1. IDENTIFICATION

Product Identifier	PRODUCED WATER, CONVENTIONAL ASSETS (excludes Deep Basin)
Chemical Description	Water produced during natural gas and oil extraction with trace amounts of salt and metal. May contain hydrocarbons and hydrogen sulfide.
Product Use	Process stream; Waste stream.
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); *666; 1-888-226-8832 (Toll Free)

2. HAZARDS IDENTIFICATION

Hazard Classifications: Acute Toxicity – Inhalation – Category 2

Label Elements

Hazard Pictogram(s)

Signal Word: **Danger**

Hazard Statement(s): Fatal if inhaled.
This liquid could release hydrogen sulfide gas which may accumulate to potentially lethal concentrations in enclosed air spaces.

Prevention: Do not breathe gas / vapour. Use only outdoors or in a well-ventilated area. In case of inadequate ventilation, wear respiratory protection.

Response: If inhaled: removed person to fresh air and keep comfortable for breathing. Immediately call emergency services, poison center, or a doctor.

Storage: Store in a well-ventilated place. Keep container tightly closed.

Disposal: Dispose of waste and residues in accordance with local, regional, national, and international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	CAS Number	Approximate Concentration
Water with dissolved mineral salts	Not Applicable	100 %
Which contains:		
Hydrocarbons	Not Applicable	20 – 600 ppm
Benzene	71-43-2	0 – 10 ppm
Hydrogen Sulfide	7783-06-04	1 – 50 ppm

4. FIRST AID MEASURES

Inhalation	Be aware of potential hydrogen sulfide – ensure own safety. Don appropriate PPE including SCBA (Self-Contained Breathing Apparatus) or SABA (Supplied Air Breathing Apparatus) before assisting the victim. Remove person to fresh air. If person is not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If necessary, give additional oxygen once breathing is restored if trained to do so. Get prompt medical attention.
Eye Contact	Remove contact lenses if present and easily done. 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	Rinse product out of mouth. Seek medical attention if unwell or symptoms develop.
Most Important Symptoms	Overexposure to hydrogen sulfide gas can induce immediate collapse, with loss of breathing and a high probability of death.

5. FIRE FIGHTING MEASURES

General Fire Hazards	This product is not flammable. Product does not burn.
Hazardous Combustion Products	Not anticipated.
Extinguishing Media	In case of fire in the surroundings: use appropriate extinguishing media.
Firefighting Equipment/ Instructions	Firefighters should wear personal protective equipment suitable for the fire conditions and the materials burning.

6. ACCIDENTAL 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	Ensure your own safety and use appropriate respiratory protection (see Section 8). 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. Eliminate all sources of ignition.
Environmental precautions	Use ventilation to prevent material from accumulating in confined areas. 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 of soil or other media impacted by release (see Section 13). Notify the appropriate regulatory authorities of reportable releases.

7. HANDLING AND STORAGE

Handling Wear appropriate personal protective equipment. Avoid inhalation. Do not enter storage areas or confined spaces unless adequately ventilated. Wash hands and face after handling and before eating, drinking or smoking.

Storage 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. 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 CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Hazardous Ingredients	Alberta	Saskatchewan	OSHA PEL	ACGIH TLV
Benzene	0.5 ppm; 2.5 ppm (15min)	--	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.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practices.
Avoid breathing in the vapour.
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.

PPE

Respirator Where concentrations may exceed exposure limits, use full-face, positive pressure self-contained breathing apparatus or 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 Wear protective gloves appropriate to the hazards of the product and nature of the task.

Eyewear Wear protective eyewear appropriate to the hazards of the product and nature of the task.

Footwear As per safety policy.

Clothing As per fire protection policy.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid	**Appearance:**	Clear / light brown
Odour:	Slight hydrocarbon; rotten egg	**Odour Threshold (ppm):**	Not available
Specific Gravity:	Not applicable	**pH:**	6-9
Vapour Pressure (mmHg, 20 °C):	Not available	**RVP (kPa):**	Not available
Vapour Density (air=1):	Not available	**Evaporation Rate:**	1 (water = 1)

Boiling Range (°C, D-7169):	Not applicable	**Initial Boiling Pt. (°C D-86):**	100
Flash Point (°C D-93)	>75	**Freezing Pt. (°C):**	0
Upper Explosive Limit (% v/v):	Not available	**Lower Explosive Limit (% v/v):**	Not available
Auto-Ignition Temp. (°C):	Not available		
Sensitivity to Impact:	Not applicable	**Sensitivity to Static Discharge:**	Not available
Octanol/Water Coefficient:	Not available	**Solubility in Water**	Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability Stable under normal, ambient conditions.

Hazardous Reactions Not known to occur.

Conditions to Avoid Not required.

Incompatibility Strong oxidizing agents, water-reactive chemicals.

Hazardous Decomposition Products Not anticipated.

Synergistic Materials/Products None reported.

11. TOXICOLOGICAL INFORMATION

Acute Exposure Initial detection of hydrogen sulfide odour at about 0.1 ppm. Irritation of eyes, nose and throat occurs. Hydrogen sulfide may cause loss of sense of smell at 100 ppm. At higher concentrations lung irritation, drowsiness, unconsciousness, respiratory failure, and possible death can occur. Eye contact may cause irritation and swelling.

Hazardous Ingredients	Result	Species	Dose	Exposure
Benzene	LD50 Oral LD50 Dermal LC50 Inhalation	Rat Rabbit Rat	1800 mg/kg >8260 mg/kg 13050-14380 ppm	- - 4 hours
Hydrogen Sulfide	LC50 Inhalation LC50 Inhalation	Rat Mouse	444 ppm; 0.701 mg/L 335 ppm	4 hours 4 hours

Chronic Exposure Hydrogen sulfide may cause fatigue, headache, dizziness, and bronchitis.
Due to presence of benzene, long-term exposure may increase the risk of anemia and leukemia.

Health Effects

Irritant: Yes
Skin Sensitization: No
Respiratory Sensitization: No
Carcinogenicity: Possibly
Reproductive Toxicity: Possibly
Teratogenicity: Possibly
Mutagenicity: Possibly

Carcinogenicity

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	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment..
Biodegradation	Not expected to be environmentally persistent.
Bioaccumulation	Not known to bioaccumulate.
Atmospheric Oxidation	Not expected to oxidize.
Photolysis	Not expected to degrade.
Mobility	When spilled onto soil, product will behave similar to spilled water. Sodium chloride may leach from soil into groundwater.

13. DISPOSAL CONSIDERATIONS

Disposal	Dispose of contents/container in accordance with local, regional, national, and/or international regulations. Empty containers at the end of their service life should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations.

14. TRANSPORT INFORMATION

TDG, DOT, IMDG, ICAO/IATA	
If transported in a clean container	***If transported in a container that last carried petroleum crude oil or condensate***
Not regulated	Note the classification of residue

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, D1A, D2A, D2B

Canada. Domestic Substances List (DSL), as amended through December 14, 2016
Name: Hydrogen sulfide (H2S)
Name: Benzene

Canada. National Pollutant Release Inventory (NPRI) Substances for 2014-15, Parts 1-4 (July 12, 2014)

Name: HYDROGEN SULPHIDE

Name: BENZENE

Canada. National Pollutant Release Inventory (NPRI) Substances for 2014-15, Part 5, VOCs with Additional Reporting Requirements (July 12, 2014)

Name: BENZENE

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; EPCRA RQ = Emergency Planning and Community Right-to-Know Act Reportable Quantity; 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; mm2/sec = millimeters squared per second; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PG = Packing Group; PPE = Personal protective equipment; SAGD = steam-assisted gravity drainage; 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; TSCA = Toxic Substances Control Act; 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

Date of preparation is noted in the footer of this document.