs, 49000 mg/m ³	50 ppm/ 20 ppm (AB/ TLV & BC)
Benzene	<0.1-1	71-43-2	LD50, rat, oral, 930 mg/kg LC50, rat, 4 hrs, 13200 ppm	0.5 & 2.5 ppm (STEL) (AB, TLV & BC)
Hydrogen Sulphide	≥1 ppm	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10(c)/15(c) /1 (5) ppm (BC/AB/TLV(STEL))

This product may contain trace quantities of Naturally Occurring Radioactive Material (NORM). All exposure levels are 8-hour time-weighted exposure limits unless otherwise indicated. STEL is a short-term exposure limit over a 15 minute time-weighted average. Ceiling exposure limit denoted by (c). Gasoline exposure levels presented for Natural Gas Condensates.

Section 3 – Physical Data for Material

Physical State: Liquid	Vapour Pressure (mmHg): 20 @ 20 deg. C.
Specific Gravity: 1.0-1.1 @ 20 degrees C	Odour Threshold (ppm): N.Av.
Vapour Density (air=1): 1.2-3.0	Evaporation Rate: N.Av.
Percent Volatiles, by volume: 100	Boiling Pt. (deg.C): >35
pH: N.Av.	Freezing Pt. (deg.C): -10 to 0 (est.)
Coefficient of Water/Oil Distribution: >100 (N.AV. = not available N.App. = not applicable)	Odour & Appearance: colorless/straw coloured liquid, rotten eggs and hydrocarbon odour

Section 4 – Fire and Explosion

Flammability: Yes **Conditions:** Bulk of product is water and will not ignite. However, sufficient hydrocarbons, hydrogen sulphide and/or methanol vapour may be present to cause flash fire 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. If safe to do so, cut off supply and allow flame to burn out.
Flash Point (deg.C): <-40 (TCC) (hydrocarbons)
Upper Explosive Limit (% by vol.): 44.0 **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, formaldehyde and sulphur dioxide.



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Section 5 – Reactivity Data

Chemical Stability: Yes **Conditions:** Heat

Incompatibility: Yes **Substances:** Oxidizing agents (e.g. chlorine), may react with iron to form iron sulphides.

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

Hazardous Decomposition Products: Hydrogen sulphide

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: Initial odour of H₂S detected as low as about 0.1 ppm. Gas/vapour may cause irritation of eyes, nose and throat, dizziness, blurred vision and drowsiness. Hydrogen sulphide may cause a 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. Repeated contact with skin may cause irritation and possibly dermatitis. Hydrocarbons and methanol may be absorbed through intact skin. Contact of liquid with eyes may cause severe irritation.

Effects of Chronic Exposure: Due to presence of benzene, long term or high dose rate exposures may increase the risk of anemia and leukemia.

Sensitization to Product: No.

Irritancy: Yes

Synergistic Materials: None reported

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

Section 7 – Preventative Measures

Personal Protective Equipment: Use a NIOSH-approved positive pressure self-contained breathing apparatus or supplied air breathing apparatus when working with this product or where concentrations may exceed exposure limits. Use approved gas detectors to assist in the detection and management of both H₂S and combustible gas and vapours.

Gloves: Viton for full hand immersion, nitrile adequate for incidental contact

Respiratory: SCBA or SABA

Eye: SCBA with full facepiece

Footwear: Covered footwear such as steel-toed boots.

Clothing: Fire retardant garments that meet NFPA 2112.

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 appropriate 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. Dike and pump into containers for recycling or disposal. Notify appropriate regulatory authorities.

Waste Disposal: Contact regulatory authorities for disposal requirements.

Handling Procedures & Equipment: Avoid contact with liquid. Avoid inhalation. Bond and ground all transfers. Avoid sparking conditions. Exposure controls to prevent overexposure and those that are detailed in the Canadian Association of Petroleum Producers publication entitled "Occupational Health and Safety of Hydrogen Sulphide (H₂S)" are recommended. The potential presence of NORM may result in the deposition of radioisotopes such as Radium-226 in the form of scale or sludge. NORM measurement is recommended. Special controls to prevent the ingestion or inhalation of these radioisotopes may be required. Scale may involve the presence of iron sulphides, which are pyrophoric and must be kept wet to prevent ignition.

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

Special Shipping Information: N.Av.



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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. Get medical attention if irritation persists.
- Inhalation:** Ensure own safety. Remove victim to fresh air. Give oxygen, artificial respiration, or CPR if needed. Get immediate medical attention.
- 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: Encana Environment, Health and Safety (EHS)
Phone Number: (403) 645-2000 Preparation Date: July 1, 2014 Expiry Date: July 1, 2017